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Biblio Vol.682(2) 1994

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CONTENTS

3361
3404
3428
3438
3465
3467
3467
3478
3486
3488
3495
3 3 3 3 3 3 3

Journal of Chromatography A, 682 (1994) B361-B462 © Elsevier Science B.V., Amsterdam. All rights reserved.

Bibliography Section

Liquid Column Chromatography

REVIEWS AND BOOKS

- 4135 Barth, H.G., Boyes, B.E. and Jackson, C.: Size exclusion chromatography. *Anal. Chem.*, 66 (1994) 595R-620R a review with 717 refs.
- 4136 Bruckner, C.A., Foster, M.D., Lima, L.R., III, Synovec, R.E., Berman, R.J., Renn, C.N. and Johnson, E.L.: Column liquid chromatography: equipment and instrumentation. *Anal. Chem.*, 66 (1994) 1R-16R a review with 304 refs.
- 4137 Cammann, K., Kleiböhmer, W., Mussenbrock, E., Ross, B. and Zuther, F.: Fast chromatographic separation techniques as competitor to chemical and biochemical sensor systems. Fresenius J. Anal. Chem., 349 (1994) 338-345.
- 4138 Dorsey, J.G., Cooper, W.T., Wheeler, J.F., Barth, H.G. and Foley, J.P.: Liquid chromatography: theory and methodology. *Anal. Chem.*, 66 (1994) 500R-546R - a review with 1045 refs.
- 4139 Handley, A.J.: Chromatographic methods (in polymer characterization). In: Hunt, B.J. and James, M.I. (Editors), *Polym. Charact.*, Blackie, Glasgow, 1993, pp. 145-177; C.A., 120 (1994) 271563e a review with 178 refs.
- 4140 Hunt, B.J.: New directions in gel permeation chromatography. *Anal. Proc.*, 30 (1993) 338-340; *C.A.*, 120 (1994) 271555d - a review with 16 refs.
- 4141 Kamide, K., Saito, M. and Miyazaki, Y.: Molecular weight determination (in polymer characterization). In: Hunt, B.J. and James, M.I. (Editors), *Polym. Charact.*, Blackie, Glasgow, 1993, pp. 115-144; C.A., 120 (1994) 271562d a review with 58 refs.
- 4142 Kline, T. (Editor): Handbook of Affinity Chromatography In: Chromatogr. Sci., Dekker, New York, 1993, 332 p., C.A., 120 (1994) 293544b.
- 4143 Krishnan, T.R. and Ibraham, I.: Solid-phase extraction technique for the analysis of biological samples. J. Pharm. Biomed. Anal., 12 (1994) 287-294 a review with 82 refs.
- 4144 Marchand, D.H.: Chromatography in analytical biotechnology. *Curr. Opin. Biotechnol.*, 5 (1994) 72-76; C.A., 120 (1994) 293181f - a review with 42 refs.
- 4145 Vreuls, J.J., de Jong, G.J., Ghijsen, R.T. and Brinkman, U.A.T.: Liquid chromatography coupled on-line with GC: state of the art. J. Assoc. Off. Anal. Chem., 77 (1994) 306-327 a review with 123 refs.
- See also 4148, 4157, 4185, 4198, 4200, 4211, 4259, 4271, 4284, 4291, 4316, 4344, 4370, 4438, 4525, 4656, 4701, 4705, 4736, 4804, 4883, 4901, 4924, 4953, 5076, 5077, 5081, 5088, 5095, 5131, 5137.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 4146 Bartha, Á. and Ståhlberg, J.: Electrostatic retention model of reversed-phase ion-pair chromatography. J. Chromatogr. A, 668 (1994) 255-284.
- 4147 Budvári Bárány, Z., Löre, A., Szász, G., Takácz-Novák, K. and Hermecz, I.: HPLC investigation of 11-amino undecanoic acid's ion pairing ability on fluoroquinolone gyrase inhibitors. J. Liq. Chromatogr., 17 (1994) 2031-2044.
- 4148 Cerjan-Stefanovic, S.: (Principles and application of ion chromatography). Kem. Ind., 41 (1992) 227-231; C.A., 120 (1994) 314479b review with 29 refs.
- 4149 Cole, S.R.: Mobile phase additives for separation improvement in reversed-phase liquid chromatography and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9302390, 1992, 187 p.; C.A., 121 (1994) 18929m.
- 4150 Cuesta Sánchez, F., Khots, M.S. and Massart, D.L.: Algorithms for the assessment of peak purity in liquid chromatography with photodiode-array detection. Part II. Anal. Chim. Acta, 290 (1994) 249-258.
- 4151 Dolan, J.W.: Obtaining separations, Part 1: a look at retention. LC-GC Int., 7 (1994) 332-334.
- 4152 Dolan, J.W.: Obtaining separations, Part II: adjusting selectivity. LC-GC Int., 7 (1994) 376-379.
- 4153 Haddad, P.R., Hao, F. and Glod, B.K.: Factors affecting retention of basic solutes in ion-exclusion chromatography using an anion-exchange column. J. Chromatogr. A, 671 (1994) 3-9.
- 4154 Liang, Y.-z. and Kvalheim, O.M.: Diagnosis and resolution of multiwavelength chromatograms by rank map, orthogonal projections and sequential rank analysis. *Anal. Chim. Acta*, 292 (1994) 5-15.
- 4155 Liang, Y.Z., Manne, R. and Kvalheim, O.M.: Resolution of embedded chromatographic peaks by sequential rank analysis of the first-order differentiated elution profile in the time domain. *Chemom. Intell. Lab. Syst.*, 22 (1994) 229-240; C.A., 120 (1994) 235130c.
- 4156 Sugimoto, Y., Ihara, T. and Hobo, T.: (Effect of reversed micellar mobile phase in normal phase liquid chromatography).

 Kuromatogurafi, 14 (1993) 40-41; C.A., 120 (1994) 332134q.
- 4157 Wojtusik, M.J., Berthold, J., Kaiser, E.Q. and Berg, D.K.: Advances in online ion chromatography for the 90's. Adv. Instrum. Control, 48 (1993) 305-317; C.A., 120 (1994) 273612u a review with 2 refs.

B362 BIBLIOGRAPHY SECTION

- 4158 Zhang, X. and Jiang, X.: (Low pressure ion chromatography). *Sepu*, 12 (1994) 92-94; *C.A.*, 121 (1994) 25723t.
- For additional information see C.A.: 120 (1994) 299767y.
- See also 4138, 4208, 4254, 4303.
- 2b. Thermodynamics and theoretical relationships
- 4159 Andersson, A.-M., Karlsson, A., Josefson, M. and Gottfries, J.: Evaluation of mobile phase additives in LC-systems using chemometrics. Chromatographia, 38 (1994) 715-722.
- 4160 Dzido, T.H. and Engelhardt, H.: Retention parameters of aromatic hydrocarbons with mono-substituted polar groups in binary RP-HPLC systems. *Chromatographia*, 39 (1994) 51-61.
- 4161 Ellison, E.H.: Studies of kinetic contribution to zone-broadening in high-performance liquid chromatography: (A) Examination of the rate of surface heating by a Joule-discharge temperature-jump. (B) Nuclear magnetic resonance relaxation study of acetonitrile-d3 a probe of surface fluidity. Avail. *Univ. Microfilms Int.*, Order No. DA9222268, 1991, 151 p.; C.A., 121 (1991) 18928k.
- 4162 Fornstedt, T. and Guiochon, G.: Theoretical study of high-concentration elution profiles and large system peaks in nonlinear chromatography. Anal. Chem., 66 (1994) 2116-2128.
- 4163 Glöckner, G., Wolf, D. and Engelhardt, H.: Control of adsorption and solubility in gradient high performance liquid chromatography. Part 3. Sudden-transition gradient elution of styrene-acetonitrile copolymers. *Chromatographia*, 38 (1994) 749-755.
- 4164 Glöckner, G., Wolf, D. and Engelhardt, H.: Control of adsorption and solubility in gradient high-performance liquid chromatography. Part 2: Sudden-transition gradient elution of styrene-ethyl methacrylate copolymers. *Chromatographia*, 38 (1994) 559-565.
- 4165 Kamenev, A.S. and Gromov, Yu.A.: (Non-equilibrium frontal chromatography of three-component system with intradiffusion kinetics and equilibrium chromatography with regard for longitudinal quassi-diffusion from the flow). *Izv. Timiryazevsk. S-kh. Akad.*, (1993) 175-182; C.A., 120 (1994) 228153j.
- 4166 Lee, H.K. and Hoffman, N.E.: Effect of temperature on the retention of simple organic compounds in ion-exchange HPLC. J. Chromatogr. Sci., 32 (1994) 97-101.
- 4167 Matsuda, R., Hayashi, Y., Ishibashi, M. and Takeda, Y.: Optimization of a liquid chromatographic method based on information theory: application of the method to dissolution testing. J. Assoc. Off. Anal. Chem., 77 (1994) 338-343.
- 4168 Mazzotti, M., Storti, G. and Morbidelli, M.: Shock layer analysis in multicomponent chromatography and countercurrent adsorption. *Chem. Eng. Sci.*, 49 (1994) 1337-1355; C.A., 120 (1994) 301906p.
- 4169 Slais, K., Horka, M. and Kleparnik, J.: Response to comments of "Solute retention and resolution in parallel-current open tubular liquid chromatography". *J. Microcolumn Sep.*, 5 (1993) 189-190; C.A., 120 (1994) 228172q.

- 4170 Stegeman, G., van Asten, A.C., Krack, J.C., Poppe, H. and Tijssen, R.: Comparison of resolving power and separation time in thermal field-flow fractionation, hydrodynamic chromatography and size exclusion chromatography. *Anal. Chem.*, 66 (1994) 1147-1160.
- 4171 Vigdergauz, M.S.: (Basic factors determining the rate of chromatographic migration). Zh. Fiz. Khim., 68 (1994) 364-365; C.A., 121 (1994) 18946q.
- 4172 Waite, S.W., Marshall, D.B. and Harris, J.M.: Temperature-jump investigations of sorption-desorption kinetics at reversed-phase chromatographic silica/solution interfaces. *Anal. Chem.*, 66 (1994) 2052-2061.
- 4173 Yun, T. and Guiochon, G.: Modeling of radial heterogeneity in chromatographic columns. Columns with cylindrical symmetry and ideal model. J. Chromatogr. A, 672 (1994) 1-10.
- See also 4150, 4154.
- 2c. Relationship between structure and chromatographic behaviour
- See 4210, 4212, 4311, 4976.
- 2d. Measurement of physico-chemical and related values
- 4174 Ching, C., Liu, X. and Hidajat, K.: Solvent concentration effects on sorption and diffusion of cresols in β-cyclodextrin-silicas. *J. Chem. Eng. Jpn.*, 27 (1994) 118-123; C.A., 120 (1994) 2281994
- 4175 Choi, J.D. and Cheong, W.J.: (Linear solvation energy comparison study in normal phase liquid chromatography). J. Korean Chem. Soc., 38 (1994) 221-233; C.A., 120 (1994) 281288h.
- 4176 Frankewich, R.P. and Hinze, W.L.: Evaluation and optimization of the factors affecting nonionic surfactant-mediated phase separations. *Anal. Chem.*, 66 (1994) 944-954.
- 4177 Micke, A., Kocirik, M. and Bulow, M.: Zero length column chromatography to characterize microporous sorbents by means of kinetic data. *Ber. Bunsen-Ges. Phys-Chem.*, 98 (1994) 242-248; C.A., 120 (1994) 254261n.
- 4178 Okada, T. and Usui, T.: Efficient chromatographic evaluation of crown-ether complexation with alkali-metal ions. *Anal. Chem.*, 66 (1994) 1654-1657.
- 4179 Shoikhet, K. and Engelhardt, H.: A photometric flow measurements method for characterization of HPLC pumps. Chromatographia, 38 (1994) 421-430.
- See also 4138, 4141, 4240, 4241, 4796, 4911, 4914, 4917, 4921, 4936, 4975.
- GENERAL TECHNIQUES
- Ba. Apparatus and accessories
- 4180 Alexandrov, M.L., Belenkii, B.G., Gotlib, V.A. and Kever, J.E.: Optimization of the eluent delivery system for microsize-exclusion chromatography. *J. Microcolumn Sep.*, 4 (1992) 379-383; C.A., 120 (1994) 260220q.
- 4181 Greenley, L.V. and Volpe, V.C.: Mobile phase reservoir. *U.S.*US 5,275,723 (Cl. 210-198.2; B01D15/08), 02 Jan. 1994, Appl. 909,575, 06 Jul. 1992; 8 p.; *C.A.*, 120 (1994) 260277p.

- 4182 Ikeguchi, Y., Nakamura, H. and Nakajima, T.: Organic phosphates analyzer using high-performance anion-exchange chromatography and postcolumn phosphomolybdic acid reaction. Anal. Sci., 9 (1993) 653-655; C.A., 120 (1994) 289156j.
- 4183 McDowall, R.D.: Read the small print? Never! LC-GC Int., 7 (1994) 386-388.
- 4184 Porter, M.D., Deinhammer, R.S. and Shimazu, K.: Ion chromatographic separations using step and linear voltage waveforms with a charge-controllable polymeric stationary phase. *PCT Int.* Appl. WO 94 00,215 (Cl. B01D15/08), 06 Jan. 1994, US Appl. 901, 687, 22 Jun. 1992; 21 p.; C.A., 120 (1994) 235171s.

See also 4136, 4262, 4276, 5088.

- 3b. Detectors and detection reagents
- 4185 Ewing, A.G., Mesaros, J.M. and Gavin, P.F.: Electrochemical detection in microcolumn separations. *Anal. Chem.*, 66 (1994) 527A-537A.
- 4186 Gerth, D.J.: The utilization of an inductively coupled plasma emission spectrometer as an element and species specific detector in transition metal chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9231107, 1992, 244 p.; C.A., 120 (1994) 288799i.
- 4187 Howard, A.L., Thomas, C.L.B. and Taylor, L.T.: Optimization of flame-based sulfur chemiluminiscence detection with microcolumn high-performance reversed-phase liquid chromatography. *Anal. Chem.*, 66 (1994) 1432-1437.
- 4188 Imakyure, O., Kai, M., Mitsui, T., Nohta, H. and Ohkura, Y.: Fluorogenic reagents for amino acids in high-performance liquid chromatography, phenanthraoxazolylphenylisothiocyanates. Anal. Sci., 9 (1993) 647-652; C.A., 120 (1994) 289111r.
- 4189 Lewis, K.C., Dohmeier, D.M., Jorgenson, J.W., Kaufman, S.L., Zarrin, F. and Dorman, F.D.: Electrospray-condensation particle counter: a molecule-counting LC detector for macromolecules. *Anal. Chem.*, 66 (1994) 2285-2292.
- 4190 Lovdahl, M.J.: Indirect detection in liquid chromatography. I. Post-column indirect fluorescence detection with aluminum morin. II. Indirect detection of cations with a chromophoric ion interaction anion reagent. Avail. *Univ. Microfilms Int.*, Order No. DA9235875, 1992, 289 p.; C.A., 121 (1994) 26006y.
- 4191 Lurie, I.S., Sperling, A.R. and Meyers, R.P.: The determination of anabolic steroids by MECC, gradient HPLC, and capillary GC. J. Forensic Sci., 39 (1994) 74-85; C.A., 120 (1994) 291563h.
- 4192 Okabayashi, Y. and Kitagawa, T.: High-performance liquid chromatography for amino compounds and thiol compounds derivatized with europium chelate. *Anal. Chem.*, 66 (1994) 1448-1453
- 4193 Ortiz, P.I., Abu Nader, P.R. and Mottola, H.A.: Glassy carbon electrodes coated with electropolymerized resole prepolymer mixtures: amperometric response to phenols and application as chromatographic sensors. *Electroanalysis*, 5 (1993) 165-169; C.A., 120 (1994) 314865z.
- 4194 Ranta, V.-P. and Naaranlahti, T.: (New dimensions of electrochemical detection in HPLC of nerve cell carbohydrates). *Kem.-Kemi*, 20 (1993) 719-723; *C.A.*, 121 (1994) 4183b.
- 4195 Roush, J.A.: Development and characterization of novel detectors for use in flow injection analysis or liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9302674, 1992, 148 p.; C.A., 120 (1994) 288812h.

- 4196 Simonson, P.G.: Indirect detection strategies in ion interaction chromatography using tetraalkylammonium salts with detector active counteranions. Avail. *Univ. Microfilms Int.*, Order No. DA9237007, 1992, 425 p.; C.A., 120 (1994) 314907q.
- 4197 Wang, C.L.: Electrochemical performance of ring-modified microelectrodes and multi-electrode devices, and their applications as miniaturized detectors in HPLC and anodic stripping analysis. Avail. *Univ. Microfilms Int.*, Order No. DA9406065, 1993, 143 p.; C.A., 121 (1994) 20814p.
- 4198 Warner, M.: Electrochemical detectors for liquid chromatography. *Anal. Chem.*, 66 (1994) 601A-606A a review without refs.
- 4199 Wiesiollek, R. and Bächmann, K.: Electrolytic conductivity detector for selective detection of chlorine-containing compounds in liquid chromatography. J. Chromatogr. A, 676 (1994) 277-285.
- 4200 Wu, J., Geng, Z. and Lu, J.: (Peroxyoxalate chemiluminescence detection in liquid chromatography). *Huaxue Shiji*, 116 (1994) 35-39; *C.A.*, 120 (1994) 338027d a review with 36 refs.
- See also 4136, 4243, 4261, 4319, 4322, 4330, 4331, 4350, 4415, 4419, 4538, 4539, 4540, 4808, 4886, 4893, 5033, 5121, 5146, 5148, 5153.
- 3c. Sorbents and columns, packing procedures
- 4201 Akapo, S.O. and Simpson, C.F.: Syntheses of stationary phases for reversed-phase HPLC: comparison of the fluidized bed technique with the organic solvent process. *J. Chromatogr. Sci.*, 32 (1994) 86-92.
- 4202 Ando, S., Takayanagi, H., Fukuda, J. and Miyata, E.: (Applications of synthetic adsorbent to largescale liquid chromatography). Res. Dev. Rev.-Mitsubishi Kasei Corp., 8 (1994) 79-83; C.A., 120 (1994) 227089f.
- 4203 Arenas, R.V. and Foley, J.P.: Selectivity of polymer-coated alumina stationary phases for reversed-phase liquid chromatography. Part 1. Methylene group selectivity. *Analyst* (*Cambridge*), 119 (1994) 1303-1314.
- 4204 Buszewski, B., Jaroniec, M. and Gilpin, R.K.: Influence of eluent composition on retention and selectivity of alkylamide phases under reversed-phase conditions. *J. Chromatogr. A*, 668 (1994) 293-299.
- 4205 Buszewski, B., Jaroniec, M. and Gilpin, R.K.: Studies of physicochemical and chromatographic properties of mixed amino-alkylamide bonded phases. J. Chromatogr. A, 673 (1994) 11-19.
- 4206 Cañas-Montalvo, B. and Izquierdo-Hornillos, R.C.: Comparative behaviour of different reversed-phase packings when equilibrated with cetyltrimethylammonium bromide. *J. Liq. Chroma*togr., 17 (1994) 1461-1478.
- 4207 Ciolino, L.A. and Dorsey, J.G.: Synthesis and characterization of silica-based aliphatic ion exchangers. *J. Chromatogr. A*, 675 (1994) 29-45.
- 4208 Dolan, J.W.: Obtaining separations, Part III: Adjusting column conditions. *LC-GC Int.*, 7 (1994) 500-504.
- 4209 Dolgonosov, A.M.: Centrally localized ion exchangers as separating sorbents for ion chromatography. Theory and application. J. Chromatogr. A, 671 (1994) 33-41.

- 4210 Forgács, E.: Comparison of various multivariate mathematicalstatistical methods for the evaluation of the retention behavior of β-cyclodextrin polymer coated silica column. *Anal. Lett.*, 27 (1994) 1075-1093.
- 4211 Frechet, J.M.J.: Design and preparation of novel particulate and continuous polymeric macroporous media for the separation of biological and synthetic molecules. *Macromol. Chem., Macromol. Symp.,* 70-71 (1993) 289-301; C.A., 120 (1994) 325098c a review with 28 refs.
- 4212 Fukumoto, T., Ihara, H., Sakaki, S., Shosenji, H. and Hirayama, C.: Chromatographic separation of geometrical isomers using highly oriented polymer-immobilized silica gels. *J. Chromatogr. A*, 672 (1994) 237-241.
- 4213 Hirayama, C., Sakata, M., Yugawa, Y. and Ihara, H.: Cross-linked N,N-dimethylaminopropylacrylamide spherical particles for selective removal of endotoxin. *J. Chromatogr. A*, 676 (1994) 267-275.
- 4214 Hosoya, K., Sawada, E., Kimata, K., Araki, T. and Tanaka, N.: (Control of selectivity in HPLC using newly developed temperature-responsive polymeric packing material). *Kuromatogurafi*, 14 (1993) 46-47; C.A., 120 (1994) 332135r.
- 4215 Hsu, C.W.: The investigation of solvent-stationary phase interaction in normal-bonded phase high-performance liquid chromatographic columns. Avail. *Univ. Microfilms Int.*, Order No. DA9309726, 1992, 156 p.; C.A., 120 (1994) 338031a.
- 4216 Huang, T., Shoup, R.E. and Kissinger, P.T.: New SepStik microbore columns for liquid chromatography. Curr. Sep., 12 (1994) 191-195; C.A., 121 (1994) 42111.
- 4217 Jen, J.-F., Zen, J.-H., Cheng, F.-C. and Yang, G.-Y.: Immobilization of glucosidase onto silica-based, amino functionalized beads for enzymatic hydrolysis of urinary phenol prior to liquid chromatographic analysis. *Anal. Chim. Acta*, 292 (1994) 23-30.
- 4218 Jinno, K., Fukuoka, K., Fetzer, J.C. and Biggs, W.R.: Buckmin-sterfullerene as a stationary phase in liquid chromatography. J. Microcolumn Sep., 5 (1993) 517-523; C.A., 121 (1994) 25974a.
- 4219 Juskowiak, B.: Binaphthyl-based amphiphile as a reagent for dynamically modified silica and fluorescence detection in highperformance liquid chromatography. J. Chromatogr. A, 668 (1994) 313-321.
- 4220 Kaneko, S., Mitsuzawa, T., Ohmori, S., Nakamura, M., Nobuhara, K. and Masatani, M.: Separation behaviour of silicacontaining mixed oxides as column packing materials for liquid chromatography. J. Chromatogr. A, 669 (1994) 1-7.
- 4221 Lancas, F.M. and Barbirato, M.A.: Chromatographic isolation of nitrogen containing compounds in liquid fuels. 1. Ti(IV)oxide grafted onto silica as stationary phase. Fuel Sci. Technol. Int., 12 (1994) 493-506; C.A., 120 (1994) 302796q.
- 4222 Lancas, F.M. and Barbirato, M.A.: Chromatographic isolation of nitrogen-containing compounds in liquid fuels. 2. Thermally treated silica gel as stationary phase. Fuel Sci. Technol. Int., 12 (1994) 507-518; C.A., 120 (1994) 302797r.
- 4223 Lohmann, D. and Dappen, R.: Use of chiral β-lactones for the synthesis of chiral LC phases. *Chirality*, 5 (1993) 168-172; *C.A.*, 120 (1994) 289184s.
- 4224 Lorenzano-Porras, C.F., Carr, P.W. and McCormick, A.V.: Relationship between pore structure and diffusion tortuosity of ZrO₂ colloidal aggregates. *J. Colloid Interface Sci.*, 164 (1994) 1-8; C.A., 120 (1994) 228217h.

- 4225 Majors, R.E.: New chromatography columns and accessories at the 1994 Pittsburgh Conference, Part II. LC-GC Int., 7 (1994) 310-324.
- 4226 Majors, R.E.: Twenty-five years of HPLC column development a commercial perspective. *LC-GC Int.*, 7 (1994) 490-496.
- 4227 Nenaidenko, S.A., Belyakova, L.D., Larionov, O.G., Alishoev, V.R. and Berezkin, V.G.: (Chromatographic properties of capillary columns with adsorbed layer of barium sulphate, modified by polymers of various natures). *Zh. Fiz. Khim.*, 67 (1993) 2033-2037; C.A., 120 (1994) 227934c.
- 4228 Okamoto, M., Nobuhara, K. and Ishii, D.: Surface modification by calcium-ions-effect on chromatographic properties of silica. *Chromatographia*, 39 (1994) 29-34.
- 4229 Ratanathanawongs, S.K. and Giddings, J.C.: Rapid size characterization of chromatographic silicas by flow field-flow fractionation. *Chromatographia*, 38 (1994) 545-554.
- 4230 Rippel, G., Alattyani, E. and Szepesy, L.: Characterization of stationary phases used in reversed-phase and hydrophobic interaction chromatography. J. Chromatogr. A, 668 (1994) 301-312.
- 4231 Rodier, D.R. and Birks, J.E.: Dual injector solvent elution and focussing technique for the on-line analysis of solid-phase extraction cartridges in HPLC. Chromatographia, 39 (1994) 45-50.
- 4232 Sander, L.C., Sharpless, K.E., Craft, N.E. and Wise, S.A.: Development of engineered stationary phases for the separation of carotenoid isomers. *Anal. Chem.*, 66 (1994) 1667-1674.
- 4233 Sato, T., Ogawa, T., Fujiwara, T. and Okuyama, T.: The mini-column of lanthanum hydroxyapatite ceramic beads for high performance liquid chromatography. *Kuromatogurafi*, 14 (1993) 64-65; C.A., 120 (1994) 318513f.
- 4234 Sellergren, B.: Imprinted dispersion polymers: a new class of easily accessible affinity stationary phases. J. Chromatogr. A, 673 (1994) 133-141.
- 4235 Smigol, V., Svec, F. and Fréchet, J.M.J.: High-performance liquid chromatography of complex mixtures using monodisperse dual-chemistry polymer beads prepared by a pore-size-specific functionalization process. A single column combination of hydrophobic interaction and reversed-phase chromatography. Anal. Chem., 66 (1994) 2129-2138.
- 4236 Sudo, Y., Akiba, M., Sakaki, T. and Takahata, Y.: Glycerylalkyl-silylated silica gels for direct injection analysis of drugs in serum by high-performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1743-1754.
- 4237 Welch, C.J.: Design synthesis, and evaluation of selectors and stationary phases for improved liquid chromatographic separations. Avail. *Univ. Microfilms Int.*, Order No. DA9236621, 1992, 188 p.; C.A., 120 (1994) 314892f.
- 4238 Wirth, M.J. and Fatunmbi, H.O.: Self-assembled monolayers in separations. *LC-GC*, 12 (1994) 222-228; *C.A.*, 120 (1994) 243109u.
- 4239 Wongyai, S.: Synthesis and characterization of phenylpropanolamine bonded silica for multimode liquid chromatography of small molecules. *Chromatographia*, 38 (1994) 485-490.
- 4240 Yazaki, Y., Collins, P.J., Reilly, M.J., Terrill, S.D. and Nikpour, T.: Fast-curing phenol-formaldehyde (PF) resins. Part 1. Molecular weight distribution of PF resins. *Holzforschung*, 48 (1994) 41-48; C.A., 120 (1994) 272007p.

- 4241 Zulli, S.L., Kovaleski, J.M., Zhu, X.R., Harris, J.M. and Wirth, M.J.: Lateral diffusion of an adsorbate at a chromatographic C₁₈/water interface. *Anal. Chem.*, 66 (1994) 1708-1712.
- 4242 Zuo, Y.M., Zhu, B.R., Liao, Y., Gui, M.D., Pang, Z.L. and Qi, J.X.: Polymer encapsulated packing material for reversed phase liquid chromatography. *Chromatographia*, 38 (1994) 756-760.
- For additional information see C.A.: 120 (1994) 293571h, 318492y; 121 (1994) 4234u, 4500c, 4526r.
- See also 4136, 4173, 4177, 4184, 4267, 4268, 4272, 4274, 4275, 4282, 4287, 4289, 4309, 4355, 4358, 4389, 4411, 4594, 4622, 4624, 4925, 4928, 4933, 5115, 5117, 5120, 5166.
- 3d. Quantitative analysis
- 4243 Burrows, J.L. and Watson, K.V.: Development and application of a calibration regression routine in conjunction with linear and non-linear chromatographic detector responses. *J. Pharm. Biomed. Anal.*, 12 (1994) 523-531.

See also 4319, 4655, 4772, 4910, 4995, 5052.

- 3e. Preparative scale chromatography
- 4244 Felinger, A. and Guiochon, G.: Optimizing experimental conditions for minimum production cost in preparative chromatography. AIChE J., 40 (1994) 594-605; C.A., 120 (1994) 273781v.
- 4245 Irgens, L.H.: Preparative chiral separations on cyclodextrin silica stationary phase. Avail. *Univ. Microfilms Int.*, Order No. DA9216945, 1991, 163 p.; C.A., 120 (1994) 253492b.
- 4246 Moskvin, L.N.: Chromatomembrane method for the continuous separation of substances. J. Chromatogr. A, 669 (1994) 81-87.

For additional information see C.A.: 120 (1994) 297688z.

See also 4138, 4202, 4222, 4523, 4720, 4967.

3f. Programmed temperature, pressure, vapors, gradients

See 4266, 4793.

- 4. SPECIAL TECHNIQUES
- 4a. Automation
- See 4310, 4927.
- 4b. Computerization and modelling
- 4247 Bourguignon, B., de Aguiar, P.F., Thorré, K. and Massart, D.L.: Application of nonlinear regression functions for the modeling of retention in reversed-phase LC. J. Chromatogr. Sci., 32 (1994) 144-152.

- 4248 Chaminade, P., Baillet, A. and Bayloq-Ferrier, D.: Use of the cubic spline interpolation algorithm for the selection of optimal ternary mobile phase composition in RP-HPLC. Analusis, 22 (1994) 55-57; C.A., 120 (1994) 338062m.
- 4249 Chaminade, P., Baillet, A. and Ferrier, D.: Computational strategy for solvent strength optimization in reversed-phase liquid chromatography. J. Chromatogr. A, 672 (1994) 67-85.
- 4250 Cheon, W.J.: A modified adsorption model for retention of nonpolar solutes in reversed phase liquid chromatography. *Bull. Korean Chem. Soc.*, 15 (1994) 15-20; C.A., 120 (1994) 228206d.
- 4251 Guillaume, Y. and Guinchard, C.: Study and optimization of column efficiency in HPLC: comparison of two methods for separating ten benzodiazepines. *J. Liq. Chromatogr.*, 17 (1994) 1443-1459.
- 4252 Kuss, H.J.: (Chromatography evaluation without paper. Pleading for practice-related chromatography software). Labor-Praxis, 18 (1994) 58-60; C.A., 120 (1994) 338037g.
- 4253 Levin, M.G., Asmoilova, N.N., Grizodub, A.I., Grigor'eva, V.D. and Georgievskii, V.P.: (Models of the adsorption stations for the description of retention in liquid chromatography with multicomponent mobile phases). Zh. Fiz. Khim., 67 (1993) 2062-2069; C.A., 120 (1994) 228128e.
- 4254 Levin, M.G., Grizodub, A.I., Asmolova, N.N., Grigor'eva, V.D. and Georgievskii, V.P.: (Mechanismus of retention in reserve-phase liquid chromatography with multicomponent mobile phases). Zh. Anal. Khim., 48 (1993) 81-93; C.A., 120 (1994) 289124x.
- 4255 Micke, A., Kocirik, M. and Bulow, M.: Theory of zero length column chromatography with the condition of a well-stirred sorbing zone. *Microporous Mater.*, 1 (1993) 363-371; C.A., 120 (1994) 227929e.
- 4256 Ouchi, G.I.: How to load chromatography data into a data base automatically. *LC-GC*, 11 (1993) 650-656; C.A., 120 (1994) 235092s.
- 4257 Rotar, A., Kozjek, F. and Medic-Saric, M.: Application of information content and numerical taxonomy in the development of HPLC methods. *Acta Pharm. (Zagreb)*, 43 (1993) 157-165; C.A., 120 (1994) 289117x.
- 4258 Watzenberger, O., Agar, D., Blumenberg, B., Kallrath, J., Brockmueller, B. and Schreieck, A.: (Characterization of a chromatographic reactor). Chem.-Ing.-Tech., 66 (1994) 207-209; C.A., 120 (1994) 274356a.

See also 4168, 4244, 4972, 5105, 5150.

- Combination with other physico-chemical techniques (MS, IR etc.)
- 4259 Donard, O.F.X. and Ritsema, R.: Hyphenated techniques applied to the speciation of organometallic compounds in the environment. *Tech. Instrum. Anal. Chem.*, 13 (1993) 549-606; C.A., 120 (1994) 330429r a review with 222 refs.
- 4260 Falter, R. and Schöler, H.F.: Interfacing high-performance liquid chromatography and cold-vapour atomic absorption spectrometry with on-line UV irradiation for the determination of organic mercury compounds. J. Chromatogr. A, 675 (1994) 253-256.

- 4261 Holland, J.F., Allison, J., Watson, J.T. and Enke, C.G.: Achieving the maximum characterizing power for chromatographic detection by mass spectrometry. ACS Symp. Ser., 549 (1994) 157-176; C.A., 120 (1994) 338078w.
- 4262 Millier, B., Sun, X.-Y. and Aue, W.A.: Multichannel chromatography and on-line spectra from a flame photometric detector. J. Chromatogr. A, 675 (1994) 155-175.
- 4263 Murray, K.K., Lewis, T.M., Beeson, M.D. and Russell, D.H.: Aerosol matrix-assisted laser desorption ionization for liquid chromatography/time-of-flight mass spectrometry. *Anal. Chem.*, 66 (1994) 1601-1609.
- 4264 Seddon, M.J., Spraul, M., Wilson, I.D., Nicholson, J.K. and Lindon, J.C.: Improvement in the characterization of minor drug metabolites from HPLC-NMR studies through the use of quantified maximum entropy processing of NMR spectra. *J. Pharm. Biomed. Anal.*, 12 (1994) 419-424.
- 4265 Smits, R.: Hyphenation an overview. *LC-GC Int.*, 7 (1994) 505-508.
- 4266 Yoo, J.H.: Theoretical and practical considerations of temperature programmed capillary liquid chromatography/mass spectrometry. Avail. *Univ. Microfilms Int.*, Order No. DA9223258, 1992, 183 p.; C.A., 120 (1994) 260204n.
- See also 4136, 4150, 4306, 4308, 4314, 4346, 4386, 4421, 4422, 4447, 4497, 4551, 4566, 4574, 4580, 4582, 4593, 4795, 4824, 4825, 4826, 4854, 4880, 4883, 4927, 4977, 4992, 4993, 5001, 5004, 5047, 5068, 5076, 5077, 5099, 5113, 5122, 5154.

4d. Affinity chromatography (advances)

- 4267 Anspach, F.B.: Silica-based metal chelate affinity sorbents. I. Preparation and characterization of iminodiacetic acid affinity sorbents prepared via different immobilization techniques. J. Chromatogr. A, 672 (1994) 35-49.
- 4268 Anspach, F.B.: Silica-based metal chelate affinity sorbents. II. Adsorption and elution behaviour of proteins on iminodiacetic acid affinity sorbents prepared via different immobilization techniques. J. Chromatogr. A, 676 (1994) 249-266.
- 4269 Feng, W. and Geng, X.: Studies on silica-bonded monoclonal antibody packing material for separation of recombinant interferon by high performance immunoaffinity chromatography. *Biomed. Chromatogr.*, 7 (1993) 317-320.
- 4270 Hale, G., Drumm, A., Harrison, P. and Phillips, J.: Repeated cleaning of protein A affinity column with sodium hydroxide. J. Immunol. Methods, 17 (1994) 15-21; C.A., 121 (1994) 6743h.
- 4271 Kasai, K.: (Affinity chromatography). *Bunseki*, (1994) 34-40; C.A., 121 (1994) 25924j a review with 75 refs.
- 4272 Ruhn, P.F., Garver, S. and Hage, D.S.: Development of dihydrazide-activated silica supports for high-performance affinity chromatography. J. Chromatogr. A, 669 (1994) 9-19.
- 4273 Sada, E.: (Purification of bioproducts by affinity chromatography). *Kuromatogurafi*, 14 (1993) 38-39; *C.A.*, 121 (1994) 4242v.
- 4274 Subramanian, A., van Cott, K.E., Milbrath, D.S. and Velander, W.H.: Role of local antibody density effects on immunosorbent efficiency. J. Chromatogr. A, 672 (1994) 11-24.
- 4275 Tichá, M., Železná, B., Jonáková, V. and Filka, K.: Immobilization of heparin on polyacrylamide derivatives. J. Chromatogr. B, 656 (1994) 423-426.

- For additional information see C.A.: 120 (1994) 293570g.
- See also 4138, 4142, 4365, 4627, 4651, 4655, 4698, 4722, 4723, 4746, 4750.
- 4f. Trace analysis and preseparation techniques
- 4276 Dolezel, P., Krejcí, M. and Kahle, V.: Enrichment technique in an automated liquid microchromatograph with a capillary mixer. J. Chromatogr. A, 675 (1994) 47-54.
- 4277 Moors, M., Steenssens, B., Tielemans, I. and Massart, D.L.: Solid-phase extraction of small drugs on apolar and ion-exchanging silica bonded phases: towards the development of a general strategy. J. Pharm. Biomed. Anal., 12 (1994) 463-481.
- 4278 Potter, G.A.: New lateral reservoir flash chromatography system for the expeditious preparative purification of organic compounds. J. Chromatogr. A, 675 (1994) 237-239.
- 4279 Taylor, R.B. and Alexander, C.: A study of precolumn and analytical column dimensions for on-line sample pretreatment in HPLC. J. Liq. Chromatogr., 17 (1994) 1479-1495.
- 4280 Veress, T.: Sample preparation by supercritical fluid extraction for quantification. A model based on the diffusion-layer theory for determination of extraction time. *J. Chromatogr. A*, 668 (1994) 285-291.
- 4281 Warner-Schmid, D., Tang, Y. and Armstrong, D.W.: Removal of organic compounds from water *via* adsorption onto polymethylhydrosiloxane pentenyl-β-cyclodextrin. *J. Liq. Chromatogr.*, 17 (1994) 1721-1735.
- See also 4143, 4910, 4938, 4940, 5031, 5112, 5144.
- 4g. Enantiomers, separation
- 4282 Armstrong, D.W., Tang, Y., Chen, S., Zhou, Y., Bugwill, C. and Chen, J.-R.: Macrocyclic antibiotics as a new class of chiral selectors for liquid chromatography. *Anal. Chem.*, 66 (1994) 1473-1484.
- 4283 Chang, S.C.S.: Enantiomeric separation by high-performance liquid chromatography using cyclodextrin stationary phases.

 Avail. *Univ. Microfilms Int.*, Order No. DA9313714, 1992, 275 p.; C.A., 120 (1994) 280433q.
- 4284 Chilmonczyk, Z. and Cybulski, J.: (Methods for determining the enantiomeric purity of optically active compounds. Part II. Chromatographic methods). Acta Pol. Pharm., 50 (1993) 87-120; C.A., 120 (1994) 318413y - a review with 211 refs.
- 4285 Hilton, M.L.: New approaches to enantiomeric separation by high-performance liquid chromatography. Avail. *Univ. Micro-films Int.*, Order No. DA9216444, 1991, 171 p.; C.A., 120 (1994) 314891e.
- 4286 Okamoto, M. and Nakazawa, H.: Separation of optically activie jasmonic acid methyl ester and its analogs. *Jpn. Kokai Tokkyo Koho, JP* 05,246,950 [93,246,950] (Cl. CO7C69/716), Sep. 1993, Appl. 92/46,810, 04 Mar. 1992; 5 pp.; C.A., 120 (1994) 298130v.
- 4287 Oliveros, L., Minguillón, C. and González, T.: Comparison between silica-bonded chiral stationary phases derived from 3,5-disubstituted N-benzoyl-(S)-phenylalanine and (S)-cyclo-hexylalanine in the resolution of racemic compounds by liquid chromatography. J. Chromatogr. A, 672 (1994) 59-65.

- 4288 Pirkle, W.H., Murray, P.G. and Yang, Q.: Chiral recognition of N-acyl-1-(2-fluorenyl)-1-aminoalkanes by π-acidic chiral stationary phases: a mechanistic view. *J. Liq. Chromatogr.*, 17 (1994) 1665-1677.
- 4289 Soltes, L., Sebille, B. and Thuaud, N.: High performance liquid chromatographic screening methods for revealing the stereose-lectivity of reversible interactions between ligand enantiomers and a counterpart substance. *Chromatographia*, 38 (1994) 761-765
- 4290 Szemán, J. and Ganzler, K.: Use of cyclodextrins and cyclodextrin derivatives in high-performance liquid chromatography and capillary electrophoresis. J. Chromatogr. A, 668 (1994) 509-517
- 4291 Yamagishi, A.: Chirality recognition by a clay surface modified with an optically active metal chelate. In: Tamaru, K. (Editor), *Dyn. Processes Solid Surf.*, Plenum, New York, 1993, pp. 307-347; C.A., 120 (1994) 322292a a review with 24 refs.
- For additional information see *C.A.*: 120 (1994) 318484x, 318493z.
- See also
 4138, 4223, 4245, 4323, 4415, 4424, 4425, 4429, 4430, 4453, 4473, 4525, 4528, 4529, 4536, 4538, 4541, 4543, 4547, 4548, 4549, 4713, 4791, 4809, 4811, 4814, 4817, 4829, 4834, 4886, 4922, 4924, 4929, 4933, 4939, 4941, 4948, 4953, 4957, 4963, 4972, 4973, 4980, 4984, 4986, 4993, 5010, 5027, 5036, 5073.
- 4h. Other special techniques
- 4292 Fishman, H.A., Amudi, N.M., Lee, T.T., Scheller, R.H. and Zare, R.N.: Spontaneous injection in microcolumn separations. *Anal. Chem.*, 66 (1994) 2318-2329.
- 4293 Giddings, J.C.: Micro-FFP: theoretical and practical aspects of reducing the dimensions of field-flow fractionation channels. J. Microcolumn Sep., 5 (1993) 497-503; C.A., 121 (1994) 18961r.
- 4294 Ito, Y. and Ma, Y.: pH-Zone-refining counter-current chromatography: a displacement mode applied to separation of dinitrophenyl amino acids. J. Chromatogr. A, 672 (1994) 101-108.
- 4295 Plocek, J., Konečný, P. and Chmelík, J.: Modification of glass channel walls for separation of biological particles by gravitational field-flow fractionation. J. Chromatogr. B, 656 (1994) 427-431.
- 4296 Reuter, K.: Continuous chromatography. Ger. Offen. DE
 4,231,327 (Cl. B01D15/00), 24 Mar. 1994, Appl. 18 Sep. 1992;
 21 p.; C.A., 120 (1994) 248560t.
- For additional information see C.A.: 120 (1994) 318483w.
- See also 4246, 4303, 4337, 4348, 5108.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

- 5a. Aliphatic hydrocarbons
- 4297 Möckel, H.J.: Influence of temperature on dead volume of ODS columns and on n-alkane retention in high-performance liquid chromatography. J. Chromatogr. A, 675 (1994) 13-28.
- 5b. Cyclic hydrocarbons, fullerenes
- 4298 Bharathi, A., Premila, M., Gopalan, P., Sundar, C.S. and Hariharan, Y.: Systematics of chromatographic separations of fullerenes in silica-gel activated charcoal mixtures. Fullerene Sci. Technol., 2 (1994) 59-71; C.A., 120 (1994) 234598z.
- 4299 Brouwer, E.R., Hermans, A.N.J., Lingeman, H. and Brinkman, U.A.T.: Determination of polycyclic aromatic hydrocarbons in surface water by column liquid chromatography with fluorescence detection, using on-line micelle-mediated sample preparation. J. Chromatogr. A, 669 (1994) 45-57.
- 4300 Codina, G., Vaquero, M.T., Comellas, L. and Broto-Puig, F.: Comparison of various extraction and clean-up methods for the determination of polycyclic aromatic hydrocarbons in sewage sludge-amended soils. J. Chromatogr. A, 673 (1994) 21-29.
- 4301 Escriva, C., Viana, E., Moltó, J.C., Picó, Y. and Manes, J.: Comparison of four methods for the determination of polycyclic aromatic hydrocarbons in airborne particulates. *J. Chromatogr. A*, 676 (1994) 375-388.
- 4302 Fetzer, J.C. and Gallegos, E.J.: The separation and identification of higher molecular weight fullerenes. *Polycyclic Aromat. Compd.*, 2 (1992) 245-251; C.A., 120 (1994) 288330z.
- 4303 García, M.A., Jimenéz, O. and Marina, M.L.: Comparison of the models describing the retention in micellar liquid chromatography with hybrid eluents for a group of benzene derivatives and polycyclic aromatic hydrocarbons. *J. Chromatogr. A*, 675 (1994) 1-11.
- 4304 Gertz, C. and Kogelheide, H.: Untersuchung und Beurteilung von PAK in Speisefetten und -ölen. Fat Sci. Technol., 96 (1994) 175-180.
- 4305 Grazfeld-Hüsgen, Schuster, R. and Schulenberg-Schell, H.: Analysis of PNAs with HPLC and SFE for sample preparation. *Int. Lab.*, 24, No. 7 (1994) 15-21.
- 4306 Gremm, T.J. and Frimmel, F.H.: Application of liquid chromatography-particle beam mass spectrometry and gas chromatography-mass spectrometry for the identification of metabolites of polycyclic aromatic hydrocarbons. *Chromatographia*, 38 (1994) 781-788.
- 4307 Jinno, K., Saito, Y., Chen, Y.L., Luehr, G., Archer, J., Fetzer, J.C. and Biggs, W.R.: Separation of C₆₀ and C₇₀ fullerenes on methoxyphenylpropyl bonded stationary phases in microcolumn liquid chromatography. *J. Microcolumn Sep.*, 5 (1993) 135-140; C.A., 120 (1994) 260033f.
- 4308 Somsen, G.W., van Stee, L.P.P., Gooijer, C., Brinkman, U.A.T., Velthorst, N.H. and Visser, T.: Isomer and congener identification of chlorinated pyrenes by narrow-bore liquid chromatography-Fourier transform infrared spectrometry. *Anal. Chim. Acta*, 290 (1994) 269-276.

See also 4160, 4205, 4231, 4242, 4318, 4326, 4485, 4594.

5c. Halogen derivatives

- 4309 Al-Haddad, A.: Determination of polychlorinated biphenyls with non-o-chlorine substituent in Aroclor mixtures and in soil using porous graphitic carbon columns. J. Assoc. Off. Anal. Chem., 77 (1994) 437-441.
- 4310 Echols, K.R.: Chromatographic behavior of polychlorinated biphenyls dibenzodioxins and dibenzofurans on porous graphitic carbon and the development of an automated fractionation system. Avail. *Univ. Microfilms Int.*, Order No. DA9327824, 1993, 237 p.; C.A., 121 (1994) 25970w.
- 4311 Liu, J., Chambers, J.E. and Coats, J.R.: Determination of lipophilicity of chlorinated alicyclic compounds by reversed-phase high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1995-2004.

See also 4199.

- Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)
- 4312 Al Kane, M., Ivanov, S. and Kalitchin, Z.: Isolation, analysis and properties of oxygen and nitrogen containing compounds of Iraqi crude oil-Kirkuk region. I. Isolation method. *Bulg. Chem. Commun.*, 25 (1992) 332-343; C.A., 120 (1994) 274829g.
- 4313 Ali, M.A. and Nofal, W.A.: Application of high performance liquid chromatography for hydrocarbon group type analysis of crude. Fuel Sci. Technol. Int., 12 (1994) 21-33; C.A., 120 (1994) 327032a.
- 4314 Hsu, C.S., Qian, K. and Robbins, W.K.: Nitrogen speciation of polar petroleum compounds by compounds class separation and on-line liquid chromatography-mass spectrometry (LC-MS). J. High Resolut. Chromatogr., 17 (1994) 271-276.
- 4315 Lancas, F.M., Vilegas, J.H.Y., Martins, S. and Gobato, E.A.F.: Chromatographic characterization of thermally upgraded products from alternative fuels. *J. High Resolut. Chromatogr.*, 17 (1994) 237-244.
- 4316 Lundanes, E. and Greibrokk, T.: Separation of fuels, heavy fractions, and crude oils into compound classes: a review. J. High Resolut. Chromatogr., 17 (1994) 197-202 a review with 109 refs.
- 4317 Sarowha, S.L.L., Madhwal, D.C., Sing, S., Bgatia, B.M.L., Ran, S. and Bhagat, S.D.: High performance liquid chromatographic analysis of petroleum fractions. *Indian J. Technol.*, 31 (1993) 645-648; C.A., 120 (1994) 274935p.
- 4318 Satou, M., Yokoyama, S. and Sanada, Y.: Distribution of aromatic hydrocarbon compound types grouped according to boiling point in neutral oils derived from various coals. *Fuel*, 73 (1994) 683-687; C.A., 120 (1994) 303065n.
- 4319 Sink, C.W. and Hardy, D.R.: Quantification of compound classes in complex mixtures and fuels using HPLC with differential refractive index detection. *Anal. Chem.*, 66 (1994) 1334-1338.

ALCOHOLS

4320 Nitschke, L. and Huber, L.: Determination of glycols by HPLC with refractive index detection. Fresenius J. Anal. Chem., 349 (1994) 451-453.

- 4321 Ruddy, S.B. and Hadzija, B.W.: High-performance liquid chromatographic method for the simultaneous determination of low-molecular-mass oligomers of polyethylene glycol in aqueous skin extracts. J. Chromatogr. B, 657 (1994) 83-92.
- 4322 Toyo'ka, T., Liu, Y.-M., Hanioka, N., Jinno, H. and Ando, M.: Determination of alcohols and amines, labelled with 4-(N,N-dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole, by liquid chromatography with conventional and laser-induced fluorescence detection. *Anal. Chim. Acta*, 285 (1994) 343-351.
- 4323 Toyo oka, T., Liu, Y.-M., Hanioka, N., Jinno, H., Ando, M. and Imai, K.: Resolution of enantiomers of alcohols and amines by high-performance liquid chromatography after derivatization with a novel fluorescent chiral reagent. J. Chromatogr. A, 675 (1994) 79-88.

See also 4166, 4357, 4362, 4821, 4892.

PHENOLS

- 4324 Amarowicz, R. and Shahidi, F.: Chromatographic separation of glycopyranosyl sinapate from canola meal. J. Am. Oil Chem. Soc., 71 (1994) 561-562.
- 4325 Di Corcia, A., Marchese, S., Samperi, R., Cecchini, G. and Cirilli, L.: Determination of phenol pollutants in water at trace levels: extraction by a reversible graphitized carbon black cartridge. J. Assoc. Off. Anal. Chem., 77 (1994) 446-453.
- 4326 Dzido, T.H. and Engelhardt, H.: Retention and selectivity of aromatic hydrocarbons with monosubstituted polar groups in ternary RP-HPLC systems. Chromatographia, 39 (1994) 67-70.
- 4327 Frebortova, J. and Tatarkovicova, V.: Trace enrichment of chlorinated phenols from drinking water on chemically bonded sorbents for high-performance liquid chromatography. *Analyst* (Cambridge), 119 (1994) 1519-1523.
- 4328 Hanai, T., Hatano, H., Nimura, N. and Kinoshita, T.: Computation chemical analysis of the retention of phenols in reversed-phase liquid chromatography. *Analyst (Cambridge)*, 119 (1994) 1167-1170.
- 4329 Jen, J.-F. and Tsai, M.-Y.: Determination of phenol in urine by high-performance liquid chromatography with on-line precolumn enzymatic hydrolysis of the conjugates. J. Chromatogr. B, 658 (1994) 87-92.
- 4330 Madigan, D., McMurrough, I. and Smyth, M.R.: Determination of proanthocyanidins and catechins in beer and barley by highperformance liquid chromatography with dual-electrode electrochemical detection. *Analyst (Cambridge)*, 119 (1994) 863-868
- 4331 Ortega, F., Domínguez, E., Burestedt, E., Emnéus, J., Gorton, L. and Marko-Varga, G.: Phenol oxidase-based biosensors as selective detection units in column liquid chromatography for the determination of phenolic compounds. J. Chromatogr. B, 675 (1994) 65-78.
- 4332 Zdráhal, Z. and Večeřa, Z.: Preconcentration and determination of 2,4,5-trichlorophenol in air using a wet effluent denuder and high-performance liquid chromatography. J. Chromatogr. A, 668 (1994) 371-374.

See also 4160, 4174, 4176, 4217, 4247.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 4333 Bae, Y.S., Foo, L.Y. and Karchesy, J.J.: GPC of natural procyanidin oligomers and polymers. *Holzforschnung*, 48 (1994) 4-6; C.A., 120 (1994) 273326d.
- 4334 Castillo, J., Benavente-García, O. and del Rio, J.A.: Study and optimization of citrus flavanone and flavones elucidation by reverse phase HPLC with several mobile phases: influence of the structural characteristics. J. Liq. Chromatogr., 17 (1994) 1497-1523
- 4335 Hendrickson, H.P., Kaufman, A.D. and Lunte, C.E.: Electrochemistry of catechol-containing flavonoids. J. Pharm. Biomed. Anal., 12 (1994) 325-334.
- 4336 Ishii, K., Urano, S., Furuta, T. and Kasuya, Y.: Determination of rhoifolin and daidzin in human plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 655 (1994) 300-304.
- 4337 Kapadia, G.J., Oguntimein, B. and Shukla, Y.N.: High-speed counter-current chromatographic separation of biflavanoids from Garcinia kola seeds. J. Chromatogr. A, 673 (1994) 142-146.
- 4338 Krauze-Baranowska, M. and Cisowski, W.: High-performance liquid chromatographic determination of flavone C-glycosides in some species of the Cucurbitaceae family. J. Chromatogr. A, 675 (1994) 240-243.

See also 4800, 5081.

8b. Aflatoxins and other mycotoxins

- 4339 Barmark, A.-L. and Larsson, K.: Immunoaffinity column cleanup/liquid chromatographic determination of aflatoxins: an interlaboratory study. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 46-53.
- 4340 Bennett, G.A. and Richard, J.L.: Liquid chromatographic method for analysis of the naphthalene dicarboxyaldehyde derivative of fumonisins. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 501-506
- 4341 Kussak, A., Andersson, B. and Andersson, K.: Determination of aflatoxin Q₁ in urine by automated immunoaffinity column clean-up and liquid chromatography. *J. Chromatogr. B*, 656 (1994) 329-334.
- 4342 Riley, R.T., Wang, E. and Merrill, A.H., Jr.: Liquid chromatographic determination of sphinganine and sphingosine: use of the free sphinganine-to-sphingosine ration as a biomarker for consumption of fumonisins. J. Assoc. Off. Anal. Chem., 77 (1994) 533-540.
- 4343 Shephard, G.S., Thiel, P.G., Sydenham, E.W., Vleggaar, R. and Alberts, J.F.: Determination of the mycotoxin fumonisin B₁ and identification of its partially hydrolyzed metabolites in the feces of non-human primates. Food Chem. Toxicol., 32 (1994) 23-29; C.A., 120 (1994) 291535a.
- 4344 Trucksess, M.W.: Mycotoxins. J. Assoc. Off. Anal. Chem., 177 (1994) 135-142 a review with 115 refs.
- 4345 Visconti, A. and Doko, M.B.: Survey of fumonisins production by Fusarium isolated from cereals in Europe. J. Assoc. Off. Anal. Chem., 77 (1994) 546-550.

See also 4346.

- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 4346 Liu, F., Luo, Y. and Zhang, L.: Identification of alternariol, alternariol monomethyl ether and zearalenone by particle-beam LC/MS. Chin. Chem. Lett., 4 (1993) 975-978; C.A., 120 (1994) 318763n.
- 4347 Matysik, G., Glowniak, K., Sozcewinski, E. and Garbacka, M.: Chromatography of esculin from stems and bark of Aesculus hippocastanum L. for consecutive vegetative period. Chromatographia, 38 (1994) 766-770.
- 4348 Van Asten, A.C., Kok, W.T., Tijssen, R. and Poppe, H.: Thermal field flow fractionation of polytetrahydrofuran. *J. Chromatogr.* A, 676 (1994) 361-373.
- 4349 Vilegas, W., Vilegas, J.H.Y. and Pozetti, G.L.: (Gel permeation chromatography of the furocoumarins from *Dorstenia heringeri* Car. and Val.) Rev. Cienc. Farm. (Sao Paulo), 14 (1992) 133-138: C.A., 120 (1994) 253462s.

For additional information see C.A.: 120 (1994) 315058a.

See also 4800, 4904, 5082.

- OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- 4350 Hara, S., Nakamura, M., Sakai, F., Nohta, H., Ohkura, Y. and Yamaguchi, M.: 2,2'-Dithiobis(1-amino-4,5-dimethoxybenzene) as a highly sensitive, selective and stable fluorescence derivatization reagent for aromatic aldehydes in liquid chromatography. Anal. Chim. Acta, 291 (1994) 189-195.
- 4351 Maestri, L., Ghittori, S., Imbriani, M. and Capodaglio, E.: Determination of 2,5-hexandione by high-performance liquid chromatography after derivatization with dansylhydrazine. J. Chromatogr. B, 657 (1994) 111-117.
- 4352 Okada, T.: Multidimensional chromatographic separation and characterization of polyethers. *Anal. Chem.*, 66 (1994) 2163-2169.
- 4353 Risner, C.H. and Martin, P.: Quantitation of formaldehyde, acetaldehyde, and acetone in sidestream cigarette smoke by high-performance liquid chromatography. J. Chromatogr. Sci., 32 (1994) 76-82.
- 4354 Tsuruta, Y., Date, Y., Tonogaito, H., Sugihara, N., Furuno, K. and Kohashi, K.: Determination of malondialdehyde by high-performance liquid chromatography using 4-(2-phthalimidyl)benzohydrazide as a pre-column fluorescent labelling reagent. Analyst (Cambridge), 119 (1994) 1047-1050.

See also 4178, 4497, 4892, 4913, 5092.

CARBOHYDRATES

- 10a. Mono and oligosaccharides. Structural studies
- 4355 Alpert, A.J., Shukla, M., Shukla, A.K., Zieske, L.R., Yuen, S.W., Ferguson, M.A.J., Mehlert, A., Pauly, M. and Orlando, R.: Hydrophilic-interaction chromatography of complex carbohydrates. J. Chromatogr. A, 676 (1994) 191-202.
- 4356 Da Silva, M.L.C., Tamura, T., McBroom, T. and Rice, K.G.: Tyrosine derivatization and preparative purification of the sialyl and asialyl N-linked oligosaccharides from porcine fibrinogen. 'Arch. Biochem. Biophys., 312 (1994) 151-157.
- 4357 Herber, W.K. and Robinett, R.S.R.: Determination of carbon sources in fermentation media using high-performance anionexchange liquid chromatography and pulsed amperometric detection. J. Chromatogr. A, 676 (1994) 287-295.
- 4358 Kondo, A., Kiso, M., Hasegawa, A. and Kato, I.: Separation of pyridylamino oligosaccharides by high-performance liquid chromatography on an amine-bearing silica column. *Anal. Biochem.*, 219 (1994) 21-25.
- 4359 Maylie-Pfenninger, M.-F.: Developmentally regulated oligosaccharides in mouse spermatogenic cells. Arch. Biochem. Biophys., 311 (1994) 469-479.
- 4360 Peelen, G.O.H., de Jong, J.G.N. and Wevers, R.A.: HPLC analysis of oligosaccharides in urine from oligosaccharidosis patients. Clin. Chem. (Washington), 40 (1994) 914-921.
- 4361 Powell, L.D. and Varki, A.: The oligosaccharide binding specificities of CD22β, a sialic acid-specific lectin of B cells. *J. Biol. Chem.*, 269 (1994) 10628-10636.
- 4362 Robinett, R.S.R. and Herber, W.K.: Analysis of substrates and metabolites in fermentation broth by ion chromatography. J. Chromatogr. A, 671 (1994) 315-322.
- 4363 Romani, A., Baldi, A., Tattini, M. and Vincieri, F.F.: Extraction, purification procedures and HPLC-RI analysis of carbohydrates in olive (Olea europaea L.) plants. Chromatographia, 39 (1994) 35-39.
- 4364 Sullivan, J. and Douek, M.: Determination of carbohydrates in wood, pulp and process liquor samples by high-performance anion-exchange chromatography with pulsed amperometric detection. J. Chromatogr. A, 671 (1994) 339-350.
- 4365 Suzuki, S., Miyatake, R. and Honda, S.: (High performance affinity chromatography of fluorescence-labeled oligosaccharides from glycoproteins on lectin-immobilized columns). Kuromatogurafi, 14 (1993) 82-83; C.A., 121 (1994) 4244x.
- 4366 Toyota, J.-i., Omichi, K. and Hase, S.: A new disaccharide Fucα1-2Man found in human urine. J. Biochem. (Tokyo), 115 (1994) 927-929.
- 4367 Urashima, T., Saito, T., Tsuji, Y., Taneda, Y., Takasawa, T. and Messer, M.: Chemical characterization of sialyl oligosaccharides isolated from tammar wallaby (*Macropus eugenii*) milk. *Bio-chim. Biophys. Acta*, 1200 (1994) 64-72.
- 4368 Vanatta, L.E.: Use of combined sodium hydroxide and carbonate-bicarbonate eluents with various anion-exchange columns. J. Chromatogr. A, 671 (1994) 83-88.
- 4369 Vercellotti, S.V. and Clarke, M.A.: Methods of sugar analysis: comparison of modern and traditional methods. *Publ. Tech. Pap. Proc. Annu. Meet Sugar Ind. Technol.*, 52 (1993) 193-216; C.A., 120 (1994) 326058b.

- 4370 Zhu, Y., Hu, O. and Zhang, Q.: (Developments in ion chromatographic analysis of carbohydrates). Wuxi Qinggongye Xueyuan Xuebao, 11 (1992) 176-185; C.A., 120 (1994) 235091r a review with 48 refs.
- 4371 Ziegler, F.D., Gemmill, T.R. and Trimble, R.B.: Glycoprotein synthesis in yeast. Early events in N-linked oligosaccharide processing in Schizosaccharomyces pombe. J. Biol. Chem., 269 (1994) 12527-12535.
- See also 4194, 4373, 4379, 4380, 4389, 4513, 4532.
- 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides
- 4372 Akiyama, H., Saito, M., Qiu, G., Toida, T. and Imanari, T.: Analytical studies on hyaluronic acid synthesis by normal human epidermal deratinocytes cultured in a serum-free medium. *Biol. Pharm. Bull.*, 17 (1994) 361-364; C.A., 121 (1994) 4258e.
- 4373 Englyst, H.N., Quigley, M.E. and Hudson, G.J.: Determination of dietary fibre as non-starch polysaccharides with gas-liquid chromatographic, high-performance liquid chromatographic or spectrophotometric measurement of constituent sugars. *Analyst (Cambridge)*, 119 (1994) 1497-1509.
- 4374 Heinze, T., Erler, U., Nehls, I. and Klemm, D.: Determination of the substituent pattern of heterogenously and homogenously synthetized carboxymethyl cellulose by using high-performance liquid chromatography. *Angew. Macromol. Chem.*, 215 (1994) 93-106; C.A., 120 (1994) 247593u.
- 4375 Moeller, E., Poetsch, S., Pscheidl, H. and Haberland, D.: (Liquid chromatographic reaction control of (enzymic) starch hydrolysis). *Chem. Tech. (Leipzig)*, 46 (1994) 25-28; C.A., 120 (1994) 326066c.
- 4376 Porsch, B. and Sundelöf, L.-O.: Size-exclusion chromatography and dynamic light scattering of dextrans in water: explanation of ion-exclusion behaviour. *J. Chromatogr. A*, 669 (1994) 21-30.
- 4377 Quigley, M.E. and Englyst, H.N.: Determination of uronic acids constituents of non-starch polysaccharides by high-performance liquid chromatography with pulsed amperometric detection. *Analyst (Cambridge)*, 119 (1994) 1511-1518.
- 4378 Reynolds, P.E., Snaith, H.A., Maguire, A.J., Dutka-Malen, S. and Courvalin, P.: Analysis of peptidoglycan precursors in vancomycin-resistant *Enterococcus gallinarum* BM4174. *Biochem. J.*, 301 (1994) 5-8.
- 4379 Schmidtchen, A. and Fransson, L.-A.: Analysis of heparan-sulphate chains and oligosaccharides from proliferating and quiescent fibroblasts. A proposed model for endoheparanase activity. *Eur. J. Biochem.*, 223 (1994) 211-221.
- 4380 Vercruysse, K.P., Lauwers, A.R. and Demeester, J.M.: Kinetic investigation of the degradation of hyaluronan by hyaluronidase using gel permeation chromatography. J. Chromatogr. B, 656 (1994) 179-190.
- 4381 Xia, J. and Gilmer, P.J.: Organic modifiers in the anion-exchange chromatographic separation of sialic acids. *J. Chroma*togr. A, 676 (1994) 203-208.

See also 4437.

10c. Glycoproteins and their constituents

- 4382 Andersen, A.P., Wyroba, E., Reichman, M., Zhao, H. and Satir, B.H.: The activity of parafusin is distinct from that of phosphoglucomutase in the unicellular eukaryote *Paramecium*. *Biochem. Biophys. Res. Commun.*, 200 (1994) 1353-1358.
- 4383 Ayre, D., Hutton, D.A. and Pearson, J.P.: The use of wheat germ agglutinin to improve binding of heterogeneous mucin species to nitrocellulose membranes. *Anal. Biochem.*, 219 (1994) 373-375.
- 4384 Bihoreau, N., Pin, S., de Kersabiec, A.-M., Vidot, F. and Fontaine-Aupart, M.-P.: Copper-atom identification in the active and inactive forms of plasma-derived FVIII and recombinant FVIII-ΔII. Eur. J. Biochem., 222 (1994) 41-48.
- 4385 Cherchi, G.M., Formato, M., Demuro, P., Masserini, M., Varani, I. and DeLuca, G.: Modifications of low density lipoprotein induced by the interaction with human plasma glycosaminogly-can-protein complexes. *Biochim. Biophys. Acta*, 1212 (1994) 345-352.
- 4386 Conboy, J.J.: The determination of glycopeptides and glycoproteins by liquid chromatography/mass spectrometry and tandem mass spectrometry. Avail. *Univ. Microfilms Int.*, Order No. DA9235999, 1992, 191 p.; C.A., 120 (1994) 314893g.
- 4387 Damhof, R.A., Feijlbrief, M., Welling-Wester, S. and Welling, G.W.: Purification of the integral membrane glycoproteins D of Herpes simplex virus types 1 and 2, produced in the recombinant baculovirus expression system, by ion-exchange high-performance liquid chromatography. J. Chromatogr. A, 676 (1994) 43-49.
- 4388 Duncan, T., Kutty, G., Chader, G.J. and Wiggert, B.: A glycoprotein binding retinoids and fatty acids is present in *Drosophila*. Arch. Biochem. Biophys., 312 (1994) 158-166.
- 4389 Fan, J.-Q., Kondo, A., Kato, I. and Lee, Y.C.: High-performance liquid chromatography of glycopeptides and oligosaccharides on graphitized carbon columns. *Anal. Biochem.*, 219 (1994) 224-229.
- 4390 Fujii, S., Unezaki, S., Okumura, T., Miura, R. and Saito, K.: Asparagine-linked carbohydrate of *Penicillium notatum* phospholipase B. *J. Biochem. (Tokyo)*, 116 (1994) 204-208.
- 4391 Gilljam, G., Siridewa, K. and Hammar, L.: Purification of simian immunodeficiency virus, SIV_{MAC251}, and of its external envelope glycoprotein, gp148. *J. Chromatogr. A*, 675 (1994) 89-100.
- 4392 Gowda, L.R., Savithri, H.S. and Rao, D.R.: The complete primary structure of a unique mannose/glucose-specific lectin from field bean (*Dolichos lab lab*). *J. Biol. Chem.*, 269 (1994) 18789-18703
- 4393 Hatakeyama, T., Kohzaki, H., Nagatomo, H. and Yamasaki, N.: Purification and characterization of four Ca²⁺-dependent lectins from the marine invertebrate, Cucumaria echinata. J. Biochem. (Tokyo), 116 (1994) 209-214.
- 4394 Linsley, K.B., Chan, S.-Y., Chan, S., Reinhold, B.B., Lisi, P.J. and Reinhold, V.N.: Applications of electrospray mass spectrometry to erythropoietin N- and O-linked glycans. *Anal. Biochem.*, 219 (1994) 207-217.
- 4395 Lo-Guidice, J.-M., Wieruszeski, J.-M., Lemoine, J., Verbert, A., Roussel, P. and Lamblin, G.: Sialylation and sulfation of the carbohydrate chains in respiratory mucins from a patient with cystic fibrosis. J. Biol. Chem., 269 (1994) 18794-18813.

- 4396 Nakano, Y., Noda, K., Endo, T., Kobata, A. and Tomita, M.: Structural study on the glycosyl-phosphatidylinositol anchor and the asparagine-linked sugar chain of a soluble form of CD59 in human urine. *Arch. Biochem. Biophys.*, 311 (1994) 117-126.
- 4397 Shimoda, I., Kitajima, K., Inoue, S. and Inoue, Y.: Isolation, structural determination, and calcium-binding properteis of the major glycoprotein present in *Bufo japonicus japonicus* egg (jelly). *Eur. J. Biochem.*, 223 (1994) 223-231.
- 4398 Vilella, E., Bengtsson-Olivecrona, G., Stigbrand, T. and Jensen, P.E.: Binding of lipoprotein lipase to α₂-macroglobulin. *Bio-chem. J.*, 300 (1994) 443-448.

For additional information see C.A.: 120 (1994) 293244d.

See also 4361, 4365, 4503, 4593, 4638, 4692.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 4399 Chen, Q. and Nilsson, Å.: Interconversion of α-linolenic acid in rat intestinal mucosa: studies in vivo and in isolated villus and crypt cells. J. Lipid Res., 35 (1994) 601-609.
- 4400 Cherchi, A., Spanedda, L., Tuberoso, C. and Cabras, P.: Solid-phase extraction and high-performance liquid chromatographic determination of organic acids in honey. *J. Chromatogr. A*, 669 (1994) 59-64.
- 4401 De Backer, B.L. and Nagels, L.J.: Potentiometric detection of organic acids in ion-exclusion chromatography using different types of liquid-membrane electrodes. *Anal. Chim. Acta*, 290 (1994) 259-267.
- 4402 Dietz, E.A. and Singley, K.F.: Determination of fumaric acid, maleic acid, and phthalic acid in groundwater and soil. J. Liq. Chromatogr., 17 (1994) 1637-1651.
- 4403 Domb, A.J.: Quantitative analysis of mixtures of symmetric and mixed anhydrides. *J. Chromatogr. A*, 673 (1994) 31-35.
- 4404 Gordon, J.A., Borekmeier, K.M., Spector, A.A. and Pfeiffer, D.R.: Mitochondrial metabolism of 12- and 15-hydroxyeicosatetraenoic acids. J. Lipid Res., 35 (1994) 698-708.
- 4405 Grechkin, A.N.: Cyclization of natural allene oxide fatty acids. The anchimeric assistance of β,γ-double bond beside the oxirane and the reaction mechanism. *Biochim. Biophys. Acta*, 1213 (1994) 199-206.
- 4406 Hayashi, K. and Kishimura, H.: Preparation of n-3 PUFA ethylester concentrates from fish oil by column chromatography on silicic acid. Nippon Suisan Gakkaishi, 59 (1993) 1429; C.A., 120 (1994) 297054q.
- 4407 Huneck, S., Feige, G.B. and Lumbsch, H.T.: High-performance liquid chromatographic analysis of aliphatic lichen acids. *Phytochem. Anal.*, 5 (1994) 57-60; C.A., 121 (1994) 4230q.
- 4408 Hušek, P. and Liebich, H.M.: Organic acid profiling by direct treatment of deproteinized plasma with ethyl chloroformate. J. Chromatogr. B, 656 (1994) 37-43.

- 4409 Huve, P., Verrecchia, T., Bazile, D., Vauthier, C. and Couvreur, P.: Simultaneous use of size-exclusion chromatography and photon correlation spectroscopy for the characterization of poly(lactic acid) nanoparticles. J. Chromatogr. A, 675 (1994) 129-139.
- 4410 Isbell, T.A. and Kleiman, R.: Characterization of estolides produced from the acid-catalyzed condensation of oleic acid. J. Am. Oil Chem. Soc., 71 (1994) 379-383.
- 4411 Juanéda, P., Sebedio, J.L. and Christie, W.W.: Complete separation of the geometrical isomers of linolenic acid by high performance liquid chromatography with a silver ion column. J. High Resolut. Chromatogr., 17 (1994) 321-324.
- 4412 Kaneshiro, T., Vesonder, R.F., Peterson, R.E., Weisleder, D. and Bagby, M.O.: 9(Z)-Octadecenamide and fatty amides by *Bacillus megaterium* (B-3437) conversion of oleic acid. *J. Am. Oil Chem. Soc.*, 71 (1994) 491-494.
- 4413 Kingery, A.F. and Allen, H.E.: Ion chromatographic separation and quantitative analysis of fluoroacetic acid and formic acid in soil. J. Chromatogr. A, 671 (1994) 231-237.
- 4414 Kondo, F., Nagata, S., Tsai, C.-E. and Saitanu, K.: Determination of pyridonecarboxylic acids in plasma by reverse-phase high-performance liquid chromatography. *Microbios*, 77 (1994) 181-189; C.A., 121 (1994) 111d.
- 4415 Kondo, J., Suzuki, N., Imaoka, T., Kawasaki, T., Nakanishi, A. and Kawahara, Y.: 6-Methoxy-2-(4-substituted phenyl)benzoxazoles as fluorescent chiral derivatization reagents for carboxylic acid enantiomers. *Anal. Sci.*, 10 (1994) 17-23; C.A., 121 (1994) 25947w.
- 4416 Laethem, R.M., Halpert, J.R. and Koop, D.R.: Epoxidation of arachidonic acid as an active-site probe of cytochrome P-450 2B isoforms. *Biochim. Biophys. Acta*, 1206 (1994) 42-48.
- 4417 Leitz, T., Muller, W., de Petrocellis, L. and di Marzo, V.: Enatiospecific synthesis of bioactive hydroxyeicosatetraenoic acids (HETEs) in Hydra magnipapillata. Biochim. Biophys. Acta, 1213 (1994) 215-223.
- 4418 Morales, J.A., de Medina, H.L., de Nava, M.G., Velásquez, H. and Santana, M.: Determination of organic acids by ion chromatography in rain water in the State of Zulia, Venezuela. J. Chromatogr. A, 671 (1994) 193-196.
- 4419 Morris, J. and Fritz, J.S.: Eluent modifiers for the liquid chromatographic separation of carboxylic acids using conductivity detection. *Anal. Chem.*, 66 (1994) 2390-2396.
- 4420 Nair, L.M., Saari-Nordhaus, R. and Anderson, J.M., Jr.: Determination of haloacetic acids by ion chromatography. *J. Chromatogr. A*, 671 (1994) 309-313.
- 4421 Niwa, T., Kawagishi, I. and Ohya, N.: Rapid assay for furancar-boxylic acid accumulated in uremic serum using high-performance liquid chromatography and on-line mass spectrometry. Clin. Chim. Acta, 226 (1994) 89-94.
- 4422 Okamoto, M., Takahashi, K. and Doi, T.: (Identification of minor metabolites of abscisic acid (ABA) by LC-TSP/MS/MS and chiral LC). Kuromatogurafi, 14 (1993) 144-145; C.A., 121 (1994) 4472v.
- 4423 Rios, J.J., Perez-Camino, M.C., Marquez-Ruiz, G. and Dobarganes, M.C.: Isolation and characterization of sucrose polyesters. J. Am. Oil Chem. Soc., 71 (1994) 385-390.
- 4424 Takagi, T.: Resolution of vic-dihydroxy acid diastereomers to four enantiomers by high-performance liquid chromatography. J. Am. Oil Chem. Soc., 71 (1994) 547-548.

- 4425 Wolf, R.M., Francotte, E. and Hainmueller, J.: Chiral discrimination of the enantiomers of δ-phenyl-δ-valerolactone by cellulose triacetate: a chromatographic and microcalorimetric study of the thermodynamics. *Chirality*, 5 (1993) 538-544; *C.A.*, 120 (1994) 323185e.
- 4426 Xiang, Z.M., Zhang, L. and Bi, L.J.: Determination of organic acids in soy sauce by HPLC. *Chin. Chem. Lett.*, 4 (1993) 913-916; C.A., 120 (1994) 296896d.
- 4427 Yamato, S., Wakabayashi, H., Nakajima, M. and Shimada, K.: Amperometric determination of oxalate in plasma and urine by liquid chromatography with immobilized oxalate oxidase. J. Chromatogr. B, 656 (1994) 29-35.
- 4428 Yoshioka, K., Shimojo, N., Nakanishi, T., Naka, K. and Okuda, K.: Measurement of urinary adipic acid and suberic acid using high-performance liquid chromatography. *J. Chromatogr. B*, 655 (1994) 189-193.
- 4429 Zerbinati, O., Aigotti, R. and Daniele, P.G.: Analysis of chiral carboxylic acids in wine by high-performance liquid chromatography with coupled UV and circular dichroism detection. J. Chromatogr. A, 671 (1994) 281-285.
- 4430 Zhang, J.Y. and Blair, I.A.: Direct resolution of epoxyeicosatrienoic acid enantiomers by chiral-phase high-performance liquid chromatography. J. Chromatogr. B, 657 (1994) 23-29.
- For additional information see C.A.: 120 (1994) 318480t.
- See also 4166, 4242, 4368, 4434, 4470, 4833, 4892, 5103, 5136, 5145, 5174.
- 11b. Prostaglandins
- 4431 Sala, A., Armetti, L., Piva, A. and Folco, G.: An improved assay for urinary LTE₄. *Prostaglandins*, 47 (1994) 281-292; *C.A.*, 120 (1994) 290276e.
- 11c. Lipids and their constituents
- 4432 Bernhard, W., Linck, M., Creutzburg, H., Postler, A.D., Arning, A., Martin-Carrera, I. and Sewing, K.-F.: High-performance liquid chromatographic analysis of phospholipids from different sources with combined fluorescence and ultraviolet detection. *Anal. Biochem.*, 220 (1994) 172-180.
- 4433 Brühl, L., Schulte, E. and Thier, H.-P.: Triglyceride mit mehrfach ungesättigten Fettsäuren in Muttermilch und in Rohstoffen für Säuglingsnahrung. Fat Sci. Technol., 96 (1994) 223-227.
- 4434 Brühl, L., Schulte, E. and Thier, H.-P.: Zusammensetzung und Aufbau der Triglyceride von Muttermilch und einiger Rohstoffe für Säuglingsnahrung. Fat Sci. Technol., 96 (1994) 147-154.
- 4435 Cedergren, R.A. and Holoingsworth, R.I.: Occurence of sulfoquinovosyl diacylglycerol in some members of the family *Rhizo-biaceae*. *J. Lipid Res.*, 35 (1994) 1452-1461.
- 4436 Flamand, N., Justine, P., Bernaud, F., Rougier, A. and Gaetani, Q.: In vivo distribution of free long-chain sphingoid gases in the human stratum corneum by high-performance liquid chromatographic analysis of strippings. J. Chromatogr. B, 656 (1994) 65-71.

- 4437 Goldbaum, F.A., Rubbi, C.P. and Fossati, C.A.: Removal of LPS from a *Brucella* cytoplasmic fraction by affinity chromatography with an anti-LPS monoclonal antibody as immunosorbent. *J. Med. Microbiol.*, 40 (1994) 174-178.
- 4438 Grünler, J., Ericsson, J. and Dallner, G.: Branch-point reactions in the biosynthesis of cholesterol, dolichol, ubiquinone and prenylated proteins. *Biochim. Biophys. Acta*, 1212 (1994) 259-277 a review with 174 refs.
- 4439 Haas, M.J., Scott, K., Jun, W. and Janssen, G.: Enzymatic phosphatidylcholine hydrolysis in organic solvents: an examination of selected commercially available lipases. J. Am. Oil Chem. Soc., 71 (1994) 483-490.
- 4440 Hall, S.B., Wang, Z. and Notter, R.M.: Separation of subfactions of the hydrophobic components of calf lung surfactant. *J. Lipid Res.*, 35 (1994) 1386-1394.
- 4441 Hansen, S.L. and Artz, W.E.: Supercritical fluid fractionation of thermally oxidized canola oil. J. Am. Oil Chem. Soc., 71 (1994) 615-618.
- 4442 Kimoto, H., Endo, Y. and Fujimoto, K.: Influence of interesterification on the oxidative stability of marine oil triacylglycerols. J. Am. Oil Chem. Soc., 71 (1994) 469-473.
- 4443 Kosugi, Y., Kunieda, T. and Azuma, N.: Continual conversion of free fatty acid in rice bran oil to triacylglycerol by immobilized lipase. J. Am. Oil Chem. Soc., 71 (1994) 445-448.
- 4444 Lange, R.L., Engst, W., Elsner, A. and Brückner, J.: Zusammensetzung, Präparation und Eigenschaften von Phospholipiden. Fat Sci. Technol., 96 (1994) 169-174.
- 4445 Liapikos, T.A., Antonopoulou, S., Karabina, S.-A.P., Tsoukatos, D.C., Demopoulos, C.A. and Tselepis, A.D.: Platelet-activating factor formation during oxidative modification of low-density lipoprotein when PAF-acetylhydrolase has been inactivated. *Biochim. Biophys. Acta*, 1212 (1994) 353-360.
- 4446 Maehr, H., Zenchoff, G. and Coffen, D.L.: Enzymic enhancement of n-3 fatty acid content in fish oil. J. Am. Oil Chem. Soc., 71 (1994) 463-467.
- 4447 Marai, L., Kuksis, A. and Myher, J.J.: Reversed-phase liquid chromatography-mass spectrometry of the uncommon triacylglycerol structures generated by randomization of butteroil. *J. Chromatogr. A*, 672 (1994) 87-99.
- 4448 Müthing, J. and Unland, F.: Improved separation of isomeric gangliosides by anion-exchange high-performance liquid chromatography. J. Chromatogr. B, 658 (1994) 39-45.
- 4449 Norris, F.A. and Majerus, P.W.: Hydrolysis of phosphatidylinositol 3,4-bisphosphate by inositol polyphosphate 4-phosphatase isolated by affinity elution chromatography. J. Biol. Chem., 269 (1994) 8716-8720.
- 4450 Ota, T., Kawabata, Y. and Ando, Y.: Positional distribution of 24:6(n-3) in triacyl-sn-glycerols from flathead flounder liver and flesh. *J. Am. Oil Chem. Soc.*, 71 (1994) 475-478.
- 4451 Patton, G.M., Fasulo, J.M. and Robins, S.J.: Hepatic phosphatidylcholines: evidence for synthesis in the rat by extensive reutilization of endogenous acylglycerides. *J. Lipid Res.*, 35 (1994) 1211-1221.
- 4452 Sebedio, J.L., Bonpunt, A., Prevost, J. and Grandgirard, A.: Lipid composition of some commercial frozen prefried french fries. Fat Sci. Technol., 96 (1994) 235-239.
- 4453 Semporé, B.G. and Bézard, J.A.: Separation of monoacylglycerol enantiomers as urethane derivatives by chiral-phase high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1679-1694.

- 4454 Singh, C.P., Shah, D.O. and Holmberg, K.: Synthesis of monoand diglycerides in water-in-oil microemulsions. *J. Am. Oil Chem. Soc.*, 71 (1994) 583-587.
- 4455 Takagi, T. and Ando, Y.: Separation of monoacylglycerols by high-performance liquid chromatography on nitrile-bonded phase. J. Am. Oil Chem. Soc., 71 (1994) 459-460.
- 4456 Trümbach, B., Rogler, G., Lackner, K.J. and Schmitz, G.: Improved separation of radioactively labelled cellular phospholipids by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 73-76.
- 4457 Viinanen, E. and Hopia, A.: Reversed-phase high-performance liquid chromatographic analysis of triacylglycerol autoxidation products with ultraviolet and evaporative light-scattering detectors. J. Am. Oil Chem. Soc., 71 (1994) 537-539.
- 4458 Wasan, K.M., Hayman, A.C. and Lopez-Berestein, G.: Determination of dimyristoylphosphatidylglycerol in human serum by liquid-liquid extraction and reversed-phase liquid chromatography. J. Pharm. Biomed. Anal., 12 (1994) 851-854.
- 4459 Yatomi, Y., Ozaki, Y., Satoh, K. and Kume, S.: Synthesis of phosphatidylinositol 3,4-bisphosphate is regulated by proteintyrosine phosphorylation but the p85α subunit of phosphatidylinositol 3-kinase may not be a target for tyrosine kinases in thrombin-stimulated human platelets. *Biochim. Biophys. Acta*, 1212 (1994) 337-344.
- For additional information see C.A.: 121 (1994) 4502c.

See also 4820, 5087.

- 11d. Lipoproteins and their constituents
- 4460 Arnold, K.S., Balestra, M.E., Krauss, R.M., Curtiss, L.K., Young, S.G. and Innerarity, T.L.: Isolation of allele-specific, receptor-binding defective low density lipoproteins from familial defective apolipoprotein B-100 subjects. *J. Lipid Res.*, 35 (1994) 1469-1476.
- 4461 Berglund, L.F., Beltz, W.F., Elam, R.L. and Witztum, J.L.: Altered apolipoprotein B metabolism in very low density lipoprotein from lovastatin-treated guinea pig. J. Lipid Res., 35 (1994) 956-965.
- 4462 De Silva, H.V., Más-Oliva, J., Taylor, J.M. and Mahley, R.W.: Identification of apolipoprotein B-100 low density lipoproteins, apolipoprotein B-48 remnants, and apolipoprotein E-rich high density lipoproteins in the mouse. *J. Lipid Res.*, 35 (1994) 1297-1310.
- 4463 Groenewegen, W.A., Averna, M.R., Pulai, J., Krul, E.S. and Schonfeld, G.: Apolipoprotein B-38.9 does not associate with apo[a] and forms two distinct HDL density particle populations that are larger than HDL. *J. Lipid Res.*, 35 (1994) 1012-1025.
- 4464 Hodis, H.N., Kramsch, D.M., Avogaro, P., Bittolo-Bon, G., Cazzolato, G., Hwang, J., Peterson, H. and Sevanian, A.: Biochemical and cytotoxic characteristics of an *in vivo* circulating oxidized low density lipoprotein (LDL). *J. Lipid Res.*, 35 (1994) 669-677.
- 4465 Knapp, H.R., Hullin, F. and Salem, N., Jr.: Asymmetric incorporation of dietary n-3 fatty acids into membrane aminophospholipids of human erythrocytes. J. Lipid Res., 35 (1994) 1283-1291.

- 4466 Lagrost, L., Athias, A., Gambert, P. and Lallemant, C.: Comparative study of phospholipid transfer activities mediated by cholesteryl ester transfer protein and phospholipid transfer protein. J. Lipid Res., 35 (1994) 825-835.
- 4467 Moulin, P., Cheung, M.C., Bruce, C., Zhong, S., Cocke, T., Richardson, H. and Tall, A.R.: Gender effects on the distribution of the cholesteryl ester transfer protein in apolipoprotein A-ldefined lipoprotein subpopulations. *J. Lipid Res.*, 35 (1994) 793-802
- 4468 Pech, M.A., Myara, I. and Moatti, N.: Comparison of venous and arterial cell models for studying modifications of low-density lipoproteins (LDL) in vitro. In: Galteau, M.-M. (Editor), Biol. Prospect. C.R. Colloq. Pont-a-Mousson, 8th 1992, Libbey, Montrouge, 1993, pp. 561-564; C.A., 120 (1994) 318511d.
- 4469 Yhomas, C.E., Ku, G. and Kalyanaraman, B.: Nitrone spin trap lipophilicity as a determinant for inhibition of low density lipoprotein oxidation and activation of interleukin 1β release from human monocytes. J. Lipid Res., 35 (1994) 610-619.

For additional information see C.A.: 120 (1994) 293573k.

See also 4438, 4685, 4686.

ORGANIC PEROXIDES

- 4470 Vaidyanathan, V.V. and Sastry, P.S.: Preparation of hydroperoxy fatty acids. *Anal. Biochem.*, 219 (1994) 381-383.
- 13. STEROIDS
- 13a. General techniques
- See 4279.
- 13b. Pregnane and androstane derivatives
- 4471 Hirata, H., Kasama, T., Sawai, Y. and Fike, R.R.: Simultaneous determination of deflazacort metabolites II and III, cortisol, cortisone, prednisolone and prednisone in human serum by reversed-phase high-performance liquid chromatography. J. Chromatogr. B, 658 (1994) 55-61.
- 4472 Jusko, W.J., Pyszczynski, N.A., Bushway, M.S., D'Ambrosio, R. and Mis, S.M.: Fifteen years of operation of a high-performance liquid chromatographic assay for prednisolone, cortisol and prednisone in plasma. *J. Chromatogr. B*, 658 (1994) 47-54.
- 4473 Lamparczyk, H., Zarzycki, P.K. and Nowakowska, J.: Effect of temperature on separation of norgestrel enantiomers by highperformance liquid chromatography. *J. Chromatogr. A*, 668 (1994) 413-417.
- 4474 Liu, K.-R., Chen, S.-H., Wu, S.-M., Kou, H.-S. and Wu, H.-L.: High-performance liquid chromatographic determination of betamethasone and dexamethasone. *J. Chromatogr. A*, 676 (1994) 455-460.

- 4475 Palmer, D.A., Evans, M., Miller, J.N. and French, M.T.: Rapid fluorescence flow injection immunoassay using a novel perfusion chromatographic material. *Analyst (Cambridge)*, 119 (1994) 943-947.
- 4476 Santos-Montes, A., Gonzalo-Lumbreras, R., Gasco-Lopez, A.I. and Izquierdo-Hornillos, R.: Extraction and high-performance liquid chromatographic separation of deflazacort and its metabolite 21-hydroxydeflazacort. Application to urine samples. J. Chromatogr. B, 657 (1994) 248-253.
- 4477 Valvo, L., Paris, A., Savella, A.L., Gallinella, B. and Signoretti, E.C.: General high-performance liquid chromatographic procedures for the rapid screening of natural and synthetic corticosteroids. J. Pharm. Biomed. Anal., 12 (1994) 805-810.
- 4478 Wolf, B., Finke, I. and Sattler, H.: Untersuchungen zur Kompatibilität von wirkstoffhaltigen Dermatika mit zusätzlich eingearbeiteten Wirkstoffen. 2. Mitteilung: glucocorticosteroidhaltige Salbe, Creme und Fettsalbe. *Pharmazie*, 49 (1994) 350-353.
- 13d. Sterols
- 4479 Chen, Y.C., Chiu, C.P. and Chen, B.H.: Determination of cholesterol oxides in heated lard by liquid chromatography. Food Chem., 50 (1994) 53-58; C.A., 120 (1994) 321734j.
- 4480 Cheng, B. and Kowal, J.: Analysis of adrenal cholesteryl esters by reversed phase high performance liquid chromatography. J. Lipid Res., 35 (1994) 1115-1121.
- 4481 Frye, L.L., Cusack, K.P., Leonard, D.A. and Anderson, J.A.: Oxolanosterol oximes: dual-action inhibitors of cholesterol biosynthesis. J. Lipid Res., 35 (1994) 1333-1344.
- 4482 Gerst, N., Pinkerton, F.D., Kisic, A., Wilson, W.K., Swaminathan, S. and Schroepfer, G.J., Jr.: Inhibitors of sterol synthesis. Effects of a new fluorinated analog of 3β-hydroxy-5α-cholest-8(14)-en-15-one in rats. J. Lipid Res., 35 (1994) 1040-1056.
- 4483 Izumi, A., Pinkerton, F.D., Nelson, S.O., Pyrek, J.S., Neill, P.J.G., Smith, J.H. and Schroepfer, G.J., Jr.: Inhibitors of sterol synthesis. Submicromolar 14α-ethyl-5α-cholest-7-ene-3β,15α-diol causes a major modification of the sterol composition of CHO-K1 cells and a marked change in cell morphology. J. Lipid Res., 35 (1994) 1251-1266.
- 4484 Pettersson, L. and Eriksson, C.G.: Reversed-phase high-performance liquid chromatographic determination of 7α-hydroxy-4-cholesten-3-one in human serum. J. Chromatogr. B, 657 (1994) 31-36.
- 4485 Schulte, E.: Determination of adible fat refining by HPLC of Δ3,5-steradienes. *Fat Sci. Technol.*, 96 (1994) 124-128.

See also 4708.

- 13e. Bile acids and alcohols
- 4486 Girard, M., Hannah, K., Menzies, J.A., Solomonraj, G. and Whitehouse, L.W.: Reversed-phase LC assay method for deoxycholate in influenza vaccine. *J. Pharm. Biomed. Anal.*, 12 (1994) 833-837.
- 4487 Scalia, S., Cova, U., Fogagnolo, M., Landi, S. and Medici, A.: Determination of free bile acids in raw materials and bulk products by HPLC and GC. Anal. Lett., 27 (1994) 1789-1804.

4488 Une, M., Inoue, A., Kurosawa, T., Tohma, M. and Hoshita, T.: Identification of (24E)-3α,7α-dihydroxy-5β-cholest-24-enoic acid and (24R,25S)-3α,7α,24-trihydroxy-5β-cholestanoic acid as intermediates in the conversion of 3α,7α-dihydroxy-5βcholestanoic acid to chenodeoxycholic acid in rat liver homogenates. J. Lipid Res., 35 (1994) 620-624.

For additional information see C.A.: 120 (1994) 318487a.

- 13f. Ecdysones and other insect steroid hormones
- 4489 Chen, J.-H., Kabbouh, M., Fisher, M.J. and Rees, H.H.: Induction of an inactivation pathway for ecdysteroids in larvae of the cotton leafworm, *Spodoptera littoralis*. *Biochem. J.*, 301 (1994) 89-95.
- 14. STEROID GLYCOSIDES AND SAPONINS
- 4490 Helm, H., Andersen, A., Müller, B.W. and Waaler, T.: Stabilization of digitalis glycosides through 2-hydroxypropyl-β-cyclodextrin complexation in aqueous solution at pH 7.3. *Pharmazie*, 49 (1994) 494-496.
- 4491 Nock, B., Wich, M.M. and Moore, B.W.: Extracti-Gel D chromatography is a simple, efficient method for removing digitonin during receptor purification: application to the κ₁ opioid receptor. *J. Neurosci. Methods*, 50 (1993) 353-358; C.A., 121 (1994) 11366.
- 4492 Tamura, M., Harris, T.M., Phillips, D., Blair, I.A., Wang, Y.F., Hellerqvist, C.G., Lam, S.K. and Inagami, T.: Identification of two cardiac glycosides as Na⁺-pump inhibitors in rat urine and diet. J. Biol. Chem., 269 (1994) 11972-11979.
- 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS
- 15a. Terpenes
- 4493 Ando, M., Ibayashi, K., Minami, N., Nakamura, T., Isogai, K. and Yoshimura, H.: Studies on the synthesis of sesquiterpene lactones, 16. The syntheses of 11β,13-dihydroxykauniolide, estafiation, isodehydrocostuslactone, 2-oxodesoxyligustrin, arborescin, 1,10-epiarborescin, 11β,13-dihydroludartin, 8-deoxy-11β,13-dihydrorupicolin, 8-deoxyrupicolin B, 3,4-epiludartin, ludartin, kauniolide, dehydroleucodin, and leucodin. J. Natural Prod., 57 (1994) 433-445.
- 4494 Chan, K.C., Alvarado, A.B., McGuire, M.T., Muschik, G.M., Issaq, H.J. and Snader, K.M.: High-performance liquid chromatography and micellar electrokinetic chromatography of taxol and related taxanes from bark and needle extracts of *Taxus* species. *J. Chromatogr. B*, 657 (1994) 301-306.
- 4495 Nikolova-Damyanova, B., Bankova, V. and Popov, S.: Separation and quantitation of stevioside and rebaudioside A in plant extracts by normal-phase high-performance liquid chromatography and thin-layer chromatography: a comparison. *Phytochem. Anal.*, 5 (1994) 81-85; C.A., 120 (1994) 318489c.

4496 Sharma, A., Conway, W.D. and Straubinger, R.M.: Reversed-phase high-performance liquid chromatographic determination of taxol in mouse plasma. *J. Chromatogr. B*, 655 (1994) 315-319.

See also 4286, 4497.

- 15b. Essential oils
- 4497 Mondello, L., Bartle, K.D., Dugo, G. and Dugo, P.: Automated HPLC-HRGC: a powerful method for essential oil analysis. Part III. Aliphatic and terpene aldehydes of orange oil. J. High Resolut. Chromatogr., 17 (1994) 312-314.
- 15c. Bitter substances
- 4498 Hermans-Lokkerbol, A.C.J. and Verpoorte, R.: Development and validation of a high-performance liquid chromatography system for the analysis of hop bitter acids. J. Chromatogr. A, 669 (1994) 65-73.
- 16. NITRO AND NITROSO COMPOUNDS
- 4499 Hayakawa, K., Terai, N., Suzuki, K., Dinning, P.G., Yamada, M. and Miyazaki, M.: Chromatographic determination method for 1-nitropyrene and its metabolites in biological samples with fluorescence detection after on-line reduction. *Biomed. Chromatogr.*, 7 (1993) 262-266.
- 4500 Zou, H., Zhou, S., Hu, X., Hong, M., Zhang, Y. and Lu, P.: Determination of 2,4,6-trinitrotoluene and its biodegradation products by normal-phase liquid chromatography. *Anal. Chim. Acta*, 291 (1994) 205-210.

See also 4242.

- 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17a. Amines and polyamines
- 4501 Brooks, R.A., Gooderham, N.J., Zhao, K., Edwards, R.J., Howard, L.A., Boobis, A.R. and Winton, D.J.: 2-Amino-1-methyl-6-phenylimidazo[4,5-b]pyridine is a potent mutagen in the mouse small intestine. Cancer Res., 54 (1994) 1665-1671.
- 4502 Dalene, M., Skarping, G. and Tinnerberg, H.: Thermospray mass spectrometry of aliphatic diamines derivatized with trifluoroethyl chloroformate, with special reference to the biological monitoring of hexamethylenediisocyanate (HDI) and isophorone-diisocyanate (IPDI). Chromatographia, 38 (1994) 776-780.
- 4503 Kuo, K.C., Gehrke, J.C., Allen, W.C., Holsbeke, M., Li, Z., Glinsky, G.V., Zumwalt, R.W. and Gehrke, C.W.: High-performance liquid chromatographic analysis of glycoamines in serum. *J. Chromatogr. B*, 656 (1994) 295-302.
- 4504 Lagana, A., Marino, A., Fago, G., Terregino, C. and Pardo-Martinez, B.: An improved method for the determination of free sphingosine in serum. *Chromatographia*, 39 (1994) 85on

B376 BIBLIOGRAPHY SECTION

- 4505 Matuska, R. and Preisler, L.: Method for determination alkanolamines and morpholine. Czech. CS 276,377 (Cl. G01N30/66),
 13 May 1992, Appl. 88/3,689, 30 May 1988; 6 p.; C.A., 120 (1994) 338127m.
- 4506 Villaseñor, S.R.: "Heart-cut" column switching techniques for the determination of an aliphatic amine in an organic matrix and for low levels of sulfate in an anion matrix. J. Chromatogr. A, 671 (1994) 11-14.
- See also 4176, 4192, 4205, 4210, 4228, 4242, 4288, 4322, 4323, 4499, 4542, 4544, 4899.
- 17b. Catecholamines and their metabolites
- 4507 Alburges, M.E., Narang, N. and Wamsley, J.K.: A sensitive and rapid HPLC-ECD method for the simultaneous analysis of norepinephrine, dopamine, serotonin and their primary metabolites in brain tissue. *Biomed. Chromatogr.*, 7 (1993) 306-310.
- 4508 Aymard, N., Honore, P. and Carbuccia, I.: Determination of 5-hydroxytryptamine and tryptophan by liquid chromatography in whole blood. Its interest for the exploration of mental disorders. *Prog. Neuro-Psychopharmacol. Biol. Psychiatry*, 18 (1994) 77-86; C.A., 120 (1994) 293247g.
- 4509 García, J.C., Blanco, L., McPherson, M., Leiva, A. and Maciás, R.: High-performance liquid chromatographic determination of norepinephrine, epinephrine and dopamine in human foetal adrenal gland. J. Chromatogr. B, 656 (1994) 77-80.
- 4510 Gariepy, K.C., Bailey, B., Yu, J., Maher, T. and Acworth, I.N.: Simultaneous determination of norepinephrine, dopamine, and serotonin in hippocampal microdialysis samples using normal bore high performance liquid chromatography: effects of dopamine receptor agonist stimulation and euthanasia. J. Liq. Chromatogr., 17 (1994) 1541-1556.
- 4511 Mashige, F., Ohkubo, A., Matsushima, Y., Takano, M., Tsuchiya, E., Kanazawa, H., Nagata, Y., Takai, N., Shinozuka, N. and Sakuma, I.: High-performance liquid chromatographic determination of catecholamine metabolites and 5-hydroxyindoleacetic acid in human urine using a mixed-mode column and an eight-channel electrode electrochemical detector. J. Chromatogr. B, 658 (1994) 63-68.
- 4512 Newton, A.P. and Justice, J.B., Jr.: Temporal response of microdialysis probes to local perfusion of dopamine and cocaine followed with one-minute sampling. *Anal. Chem.*, 66 (1994) 1468-1472.
- 4513 Rocklin, R.D., Tullsen, T.R. and Marucco, M.G.: Maximizing signal-to-noise ratio in direct current and pulsed amperometric detection. J. Chromatogr. A, 671 (1994) 109-114.
- 4514 Sarzanini, C., Mentasti, E. and Nerva, M.: Determination of catecholamines by ion chromatography and electrochemical detection. J. Chromatogr. A, 671 (1994) 259-264.
- 4515 Shen, Y. and Ye, M.Y.: Determination of the stability of dopamine in aqueous solutions by high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1557-1565.
- 4516 Van Haaster, C.M.C.J., Engels, W., Lemmens, P.J.M.R., Hornstra, G. and van der Vusse, G.J.: Rapid and highly sensitive high-performance liquid chromatographic method for the determination of histamine and 3-methylhistamine in biological samples using fluorescamine as the derivatizing agent. J. Chromatogr. B, 657 (1994) 261.

- 17c. Urea and guanidine derivatives
- 4517 Milchert, E. and Pazdzioch, W.: Determination of ethyl N-phenyl carbamate, 4,4'-methylenebis(ethyl phenylcarbamate) and 4,4'-methylenebis(phenyl isocyanate) by high-performance liquid chromatography. Analyst (Cambridge), 119 (1994) 1493-1495.
- 4518 Shintani, H.: Selection of columns for analysis of blood urea. *J. Liq. Chromatogr.*, 17 (1994) 1737-1742.
- 17d. Other amine derivatives and amides (excl. peptides)
- 4519 Fossati, T., Colombo, M., Castiglioni, C. and Abbiati, G.: Determination of plasma choline by high-performance liquid chromatography with a postcolumn enzyme reactor and electrochemical detection. J. Chromatogr. B, 656 (1994) 59-64
- 4520 Moreau, J.L., Azza, S., Bigey, F., Arnaud, A. and Galzy, P.: Application of high-performance liquid chromatography to the study of the biological transformation of adiponitrile. *J. Chromatogr. B*, 656 (1994) 197-202.
- 4521 Nair, J.B.: Determination of trace levels of cyanamide in a novel potassium channel activator bulk drug by pulsed electrochemical detection. J. Chromatogr. A, 671 (1994) 367-374.
- See also 4205, 4502, 5016, 5081, 5087.
- AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PRO-TEINS
- 18a. Amino acids and their derivatives
- 4522 Abbiati, G., Rigoldi, M., Frignani, S., Colombo, L. and Mussini, E.: Determination of pyridinium crosslinks in plasma and serum by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 303-310.
- 4523 Arbault, P., Gineyts, E., Grimaux, M., Seguin, P. and Delmas, P.D.: A rapid procedure for purifying large amounts of pyridinoline crosslinks of bone. *J. Liq. Chromatogr.*, 17 (1994) 1981-1993.
- 4524 Begley, D.J., Reichel, A. and Ermisch, A.: Simple high-performance liquid chromatographic analysis of free primary amino acid concentrations in rat plasma and cisternal cerebrospinal fluid. J. Chromatogr. B, 657 (1994) 185-191.
- 4525 Bhushan, R. and Joshi, S.: Resolution of enantiomers of amino acids by HPLC. *Biomed. Chromatogr.*, 7 (1993) 235-250 - a review with 186 refs.
- 4526 Cardillo, M., Fedeli, E. and Oliveira, M.N.: (Determination by ion-exchange chromatography of hydroxyproline as measure of collagen content in food, pharmaceutical and cosmetic products). *Riv. Ital. Sostanze Grasse*, 70 (1993) 501-503; C.A., 120 (1994) 330799m.
- 4527 Charpiot, P., Calaf, R., Chareyre, C., Rolland, P.H. and Garcon, D.: Rapid determination of desmosine and isodesmosine in tissue hydrolyzates by isocratic high performance liquid chromatography and precolumn derivatization. *Amino Acids*, 6 (1994) 57-63; C.A., 120 (1994) 318495b.

- 4528 Cheng, C. and Lin, F.-Y.: Ligand-exchange chromatography of amino acid enantiomers and its application to the biotransformation of DL-aspartic acid by *Psudomonas dacunhae*. Chromatographia, 39 (1994) 15-22.
- 4529 De Witt, P., Deias, R., Muck, S., Galletti, B., Meloni, D., Celletti, P. and Marzo, A.: High-performance liquid chromatography and capillary electrophoresis of L- and D-carnitine by precolumn diastereomeric derivatization. J. Chromatogr. B, 657 (1994) 67-73.
- 4530 Duescher, R.J., Lawton, M.P., Philpot, R.M. and Elfarra, A.A.: Flavin-containing monooxygenase (FMO)-dependent metabolism of methionine and evidence for FMO3 being the major FMO involved in methionine sulfoxidation in rabbit liver and kidney microsomes. J. Biol. Chem., 269 (1994) 117525-17530.
- 4531 Gentili, D., Zucchetti, M., Conter, V., Masera, G. and D'Incalci, M.: Determination of L-asparagine in biological samples in the presence of L-asparaginase. J. Chromatogr. B, 657 (1994) 47-52
- 4532 Gorbics, L., Urge, L. and Otvos, L., Jr.: Comparative and optimized dabsyl-amino acid analysis of synthetic phosphopeptides and glycopeptides. J. Chromatogr. A, 676 (1994) 169-176.
- 4533 Gotti, R., Andrisano, V., Cavrini, V. and Bungini, A.: Determination of glutathione in pharmaceuticals and cosmetics by HPLC with UV and fluorescence detection. *Chromatographia*, 39 (1994) 23-28.
- 4534 Grzywacz, C.M.: Identification of proteinaceous binding media in paintings by amino acid analysis using 9-fluorenylmethyl chloroformate derivatization and reversed-phase high-performance liquid chromatography. J. Chromatogr. A, 676 (1994) 177-183.
- 4535 Hartkopf, J., Pahlke, C., Lüdemann, G. and Erbersdobler, H.F.: Determination of N^e-carboxymethyllysine by a reversed-phase high-performance liquid chromatography method. *J. Chroma-togr. A*, 672 (1994) 242-246.
- 4536 Hirota, T., Minato, K., Ishii, K., Nishimura, N. and Sato, T.: High-performance liquid chromatographic determination of the enantiomers of carnitine and acetylcarnitine on a chiral stationary phase. *J. Chromatogr. A*, 673 (1994) 37-43.
- 4537 Hosoda, K., Omae, K., Takebayashi, T., Wada, H., Sakurai, H. and Shibata, T.: (Determination of δ-aminolevulinic acid in blood using stopped-flow HPLC). *Bunseki Kagaku*, 43 (1994) 311-316; C.A., 120 (1994) 291546e.
- 4538 Imai, K. and Fukushima, T.: Derivatization with fluorogenic benzofurazan reagents of amino acid enantiomers and their separation on a Pirkle type column. *Biomed. Chromatogr.*, 7 (1993) 275-276.
- 4539 İmakyure, O., Kai, M. and Ohkura, Y.: A fluorogenic reagent for amino acids in liquid chromatography, 4-(2-cyanoisoindolyl)phenylisothiocyanate. Anal. Chim. Acta, 291 (1994) 197-204.
- 4540 Jacobsen, D.W., Gatautis, V.J., Green, R., Robinson, K., Savon, S.R., Secic, M., Ji, J., Otto, J.M. and Taylor, L.M., Jr.: Rapid HPLC determination of total homocysteine and other thiols in serum and plasma: sex differences and correlation with cobalamin and folate concentrations in healthy subjects. *Clin. Chem. (Washington)*, 40 (1994) 873-881.
- 4541 Jegorov, A., Tříska, J. and Trnka, T.: 1-Thio-β-D-galactose as a chiral derivatization agent for the resolution of D,L-amino acid enantiomers. *J. Chromatogr. A*, 673 (1994) 286-290.

- 4542 Kirschbaum, J., Luckas, B. nad Beinert, W.D.: HPLC analysis of biogenic amines and amino acids in food: after automatic precolumn derivatization with 9-fluorenylmethyl chloroformate. *Int. Lab.*, 24, No. 8 (1994) 27-30.
- 4543 Lin, C.-E. and Lin, C.-H.: Enantiomer separation of amino acids on a chiral stationary phase derived from L-alanyl- and pyrrolidinyl-disubstituted cyanuric chloride. *J. Chromatogr. A*, 676 (1994) 303-309.
- 4544 Maier-Rosenkranz, J., Maisch, A., Kupka, A. and Földi, P.: Superior precolumn derivatization of biological amines with fluorenyl derivatives using the ADAM-EVE approach. *LC-GC Int.*, 7 (1994) 509±516.
- 4545 Molnár-Perl, I. and Khalifa, M.: Analysis of foodstuff amino acids using vapour-phase hydrolysis. *LC-GC Int.*, 7 (1994) 395-398
- 4546 Nokihara, K., Kuriki, T. and Morita, N.: Two-dimensional electrophoresis as a complementary method of isolating peptide fragments of cleaved proteins for internal sequencing. *J. Chromatogr. A*, 676 (1994) 233-238.
- 4547 Okamoto, M., Takahashi, K.-I. and Doi, T.: Direct stereochemical resolution of 3,4-dihydroxyphenylserine using a chiral crown ether stationary phase. J. Chromatogr. A, 675 (1994) 244-247.
- 4548 Péter, A., Tóth, G. and Tourwé, D.: Monitoring of optical isomers of some conformationally constrained amino acids with tetrahydroisoquinoline or tetraline ring structures. *J. Chromatogr. A*, 668 (1994) 331-335.
- 4549 Pirkle, W.H., Bowen, W. and Vuong, D.V.: Liquid chromatographic separation of the enantiomers of cyclic β-amino esters as their N-3,5-dinitrobenzoyl derivatives. *J. Chromatogr. A*, 676 (1994) 297-302.
- 4550 Saurina, J. and Hernández-Cassou, S.: Determination of amino acids by ion-pair liquid chromatography with post-column derivatization using 1,2-naphthoquinone-4-sulfonate. *J. Chromatogr. A*, 676 (1994) 311-319.
- 4551 Sugahara, K., Jianying, Z. and Kodama, H.: Liquid chromatographic-mass spectrometric analysis of N-acetylamino acids in human urine. *J. Chromatogr. B*, 657 (1994) 15-21.
- 4552 Sypniewski, S. and Bald, E.: Ion-pair high-performance liquid chromatography of cysteine and metabolically related compounds in the form of their S-pyridinium derivatives. *J. Chro*matogr. A, 676 (1994) 321-330.
- 4553 Takeuchi, T. and Miwa, T.: Effect of cyclodextrin as mobile phase additive on fluorescence intensity of dansylamino acids in microcolumn liquid chromatography. *Anal. Chim. Acta*, 292 (1994) 275-279.
- 4554 Tatár, E., Khalifa, M., Záray, G. and Molnár-Perl, I.: Comparison of the recovery of amino acids in vapour-phase hydrolysates of proteins performed in a Pico Tag work station and in a microwave hydrolysis system. *J. Chromatogr. A*, 672 (1994) 109-115.
- 4555 Torsi, G., Gioacchini, A.M. and Gandini, N.: Absolute analysis method applied to the dansyl derivatives of amino acids in HPLC. Stability of amino acids in 6N HCl. Ann. Chim. (Rome), 83 (1993) 345-354; C.A., 120 (1994) 338094y.
- 4556 Turiák, G. and Volicer, L.: Stability of o-phthalaldehyde-sulfite derivatives of amino acids and their methyl esters: electrochemical and chromatographic properties. *J. Chromatogr. A*, 668 (1994) 323-329.

BIBLIOGRAPHY SECTION

- 4557 Ueno, H., Masuko, T., Wang, J. and Hashimoto, Y.: Epitope mapping of bovine serum albumin using monoclonal antibodies coupled with a photoreactive crosslinker. J. Biochem. (Tokyo), 115 (1994) 1119-1127.
- 4558 Ye, W., Fang, C. and Li, H.: (Determination of pipecolic acid in human plasma by high performance liquid chromatography with fluorescence detection). Sepu, 12 (1994) 128-129; C.A., 120 (1994) 318521g.
- See also 4188, 4289, 4294, 4508, 4584, 4654, 5084.
- 18b. Peptides, peptidic and proteinous hormones, growth factors
- 4559 Bílek, R., Bradbury, A.F. and Smyth, D.G.: Synthesis and high-performance liquid chromatographic purification of tritiated thyrotrophin-releasing hormone-like peptides. J. Chromatogr. B, 656 (1994) 115-118.
- 4560 Boppana, V.K. and Miller-Stein, C.: Determination of a novel hematoregulatory peptide in dog plasma by reversed-phase high-performance liquid chromatography and an amine-selective o-phthaldialdehyde-thiol post-column reaction with fluorescence detection. J. Chromatogr. A, 676 (1994) 161-167.
- 4561 Bösze, S., Mák, M., Medzihradszky-Schweiger, H. and Hudecz, F.: Chromatographic characterization of HSV-1 gD 268-284 and IL-6 179-185 synthetic oligopeptides by reversed-phase high-performance liquid chromatography, automated Edman degradation and mass spectrometric analysis. J. Chromatogr. A, 668 (1994) 345-351.
- 4562 Brizzi, V. and Corradini, D.: Rapid analysis of somatostatin in pharmaceutical preparations by HPLC with a micropellicular reversed-phase column. J. Pharm. Biomed. Anal., 12 (1994) 821-824.
- 4563 Chang, J.P., Tucker, R.C., Ghrist, B.F. and Coleman, M.R.: Non-denaturing assay for the determination of the potency of recombinant bovine somatotropin by high-performance size-exclusion chromatography. J. Chromatogr. A, 675 (1994) 113-122.
- 4564 Chishima, S.: A radioimmunoassay for TA-0910, a new metabolically stable thyrotrophin-releasing hormone analogue. *J. Pharm. Biomed. Anal.*, 12 (1994) 795-804.
- 4565 Cox, S., Harvey, R. and Frazier, D.: High-performance liquid chromatographic determination of intrathecally administered [D-Ala²-D-Leu⁵]-enkephalin concentrations in canine cerebrospinal fluid. *J. Chromatogr. B*, 657 (1994) 243-247.
- 4566 Elicone, C., Lui, M., Geromanos, S., Erdjument-Bromage, H. and Tempst, P.: Microbore reversed-phase high-performance liquid chromatographic purification of peptides for combined chemical sequencing-laser-desorption mass spectrometric analysis. J. Chromatogr. A, 676 (1994) 121-137.
- 4567 Fujinari, E.M. and Manes, J.D.: Nitrogen-specific detection of peptides in liquid chromatography with a chemiluminescent nitrogen detector. J. Chromatogr. A, 676 (1994) 113-120.
- 4568 Jarzebinski, J. and Szrajber, Z.: (Examination of certain peptides isolated from the residue left after insulin separation from pancreas. III. Analytical characteristic of the products separated by chromatography and electrophoresis). Acta Pol. Pharm., 50 (1993) 121-125; C.A., 120 (1994) 318776u.

- 4569 Kaur, H. and Halliwell, B.: Aromatic hydroxylation of phenylalanine as an assay for hydroxyl radicals. Measurement of hydroxyl radical formation from ozone and in blood from premature babies using improved HPLC methodology. Anal. Biochem., 220 (1994) 11-15.
- 4570 Larsimont, V., Prokai, L. and Hochhaus, G.: Leucine enkephalintyrosinase reaction products - identification and biological activity. *Biochim. Biophys. Acta*, 1222 (1994) 95-100.
- 4571 Lawton, L.A., Edwards, C. and Codd, G.A.: Extraction and high-performance liquid chromatographic method for the determination of microcystins in raw and treated waters. *Analyst (Cambridge)*, 119 (1994) 1525-1530.
- 4572 Lew, R.A., Tetaz, T.J., Glucksman, M.J., Roberts, J.L. and Smith, A.I.: Evidence for a two-step mechanism of gonadotropin-releasing hormone metabolism by prolyl endopeptidase and metalloendopeptidase EC 3.4.24.15 in ovine hypothalamic extracts. J. Biol. Chem., 269 (1994) 12626-12632.
- 4573 Li, Y., Huan, Q., Zhang, S., Liu, S., Chi, C. and Tang, Y.: Studies on an artificial trypsin inhibitor peptide derived from the mung bean trypsin inhibitor: chemical synthesis, refolding, and crystallographic analysis of its complex with trypsin. J. Biochem. (Tokyo), 116 (1994) 18-25.
- 4574 Lin, H.Y. and Voyksner, R.D.: Analysis of neuropeptides by perfusion liquid charomatography/electrospray ion-trap mass spectrometry. *Rapid Commun. Mass Spectrom.*, 8 (1994) 333-338; C.A.: 120 (1994) 290275d.
- 4575 Loutelier, C., Lange, C., Cassier, P., Vey, A. and Cherton, J.-C.: Non-extractive metabolism study of E and A destruxins in the locust, *Locusta migratoria* L. III. Direct high-performance liquid chromatographic analysis and parallel fast atom bombardment mass spectrometric monitoring. *J. Chromatogr. B*, 656 (1994) 281-292.
- 4576 McIntosh, J.M., Yoshikami, D., Mahe, E., Nielsen, D.B., Rivier, J.E., Gray, W.R. and Olivera, B.M.: A nicotinic acetylcholine receptor ligand of unique specificity, α-conotoxin Iml. J. Biol. Chem., 269 (1994) 16733-16739.
- 4577 Miller, B.T., Rogers, M.E., Smith, J.S. and Kurosky, A.: Identification and characterization of O-biotinylated hydroxy amino acid residues in peptides. *Anal. Biochem.*, 219 (1994) 240-248
- 4578 Monks, S.A., Gould, A.R., Lumley, P.E., Alewood, P.F., Kem, W.R., Goss, N.H. and Norton, R.S.: Limited proteolysis study of structure-function relationships in Sh I, a polypeptide neurotoxin from a sea anemone. *Biochim. Biophys. Acta*, 1207 (1994) 93-101.
- 4579 Nashabeh, W., Greve, K.F., Kirby, D., Foret, F., Karger, B.L., Reifsnyder, D.H. and Builder, S.E.: Incorporation of hydrophobic selectivity in capillary electrophoresis: analysis of recombinant insulin-like growth factor I variants. *Anal. Chem.*, 66 (1994) 2148-2154.
- 4580 Neubauer, G. and Anderegg, R.J.: Identifying charge states of peptides in liquid chromatography/electrospray ionization mass spectrometry. *Anal. Chem.*, 66 (1994) 1056-1061.
- 4581 Nguyen, T.M., Mommsen, T.P., Mims, S.M. and Conlon, J.M.: Characterization of insulins and proglucagon-derived peptides from a phylogenetically ancient fish, the paddlefish (*Polyodon spathula*). *Biochem. J.*, 300 (1994) 339-345.

LIQUID COLUMN CHROMATOGRAPHY B379

- 4582 Ogawa, Y., Umeda, Y., Kato, I. and Matsumoto, I.: Simultaneous measurement of thirteen human serum peptide hormones by ion spray liquid chromatography-mass spectrometry. Adv. Chem. Diagn. Treat. Metab. Disord., 1 (1992) 143-152; C.A., 120 (1994) 290273b.
- 4583 Olson, C.V., Reifsnyder, D.H., Canova-Davis, E., Ling, V.T. and Builder, S.E.: Preparative isolation of recombinant human insulin-like growth factor 1 by reversed-phase high-performance liquid chromatography. J. Chromatogr. A, 675 (1994) 101-112.
- 4584 Parmelee, D.C., Hoang, T.N., Benjamin, T. and Sechi, S.: Noninterfering synthetic peptides as internal controls for amino acid sequencing of sample unknowns. *Anal. Biochem.*, 219 (1994) 71-81.
- 4585 Quistad, G.B. and Skinner, W.S.: Isolation and sequencing of insecticidal peptides from the primitive hunting spider, *Plectreu-rys tristis* (Simon). *J. Biol. Chem.*, 269 (1994) 11098-11101.
- 4586 Qureshi, G.A., Bednar, I., Min, Q., Södersten, P., Silberring, J., Nyberg, F. and Thörnwall, M.: Quantitation and identification of two cholecystokinin peptides, CCK-4 and CCK-8s, in rat brain by HPLC and fast atom bombardment mass spectrometry. Biomed. Chromatogr., 7 (1993) 251-255.
- 4587 Reubsaet, J.L.E., Beijnen, J.H., Bult, A., Teeuwsen, J., Koster, E.H.M., Waterval, J.C.M. and Underberg, W.J.M.: Reversed-phase high-performance liquid chromatography and capillary electrophoresis in the stability study of the neuropeptide growth factor antagonist [Arg⁶,D-Trp^{7,9},MePhe⁸]-substance P {6-11}: a comparative study. Anal. Biochem., 220 (1994) 98-102.
- 4588 Rodriguez-Ariza, A., Toribio, F. and López-Barea, J.: Rapid determination of glutathione status in fish liver using high-performance liquid chromatography and electrochemical detection. J. Chromatogr. B, 656 (1994) 311-318.
- 4589 Rosnack, K.J., Stroh, J.G., Singleton, D.H., Guarino, B.C. and Andrews, G.C.: Use of capillary electrophoresis-electrospray ionization mass spectrometry in the analysis of synthetic peptides. J. Chromatogr. A, 675 (1994) 219-225.
- 4590 Sanderson, K., Thörnwall, M., Nyberg, G., Glämsta, E.-L. and Nyberg, F.: Reversed-phase high-performance liquid chromatography for the determination of haemorphin-like immunoreactivity in human cerebrospinal fluid. J. Chromatogr. A, 676 (1994) 155-160.
- 4591 Sereda, T.J., Mant, C.T., Sönnichsen, F.D. and Hodges, R.S.: Reversed-phase chromatography of synthetic amphipathic α-helical peptides as a model for ligand/receptor interactions. Effect of changing hydrophobic environment on the relative hydrophilicity/hydrophobicity of amino acid side-chains. J. Chromatogr. A, 676 (1994) 139-153.
- 4592 Tagliaro, F., Moffa, M., Gentile, M.M., Clavenna, G., Valentini, R., Ghielmi, S. and Marigo, M.: Free solution capillary electrophoresis of calcitonins and calcitonin tryptic digests. *J. Chromatogr. B*, 656 (1994) 107-113.
- 4593 Tetaert, D., Soudan, B., Lo-Guidice, J.-M., Richet, C., Degand, P., Boussard, G., Mariller, C. and Spik, G.: Combination of high-performance anion-exchange chromatography and electrospray mass spectrometry for analysis of the *in vitro* O-glycosylated mucin motif peptide. *J. Chromatogr. B*, 658 (1994) 31-38.
- 4594 Wang, Q.C., Švec, F. and Fréchet, J.M.J.: Reversed-phase chromatography of small molecules and peptides on a continuous rod of macroporous poly(styrene-co-divinylbenzene). J. Chromatogr. A, 669 (1994) 230-235.

4595 Watanabe, T., Shintani, A., Nakata, M., Shing, Y., Folkman, J., Igarashi, K. and Sasada, R.: Recombinant human betacellulin. Molecular structure, biological activities, and receptor interaction. *J. Biol. Chem.*, 269 (1994) 9966-9973.

See also 4263, 4386, 4683, 4977.

- 18c. Elucidation of structure of proteins and enzymes
- 4596 Berger, S., Karamanos, Y., Schoentgen, F. and Julien, R.: Characterization and use of biotinylated *Escherichia coli* K99 lectin. *Biochim. Biophys. Acta*, 1206 (1994) 197-202.
- 4597 Bischof, O., Kruft, V. and Wittmann-Liebold, B.: Analysis of the puromycin binding site in the 70 S ribosome of Escherichia coli at the peptide level. J. Biol. Chem., 269 (1994) 18315-18319.
- 4598 D'Avino, R., Caruso, C., Tamburrini, M., Romano, M., Rutigliano, B., Polverino de Laureto, P., Camardella, L., Carratore, V. and diPrisco, G.: Molecular characterization of the functionally distinct hemoglobins of the antarctic fish *Trematomus newnesi. J. Biol. Chem.*, 269 (1994) 9675-9681.
- 4599 Eguchi, M., Itoh, M., Nishino, K., Shibata, H., Tanaka, T., Kamei-Hayashi, K. and Hara, S.: Amino acid sequence of an inhibitor from the silkworm (Bombyx mori) hemolymph against fungal protease. J. Biochem. (Tokyo), 115 (1994) 881-884.
- 4600 Kim, U., Garner, T.L., Sanford, T., Speicher, D., Murray, J.M. and Nishikura, K.: Purification and characterization of doublestranded RNA adenosine deaminase from bovine nuclear extracts. J. Biol. Chem., 269 (1994) 13480-13489.
- 4601 Kodama, H., Asai, K., Adachi, T., Mori, Y., Hayashi, K., Hirano, K. and Stigbrand, T.: Expression of a heterodimeric (placental-intestinal) hybrid alkaline phosphatase in KB cells. *Biochim. Biophys. Acta*, 1218 (1994) 163-172.
- 4602 Komalavilas, P. and Lincoln, T.M.: Phosphorylation of the inositol 1,4,5-trisphosphate receptor by cyclic GMP-dependent protein kinase. J. Biol. Chem., 269 (1994) 8701-8707.
- 4603 Komatsu, H. and Tawada, K.: Trinitrophenylation of the reactive lysine residue in double-headed myosin in the presence of PP. J. Biochem. (Tokyo), 115 (1994) 1190-1196.
- 4604 Kurata, H., Sannoh, T., Kozutsumi, Y., Yokota, Y. and Kawasaki, T.: Structure and function of mannan-binding proteins isolated from human liver and serum. *J. Biochem. (Tokyo)*, 115 (1994) 1148-1154
- 4605 MacDonald, J.I.S. and Kent, C.: Identification of phosphorylation sites in rat liver CTP: phosphocholine cytidylyltransferase. J. Biol. Chem., 269 (1994) 10529-10537.
- 4606 Matsui Lee, I.S., Takio, K., Kido, R. and Titani, K.: Purification and amino- and carboxyl-terminal amino acid sequences of alanine-glyoxylate transaminase 1 from human liver. *J. Biochem (Tokyo)*, 116 (1994) 12-17.
- 4607 Mattar, S., Scharf, B., Kent, S.B.H., Rodewald, K., Oesterhelt, D. and Engelhard, M.: The primary structure of halocyanin, an archaeal blue copper protein, predicts a lipid anchor for membrane fixation. *J. Biol. Chem.*, 269 (1994) 14939-14945.
- 4608 Mezgueldi, M., Derancourt, J., Calas, B., Kassab, R. and Fattoum, A.: Precise identification of the regulatory F-actin- and calmodulin-binding sequences in the 10-kDa carboxyl-terminal domain of caldesmon. *J. Biol. Chem.*, 269 (1994) 12824-12832

B380 BIBLIOGRAPHY SECTION

- 4609 Miesbauer, L.R., Zhou, X., Yang, Z., Yang, Z., Sun, Y., Smith, D.L. and Smith, J.B.: Post-translational modifications of watersoluble human lens crystallins from young adults. *J. Biol. Chem.*, 269 (1994) 12494-12502.
- 4610 Nakayama, S., Tanaka, H., Yajima, E. and Maita, T.: Primary structure of chicken cardiac myosin S-1 heavy chain. J. Biochem. (Tokyo), 115 (1994) 909-926.
- 4611 Pavela-Vrancic, M., Pfeifer, E., Schröder, W., von Döhren, H. and Kleinkauf, H.: Identification of the ATP binding site in tyrocidine synthetase 1 by selective modification with fluorescein 5'isothiocyanate. J. Biol. Chem., 269 (1994) 14962-14966.
- 4612 Pennington, J. and Harding, J.J.: Identification of the site of glycation of γ-II-crystallin by (¹⁴C)-fructose. *Biochim. Biophys.* Acta, 1226 (1994) 163-167.
- 4613 Roberts, D.L., Bennett, D.W. and Forst, S.A.: Identification of the site of phosphorylation on the osmosensor, EnvZ, of Escherichia coli. J. Biol. Chem., 269 (1994) 8728-8733.
- 4614 Ronnenberg, J., Preitz, B., Wöstemeier, G. and Diekmann, S.: Immobilized residue-specific endoproteinases for protein sequencing. J. Chromatogr. B, 656 (1994) 169-177.
- 4615 Rudnick, S.E., Hilser, V.J., Jr. and Worosila, G.D.: Comparison of the utility of capillary zone electrophoresis and high-performance liquid chromatography in peptide mapping and separation. J. Chromatogr. A, 672 (1994) 219-229.
- 4616 Scaloni, A., Barra, D., Jones, W.M. and Manning, J.M.: Human acylpeptide hydrolase. Studies on its thiol groups and mechanism of action. *J. Biol. Chem.*, 269 (1994) 15076-15084.
- 4617 Sekimoto, T., Fukui, T. and Tanizawa, K.: Role of the conserved glycyl residues located at the active site of leucine dehydrogenase from *Bacillus stearothermophilus*. J. Biochem. (Tokyo), 116 (1994) 176-182.
- 4618 Winz, R., Hess, D., Aebersold, R. and Brownsey, R.W.: Unique structural features and differential phosphorylation of the 280kDa component (isozyme) of rat liver acetyl-CoA carboxylase. J. Biol. Chem., 269 (1994) 14438-14445.
- See also 4546, 4561, 4566, 4585, 4592, 4632, 4669, 4728, 4729, 4738.

19. PROTEINS

19a. General techniques

- 4619 Frechet, J.M.J., Svec, F. and Smigol, V.: Multimodal chromatographic separation of proteins and nucleic acids. *PCT Int.* Appl. WO 94 08,686 (Cl. B01D15/08), 28 Apr. 1994, US Appl. 964,404, 21 Oct. 1992; 52 p.; C.A., 121 (1994) 12998m.
- 4620 Hodges, R.S., Zhu, B.-Y., Zhou, N.E. and Mant, C.T.: Reversed-phase liquid chromatography as a useful probe of hydrophobic interactions involved in protein folding and protein stability. J. Chromatogr. A, 676 (1994) 3-15.
- 4621 Ivanov, A.E. and Zubov, V.P.: Adsorption and separation of proteins on composite anion exchangers with poly(N-diethylaminoethylacrylamide) bonded phases. *J. Chromatogr. A*, 673 (1994) 159-165.
- 4622 Kleinmann, I., Plicka, J., Smidl, P. and Vins, I.: Hydrophobic interaction chromatography of proteins on HEMA-based sorbents. *Int. Lab.*, 24, No. 8 (1994) P18-P21.

- 4623 Richards, K.L., Aguilar, M.I. and Hearn, M.T.W.: Effect of protein conformation on experimental bandwidths in reversed-phase high-performance liquid chromatography. J. Chromatogr. A, 676 (1994) 33-41.
- 4624 Szepesy, L. and Rippel, G.: Effect of the characteristics of the phase system on the retention of proteins in hydrophobic interaction chromatography. J. Chromatogr. A, 668 (1994) 337-344
- For additional information see C.A.: 121 (1994) 4200e, 4205k, 4235v.
- See also 4263, 4268.
- 19b. Proteins of cells, viruses and subcellular particles
- 4625 Gachot, B., Tauc, M., Wanstok, F., Morat, L. and Poujeol, P.: Zinc transport and metallothionein induction in primary cultures of rabbit kidney proximal cells. *Biochim. Biophys. Acta*, 1191 (1994) 291-298.
- 4626 Ogata, K., Kurahashi, A., Nishiyama, C. and Terao, K.: Presence and role of the 5SrRNA-L5 protein complex (5SRNP) in the threonyl- and histidyl-tRNA synthetase complex in rat liver cytosol. *Biochim. Biophys. Acta*, 1218 (1994) 388-400.
- See also 4466, 4597.
- Proteins synthesized by genetic manipulation, monoclonal antibodies
- 4627 Agraz, A., Duarte, C.A., Costa, L., Pérez, L., Páez, R., Pujol, V. and Fontirrochi, G.: Immunoaffinity purification of recombinant hepatitis B surface antigen from yeast using a monoclonal antibody. J. Chromatogr. A, 672 (1994) 25-33.
- 4628 Arizono, H., Ishii, S., Nagao, T., Kudo, S., Sasaki, S., Kondo, S. and Kiyoki, M.: Pharmacokinetics of a new human monoclonal antibody against cytomegalovirus. First communication: Plasma concentration, distribution, metabolism and excretion of the new monoclonal antibody: regavirumab after intravenous administration in rats and rabbits. Arzneim.-Forsch., 44 (1994) 890-808.
- 4629 DeManno, D.A., Jackiw, V., Brooks, E.J. and Hunzicker-Dunn, M.: Characterization of recombinant RIβ and evaluation of the presence of RIβ protein in rat brain and testicular extracts. *Bio-chim. Biophys. Acta*, 1222 (1994) 501-510.
- 4630 Liška, V., Dyr, J.E., Suttnar, J., Hirsch, I. and Vonka, V.: Production and simple purification of a protein encoded by part of the gag gene of HIV-I in the *Escherichia coli* HB101F⁺ expression system inducible by lactose and isopropyl-β-D-thiogalactopyranoside. *J. Chromatogr. B*, 656 (1994) 127-133.
- 4631 Mimura, T., Hayashi, I., Hoshino, T. and Oh-ishi S.: Demonstration of high-molecular-weight kininogen in kininogen-deficient rat kidneys. *J. Biochem. (Tokyo)*, 116 (1994) 59-63.
- 4632 Pacitti, A., Stevis, P., Evans, M., Trowbridge, I. and Higgins, T.J.: High level expression and purification of the enzymatically active cytoplasmic region of human CD45 phosphatase from yeast. *Biochim. Biophys. Acta*, 1222 (1994) 277-286.
- 4633 Potter, P.M., Lassiter, A. and Brent, T.P.: Purification to homogeneity of a human DNA repair protein using an alternative to DNA-affinity chromatography. *Methods Mol. Cell. Biol.*, 4 (1993) 139-146; C.A., 121 (1994) 4231r.

- 4634 Randall, R.E., Young, D., Hanke, T., Szawlowski, P. and Botting, C.: Purification of antibody-antigen complexes containing recombinant SIV proteins: comparison of antigen and antibody-antigen complexes for immune priming. Vaccine, 12 (1994) 351-358; C.A., 120 (1994) 320851h.
- 4635 Suttnar, J., Dyr, J.E., Hamšíková, E., Novák, J. and Vonka, V.: Procedure for refolding and purification of recombinant proteins from *Escherichia coli* inclusion bodies using a strong anion exchanger. *J. Chromatogr. B*, 656 (1994) 123-126.

See also 4269, 4640.

- 19d. Microbial and plant proteins
- 4636 Amarowicz, R., Ciska, E. and Kmita-Glazewska, H.: Fast ion-exchange chromatography of low-molecular rapeseed proteins. Pol. J. Food Nutr. Sci., 2 (1993) 77-82; C.A., 120 (1994) 296886a.
- 4637 Duman, J.G.: Purification and characterization of a thermal hysteresis protein from a plant, the bittersweet nightshade Solanum dulcamara. Biochim. Biophys. Acta, 1206 (1994) 129-135.
- 4638 Fanget, B. and Francon, A.: Process for preparation of hepatitis A virus antigen and vaccine. Eur. Pat. Appl. EP 593,339 (Cl. CO7K3/18), 20 Apr. 1994, FR Appl. 92/12,285, 14 Oct. 1992; 5 pp.; C.A., 120 (1994) 321350f.
- 4639 Murty, M.G., Srinivas, G., Bora, R.S. and Sekar, V.: A simple method for separation of the protein crystals from *Bacillus thu*ringiensis using carboxymethyl cellulose column chromatography. *J. Microbiol. Methods*, 19 (1994) 103-110; C.A., 120 (1994) 318497d.
- 4640 Schmidt, T.G.M. and Skerra, A.: One-step affinity purification of bacterially produced proteins by means of the "Strep tag" and immobilized recombinant core streptavidin. *J. Chroma-togr. A*, 676 (1994) 337-345.
- 4641 Soffientini, A., Lorenzetti, R., Gastaldo, L., Parlett, J.H., Spurio, R., La Teana, A. and Islam, K.: Purification procedure for bacterial translational initiation factors IF2 and IF3. Protein Expression PUrif., 5 (1994) 118-124; C.A., 120 (1994) 293256j.
- 4642 Yamano, A. and Teeter, M.M.: Correlated disorder of the pure Pro²²/Leu²⁵ form of crambin at 150 K refined to 1.05-Å resolution. *J. Biol. Chem.*, 269 (1994) 13956-13965.
- For additional information see C.A.: 120 (1994) 318494a.
- See also 4607, 4613, 4627, 4683, 4695, 4700.
- 19e. Proteins of blood, serum and blood cells
- 4643 Andersson, C., Iresjo, B.-M. and Lundholm, K.: Isolation of radiopure plasma and hepatic albumin in acute phase conditions. Clin. Nutr., 13 (1994) 35-41; C.A., 120 (1994) 318506f.
- 4644 Cavanagh, A.C. and Morton, H.: The purification of early-pregnancy factor to homogeneity from human platelets and identification as chaperonin 10. Eur. J. Biochem., 222 (1994) 551-560.

- 4645 DiScipio, R.G.: The fractionation of human plasma proteins. III. Purification of complement factors D and I using affinity chromatography. *Protein Expression Purif.*, 5 (1994) 178-186; C.A., 120 (1994) 296156n.
- 4646 DiScipio, R.G. and Sweeney, S.P.: The fractionation of human plasma. II. The purification of human complement proteins C3, C3u, and C5 by application of affininity chromatography. Protein Expression Purif., 5 (1994) 170-177; C.A., 120 (1994) 296155m.
- 4647 Ghanem, A.B., Winchenne, J.J., Lopez, C., Chrétien, S., Dubarry, M., Craescu, C.T., Le Caer, J.P., Casadevall, N., Rouger, P., Cartron, J.P. and Lambin, P.: Purification and biological activity of a recombinant human erythropoietin produced by lymphoblastoid cells. *Prepar. Biochem.*, 24 (1994) 127-142.
- 4648 Hasegawa, N., Watanabe, M., Okano, H.J. and Ohno, T.: A rapid and large scale purification of monoclonal antibody IgG2a and IgG2b in mouse ascites with Zetaprep 15 QAE disk. *Jikeikai Med. J.*, 40 (1993) 489-497; C.A., 121 (1994) 6749q.
- 4649 Khan, M.T., Wang, K.K.W., Villalobo, A. and Roufogalis, B.D.: Characterization of a novel high molecular mass protein with peptidase activity purified from the human erythrocyte membrane by calmodulin affinity chromatography. J. Biol. Chem., 269 (1994) 10016-10021.
- 4650 Moon, H.J., Lee, S.Y., Kurata, S., Natori, S. and Lee, B.L.: Purification and molecular cloning of cDNA for and inducible antibacterial protein from larvae of the coleopteran, *Tenebrio molitor. J. Biochem. (Tokyo)*, 116 (1994) 53-58.
- 4651 Müller-Schulte, D., Melzer, H. and Mann, H.: Removal of β₂-microglobulin using grafted affinity adsorbents as therapeutic approach for the treatment of hemodialysis patients. *J. Chromatogr. B*, 656 (1994) 135-141.
- 4652 Nadler, T.K., Paliwal, S.K. and Regnier, F.E.: Rapid, automated, two-dimensional high-performance liquid chromatographic analysis of immunoglobulin G and its multimers. *J. Chroma*togr. A, 676 (1994) 331-335.
- 4653 Nag, B., Mukku, P.V., Arimilli, S., Kendrick, T., Deshpande, S.V. and Sharma, S.D.: Separation of complexes of major histocompatibility class II molecules and known antigenic peptide by metal chelate affinity chromatography. J. Immunol. Methods, 169 (1994) 273-285; C.A., 120 (1994) 296136f.
- 4654 Sacks, D.B.: Alteration of calmodulin-protein interactions by a monoclonal antibody to calmodulin. *Biochim. Biophys. Acta*, 1206 (1994) 120-128.
- 4655 Sluzky, V., Shakrokh, Z., Stratton, P., Eberlein, G. and Wang, Y.J.: Chromatographic methods for quantitative analysis of native, denatured, and aggregated basic fibroblast growth factor in solution formulations. *Pharm. Res.*, 11 (1994) 485-490; C.A., 120 (1994) 307589j.
- 4656 Sultan, Y., Boyeldieu, D. and Stieltjes, N.: Products for the treatment of hemophilia A and B prepared by ion exchange chromatography. *Nouv. Rev. Fr. Hematol.*, 36 (1994) 559-560; C.A., 120 (1994) 330888q - a review with no refs.
- 4657 Van den Berg, C.W. and van Dijk, H.: Rapid, activity-guided isolation of sex-limited protein (Slp) from mouse serum by fractionated precipitation and high-performance liquid chromatography. J. Immunol. Methods, 169 (1994) 251-256; C.A., 120 (1994) 296135e.
- 4658 Yamada, T., Kluve-Beckerman, B., Liepnieks, J.J. and Benson, M.D.: Fibril formation from recombinant human serum amyloid A. *Biochim. Biophys. Acta*, 1226 (1994) 323-329.

- 4659 Yoshida, H., Nishihara, H. and Kataoka, T.: Adsorption of BSA on strongly basic chitosan: equilibria. *Biotechnol. Bioeng.*, 43 (1994) 1087-1093; C.A., 120 (1994) 318500z.
- 4660 Zhou, F.L., Burnouf-Radosevich, M. and Burnouf, T.: Purification of factor VIII/von Willebrand factor from human plasma on immoblized lentil lectin. *Protein Expression Purif.*, 5 (1994) 138-143; C.A., 120 (1994) 293257k.
- See also 4275, 4385, 4599, 4631, 4667, 4668, 4688.
- 19f. Structural and muscle proteins
- 4661 Fujii, T., Oomatsuzawa, A., Kuzumaki, N. and Kondo, Y.: Calcium-dependent regulation of smooth muscle calponin by S100. J. Biochem. (Tokyo), 116 (1994) 121-127.
- 4662 Kato, K., Goto, S., Inaguma, Y., Hasegawa, K., Morishita, R. and Asano, T.: Purification and characterization of a 20-kDa protein that is highly homologous to βB crystallin. J. Biol. Chem., 269 (1994) 15302-15309.
- 4663 McGregor, A., Blanchard, A.D., Rowe, A.J. and Critchley, D.R.: Identification of the vinculin-binding site in the cytoskeletal protein α-actinin. *Biochem. J.*, 301 (1994) 225-233.
- 4664 Pedersen, B.J. and Bonde, M.: Purification of human procollagen type I carboxyl-terminal propeptide cleaved as in vivo from procollagen and used to calibrate a radioimmunoassay of the propeptide. Clin. Chem. (Washington), 40 (1994) 811-816.
- See also 4603, 4608, 4610, 4654, 5105.
- 19g. Protamines, histones and other nuclear proteins
- 4665 Davies, N. and Lindsey, G.G.: Histone H2B (and H2A) ubiquitination allows normal histone octamer and core particle reconstitution. *Biochim. Biophys. Acta*, 1218 (1994) 187-193.
- 19h. Chromoproteins and metalloproteins
- 4666 Escriou, V., Laporte, F., Garin, J., Brandolin, G. and Vignais, P.V.: Purification and physical properties of a novel type of cytochrome b from rabbit peritoneal neutrophils. *J. Biol. Chem.*, 269 (1994) 14007-14014.
- 4667 Khoo, U.Y., Newman, D.J., Miller, W.K. and Price, C.P.: The influence of glycation on the peroxidase activity in haemoglobin. Eur. J. Clin. Chem. Clin. Biochem., 32 (1994) 435-440.
- 4668 Merruer, M.H., van Kooten, E.A.W., Sluiter, H.E. and Zuijderhoudt, F.M.J.: Influence of uraemia on the determination of blood glycohaemoglobin by HPLC, electrophoresis, and affinity chromatography in diabetic and non-diabetic patients. Eur. J. Clin. Chem. Clin. Biochem., 32 (1994) 361-364.
- 4669 Naud, I., Vincon, M., Garin, J., Gaillard, J., Forest, E. and Jouanneau, Y.: Purification of a sixth ferredoxin from Rhodobacter capsulatus. Primary structure and biochemical properties. Eur. J. Biochem., 222 (1994) 933-939.
- 4670 Pobedimskaya, D.D., Molchanova, T.P., Amernick, R., Druskin, M.S., Webber, B.B., Wilson, J.B. and Huisman, T.H.J.: Hb Sinai-Baltimore or α₂β₂18(A15)Val→Gly, a silent, mildly unstable β chain variant detected by isoelectrofocusing and high performance liquid chromatography. *Hemoglobin*, 17 (1993) 505-512; C.A., 120 (1994) 318762m.

- 4671 Richard, L., Batten, J., Jambou, J., Jourdan, F. and Laverdure, G.: Hemoglobin A1c by liquid chromatography: clinical application. Am. Clin. Lab., 13 (1994) 26-27; C.A., 120 (1994) 293236c.
- 4672 Richards, K.L., Aguilar, M.I. and Hearn, M.T.W.: A comparative study of the retention behaviour and stability of cytochrome c in reversed-phase high-performance liquid chromatography. J. Chromatogr. A, 676 (1994) 17-31.
- 4673 Roa, P.D., Turner, E.A., Aguinaga, M. Del Pilar: Hemoglobin variant detection from dried blood specimens by high performance liquid chromatography. *Ann. Clin. Lab. Sci.*, 23 (1993) 433-438; C.A., 120 (1994) 293246f.
- 4674 Suttnar, J., Fořtová, H. and Brabec, V.: EDMA 2000 as a matrix for high-performance liquid chromatography of human haemoglobin chains. J. Chromatogr. B, 656 (1994) 119-122.
- For additional information see C.A.: 120 (1994) 296763h, 318830g.
- See also 4598, 4623, 5114.
- Proteins of glands, gland products, various zymogens (incl. milk proteins)
- 4675 Konecny, P., Brown, R.J. and Scouten, W.H.: Chromatographic purification of immunoglobulin G from bovine milk whey. J. Chromatogr. A, 673 (1994) 45-53.
- 4676 Mandal, A. and Bhattacharyya, A.K.: Isolation of the predominant coagulum protein of human semen before liquefaction. Hum. Reprod., 9 (1994) 320-324; C.A., 121 (1994) 4237x.
- 4677 Stevenson, E.M. and Leaver, J.: Chromatographic separation of the proteins of mouse milk. *Int. Dairy J.*, 4 (1994) 205-220; C.A., 120 (1994) 318507g.
- For additional information see C.A.: 120 (1994) 296890x.
- See also 4275, 4698.
- 19j. Proteins of brain, cerebrospinal fluid and eye
- 4678 Buczylko, J. and Palczewski, K.: Purification of arrestin from bovine retinas. *Methods Neurosci.*, 15(Photoreceptor Cells) (1993) 226-236; C.A., 120 (1994) 293235b.
- 4679 Nürnberg, B., Spicher, K., Harhammer, R., Bosserhoff, A., Frank, R., Hilz, H. and Schultz, G.: Purification of a novel G-protein α₀-subtype from mammalian brain. *Biochem. J.*, 300 (1994) 387-394.
- 4680 Patel, Y., Martin, H., Howell, S., Jones, D., Robinson, K. and Aitken, A.: Purification of 14-3-3 protein and analysis of isoforms in chicken brain. *Biochim. Biophys. Acta*, 1222 (1994) 405-409
- 4681 Rao, P.V., Horwitz, J. and Zigler, J.S., Jr.: Chaperone-like activity of α-crystallin. The effect of NADPH on its interaction with ξcrystallin. J. Biol. Chem., 269 (1994) 13266-13272.
- 4682 Wang, K. and Spector, A.: The chaperone activity of bovine α crystallin. Interaction with other lens crystallins in native and denatured states. J. Biol. Chem., 269 (1994) 13601-13608.

See also 4609, 4612.

- 191. Specific binding and receptor proteins
- 4683 Curmi, P.A., Maucuer, A., Asselin, S., Lecourtois, M., Chaffotte, A., Schmitter, J.-M. and Sobel, A.: Molecular characterization of human stathmin expressed in *Escherichia coli*: site-directed mutagenesis of two phosphorylatable series (Ser-25 and Ser-63). *Biochem. J.*, 300 (1994) 331-338.
- 4684 Dostálová, Z., Calvete, J.J., Sanz, L. and Töpfer-Petersen, E.: Quantitation of boar spermadhesins in accessory sex gland fluids and on the surface of epididymal, ejaculated and capacitated spermatozoa. *Biochim. Biophys. Acta*, 1200 (1994) 48-54
- 4685 Guyard-Dangremont, V., Lagrost, L. and Gambert, P.: Comparative effects of purified apolipoproteins A-I, A-II, and A-IV on cholesteryl ester transfer protein activity. *J. Lipid Res.*, 35 (1994) 982-992.
- 4686 Liang, H.-Q., Rye, K.-A. and Barter, P.J.: Dissociation of lipid-free apolipoprotein A-I from high density lipoproteins. *J. Lipid Res.*, 35 (1994) 1187-1199.
- 4687 Loukas, S., Mercouris, M., Panetsos, F. and Zioudrou, C.: Purification to homogeneity of an active opioid receptor from rat brain by affinity chromatography. *Proc. Natl. Acad. Sci. U.S.A.*, 91 (1994) 4574-4578; C.A., 121 (1994) 1154g.
- 4688 Morton, R.E. and Greene, D.J.: Regulation of lipid transfer between lipoproteins by an endogenous plasma protein: selective inhibition among lipoprotein classes. J. Lipid Res., 35 (1994) 836-847.
- 4689 Nishiki, T., Kamata, Y., Nemoto, Y., Omori, A., Ito, T., Takahashi, M. and Kozaki, S.: Identification of protein receptor for Clostridium botulinum type B neurotoxin in rat brain synaptosomes. J. Biol. Chem., 269 (1994) 10498-10503.
- 4690 O'Rourke, F., Soons, K., Flaumenhauft, R., Watras, J., Baio-Larue, C., Matthews, E. and Feinstein, M.B.: Ca²⁺ Release by inositol 1,4,5-trisphosphate is blocked by the K+-channel blockers apamin and tetrapentylammonium ion, and a monoclonal antibody to a 63 kDa membrane protein: reversal of blockade by K+ ionophores nigericin and valinomycin and purification of the 63 kDa antibody-binding protein. *Biochem. J.*, 300 (1994) 673-683.
- 4691 Toft, E., Södeström, M., Ahlberg, M.B. and DePierre, J.W.: A novel 34 kDa glutathione-binding protein in mature rat ovary. *Biochem. Biophys. Res. Commun.*, 201 (1994) 149-154.
- 4692 Van Dieijen-Visser, M.P., van Pelt, J. and Delaere, K.P.J.: Pitfalls in the differentiation of N-glycosylation variants of prostate-specific antigen using concanavalin A. Eur. J. Clin. Chem. Clin. Biochem., 32 (1994) 473-478.
- 4693 Wenzel, U. and Ziegler, K.: Binding proteins for cyclosomatostatins and bile acids in basolateral plasma membranes of rat liver. *Biochim. Biophys. Acta*, 1193 (1994) 17-23.
- 4694 Wu, C.Y.E., Blaszczak, L.C., Smith, M.C. and Skatrud, P.L.: Construction of a modified penicillin-binding protein 2a from methicillin-resistant *Staphylococcus aureus* and purification by immobilized metal affinity chromatography. *J. Bacteriol.*, 176 (1994) 1539-1541; C.A., 120 (1994) 293245e.
- 4695 Yacoub, A., Lindahl, P., Rubin, K., Wendel, M., Heinegard, D. and Ryden, C.: Purification of a bone sialoprotein-binding protein from Staphylococcus aureus. Eur. J. Biochem., 222 (1994) 919-925.

- 4696 Yoshida, M., Kanematsu, T., Watanabe, Y., Koga, T., Ozaki, S., Iwanaga, S. and Hirata, M.: D-myo-Inositol 1,4,5-trisphosphate-binding proteins in rat brain membranes. J. Biochem. (Tokyo), 115 (1994) 973-980.
- See also 4393, 4440, 4460, 4602, 4604.
- 19m. Urinary proteins
- 4697 Arai, H., Tomizawa, S., Maruyama, K., Seki, Y. and Kuroume, T.: Reversed-phase high-performance liquid chromatography for analysis of urinary proteins: diagnostic significance of α₁-acid glycoprotein. Nephron, 66 (1994) 278-284; C.A., 120 (1994) 318504d.
- 19n. Other proteins (incl. proteinous inhibitors of enzymic activity)
- 4698 Berkovsky, A.L. and Potapov, P.P.: Use of metal-chelate affinity chromatography and hydrophobic interaction chromatography for purification of placental protein 12. *J. Chromatogr. B*, 656 (1994) 432-435.
- 4699 Nakagawa, H., Komorita, N., Shibata, F., Ikesue, A., Konishi, K., Fujioka, M. and Kato, H.: Identification of cytokine-induced neutrophil chemoattractants (CINC), rat GRO/CINC-2α and CINC-2β, produced by granulation tissue in culture: purification, complete amino acid sequences and characterization. *Biochem. J.*, 301 (1994) 545-550.
- 4700 Truscott, K.N., Hoj, P.B. and Scopes, R.K.: Purification and characterization of chaperonin 60 and chaperonin 10 from the anaerobic thermophile *Thermoanaerobacter brochnii*. Eur. J. Biochem., 222 (1994) 277-284.
- 20. ENZYMES AND ENZYME ACTIVITY ESTIMATION
- 4701 Lambeth, D.O. and Muhonen, W.W.: High-performance liquid chromatography-based assays of enzyme activities. *J. Chromatogr. B*, 656 (1994) 143-157 a review with 113 refs.
- 20a. Oxidoreductases
- 4702 De Prada, P., Setchell, K.D.R. and Hylemon, P.B.: Purification and characterization of a novel 17α-hydroxysteroid dehydrogenase from an intestinal Eubacterium sp. VPI 12708. J. Lipid Res., 35 (1994) 922-929.
- 4703 Eriksson, A.C., Sjöling, S. and Glaser, E.: The ubiquinol cytochrome c oxidoreductase complex of spinach leaf mitochondria is involved in both respiration and protein processing. *Biochim. Biophys. Acta*, 1186 (1994) 221-231.
- 4704 Genet, R., Denoyelle, C. and Ménez, A.: Purification and partial characterization of an amino acid α,β-dehydrogenase, L-tryptophan 2',3'-oxidase from Chemobacterium violaceum. J. Biol. Chem., 269 (1994) 18177-18184.
- 4705 Gennaro, M.C., Abrigo, C. and Cipolla, G.: High-performance liquid chromatography of food colours and its relevance in forensic chemistry. *J. Chromatogr. A*, 674 (1994) 281-299 - a review with 95 refs.
- 4706 Inazu, N., Nagashima, Y., Satoh, T. and Fujii, T.: Purification and properties of six aldo-keto reductases from rat adrenal gland. J. Biochem. (Tokyo), 115 (1994) 991-999.

- 4707 Karam, W.G. and Chiang, J.Y.L.: Expression and purification of human cholesterol 7α-hydroxylase in Escherichia coli. J. Lipid Res., 35 (1994) 1222-1231.
- 4708 Kim, K.-S., Kubota, S., Kuriyama, M., Fujiyama, J., Björkhem, I., Eggertsen, G. and Seyama, Y.: Identification of new mutations in sterol 27-hydroxylase gene in Japanese patients with cerebrotendinous xanthomatosis (CTX). J. Lipid Res., 35 (1994) 1031-1039.
- 4709 Klein, C.R., Kesseler, F.P., Perrei, C., Frank, J., Duine, J.A. and Schwartz, A.C.: A novel dye-linked formaldehyde dehydrogenase with some properties indicating the presence of a protein-bound redox-active quinone cofactor. *Biochem. J.*, 301 (1994) 289-295.
- 4710 Maellaro, E., del Bello, B., Sugherini, L., Santucci, A., Comporti, M. and Casini, A.F.: Purification and characterization of glutathione-dependent dehydroascorbate reductase from rat liver. *Biochem. J.*, 301 (1994) 471-476.
- 4711 Malherbe, P., Köhler, C., da Prada, M., Lang, G., Kiefer, V., Schwarcz, R., Lahm, H.-W. and Cesura, A.M.: Molecular cloning and functional expression of human 3-hydroxyanthranilic-acid dioxygenase. J. Biol. Chem., 269 (1994) 13792-13797.
- 4712 Ohshima, T., Nishida, N., Bakthavatsalam, S., Kataoka, K., Takada, H., Toshimura, T., Esaki, N. and Soda, K.: The purification, characterization, cloning and sequencing of the gene for a halostable and thermostable leucine dehydrogenase from Thermoactinomyces intermedius. Eur. J. Biochem., 222 (1994) 305-312.
- 4713 Reddy, R.G., Yoshimoto, T., Yamamoto, S., Funk, C.D. and Marnett, L.J.: Expression of porcine leukocyte 12-lipoxygenase in a baculovirus/insect cell system and its characterization. Arch. Biochem. Biophys., 312 (1994) 219-226.
- 4714 Rettie, A.E., Lawton, M.P., Sadeque, A.J.M., Meier, G.P. and Philpot, R.M.: Prechiral sulfoxidation as a probe for multiple forms of the microsomal flavin-containing monooxygenase: studies with rabbit FMO₁, FMO₂, FMO₃, and FMO₅ expressed in Escherichia coli. Arch. Biochem. Biophys., 311 (1994) 369-377.
- 4715 Van Veldhoven, P.P., van Rompuy, P., Franssen, M., de Béthune, B. and Mannaerts, G.P.: Large-scale purification and further characterization of rat pristanoyl-CoA-oxidase. *Eur. J. Biochem.*, 222 (1994) 795-801.
- 20b. Transferases (excl. E.C. 2.7.-.-)
- 4716 Bokar, J.A., Rath-Shambaugh, M.E., Ludwiczak, R., Narayan, P. and Rottman, F.: Characterization and partial purification of mRNA N⁶-adenosine methyltransferase from HeLa cell nuclei. Internal mRNA methylation requires a multisubunit complex. *J. Biol. Chem.*, 269 (1994) 17697-17704.
- 4717 Canepari, S., Carunchio, V., Girelli, A.M. and Messina, A.: Determination of aspartate aminotransferase activity by high-performance liquid chromatography. *J. Chromatogr. B*, 656 (1994) 191-195.
- 4718 Horbach, M.E., Sies, H. and Akerboom, T.P.M.: Purification of rat liver plasma membrane glutathione transferase. Eur. J. Biochem., 222 (1994) 91-96.
- 4719 Kitazume, S., Kitajima, K., Inoue, S., Inoue, Y. and Troy, II, F.A.: Developmental expression of trout egg polysialoglycoproteins and the prerequisite α2,6-, and α2,8-sialyl and α2,8-polysialyltransferase activities required for their synthesis during oogenesis. *J. Biol. Chem.*, 269 (1994) 10330-10340.

- 4720 Ofman, R. and Wanders, R.J.A.: Purification of peroxisomal acyl-CoA:dihydroxyacetonephosphate acyltransferase from human placenta. *Biochim. Biophys. Acta*, 1206 (1994) 27-34.
- 4721 Shimoji, M. and Aniya, Y.: Glutathione S-transferases in rat testis microsomes: comparison with liver transferase. J. Biochem. (Tokyo), 115 (1994) 1128-1134.
- 4722 Wheatley, J.B., Hughes, B., Bauer, K. and Schmidt, D.E., Jr.: Study of chromatographic parameters for glutathione S-transferases on an high-performance liquid chromatography affinity stationary phase. J. Chromatogr. A, 676 (1994) 81-90.
- 4723 Wheatley, J.B., Montali, J.A. and Schmidt, D.E., Jr.: Coupled affinity-reversed-phase high-performance liquid chromatography systems for the measurement of glutathione S-transferases in human tissues. J. Chromatogr. A, 676 (1994) 65-79.

For additional information see C.A.: 120 (1994) 292565v.

See also 4606, 4633, 4686.

- Transferases transferring phosphorus containing groups (E.C. 2.7.-.-)
- 4724 Bravo, J., Fernández, E., Ribó, M., de Llorens, R. and Cuchillo, C.M.: A versatile negative-staining ribonuclease zymogram. Anal. Biochem., 219 (1994) 82-86.
- 4725 Feher, Z. and Mishra, N.C.: Aphidicolin-resistant Chinese hamster ovary cells possess altered DNA polymerases of the α-family. Biochim. Biophys. Acta, 1218 (1994) 35-47.
- 4726 Hughes, P.J., Kirk, C.J. and Michell, R.H.: Inhibition of porcine brain inositol 1,3,4-trisphosphate kinase by inositol polyphosphates, other polyol phosphates, polyanions and polycations. *Biochim. Biophys. Acta*, 1223 (1994) 57-70.
- 4727 Liu, J.J. and McLennan, A.G.: Purification and properties of GTP:GTP guanylyltransferase from encysted embryos of the brine shrimp Artemia. J. Biol. Chem., 269 (1994) 11787-11794.
- 4728 Nomura, H., Inokuchi, N., Kobayashi, H., Koyama, T., Iwama, M., Ohgi, K. and Irie, M.: Purification and primary structure of a new guanylic acid specific ribonuclease from *Pleurotus ostreatus*. J. Biochem. (Tokyo), 116 (1994) 26-33.
- 4729 Palladino, D.E.H., Hopkins, J.L., Ingraham, R.H., Warren, T.C., Kapadia, S.R., van Moffaert, G.J., Grob, P.M., Stevenson, J.M. and Cohen, K.A.: High-performance liquid chromatography and photoaffinity crosslinking to explore the binding environment of nevirapine to reverse transcriptase of human immunodeficiency virus type-1. J. Chromatogr. A, 676 (1994) 99-112
- 4730 Quamme, G., Pelech, S., Biber, J. and Murer, H.: Abnormalities of parathyroid hormone-mediated signal transduction mechanisms in opossum kidney cells. *Biochim. Biophys. Acta*, 1223 (1994) 107-116.
- 4731 Sommer, D. and Song, P.-S.: A plant nucleoside diphosphate kinase homologous to the human Nm23 gene product: purification and characterization. *Biochim. Biophys. Acta*, 1222 (1994) 464-470.
- 4732 Stadlbauer, F., Brueckner, A., Rehfuess, C., Eckerskorn, C., Lottspeich, F., Förster, V., Tseng, B.Y. and Nasheuer, H.-P.: DNA replication in vitro by recombinant DNA-polymerase-α-primase. Eur. J. Biochem., 222 (1994) 781-793.

- 4733 Stocchi, V., Cardoni, P., Ceccaroli, P., Piccoli, G., Cucchiarini, L., de Bellis, R. and Dacha, M.: High resolution of multiple forms of rabbit reticulocyte hexokinase type I by hydrophobic interaction chromatography. *J. Chromatogr. A*, 676 (1994) 51-63.
- 4734 Tsubokawa, M., Yanagi, S., Sada, K., Nakamura, S.-i., Saito, H. and Yamamura, H.: CPTK71, a cytosolic protein-tyrosine kinase previously purified from bovine platelets, is identical with p72syk. Biochem. Biophys. Res. Commun., 200 (1994) 1592-1597.

See also 4605, 4736.

- 20d. Hydrolases, acting on ester bonds (E.C. 3.1.-.-)
- 4735 Asano, M., Tamiya-Koizumi, K., Homma, Y., Takenawa, T., Nimura, Y., Kojima, K. and Yoshida, S.: Purification and characterization of nuclear phospholipase C specific for phosphinositides. J. Biol. Chem., 269 (1994) 12360-12366.
- 4736 Farooqui, A.A., Yang, H.-C. and Horrocks, L.A.: Purification of lipases, phospholipases and kinases by heparin-Sepharose chromatography. *J. Chromatogr. A*, 673 (1994) 149-158 a review with 67 refs.
- 4737 Hansbro, P.M., Foster, P.S., Hogan, S.P., Ozaki, S. and Denborough, M.A.: Purification and characterization of D-myo-inositol(1,4,5)/(1,3,4,5)-polyphosphate 5-phosphatase from skeletal muscle. Arch. Biochem. Biophys., 311 (1994) 47-54.
- 4738 Mejdoub, H., Reinbolt, J. and Gargouri, Y.: Dromedary pancreatic lipase: Purification and structural properties. *Biochim. Bio*phys. Acta, 1213 (1994) 119-126.
- 4739 Pesi, R., Turriani, M., Allegrini, S., Scolozzi, C., Camici, M., Ipata, P.L. and Tozzi, M.G.: The bifunctional cytosolic 5'-nucleotidase: regulation of the phosphotransferase and nucleotidase activities. Arch. Biochem. Biophys., 312 (1994) 75-80.
- 4740 Thompson, F.J. and Clark, M.A.: Purification of a lysophosphatidic acid-hydrolysing lysophospholipase from rat brain. *Biochem. J.*, 300 (1994) 457-461.
- 4741 Wilcke, M. and Alexson, S.E.H.: Characterization of acyl-CoAthioesterase activity in isolated rat liver peroxisomes. Partial purification and characterization of a long-chain acyl-CoA-thioesterase. Eur. J. Biochem., 222 (1994) 803-811.
- 4742 Wu, C.Y., Chen, C.F. and Chiang, C.F.: Purification of phospholipase C from rat cerebral cortex. *Prepar. Biochem.*, 24 (1994) 99-111.
- 4743 Zaman, Z., van Orshoven, A., Mariën, G., Fevery, J. and Blanckaert, N.: Simultaneous macroamylasemia and macrolipasemia. *Clin. Chem. (Washington)*, 40 (1994) 939-942.

See also 4390, 4398, 4601, 4632.

- 20e. Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)
- 4744 Chaga, G., Porath, J. and Illéni, T.: Isolation and purification of amyloglucosidase from Halobacterium sodomense. Biomed. Chromatogr., 7 (1993) 256-261.
- 4745 Chou, M., Li, S., Kiso, M., Hasegawa, A. and Li, Y.: Purification and characterization of sialidase L, a NeuAcα2→3Gal-specific sialidase. J. Biol. Chem., 269 (1994) 18821-18826.

- 4746 Lasonder, E., Bloemhoff, W. and Welling, G.W.: Interaction of lysozyme with synthetic anti-lysozyme D1.3 antibody fragments studied by affinity chromatography and surface plasmon resonance. J. Chromatogr. A, 676 (1994) 91-98.
- 4747 Quirós, L.M., Hernández, C. and Salas, J.A.: Purification and characterization of an extracellular enzyme from Strepotomyces antibioticus that converts inactive glycosylated oleandomycin into the active antibiotic. Eur. J. Biochem., 222 (1994) 129-135.
- 4748 Zschoche, A., Fürst, W., Schwarzmann, G. and Sandhoff, K.: Hydrolysis of lactosylceramide by human galactosylceramidase and GM1-β-galactosidase in a detergent-free system and its stimulation by sphingolipid activator proteins, sap-B and sap-C. Activator proteins stimulate lactosylceramide hydrolysis. *Eur. J. Biochem.*, 222 (1994) 83-90.

See also 4743, 4852, 5084.

20f. Other hydrolases

- 4749 Baragi, V., Fliszar, C.J., Conroy, M.C., Ye, Q., Shipley, J.M. and Welgus, H.G.: Contribution of the C-terminal domain of metalloproteinases to binding by tissue inhibitor of metalloproteinases. C-terminal truncated stromelysin and matrilysin exhibit equally compromised binding affinities as compared to fulllength stromelysin. J. Biol. Chem., 269 (1994) 12692-12697.
- 4750 Chung, B.H., Chu, C.W., Chang, Y.K., Sohn, J.H., Rhee, S.K. and Park, Y.H.: Immobilized metal ion affinity chromatography of genetically engineered hirudin variants. *J. Microbiol. Biotech*nol., 3 (1993) 161-167; C.A., 120 (1994) 292681g.
- 4751 Dekeyser, P.M., de Smedt, S., Demeester, J. and Lauwers, A.: Fractionation and purification of the thiol proteinases from papaya latex. *J. Chromatogr. B*, 656 (1994) 203-208.
- 4752 Dwod, A.J., Smith, A.M., McGonigle, S. and Dalton, J.P.: Purification and characterization of a second cathepsin L proteinase secreted by the parasitic trematode Fasciola hepatica. Eur. J. Biochem., 223 (1994) 91-98.
- 4753 Hamabata, T., Okimura, H., Yokoyama, N., Takahashi, T. and Takahashi, K.: Purification, characterization, and localization of follipsin, a novel serine proteinase from the fluid of porcine ovarian follicles. J. Biol. Chem., 269 (1994) 17899-17904.
- 4754 Hojima, Y., Mörgelin, M.M., Engel, J., Boutillon, M.-M., van der Rest, M., McKenzie, J., Chen, G., Rafi, N., Romanic, A.M. and Prockop, D.J.: Characterization of type I procollagen N-proteinase from fetal bovine tendon and skin. Purification of the 500kilodalton form of the enzyme from bovine tendon. *J. Biol. Chem.*, 269 (1994) 11381-11390.
- 4755 Hung, C.-C. and Chiou, S.-H.: Isolation of multiple isoforms of α-fibrinogenase from the western diamondbrack rettlesnake, Crotalus atrox: N-terminal sequence homology with ancrod, an antithrombotic agent from malayan viper. Biochem. Biophys. Res. Commun., 201 (1994) 1414-1423.
- 4756 Lucas, N., Mazaud-Aujard, C., Bremaud, L., Cenatiempo, Y. and Julien, R.: Protein purification, gene cloning and sequencing of an acidic endoprotease from Myxococcus xanthus DK101. Eur. J. Biochem., 222 (1994) 247-254.
- 4757 Oppezzo, O., Ventura, S., Bergman, T., Vendrell, J., Jörnvall, H. and Avilés, F.X.: Procarboxypeptidase in rat pancreas. Overall characterization and comparison of the activation processes. *Eur. J. Biochem.*, 222 (1994) 55-63.

- 4758 Sagar, S.L., Beitle, R.R., Ataai, M.M. and Domach, M.M.: Metal-based affinity separation of α- and γ-chymotrypsin and thermal stability analysis of isolates. *Bioseparation*, 3 (1993) 291-296; *C.A.*, 120 (1994) 292612k.
- 4759 Schönlein, C., Löffler, J. and Huber, G.: Purification and characterization of a novel metalloprotease from human brain with the ability to cleave substrate derived from the N-terminus of β-amyloid protein. *Biochem. Biophys. Res. Commun.*, 201 (1994) 45-53.
- 4760 Tezapsidis, N. and Parish, D.C.: Characterization of a metalloprotease from ovine chromaffin granules which cleaves a proenkephalin fragment (BAM12P) at a single arginine residue. Biochem. J., 301 (1994) 607-614.
- 4761 Thomas, M.P., Topham, C.M., Kowlessur, D., Mellor, G.W., Thomas, E.W., Whitford, D. and Brocklehurst, K.: Structure of chymopapain M the late-eluted chymopapain deduced by comparative modelling techniques and active-centre characteristics determined by pH-dependent kinetics of catalysis and reactions with time-dependent inhibitors: the Cys-25/His-159 ion-pair is insufficient for catalytic competence. Biochem. J., 300 (1994) 805-820.
- 4762 Van Alebeek, G.-J.W.M., Keltjens, J.T. and van der Drift, C.: Purification and characterization of inorganic pyrophosphatase from Methanobacterium thermoautotrophicum (strain ΔH). Biochim. Biophys. Acta, 1206 (1994) 231-239.

For additional information see C.A.: 121 (1994) 3956u.

See also 4600, 4616.

20g. Lyases

- 4763 Dubery, I.A. and Smit, F.: Phenylalanine ammonia-lyase from cotton (Gossypium hirsutum) hypocotyls: properties of the enzyme induced by a Verticillium dahliae phytotoxin. Biochim. Biophys. Acta, 1207 (1994) 24-30.
- 4764 Hughes, J., de C.Carvalho, F.J.P. and Hughes, M.A.: Purification, characterization, and cloning of α-hydroxynitrile lyase from cassava (Manihot esculenta Crantz.) Arch. Biochem. Biophys., 311 (1994) 496-502.
- 4765 Rokosz, L.L., Boulton, D.A., Butkiewicz, E.A., Sanyal, G., Cueto, M.A., Lachance, P.A. and Hermes, J.D.: Human cytoplasmic 3-hydroxy-3-methylglutaryl coenzyme A synthase: expression, purification, and characterization of recombinant wild-type and Cys¹²⁹ mutant enzymes. *Arch. Biochem. Biophys.*, 312 (1994) 1-3.

See also 4823.

20h. Isomerases

4766 Kozyavkin, S.A., Krah, R., Gellert, M., Stetter, K.O., Lake, J.A. and Slesarev, A.I.: A reverse gyrase with an unusual structure. A type I DNA topoisomerase from the hyperthermophile *Methanopyrus kandleri* is a two-subunit protein. *J. Biol. Chem.*, 269 (1994) 11081-11089.

- 4767 Mochizuki, K., Hosono, K. and Kobayashi, H.: Purification and some properties of a novel racemase, which racemizes 2oxothiazolidine-4-carboxylic acid and 5-oxoproline, from Flectobacillus sp. strain B-1. Biochim. Biophys. Acta, 1200 (1994) 27-33.
- 4768 Schmitz, W., Fingerhut, R. and Conzelman, E.: Purification and properties of an α-methylacyl-CoA racemase from rat liver. Eur. J. Biochem., 222 (1994) 313-323.
- 4769 Yu, X.-c., Wang, C.-C. and Tsou, C.-L.: Association and dissociation of protein disulfide isomerase. *Biochim. Biophys. Acta*, 1207 (1994) 109-113.

20i. Ligases

4770 Mayer, S.M., Rieble, S. and Beale, S.I.: Metal requirements of the enzymes catalyzing conversion of glutamate to δ-aminolevulinic acid in extracts of *Chlorella vulgaris* and *Synechocys*tis sp. PCC 6803. Arch. Biochem. Biophys., 312 (1994) 203-209.

See also 4611, 4618.

- 20j. Complex mixtures and incompletely identified enzymes
- 4771 Blumenfeld, N., Gonen, H., Mayer, A., Smith, C.E., Siegel, N.R., Schwartz, A.L. and Ciechanover, A.: Purification and characterization of a novel species of ubiquitin-carrier protein, E2, that is involved in degradation of non-"N-end rule" protein substrates. J. Biol. Chem., 269 (1994) 9574-9581.
- 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. Purines, pyrimidines, nucleosides, nucleotides
- 4772 Chen, H., Xiao, F., Zhai, Q. and Zhou, S.: (Quantitatiave determination of adenosine triphosphate in its preparations by reversed-phase ion-pair HPLC). Zhongguo Yaoxue Zazhi, 29 (1994) 108-111; C.A., 120 (1994) 280399h.
- 4773 Chi, K., Kunugi, K.A. and Kinsella, T.J.: Iododeoxyuridine chemosensitization of cis-diaminedichloroplatinum(II) in human bladder cancer cells. Cancer Res., 54 (1994) 2701-2706.
- 4774 Cummings, J., Leonard, R.C.F. and Miller, W.R.: Sensitive determination of 8-chloroadenosine 3',5'-monophosphate and 8-chloroadenosine in plasma by high-performance liquid chromatography. J. Chromatogr. B, 658 (1994) 183-188.
- 4775 Goossens, J.F., Leroux, F., Pommery, N., Pommery, J. and Hénichart, J.P.: High-performance liquid chromatographic determination of cyclic 3',5'-AMP with fluorescence detection. Vasoactive intestinal peptide-induced modification of its concentration in neuroblastoma cells. J. Chromatogr. B, 657 (1994) 192-196
- 4776 Harker, A.J., Evans, G.L., Hawley, A.E. and Morris, D.M.: High-performance liquid chromatographic assay for 2-deoxy-3'-thiacytidine in human serum. *J. Chromatogr. B*, 657 (1994) 227-232.
- 4777 Jain, R., Isac, T.V. and Sharma, M.: Fluorescence postlabeling assay of RNA modification. *Biochem. Biophys. Res. Commun.*, 200 (1994) 1239-1244.

- 4778 Komiyama, M., Kodama, T., Takeda, N., Sumaoka, J., Shiiba, T., Matsumoto, Y. and Yashiro, M.: Catalytically active species for CeCl₃-induced DNA hydrolysis. *J. Biochem. (Tokyo)*, 115 (1994) 809-810.
- 4779 Parker, W.B., Allan, P.W., Niwas, S., Montgomery, J.A. and Bennett, L.L., Jr.: Effect of 9-benzyl-9-deazaguanine, a potent inhibitor of purine nucleoside phosphorylase, on the cytotoxicity and metabolism of 6-thio-2'-deoxyguanosine. Cancer Res., 54 (1994) 1742-1745.
- 4780 Vajda, M., Csarnyi, A., Valko, K. and Forgacs Toth, E.: (Development of methods for the chromatographic determination of Hevizos). Acta Pharm. Hung., 63 (1993) 188-192; C.A., 120 (1994) 307597k.
- 4781 Wise, C.K. and Hass, B.S.: HPLC analysis for 5-methyldeoxy-cytidine in cellular DNA obtained directly from the culture flask. BioTechniques, 16 (1994) 218-222; C.A., 120 (1994) 293237d
- 4782 Xu, X.Z., Yang, T., Chen, S.X., Cheng, H.Q. and Mo, X.M.: (Measurement of guanine plus cytosine content in *Rhizobia* DNA of tropical legumes by high performance liquid chromatography). *Shengwu Huaxue Yu Shengwu Wuli Xuebao*, 25 (1993) 441-445; C.A., 121 (1994) 4241u.
- 4783 Zhao, J., Todd, B. and Fleet, G.H.: Separation of ribonucleotides, ribonucleosides, deoxyribonucleotides, deoxyribonucleosides and bases by reversed-phase high-performance liquid chromatography. J. Chromatogr. A, 673 (1994) 167-171.

For additional information see C.A.: 120 (1994) 296875w; 121 (1994) 4252y.

See also 4847, 5005, 5022, 5031, 5032, 5065, 5071.

21b. Nucleic acids, RNA

- 4784 Chen, Y. and Wu, R.: Altered queuine modification of transfer RNA involved in the differentiation of human K562 erythroleukemia cells in the presence of distinct differentiation inducers. *Cancer Res.*, 54 (1994) 2192-2198.
- 4785 Forgács, E. and Cserháti, T.: Retention behaviour of barbituric acid derivatives on a β-cyclodextrin polymer-coated silica columm. J. Chromatogr. A, 668 (1994) 395-402.
- 4786 Rodnina, M.V., Semenkov, Y.P. and Wintermayer, W.: Purification of fMet-tRNAf^{Met} by fast protein liquid chromatography. Anal. Biochem., 219 (1994) 380-381.

See also 4777.

21c. Nucleic acids, DNA

See 4787.

- 21e. Structural studies on DNA and DNA mapping
- 4787 Oefner, P.J. and Bonn, G.K.: High-resolution liquid chromatography of nucleic acids. *Int. Lab.*, 24, No. 8 (1994) 14-23.

For additional information see C.A.: 120 (1994) 291472c.

21f. Complex mixtures of nucleic acids and their fragments

See 4619.

22. ALKALOIDS

- 4788 Balíková, M. and Večerková, J.: High-performance liquid chromatographic confirmation of cocaine and benzoylecgonine in biological samples using photodiode-array detection after toxicological screening. J. Chromatogr. B, 656 (1994) 267-273.
- 4789 Caslavska, J., Hufschmid, E., Theurillat, R., Desiderio, C., Wolfisberg, H. and Thormann, W.: Screening for hydroxylation and acetylation polymorphisms in man via simultaneous analysis of urinary metabolites of mephenytoin, dextromethorphan and caffeine by capillary electrophoretic procedures. J. Chromatogr. B, 656 (1994) 219-231.
- 4790 Chizzola, R.: Rapid sample preparation technique for the determination of pyrrolizidine alkaloids in plant extracts. *J. Chromatogr. A*, 668 (1994) 427-433.
- 4791 Demetriou, D., Rustemeier, K., Voncken, P. and Schepers, G.: HPLC separation of the enantiomers of nicotine and nicotine-like compounds. *Chirality*, 5 (1993) 300-302; C.A., 120 (1994) 291522u.
- 4792 Duez, P., Milcamp, A., Lompo, M., Guissou, P. and Hanocq, M.: Comparison of HPTLC - fluorodensitometry and HPLC for the assay of strictosamide in the leaves, root and stem bark of Nauclea latifolia. J. Planar Chromatogr., 7 (1994) 5-9.
- 4793 Gomez-Serranillos, P., Carreto, E. and Villar, A.: Analysis of poppy straw and poppy straw concentrate by reverse-phase high-performance liquid chromatography. *Phytochem. Anal.*, 5 (1994) 15-18; C.A., 120 (1994) 307578e.
- 4794 Gordon, B.H., Bakes, D.M., Bennett, P., LeBras, B., Walther, B., Lucas, C., Marc, S. and Gouyette, A.: Methods for the analysis of the new vinca alkaloid derivative, S 12363, in plasma by high-performance liquid chromatography with fluorescence detection. J. Chromatogr. B, 657 (1994) 163-171.
- 4795 Hoke, S.H., II, Cooks, R.G., Chang, C.J., Kelly, R.C., Qualls, S.J., Alvarado, B., McGuire, M.T. and Snader, K.M.: Determination of taxanes in *Taxus brevifolia* extracts by tandem mass spectrometry and high-performance liquid chromatography. *J. Nat. Prod.*, 57 (1994) 277-286; C.A., 120 (1994) 331223f.
- 4796 Hrabalek, A., Dolezal, P., Roman, M., Machacek, M. and Skubalova, Z.: Esters of ω-amino acids as flexible penetration enhancers. *Pharmazie*, 49 (1994) 325-328.
- 4797 Kvasnicka, F., Price, K.R., Ng, K. and Fenwick, G.R.: Determination of potato glycoalkaloids using isotachophoresis and comparison with a HPLC method. *J. Liq. Chromatogr.*, 17 (1994) 1941-1951.
- 4798 Liao, J., Liang, W. and Tu, G.: Determination of quaternary and tertiary alkaloids in *Corydalis decumbens* by reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 669 (1994) 225-229.
- 4799 Nagy-Turák, A. and Végh, Z.: Extraction and in situ densitometric determination of alkaloids from Catharanthus roseus by means of overpressured layer chromatography on aminobonded silica layers. J. Optimization and validation of the separation system. J. Chromatogr. A, 668 (1994) 501-507.

B388 BIBLIOGRAPHY SECTION

- 4800 Razmilic, I., Schmeda-Hirschmann, G., Dutra-Behrens, M., Reyes, S., Lopez, I. and Theoduloz, C.: Rutin and scopoletin content and micropropagation of Fabiana imbricata. Planta Med., 60 (1994) 140-142; C.A., 121 (1994) 3204x.
- 4801 Tagliaro, F., Antonioli, C., Moretto, S., Archetti, S., Ghielmi, S. and Marigo, M.: High-sensitivity low-cost methods for determination of cocaine in hair: high-performance liquid chromatography and capillary electrophoresis. Forensic Sci. Int., 63 (1993) 227-238; C.A., 120 (1994) 291577r.
- 4802 Wildfeuer, A., Pfaff, G. and Lach, P.: Biopharmazeutische Eigenschaften von retardiertem Codeinphosphat. Untersuchung der Wirkstoff-Freisetzung eines Ionenaustauschers in vitro und in vivo. Arzneim.-Forsch., 44 (1994) 758-761.

See also 4512, 5062, 5076, 5080, 5081.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

- 23a. Porphyrins and other pyrroles
- 4803 Boyton, S.B. and Roth, K.S.: Rapid and accurate random urinary porphyrin quantitation. Clin. Chim. Acta, 226 (1994) 1-11.
- 4804 Hungerford, J.M.: Seafood toxins. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 145-150 a review.
- 4805 Li, M., Larter, S.R., Frolov, Y.B. and Bjoroy, M.: Adsorptive interaction between nitrogen compounds and organic and/or mineral phases in subsurface rocks. Models for compositional fractionation of pyrrolic nitrogen compounds in petroleum during petroleum migration. J. High Resolut. Chromatogr., 17 (1994) 230-236.
- 4806 Wan, J.R., Gouterman, M., Green, E. and Khalil, G.-E.: High performance liquid chromatography separation and analysis of metallotetra(pentafluorophenyl)porpholactone. *J. Liq. Chromatogr.*, 17 (1994) 2045-2056.
- 4807 Zeng, Y. and Uden, P.C.: Size exclusion chromatography sample pretreatment for GC-AED analysis of metalloporphyrins in crude oils. J. High Resolut. Chromatogr., 17 (1994) 217-222.
- 23c. Indole derivatives and plant hormones (gibberelins)
- See 4507, 4510, 4833.
- 23d. Pyridine derivatives
- See 4228, 4791, 5008.
- 23e. Other N-heterocyclic compounds
- See 4505, 4833, 5079.
- 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)
- 4808 Bernard, J., Nicodemo, T., Barthakur, N.N. and Blais, J.S.: Design and characterisation of thermochemical high-performance liquid chromatography flame photometric detector interface for speciation of sulfur. *Analyst (Cambridge)*, 119 (1994) 1475-1481.

- 4809 Bojarski, J., Kubaszek, M., Barton, H. and Chmiel, E.: Chromatography of methyl derivatives of 5-ethyl-5-phenyl-2-thiobarbituric acid. J. Chromatogr. A, 668 (1994) 481-484.
- 4810 Crowley, T.O. and Larson, R.A.: HPLC and GC methods for analysis of water-soluble nitrosulfonic acids. *J. Chromatogr. Sci.*, 32 (1994) 57-60.
- 4811 Jira, T., Pfeiffer, W.D., Lachmann, K. and Epperlein, U.: Synthese und HPLC-Trennung chiraler 1,3,4-Thiadiazine und 1,3,4-Selenadiazine. *Pharmazie*, 49 (1994) 401-406.
- 4812 Kishimura, M., Hayashi, M., Hayakawa, K. and Miyazaki, M.: lon chromatographic study of sulphate-triethylenetetramine complexes in aqueous solution. *Anal. Sci.*, 10 (1994) 321-324; C.A., 120 (1994) 314579j.
- 4813 Polanuer, B., Ivanov, S. and Sholin, A.: Rapid assay of dinitrophenyl derivative of taurine by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 81-85.
- 4814 Wagner, J., Offhauss, U. and Martin, A.A.: Enzymic and chromatographic chiral discrimination of racemic (thio)glycidyl esters on modified cellulose chiral stationary phases. *Chirality*, 5 (1993) 255-257; C.A., 120 (1994) 323117j.
- 4815 Waterfield, C.J.: Determination of taurine in biological samples and isolated hepatocytes by high-performance liquid chromatography with fluorimetric detection. *J. Chromatogr. B*, 657 (1994) 37-45.
- 4816 Weir, S.I., Butler, E.C.V. and Haddad, P.R.: Ion chromatography with UV detection for the determination of thiosulfate and polythionates in saline waters. J. Chromatogr. A, 671 (1994) 197-203.

See also 4187, 4192, 4435, 5099.

- ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOS-PHATES)
- 4817 Camilleri, P., Reid, C.A. and Manallack, D.T.: Chiral recognition of structurally related aminoalkylphosphonic acid derivatives on an acetylated beta-cyclodextrin bonded phase. *Chromatographia*, 38 (1994) 771-775.
- 4818 Carter, A.N., Huang, R., Sorisky, A., Downes, C.P. and Rittenhouse, S.E.: Phosphatidylinositol 3,4,5-trisphosphate is formed from phosphatidylinositol 4,5-bisphosphate in thrombin-stimulated platelets. *Biochem. J.*, 301 (1994) 415-420.
- 4819 Ivanova, G.G., Ivanov, A.A. and Kashin, A.N.: (Ion-chromatographic determination of phosphorus in some organic compounds). *Zh. Anal. Khim.*, 49 (1994) 302-306; C.A., 120 (1994) 314925u.
- 4820 Maffei Facino, R., Carini, M., Aldini, G., Bombardelli, E., Morazzoni, P. and Morelli, R.: Free radicals scavening action and anti-enzyme activities of procyanidines from Vitis vinifera. A mechanism for their capillary protective action. Arzneim.-Forsch., 44 (1994) 592-601.
- 4821 Muller, J.P., Coejan, J. and Gentil, R.: Process for determining tributyl phosphate and/or butanol by liquid-phase chromatography. Eur. Pat. Appl. EP 578,579 (Cl. G01N30/96), 12 Jan. 1994, FR Appl. 92/8,583, 10 Jul. 1992; 9 p.; C.A., 120 (1994) 235175w.

- 4822 Stan'kov, I.N., Beresnev, A.V. and Lanin, S.N.: (Chemical-chromatographic estimation of the composition of a mixture of methylphosphonic, o-hexylmethylphosphonic acids, their anhydrides and acid halides). Zh. Anal. Khim., 48 (1993) 122-130; C.A., 120 (1994) 289125y.
- 4823 Taha, T.S.M. and Deits, T.L.: Detection of metabolites of the Entner-Dondoroff pathway by HPLC with pulsed amperometry: application to assays for pathway enzymes. *Anal. Biochem.*, 219 (1994) 115-120.

See also 4182, 4459, 4532, 4654, 4737.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

- 26a. Organometallic compounds
- 4824 Epler, K.S., O'Haver, T.C. and Turk, G.C.: Liquid chromatography-laser-enhanced ionization spectrometry for the speciation of organolead compounds. J. Anal. At. Spectrom., 9 (1994) 79-82; C.A., 120 (1994) 291544c.
- 4825 Inoud, Y. and Kawabata, K.: (Speciation of organotin compounds by inductively coupled plasma mass spectrometry combined with liquid chromatography). *J. Mass Spectrom. Soc. Jpn.*, 41 (1993) 245-252; C.A., 121 (1994) 25728y.
- 4826 Le, X.-C., Cullen, W.R. and Reimer, K.J.: Human urinary arsenic excretion after one-time ingestion of seaweed, crab, and shrimp. *Clin. Chem. (Washington)*, 40 (1994) 617-624.

See also 4259, 4260, 4811, 5134, 5137.

- 26c. Coordination compounds
- 4827 Uehara, N., Kurahashi, T. and Shijo, Y.: Silanol effect on the chromatographic behavior of tris(2-methyl-8-quinolinolato)gallium in high-performance liquid chromatography. *Anal. Sci.*, 10 (1994) 31-34; C.A., 120 (1994) 314571a.

See also 4178, 5114, 5119, 5170.

- 27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 4828 Allenby, G., Janocha, R., Kazmer, S., Speck, J., Grippo, J.F. and Levin, A.A.: Binding of 9-cis-retinoic acid and all-trans-retinoic acid to retinoic acid receptors α, β, and γ. Retinoic acid receptor γ binds all-trans-retinoic acid preferentially over 9-cis-retinoic acid. J. Biol. Chem., 269 (1994) 16689-16695.
- 4829 Bargagna, A., Mariani, E. and Dorato, S.: TLC, HPTLC and HPLC determination of cis- and trans-retinoic acids, retinol and retinyl acetate in topically applied products. Acta Technol. Legis Med., 2 (1991) 75-86; C.A., 120 (1994) 280385a.
- 4830 Barna, É. and Dworschák, E.: Determination of thiamine (vitamin B₁) and riboflavin (vitamin B₂) in meat and liver by high-performance liquid chromatography. *J. Chromatogr. A*, 668 (1994) 359-363.

- 4831 Blanco, D., Sánchez, L.A. and Gutiérrez, M.D.: Determination of water soluble vitamins by liquid chromatography with ordinary and arrow-bore colums. *J. Liq. Chromatogr.*, 17 (1994) 1525-1539.
- 4832 Blaner, W.S., Obunike, J.C., Kurlandsky, S.B., Al-Haideri, M., Piantedosi, R., Deckelbaum, R.J. and Goldberg, I.J.: Lipoprotein lipase hydrolysis of retinyl ester. Possible implications for retinoid uptake by cells. J. Biol. Chem., 269 (1994) 16559-16565.
- 4833 Candito, M., Nagatsu, T., Chambon, P. and Chatel, M.: High-performance liquid chromatographic measurement of cerebrospinal fluid tetrahydrobiopterin, neopterin, homovanillic acid and 5-hydroxindoleacetic acid in neurological diseases. J. Chromatogr. B, 657 (1994) 61-66.
- 4834 Chan, K.Y., Dusterhoft, D.A. and Chen, T.-M.: Determination of MDL 74,405, a synthetic analogue of α-tocopherol, in dog plasma and heart tissue by high-performance liquid chromatography with electrochemical detection. J. Chromatogr. B, 656 (1994) 359-365.
- 4835 Clemens, M.R., Schmid, B. and Mayer, A.: (Techniques and application of HPLC: determination of retinol, tocopherol, and carotenoids). *MTA*, 9 (1994) 184-187; C.A., 121 (1994) 4249c.
- 4836 Fiorella, P.D. and Napoli, J.L.: Microsomal retinoic acid metabolism. Effects of cellular retinoic acid-binding protein (type I) and C18-hydroxylation as an initial step. J. Biol. Chem., 269 (1994) 10538-10544.
- 4837 Greenway, G.M. and Kometa, N.: On-line sample preparation for the determination of riboflavin and flavin mononucleotides in foodstuffs. *Analyst (Cambridge)*, 119 (1994) 929-935.
- 4838 Guiso, G., Rambaldi, A., Dimitrova, B., Biondi, A. and Caccia, S.: Determination of orally administered all-trans-retinoic acid in human plasma by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 239-244.
- 4839 Huang, S.-i., Caldwell, M.J. and Simpson, K.L.: Reversed-phase open-column chromatography determination of urinary riboflavin. Int. J. Vitam. Nutr. Res., 63 (1993) 217-222; C.A., 120 (1994) 318510c.
- 4840 Iwase, H. and Ono, I.: Determination of ascorbic acid in human plasma by high-performance liquid chromatography with electrochemical detection using a hydroxyapatite cartridge for precolumn deproteinization. J. Chromatogr. B, 655 (1994) 195-200.
- 4841 Kim, S.Y., Kim, J.H., Kim, S.K., Oh, M.J. and Jung, M.Y.: Antioxidant activities of selected oriental herb extracts. *J. Am. Oil Chem. Soc.*, 71 (1994) 633-640.
- 4842 Kraft, J.C., Schuh, T., Juchau, M.R. and Kimelman, D.: Temporal distribution, localization and metabolism of all-trans-retinal, didehydroretinal and all-trans-retinal during Xenopus development. Biochem. J., 301 (1994) 111-119.
- 4843 Livaniou, E., Roboti, A., Kakabakos, S.E., Nyalala, J., Evangelatos, G.P. and Ithakissios, D.S.: High-performance liquid chromatographic separation of biotinylamide analogues used as substrates in biotinidase radioassays. *J. Chromatogr. B*, 656 (1994) 215-218.
- 4844 Martínez-Férez, I., Fernández-González, B., Sandmann, G. and Vioque, A.: Cloning and expression in *Escherichia coli* of the gene coding for phytoene synthase from the cyanobacterium *Synechocystis* sp. PCC6803. *Biochim. Biophys. Acta*, 1218 (1994) 145-152.

B390 BIBLIOGRAPHY SECTION

- 4845 Nelis, H.J., Merchie, G., Lavens, P., Sorgeloos, P. and de Leenheer, A.P.: Solid-phase extraction of ascorbic acid 2-sulfate from cysts of the brine shrimp Artemia franciscana. Anal. Chem., 66 (1994) 1330-1333.
- 4846 Panfili, G., Manzi, P. and Pizzoferrato, L.: High-performance liquid chromatographic method for simultaneous determination of tocopherols, carotenes and retinol and its geometric isomers in italian cheeses. *Analyst (Cambridge)*, 119 (1994) 1161-1165.
- 4847 Ross, M.A.: Determination of ascorbic acid and uric acid in plasma by high-performance liquid chromatography. J. Chromatogr. B, 657 (1994) 197-200.
- 4848 Schallreuter, K.U., Wood, J.M., Ziegler, I., Lemke, K.R., Pittelkow, M.R., Lindsey, N.J. and Gütlich, M.: Defective tetrahydrobiopterin and catecholamine biosynthesis in the depigmentation disorder vitiligo. *Biochim. Biophys. Acta*, 1226 (1994) 181-192.
- 4849 Schell, D.A. and Bode, A.M.: Measurement of ascorbic acid and dehydroascorbic acid in mammalian tissue utilizing HPLC and electrochemical detection. *Biomed. Chromatogr.*, 7 (1993) 267-272.
- 4850 Shimada, K., Mitamura, K., Kaji, H. and Morita, M.: Retention behavior of conjugated metabolites of vitamin D and related compounds in high-performance liquid chromatography. J. Chromatogr. Sci., 32 (1994) 107-111.
- 4851 Takeda, N. and Yamamoto, A.: Simultaneous determination of 13-cis- and all-trans-retinoic acids and retinol in human serum by high-performance liquid chromatography. J. Chromatogr. B, 657 (1994) 53-59.
- 4852 Vanderjagt, D.J., Fry, D.E. and Glew, R.H.: Human glucocerebrosidase catalyses transglucosylation between glucocerebroside and retinol. *Biochem. J.*, 300 (1994) 309-315.
- 4853 Watanabe, Y., Kubota, T., Suzumura, E., Suzuki, T., Yonezawa, M., Ishigami, T., Ichikawa, M. and Seino, Y.: 1,25-Dihydroxyvitamin D radioreceptor assay using bovine mammary gland receptor and non-high performance liquid chromatographic purification. Clin. Chim. Acta, 225 (1994) 187-194.
- 4854 Yamanaka, K., Horimoto, S., Matsuoko, M. and Banno, K.: Analysis of thiamine in dried yeast by high-performance liquid chromatography and high-performance liquid chromatography/atmospheric pressure chemical ionization-mass spectrometry. Chromatographia, 39 (1994) 91-96.
- For additional information see C.A.: 121 (1994) 7564n, 7565p.

See also 4206, 4232.

28. ANTIBIOTICS

- 4855 Alfredson, T.V., Bruins, P.W., Maki, A.H. and Excoffier, J.-L.: Conformer interconversion in the LC analysis of triostin A and its under-N-methylated synthetic analogue. *J. Chromatogr. Sci.*, 32 (1994) 132-138.
- 4856 Bhanot, S.K., Chatterjee, N.R. and Naik, S.R.: Synthesis and antimicrobial activities of some new quinolonyl-3'-penicillin and -4'-cephalosporin derivatives. Arzneim.-Forsch., 44 (1994) 663-667.

4857 Camus, F., Deslandes, A., Harcouet, L. and Farinotti, R.: High-performance liquid chromatographic method for the determination of cefpodoxime levels in plasma and sinus mucosa. J. Chromatogr. B, 656 (1994) 383-388.

- 4858 Chan, W., Gerhardt, G.C. and Salisbury, C.D.C.: Determination of tylosin and tilmicosin residues in animal tissues by reversedphase liquid chromatography. J. Assoc. Off. Anal. Chem., 77 (1994) 331-333.
- 4859 Changgin, H., Shaohong, J. and Kaimin, W.: The chromatographic behaviour of cephalosporins in gel filtration chromatography, a novel method to separate high molecular weight impurities. J. Pharm. Biomed. Anal., 12 (1994) 533-541.
- 4860 Colombo, N., Depaoli, A., Gobetti, M. and Saorin, M.G.: Analytical-physical profile of the novel macrolide antibiotic flurithromycin ethylsuccinate. *Arzneim.-Forsch.*, 44 (1994) 850-855.
- 4861 Faouzi, M.A., Dine, T., Luyckx, M., Gressier, C., Goudaliez, F., Mallevais, M.L., Cazin, M. and Cazin, J.C.: Stability and compatibility studies of cefaloridine, cefuroxime and ceftazidime with PVC infusion bags. *Pharmazie*, 49 (1994) 425-427.
- 4862 Gerhardt, G.C., Salisbury, C.D.C. and McNeil, J.D.: Determination of streptomycin and dihydrostreptomycin in animal tissues by on-line sample enrichment liquid chromatography. J. Assoc. Off. Anal. Chem., 77 (1994) 334-337.
- 4863 Guo, Y. and Fu, C.: (High performance liquid chromatographic determination of trace patulin and penicillic acid by precolumn derivatization with 4-(2-phthalimidyl)benzoyl chloride). Sepu, 12 (1994) 87-89; C.A., 121 (1994) 2719g.
- 4864 Hochlowski, J.E., Hill, P., Whittern, D.N., Scherr, M.H., Rasmussen, R.R., Dorwin, S.A. and McAlpine, J.B.: Aselacins, novel compounds that inhibit binding of endothelin to its receptor. II. Isolation and elucidation of structures. *J. Antibiot.*, 47 (1994) 538-635.
- 4865 Kirchmann, E., Earley, R.L. and Welch, L.E.: The electrochemical detection of penicillins in milk. J. Liq. Chromatogr., 17 (1994) 1755-1772.
- 4866 Lawen, A., Traber, R., Reuille, R. and Ponelle, M.: In vitro biosynthesis of ring-extended cyclosporins. Biochem. J., 300 (1994) 395-399.
- 4867 Liang, D., Chow, D. and White, C.: High-performance liquid chromatographic assay of cefazolin in rat tissues. *J. Chromatogr. B*, 656 (1994) 460-465.
- 4868 Moats, W.A.: Determination of ampicillin and amoxicillin in milk with an automated liquid chromatographic cleanup. J. Assoc. Off. Anal. Chem., 77 (1994) 41-45.
- 4869 Naidong, W., Dzerk, A.M. and Lee, J.W.: Development and validation of an LC method for the quantitation of carbenicillin in human serum. J. Pharm. Biomed. Anal., 12 (1994) 845-850.
- 4870 Phillips, J.G. and Simmonds, C.: Determination of spectinomycin using cation-exchange chromatography with pulsed amperometric detection. *J. Chromatogr. A*, 675 (1994) 123-128.
- 4871 Ponomareva, L.P., Olsufyeva, E.N., Preobrazhenskaya, M.N., Kumskov, M.I. and Zefirov, N.S.: (A model for estimating the chromatographic mobility of anthracycline antibiotics such as daunorubicin and its semisynthetic analogs). Khim.-Farm. Zh., 27 (1993) 36-40; C.A., 120 (1994) 323017b.

- 4872 Renard, L., Henry, P., Sanders, P., Laurentie, M. and Delmas, J.-M.: Determination of spiramycin and neospiramycin in plasma and milk of lactating cows by reversed-phase high-performance liquid chromatography. J. Chromatogr. B, 657 (1994) 219-226.
- 4873 Sauer, B. and Matusch, R.: High-performance liquid chromatographic separations of nystatin and their influence on the antifungal activity. J. Chromatogr. A, 672 (1994) 247-253.
- 4874 Sokol, J. and Matisova, E.: Determination of tetracycline antibiotics in animal tissues of food-producing animals by high-performance liquid chromatography using solid-phase extraction. J. Chromatogr. A, 669 (1994) 75-80.
- 4875 Takano, T., Kagami, Y., Kuwabara, Y. and Hata, S.: Column-switching high-performance liquid chromatographic analysis of BO-2727, a new carbapenem antibiotic, in human plasma and urine by direct injection. J. Chromatogr. B, 656 (1994) 353-358
- 4876 Tsurumi, Y., Ohhata, N., Iwamoto, T., Shigematsu, N., Sakamoto, K., Nishikawa, M., Kiyoto, S. and Okuhara, M.: WS79089A, B and C, new endothelin converting enzyme inhibitors isolated from Streptosporangium roseum No. 79089. Taxonomy, fermentation, isolation, physico-chemical properties and biological activities. J. Antibiot., 47 (1994) 619-630.
- 4877 Uchida, H., Nakakita, Y., Enoki, N., Abe, N., Nakamura, T. and Munekata, M.: Chrymutasins: novel aglycone antitumor antibiotics from a mutant of *Streptomyces chartreusis*. I. Taxonomy, mutation, fermentation, isolation and biological activities. *J. Antibiot.*, 47 (1994) 648-654.
- 4878 Woodcock, J.M., Wolstenholme, M.R., Andrews, J.M. and Wise, R.: Determination of 6-β-bromopenicillanic acid (brobactam) in human serum by high-performance liquid chromatography (HPLC) using solid phase extraction for sample preparation. J. Antimicrob. Chemother., 33 (1994) 157-161; C.A., 120 (1994) 315055x.
- 4879 Young, J.-J., Ho, S-N., Ju, W.-M. and Chang, L.-R.: FL-120A~D', new products related to kinamycin from Streptomyces chattanoogensis subsp. taitungensis subsp. nov. II. Isolation and structure determination. J. Antibiot., 47 (1994) 681-687.

For additional information see C.A.: 120 (1994) 315062x.

See also 5075.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 4880 Capiello, A., Famiglini, G. and Bruner, F.: Determination of acidic and basic/neutral pesticides in water with a new microliter flow rate LC/MS particle beam interface. *Anal. Chem.*, 66 (1994) 1416-1423.
- 4881 Cserháti, T. and Forgács, E.: Relationship between the high-performance liquid and thin-layer chromatographic retention of non-homologous series of pesticides on an alumina support. J. Chromatogr. A, 668 (1994) 495-500.

- 4882 García Sánchez, F., Navas Díaz, A. and García Pareja, A.: Ion-pair reversed-phase líquid chromatography with fluorimetric detection of pesticides. J. Chromatogr. A, 676 (1994) 347-354.
- 4883 Lamoree, M.H., Ghijsen, R.T. and Brinkman, U.A.T.: LC-MS interfacing systems in environmental analysis: application to polar pesticides. *Tech. Instrum. Anal. Chem.*, 13 (1993) 521-548; C.A., 120 (1994) 329926u a review with many refs.
- 4884 Puig, D. and Barceló, D.: Comparative study of various size-exclusion chromatographic columns for the clean-up of selected pesticides in soil samples. *J. Chromatogr. A*, 673 (1994) 55-64.

See also 4898.

29b. Chlorinated insecticides

- 4885 Grimvall, E. and Östman, C.: Retention characteristics of some selected halogenated environmental pollutants in silica and bonded normal-phase liquid chromatography. J. Chromatogr. A. 675 (1994) 55-64.
- 4886 Müller, M.D. and Buser, H.-R.: Identification of the (+)- and (-)-enantiomers of chiral chlordane compounds using chiral high-performance liquid chromatography/chiroptical detection and chiral high-resolution gas chromatography/mass spectrometry. Anal. Chem., 66 (1994) 2155-2162.

29c. Phosphorus insecticides

- 4887 Hanks, A.R.: Liquid chromatographic determination of phosphamidon in technical and formulated products: CIPAC collaborative study. J. Assoc. Off. Anal. Chem., 77 (1994) 8-10.
- 4888 Kurnar, R., Roy, S., Rishi, R. and Sharma, C.B.: Metabolic fate of fenitrothion in liver, kidney and brain of rat. *Biomed. Chromatogr.*, 7 (1993) 301-305.

29d. Carbamates

4889 Sundaram, K.M.S. and Curry, J.: High-performance liquid chromatographic method for the analysis of aminocarb, mexacarbate and some of their N-methylcarbamate metabolites by post-column derivatization with fluorescence detection. *J. Chromatogr. A,* 672 (1994) 117-124.

See also 4187.

29e. Herbicides

- 4890 Carneiro, M.C., Puignou, L. and Galceran, M.T.: Comparison of capillary electrophoresis and reversed-phase ion-pair high-performance liquid chromatography for the determination of paraquat, diquat and difenzoquat. J. Chromatogr. A, 669 (1994) 217-224.
- 4891 Hogendoorn, E.A., de Graaf, W.F., Tan, M. and van Zoonen, P.: The residue analysis of chlorophenoxy acids and triclopyr in cereal and bean sprouts using off-line SPE and online column-switching RPLC. Meded.-Fac. Landbouwkd. Toegepaste Biol. Wet. (Univ. Gent), 58 (1993) 165-172; C.A., 120 (1994) 321611s.
- 4892 Mao, J., Doane, R. and Kovacs, M.F., Jr.: Separation of acrolein and its possible metabolites using different modes of high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1811-1819.

- 4893 Meyer, A. and Henze, G.: HPLC with amperometric detection for the determination of pesticides of high polarity. Quantification of amitrole. Fresenius J. Anal. Chem., 349 (1994) 650-653.
- 4894 Nováková, O.: Determination of imazethapyr and imazapyr residues in soil by coupled-column liquid chromatography. Chromatographia, 39 (1994) 62-66.
- 4895 Sacchero, G., Apone, S., Sarzanini, C. and Mentasti, E.: Chromatographic behaviour of triazine compounds. *J. Chromatogr. A*, 668 (1994) 365-370.
- 4896 Sacchero, G., Sarzanini, C. and Mentasti, E.: On-line preconcentration and ion chromatography of triazine compounds. J. Chromatogr. A, 671 (1994) 151-157.
- 4897 Schmitt, T.M.: Liquid chromatographic determination of bentazone in technical and formulated products: collaborative study. J. Assoc. Off. Anal. Chem., 77 (1994) 328-330.

29f. Fungicides

- 4898 Salau, J.S., Alonso, R., Batlló, G. and Barceló, D.: Application of solid-phase disk extraction followed by gas and liquid chromatography for the simultaneous determination of the fungicides: captan, captafol, carbendazim, chlorothalonil, ethirimol, folpet, metalaxyl and vinclozolin in environmental waters. *Anal. Chim. Acta*, 293 (1994) 109-117.
- 29g. Other types of pesticides and various agrochemicals
- 4899 Diaz, T.G., Acedo, M.I., Pena, M.A., Pena, M.S. and Salinas, F.: Determination of 1-naphthylamine and the related pesticides, naphtylam and atu, in river-water by high-performance liquid chromatography. Application to the study of the degradation processes in naphtalam. Analyst (Cambridge), 119 (1994) 1151-1155.
- 4900 Gucht, I.V.: Determination of chelating agents in fertilizers by ion chromatography. J. Chromatogr. A, 671 (1994) 359-365.

See also 4907.

30. SYNTHETIC AND NATURAL DYES

30a. Synthetic dyes

- 4901 Evans, K.P. and Truslove, N.J.: Advances in chromatography for dyes. Rev. Prog. Color Relat. Top., 23 (1993) 36-39; C.A., 121 (1994) 11700w - a review with 35 refs.
- 4902 Griffin, R.M.E., Speers, S.J., Elliot, L., Todd, N., Sogomo, W. and Kee, T.G.: An improved high-performance liquid chromatography system for the analysis of basic dyes in forensic casework. J. Chromatogr. A, 674 (1994) 271-280.
- 4903 Speers, S.J., Little, B.H. and Roy, M.: Separation of acid, basic and dispersed dyes by a single-gradient elution reversed-phase high-performance liquid chromatography system. *J. Chromatogr. A*, 674 (1994) 263-270.

- 30b. Chloroplast and other natural pigments
- 4904 Biswas, G., Sarkar, S., Chatterjee, T.K. and Mukherjee, S.P.: Determination of anthocyanins in fruits of Vitis vinifera by HPLC. J. Inst. Chem. (India), 65 (1993) 52; C.A., 120 (1994) 296870r
- 4905 Chapman, D.M.: Benefits and limitations of a novel chlorofyll adsorbent. J. Am. Oil Chem. Soc., 71 (1994) 397-400.
- 4906 Chapman, D.M., Pfannkoch, E.A. and Kupper, R.J.: Separation and characterization of pigments from bleached and deodorized canola oil. J. Am. Oil Chem. Soc., 71 (1994) 401-407.
- 4907 Kitanov, G.M. and Pashankov, P.P.: Quantitative investigation on the dynamics of plumbagin in *Plumbago europea L.* roots and herb by HPLC. *Pharmazie*, 49 (1994) 462.
- 4908 Kowalewska, G.: Identification of phytoplankton pigments by RP-HPLC with diode-array type detector. Chem. Anal. (Warsaw), 38 (1993) 711-718; C.A., 120 (1994) 318490w.
- 4909 West, K.J. and Rauch, P.: Microscale column chromatographic isolation of a red pigment from paprika. J. Chem. Educ., 71 (1994) A59, A62; C.A., 121 (1994) 8206j.

See also 4838, 4851.

31. PLASTICS AND THEIR INTERMEDIATES

- 4910 Cortes, H.J., Bormett, G.E. and Graham, J.D.: Quantitative polymer additive analysis by multidimensional chromatography using online coupled microcolumn size exclusion chromatography as a preliminary separation. *J. Microcolumn Sep.*, 4 (1992) 51-57; C.A., 121 (1994) 10666c.
- 4911 Degoulet, C., Busnel, J.P. and Tassin, J.F.: Study of the steric partition coefficient in size-exclusion chrmatography by Monte Carlo simulation. *Polymer*, 35 (1994) 1957-1962; C.A., 120 (1994) 324572r.
- 4912 Evdokimova, S.P.: (Chromatographic determination of moisture in mixtures of liquid siloxane rubbers and mineral fillers). *Proiz*vod. Ispol'z. Elastomerov, (1992) 3-5; C.A., 120 (1994) 220095w.
- 4913 Okada, T. and Usui, T.: Stationary phase complexation of polyethers: separation of polyethers with amino-bonded silica gel. J. Chromatogr. A, 676 (1994) 355-359.
- 4914 Patrickios, C.S., Gadam, S.D., Cramer, S.M., Herter, W.R. and Hatton, T.A.: Chromatographic characterization of acrylic polyampholytes. *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)*, 34 (1993) 1073-1074; C.A., 120 (1994) 219015p.
- 4915 Porcar, I., García, R., Campos, A. and Soria, V.: Size-exclusion chromatographic and viscometric study of polymer solutions containing nicotine or silicic acid. *J. Chromatogr. A*, 673 (1994) 65-76.
- 4916 Rudzinski, W.E., Pin, L., Sutcliffe, R., Richardson, A. and Thomas, T.: Determination of hexamethylene diisocyanate in spray-painting operations using capillary zone electrophoresis. *Anal. Chem.*, 66 (1994) 1664-1666.
- 4917 Samuels, M.Q. and Coughlin, C.S.: Absolute molecular weight distribution of some polyurethane elastomers via SEC-multi angle laser light scattering. Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.), 33 (1992) 1138-1139; C.A., 120 (1994) 220106a.

- 4918 Twyman, L.J., Beezer, A.E. and Mitchell, J.C.: An approach for the rapid synthesis of moderately sized dendritic macromolecules. J. Chem. Soc., Perkin Trans. 1, (1994) 407-411; C.A., 121 (1994) 8368p.
- 4919 Veggeland, K. and Austad, T.: An evaluation of gel permeation chromatography in screening surfactant/polymer interaction of commercial products in saline aqueous solutions. *Colloids* Surf., A; 76 (1993) 73-80; C.A., 120 (1994) 219407t.
- 4920 Wu, W.S. and Gaind, V.S.: Application of tryptamine as a derivatizing agent for the determination of airborn isocyanates. Part 6: Confirmation of concept of isolation of selected π-system of a derivative for specific high-performance liquid chromatographic detection through analysing bulk materials for total isocyanate content. Analyst (Cambridge), 119 (1994) 1043-1045.
- 4921 Zinbo, M. and Theodore, A.N.: Molecular-weight parameters of elastomeric fluorocarbon materials. *Ind. Eng. Chem. Res.*, 33 (1994) 1017-1021; C.A., 120 (1994) 220119g.
- See also 4139, 4140, 4141, 4163, 4164, 4170, 4240, 4348, 4374

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 4922 Aubry, A.-F. and McGann, A.: Applications of biochromatography to the determination of drug-protein binding interactions. *LC-GC Int.*, 7 (1994) 389-394.
- 4923 Bell, C., Tsai, E.W., Ip, D.P. and Mathre, D.J.: Direct isomeric separation of a 3-hydroxyproline-containing prodrug, L-693 989, by high-performance liquid chromatography with a porous graphitic carbon column. *J. Chromatogr. A*, 675 (1994) 248-252
- 4924 Camilleri, P., de Biasi, V. and Hutt, A.: Resolving the problem. *Chem. Br.*, 30 (1994) 43-46; *C.A.*, 120 (1994) 280373v - a review with 10 refs.
- 4925 Forgács, E. and Cserháti, T.: Retention behaviour of some barbituric acid derivatives on a polyethylene-coated silica column. J. Chromatogr. B, 656 (1994) 233-238.
- 4926 Kaine, L.A., Heitkemper, D.T., Jackson, D.S. and Wolnik, K.A.: Use of ion chromatography for the verification of drug authenticity. *J. Chromatogr. A*, 671 (1994) 303-308.
- 4927 Kanai, M., Seta, K., Mylchreest, I., Hail, M. and Ishioka, N.: (Analysis of drugs and their metabolites using HPLC-API/TSQMS with conventional HPLC columns). *Kuromatogurafi*, 14 (1993) 138-139; C.A., 121 (1994) 18173k.
- 4928 Kanda, T., Kutsuna, H., Ohtsu, Y. and Yamaguchi, M.: Synthesis of polymer-coated mixed-functional packing materials for direct analysis of drug-containing serum and plasma by high-performance liquid chromatography. J. Chromatogr. A, 672 (1994) 51-57.
- 4929 Kelly, J.W.: Separation of diastereomers, enantiomers and geometrical isomers of selected pharmaceuticals. Avail. *Univ. Microfilms Int.*, Order No. DA9404662, 1993, 119 p.; C.A., 120 (1994) 280397f.

- 4930 Li, S., Gemperline, P.J., Briley, K. and Kazmierczak, S.: Identification and quantitation of drugs of abuse in urine using the generalized rank annihilation method of curve resolution. J. Chromatogr. B, 655 (1994) 213-223.
- 4931 Liu, H. and Wehmeyer, K.R.: Supercritical fluid extraction as a sample preparation technique for the direct isolation of drugs from plasma prior to analysis. *J. Chromatogr. B*, 657 (1994) 206-213.
- 4932 Romanyshyn, L.A., Wichmann, J.K., Kucharczyk, N., Shumaker, R.C., Ward, D. and Sofia, R.D.: Simultaneous determination of felbamate, primidone, phenobarbital, carbamazepine, two carbamazepine metabolites, phenytoin, and one phenytoin metabolite in human plasma by high-performance liquid chromatography. *Ther. Drug Monit.*, 16 (1994) 90-99; C.A., 121 (1994) 116j.
- 4933 Shiu, G.K.: A simple methodology for preparing synthetic multiple-interaction chiral stationary phase column for chiral drug analysis. Yaowu Shipin Fenxi, 1 (1993) 335-339; C.A., 121 (1994) 18158j.
- 4934 Umprayn, V.: (Ion chromatographic analysis of selected pharmaceuticals). Avail. Univ. Microfilms Int., Order No. DA9235273, 1991, 189 p.; C.A., 120 (1994) 280379b.

See also 4236, 4247, 4277, 4290, 4785, 5111.

32b. Antirheumatics and antiinflammatory drugs

- 4935 Akhtar, M.J., Khan, S. and Hafiz, M.: High-performance liquid chromatographic assay for the determination of paracetamol, pseudoephedrine hydrochloride and triprolidine hydrochloride. J. Pharm. Biomed. Anal., 12 (1994) 379-382.
- 4936 Bansal, A.K., Khar, R.K., Dubey, R. and Sharma, A.K.: Effect of group substitution on the physicochemical properties of ibuprofen prodrugs. *Pharmazie*, 49 (1994) 422-424.
- 4937 Barbetti, P., Chiappini, I., Fardella, G. and Grandolini, G.: (New HPLC methods for Etodolac determination). *Acta Technol. Legis Med.*, 1 (1990) 117-126; C.A., 120 (1994) 331259x.
- 4938 Golkiewicz, W. and Bartos, A.: (Determination of trace amounts of salicylic and acetylsalicylic acids in Polopirin and other drugs containing acetylsalicylic acids). Acta Pol. Pharm., 50 (1993) 143-147; C.A., 120 (1994) 280419q.
- 4939 Mills, M.H., Mather, L.E., Gu, X.S. and Huang, J.L.: Determination of ketorolac enantiomers in plasma using enantioselective liquid chromatography on an α₁-acid glycoprotein chiral stationary phase and ultraviolet detection. *J. Chromatogr. B*, 658 (1994) 177-182.
- 4940 Miyairi, S., Shimada, H., Awata, N., Goto, J. and Nambara, T.: Novel immunoaffinity extraction for liquid chromatographic determination of major metabolites of 4-acetoxy-2-(4-methylphenyl)benzothiazole in plasma. *J. Pharm. Biomed. Anal.*, 12 (1994) 389-395.
- 4941 Naidong, W. and Lee, J.W.: Development and validation of a liquid chromatographic method for the quantitation of ibuprofen enantiomers in human plasma. *J. Pharm. Biomed. Anal.*, 12 (1994) 551-556.
- 4942 Niopas, I. and Mamzoridi, K.: Determination of indomethacin and mefenamic acid in plasma by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 447-450.

B394 BIBLIOGRAPHY SECTION

- 4943 Ojingwa, J.C., Spahn-Langguth, H. and Benet, L.: Reversible binding of tolmetin, zomepirac, and their glucuronide conjugates to human serum albumin and plasma. *J. Pharmacokin. Biopharm.*, 22 (1994) 19-40.
- 4944 Palette, C., Cordonnier, P., Naline, E., Pays, M. and Advenier, C.: (Analytical conditions for determination of antipyrine metabolites). In: Galteau, M.-M. (Editor), Biol. Prospect., C.R. Colloq. Pont-a-Mousson, 8th 1992, Libbey, Montrouge, 1993, pp. 195-198; C.A., 120 (1994) 315073b.
- 4945 Schild, P.N. and Charles, B.G.: Determination of dexamethasone in plasma of premature neonates using high-performance liquid chromatography. *J. Chromatogr. B*, 658 (1994) 189-192
- 4946 Shah, Y., Joshi, S., Jindal, K.C. and Khanna, S.: High-performance liquid chromatographic determination of diclophenac diethylammonium in gels. *Drug Dev. Ind. Pharm.*, 20 (1994) 1303-1307; C.A., 120 (1994) 331261s.
- 4947 Torrado, S., Torrado, S. and Cadórniga, R.: Comparison of assay methods by second-derivative spectroscopy, colorimetry and fluorescence spectroscopy of salicylic acid in aspirin preparations with a high-performance liquid chromatographic method. J. Pharm. Biomed. Anal., 12 (1994) 383-387.
- 4948 Van Overbeke, A., Baeyens, W., van den Bossche, W. and Dewaele, C.: Separation of 2-arylpropionic acids on a cellulose based chiral stationary phase by RP-HPLC. J. Pharm. Biomed. Anal., 12 (1994) 901-909.
- 4949 Wu, W.-N. and Masucci, J.A.: Identification of two new surprofen metabolites in human urine. J. Pharm. Biomed. Anal., 12 (1994) 569-571.

For additional information see C.A.: 121 (1994) 144s.

See also 4264, 4336, 4471, 4477.

32c. Autonomic and cardiovascular drugs

- 4950 Ascalone, V., Locatelli, M. and Malavasi, B.: Determination of diltiazem and its main metabolites in human plasma by automated solid-phase extraction and high-performance liquid chromatography: a new method overcoming instability of the compounds and interference problems. J. Chromatogr. B, 657 (1994) 133-140.
- 4951 Bando, T., Fujimura, M., Shintani, H., Saito, M., Kurashima, K., Nishi, K. and Matsuda, T.: Inhibitory effect of aerosol administration of a sulfidopeptide leukotriene antagonist on bronchoconstriction induced by antigen inhalation in guinea pigs. Arzneim.-Forsch., 44 (1994) 754-757.
- 4952 Barberi-Heyob, M., Merlin, J.L., Pons, L., Calco, M. and Weber, B.: A sensitive isocratic liquid chromatography assay for the determination of dipyramidole in plasma with electrochemical detection. J. Liq. Chromatogr., 17 (1994) 1837-1848.
- 4953 Egginger, G., Lindner, W., Vandenbosch, C. and Massart, D.L.: Enantioselective bioanalysis of beta-blocking agents: focus on atenolol, betaxolol, carvedilol, metoprolol, pindolol, propranolol and sotalol. *Biomed. Chromatogr.*, 7 (1993) 277-295 - a review with 152 refs.

4954 Guiberteau Cabanillas, A., Galeano Diaz, T., Salina, F. and Guiberteau Cabanillas, C.: Rapid determination of propranolol hydrochloride and hydralazine hydrochloride in pharmaceutical preparations by reversed-phase liquid chromatography. Ann. Chim. (Rome), 83 (1993) 523-528; C.A., 120 (1994) 253513j.

- 4955 Gumieniczek, A. and Przyborowski, L.: Determination of benziodarone in human plasma and tablets by high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1587-1595
- 4956 Hamoir, T. and Massart, D.L.: Retention prediction for β-adrenergic blocking drugs in normal-phase liquid chromatography. J. Chromatogr. A, 673 (1994) 1-10.
- 4957 Heinig, R., Muschalek, V. and Ahr, G.: Determination of the enantiomers of nisoldipine in human plasma using high-performance liquid chromatography on a chiral stationary phase and gas chromatography with mass-selective detection. J. Chromatogr. B, 655 (1994) 286-292.
- 4958 Herrmann, R. and Kleinbloesem, C.H.: Bioäquivalenz einer neuen Tablettenformulierung mit Sotalolhydrochlorid im Vergleich zu einer Standardzubereitung. Arzneim.-Forsch., 44 (1994) 589-592.
- 4959 Irth, H., Cleton, A., Mathot, R.A.A., Danhof, M., IJzerman, A.P., Tjaden, U.R. and van der Greef, J.: Liquid chromatographic determination of the adenosine receptor agonist CGS 21680 in blood using on-line solid-phase extraction on a phenylboronic acid support and fluorescence detection. J. Chromatogr. B, 658 (1994) 207-212.
- 4960 Jankowski, A. and Lamparczyk, H.: Evaluation of chromatographic methods for the determination of nifedipine in human serum. J. Chromatogr. A, 668 (1994) 469-473.
- 4961 Laganière, S. and Goernert, L.: Amrinone and N-acetylamrinone assay in human plasma using solid-phase extraction and reversed-phase chromatography. J. Pharm. Biomed. Anal., 12 (1994) 407-411.
- 4962 Mascher, H. and Wasilewski, M.: Simple and fast HPLC method for the determination of triamterene and hydroxytriamterenesulphate in plasma and urine. J. Liq. Chromatogr., 17 (1994) 1577-1585.
- 4963 Nishi, H., Yamasaki, K., Kokusenya, Y. and Sato, T.: Optical resolution of imidapril hydrochloride by high-performance liquid chromatography and application to the optical purity testing of drugs. J. Chromatogr. A, 672 (1994) 125-133.
- 4964 Rutledge, D.R., Abadi, A.H. and Lopez, L.M.: Simultaneous determination of verapamil and celiprolol in human plasma. J. Chromatogr. Sci., 32 (1994) 153-156.
- 4965 Semple, H.A. and Xia, F.: Simplified high-performance liquid chromatographic method for propranolol and five metabolites in liver perfusate, rat serum and dog plasma. *J. Chromatogr. B*, 655 (1994) 293-299.
- 4966 Tokumura, T., Takase, Y. and Horie, T.: Determination of a novel and potent cyclic GMP phosphodiesterase inhibitor, 4-{[3,4-(methylenedioxy)-benzyl]amino}-6,7,8-trimethoxyquinazoline, in dog plasma by high-performance liquid chromatography. J. Chromatogr. B, 658 (1994) 202-206.
- 4967 Unterhalt, B. and Middelberg, C.: Stabilitätsuntersuchungen an Butinolin. *Pharmazie*, 49 (1994) 492-494.
- 4968 Witek, A., Zawisza, P. and Przyborowski, L.: Determination of disopyramide in plasma by high-performance liquid chromatography. J. Pharm. Biomed. Anal., 12 (1994) 425-427.

See also 4490, 4811, 4985, 5082.

32d. Central nervous system drugs

- 4969 Aravagiri, M., Marder, S.R., van Putten, T. and Marshall, B.D.: Simultaneous determination of plasma haloperidol and its metabolite reduced haloperidol by liquid chromatography with electrochemical detection. Plasma levels in schizophrenic patients treated with oral or intramuscular depot haloperidol. J. Chromatogr. B, 656 (1994) 373-381.
- 4970 Bagli, M., Rao, M.L. and Höflich, G.: Quantification of chlor-prothixene, levomepromazine and promethazine in human serum using high-performance liquid chromatography with coulometric electrochemical detection. *J. Chromatogr. B*, 657 (1994) 141-148.
- 4971 Barbetti, P., Chiappini, I., Fardella, G. and Grandolini, G.: (New method for the HPLC determination of Alprazolam and determination of its release from commercial formulations). Acta Technol. Legis Med., 2 (1991) 171-182; C.A., 120 (1994) 280411f.
- 4972 Barderas, A.V. and Duprat, F.: Optimization of the resolution of the enantiomers of β-dimethylaminobutyrophenone by HPLC on a β-cyclodextrin column. *J. Liq. Chromatogr.*, 17 (1994) 1709-1719.
- 4973 Castoldi, D., Oggioni, A., Renoldi, M.I., Ratti, E., di Giovine, S. and Bernareggi, A.: Assay of moguisteine metabolites in human plasma and urine: conventional and chiral high-performance liquid chromatographic methods. J. Chromatogr. B, 655 (1994) 243-252.
- 4974 Chang, L.-C. and Wang, D.-P.: Rapid fluorimetric assay for plasma nefopam using high-performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1971-1980.
- 4975 Čižmárik, J., Lehotay, J. and Bednáriková, A.: Correlation between MIC, MBC, pH_t, γ, C_B, P' and k' in the series of piperidinoethylesters of 2-, 3- and 4-alkoxysubstituted phenylcarbamic acids. *Pharmazie*, 49 (1994) 535-536.
- 4976 Čižmárik, J., Lehotay, J., Pham Thi Viet Nga and Bednáriková, A.: Study of local anaesthetics. Part 116: Capacity factors of the pyrrolidinoethylesters of 2-, 3- and 4-alkoxy substituted phenylcarbamic acids. *Pharmazie*, 49 (1994) 368-369.
- 4977 Crowther, J., Adusumalli, V., Mukherjee, T., Jordan, K., Abnaf, P., Corkum, N., Goldstein, G. and Tolan, J.: Determination of nanogram levels of peptide drug in rabbit and human plasma using high-performance liquid chromatography coupled with electrospray ionization mass spectrometry. *Anal. Chem.*, 66 (1994) 2356-2361.
- 4978 Dewell, W.M., Khandaghabadi, M., D'Souza, M.J. and Solomon, H.M.: High-performance liquid chromatographic determination of fentanyl and sufentanyl returned from the operating room. Am. J. Hosp. Pharm., 50 (1993) 2374-2375; C.A., 120 (1994) 227097g.
- 4979 Flaminio, L., Ripamonti, M. and Ascalone, V.: Determination of alpidem, an imidazopyridine anxiolytic, and its metabolites by column-switching high-performance liquid chromatography with fluorescence detection. J. Chromatogr. A, 668 (1994) 403-411.
- 4980 Foster, R.T., Caillé, G., Ngoc, A.H., Lemko, C.H., Kherani, R. and Pasutto, F.M.: Stereospecific high-performance liquid chromatographic assay of zopiclone in human plasma. *J. Chromatogr. B*, 658 (1994) 161-166.

- 4981 Furuno, K. Oishi, R., Gomita, Y. and Eto, K.: Simple and sensitive assay of zonisamide in human serum by high-performance liquid chromatography using a solid-phase extraction technique. J. Chromatogr. B, 656 (1994) 456-459.
- 4982 Gupta, R.N. anld Dauphin, A.: Column liquid chromatographic determination of bupivacaine in human serum using solidphase extraction. J. Chromatogr. B, 658 (1994) 113-119.
- 4983 Hadwiger, M.E., Telting-Diaz, M. and Lunte, C.E.: Liquid chromatographic determination of tacrine and its metabolites in rat bile microdialysates. J. Chromatogr. B, 655 (1994) 235-241.
- 4984 Hutchaleelaha, A., Walters, A., Chow, H.-H. and Mayersohn, M.: Sensitive enantiomer-specific high-performance liquid chromatographic analysis of methamphetamine and amphetamine from serum using precolumn fluorescent derivatization. J. Chromatogr. B, 658 (1994) 103-112.
- 4985 Jacobson, G.A. and Peterson, G.M.: High-performance liquid chromatographic assay for the simultaneous determination of ipratropium bromide, fenoterol, salbutamol and terbutaline in nebulizer solution. J. Pharm. Biomed. Anal., 12 (1994) 825-832
- 4986 Kelly, J.W., Aggarwal, N.D., Murari, R. and Stewart, J.T.: HPLC separation of the ZZ, ZE, EZ, and EE geometric isomers and EE isomer enantiomers of a substituted pentadienyl carboxamide using achiral-chiral column switching. J. Liq. Chromatogr., 17 (1994) 1433-1442.
- 4987 Kobayashi, K., Chiba, K., Tani, M., Kuroiwa, Y. and Ishizaki, T.: Development and preliminary application of a high-performance liquid chromatographic assay for omeprazole metabolism in human liver microsomes. J. Pharm. Biomed. Anal., 12 (1994) 839-844.
- 4988 Kuss, H.J., Sirch, S. and Zhao, D.Y.: Assay for maprotiline in human serum with improved sensitivity and selectivity. J. Chromatogr. B, 656 (1994) 245-249.
- 4989 La Croix, R., Pianezzola, E. and Benedetti, M.S.: Sensitive high-performance liquid chromatographic method for the determination of the three main metabolites of selegiline (L-deprenyl) in human plasma. J. Chromatogr. B, 656 (1994) 251-258.
- 4990 Lambert, W., van Bocxlaer, J., Piette, M. and de Leenheer, A.: A fatal case of trazodone and dothiepin poisoning: toxicological findings. *J. Anal. Toxicol.*, 18 (1994) 176-179.
- 4991 Logan, B.K., Friel, P.N. and Case, G.A.: Analysis of sertraline (Zoloft®) and its major metabolite in *postmortem* specimens by gas and liquid chromatography. *J. Anal. Toxicol.*, 18 (1994) 139-142.
- 4992 Mälkki-Laine, L. and Bruins, A.P.: Structural characterization of the decomposition products of salbutamol by liquid chromatography-ionspray mass spectrometry. J. Pharm. Biomed. Anal., 12 (1994) 543-550.
- 4993 Mano, N., Oda, Y., Ohe, H., Asakawa, N., Yoshida, Y. and Sato, T.: Resolution of 4-(4-chlorobenzyl)-2-(hexahydro-1-methyl-1H-azepin-4yl)-1(2H)-phthalazinone enantiomers in plasma with frit-FAB LC-MS using a conalbumin column. *J. Pharm. Biomed. Anal.*, 12 (1994) 557-567.
- 4994 Mastey, V., Panneton, A.-C., Donati, F. and Varin, F.: Determination of midazolam and two of its metabolites in human plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 655 (1994) 305-310.

B396 BIBLIOGRAPHY SECTION

- 4995 Mathew, M., das Gupta, V. and Bethea, C.: Quantitation of promethazine hydrochloride in pharmaceutical dosage forms using high performance liquid chromatography. *Drug. Dev. Ind. Pharm.*, 20 (1994) 1693-1698; C.A., 120 (1994) 307635w.
- 4996 Miyamoto, E., Kawashima, S., Murata, Y., Yamada, Y., Demizu, Y., Kontani, H. and Sakai, T.: Physico-chemical properties of oxybutinin. *Analyst (Cambridge)*, 119 (1994) 1489-1492.
- 4997 Ramachandran, S., Underhill, S. and Jones, S.R.: Measurement of lamotrigine under conditions measuring phenobarbitone, phenytoin, and carbamazepine using reversed-phase high-performance liquid chromatography at dual wavelengths. *Ther. Drug Monit.*, 16 (1994) 75-82; C.A., 121 (1994) 114g.
- 4998 Rao, M.L., Staberock, U., Baumann, P., Hiemke, C., Deister, A., Cuendet, C., Amey, M., Härtter, S. and Kraemer, M.: Monitoring tricyclic antidepressant concentrations in serum by fluorescence polarization immunoassay compared with gas chromatography and HPLC. Clin. Chem. (Washington), 40 (1994) 929-933.
- 4999 Rouan, M.C., Decherf, M., le Clanche, V., Lecaillon, J.B. and Godbillon, J.: Automated microanalysis of oxcarbazepine and its monohydroxy and transdiol metabolites in plasma by liquid chromatography. J. Chromatogr. B, 658 (1994) 167-172.
- 5000 Scheyer, R.D., During, M.J., Cramer, J.A., Toftness, B.R., Hochholzer, J.M. and Mattson, R.H.: Simultaneous HPLC analysis of carbamazepine and carbamazepine epoxide in human brain microdialysate. J. Liq. Chromatogr., 17 (1994) 1567-1576.
- 5001 Swart, P.J., Oelen, W.E.M., Bruins, A.P., Tepper, P.G. and de Zeeuw, R.A.: Determination of the dopamine D2 agonist N-0923 and its major metabolites in perfused rat livers by HPLC-UV-atmospheric pressure ionization mass spectrometry. *J. Anal. Toxicol.*, 18 (1994) 71-77.
- 5002 Van Belle, K., de Koster, V., Sarre, S., Ebinger, G. and Michotte, Y.: Narrow-bore liquid chromatographic assay for oxcarbazepine and its major metabolite in rat brain, liver and blood microdialysates. J. Chromatogr. B, 657 (1994) 149-154.
- 5003 Verjee, Z. and Giesbrecht, E.: Lidocaine and HPLC assay for anticonvulsants. Clin. Chem. (Washington), 40 (1994) 833.
- See also 4167, 4251, 4512, 4935, 4937, 5073.
- 32e. Chemotherapeutics (exc. cytostatics and antibiotics)
- 5004 Blanchflower, W.J., Cannavan, A. and Kennedy, D.G.: Determination of fenbendazole and oxfendazole in liver and muscle using liquid chromatography-mass spectrometry. *Analyst (Cambridge)*, 119 (1994) 1325-1328.
- 5005 Bleyzac, N. and Boulieu, R.: High-performance liquid chromatographic determination of ganciclovir nucleotides in human myocardial tissue. *J. Chromatogr. B*, 658 (1994) 173-176.
- 5006 Brizzi, V., Corradini, D. and Baldi, A.: A rapid HPLC method for the simultaneous determination of thymopentin and alkyl-p-hydroxybenzoates in pharmaceutical preparations. Acta Technol. Legis. Med., 3 (1992) 101-107; C.A., 120 (1994) 280412g.
- 5007 Dagorn, M. and Delmas, J.M.: Methods for assay of trimethoprim and sulphadiazine in broiler tissues using liquid chromatography. *Anal. Chim. Acta*, 285 (1994) 353-358.

5008 Defilippi, A., Piancone, G., Costa Laia, R., Balla, S. and Tibaldi, G.P.: High-performance liquid chromatography with UV detection and diode-array UV confirmation of isonicotinic acid hydrazide in cattle milk. J. Chromatogr. B, 656 (1994) 466-471.

- 5009 Degroodt, J.M., Wyhowski de Bukanski, B. and Srebrnik, S.: Oxolinic acid and flumequine in fish tissues: validation of an HPLC method; analysis of medicated fish and commercial fish samples. J. Liq. Chromatogr., 17 (1994) 1785-1794.
- 5010 Ficarra, P., Ficarra, R., Chimirri, A., Romeo, G., Tommasini, S., Calabro, M.L., Constantino, D., Monforte, A.M. and Carulli, M.: Enantiomeric resolution of anti-HIV agents on a cellulose derivative chiral stationary phase. *Chromatographia*, 38 (1994) 57-61.
- 5011 Jindal, K.C., Chaudhary, R.S., Singla, A.K., Gangwal, S.S. and Khanna, S.: Dissolution test method for rifampicin-isoniazid fixed dose formulations. J. Pharm. Biomed. Anal., 12 (1994) 403-407
- 5012 Koel, M. and Nebinger, P.: HPLC determination of serum ganciclovir using ultrafiltration, ultraviolet and fluorescence detection. J. Pharm. Biomed. Anal., 12 (1994) 429-432.
- 5013 Mathew, M., Gupta, V.D. and Bethea, C.: Stability of metronidazole benzoate in suspensions. J. Clin. Pharm. Ther., 19 (1994) 31-34; C.A., 120 (1994) 307280b.
- 5014 Medlicott, N.J., Ferry, D.G., Tucker, I.G., Rathbone, M.J., Holborow, D.W. and Jones, D.S.: High performance liquid chromatographic (HPLC) assay for the determination of chlorhexidine in saliva film. J. Lig. Chromatogr., 17 (1994) 1605-1620.
- 5015 Mokrý, M., Klimeš, J. and Zahradniček, M.: HPLC analysis of some sulfonamides in selected pharmaceutical formulations. *Pharmazie*, 49 (1994) 333-335.
- 5016 Nastruzzi, C., Pastesini, C., Menegatti, E. and Scalia, S.: High-performance liquid charomatographic determination of aromatic poly-amidines: formulatory and preclinical applications. J. Liq. Chromatogr., 17 (1994) 2057-2067.
- 5017 Newman, R.A., Costa, M. and Cisneros, A.: High-performance liquid chromatographic measurement of the novel anti-HIV agent 7,8-dihydrocostatolide (NSC 661123). J. Chromatogr. B, 658 (1994) 129-133.
- 5018 Parks, O.W.: Stability of sulfaquinoxaline, sulfadimethoxine, and their N⁴-acetyl derivatives in chicken tissues during frozen storage. J. Assoc. Off. Anal. Chem., 77 (1994) 486-488.
- 5019 Rabanal, B., de Arriba, R.G., Garzón, M.J., Reguera, R.M., Balaña-Fouce, R. and Negro, A.: Determination of pentamidine in *Leishmania* infantum promastigotes by ion-paired liquid chromatography. *J. Liq. Chromatogr.*, 17 (1994) 2017-2029.
- 5020 Radwan, M.A.: Stability-indicating HPLC assay of zidovudine in extemporaneous syrup. Anal. Lett., 27 (1994) 1159-1164.
- 5021 Ramanathan, S., Nair, N.K., Mansor, S.M. and Navaratnam, V.: Determination of the antifilarial drug UMF-078 and its metabolites UMF-060 and flubendazole in whole blood using high-performance liquid chromatography. *J. Chromatogr. B*, 655 (1994) 269-273.
- 5022 Reardon, J.E., Crouch, R.C. and St. John-Williams, L.: Reduction of 3'-azido-3'-deoxythymidine (AZT) and AZT nucleotides by thiols. Kinetics and product identification. *J. Biol. Chem.*, 269 (1994) 15999-16008.

- 5023 Rupp, H.S., Munns, R.K., Long, A.R. and Plakas, S.M.: Simultaneous determination of nitrofurazone, nitrofurantoin, and furazolidone in channel carfish (*Ictalurus punctatus*) muscle tissue by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 344-350.
- 5024 Samuelsen, O.B.: High-performance liquid chromatographic determination of oxolinic acid residues in fish silage. J. Chromatogr. B, 655 (1994) 311-314.
- 5025 Sellergren, B.: Direct drug determination by selective sample enrichment on an imprinted polymer. *Anal. Chem.*, 66 (1994) 1578-1582.
- 5026 Shearan, P., O'Keeffe, M. and Smyth, M.R.: Comparison of matrix solid phase dispersion (MSPD) with a standard solvent extraction method for sulfamethazine in pork muscle using high-performance liquid and thin-layer chromatography. Food Addit. Contam., 11 (1994) 7-15; C.A., 120 (1994) 296882w.
- 5027 Terefe, H. and Blaschke, G.: Direct determination of the enantiomers of the antimalarial drug halofantrine and its active metabolite N-desbutylhalofantrine in human plasma. J. Chromatogr. B, 657 (1994) 238-242.
- 5028 Woolf, E.J., Au, T. and Matuszewski, B.: The simultaneous determination of L-697,661, a HIV-1 specific reverse transcriptase inhibitor, and its 6-hydroxy metabolite in human plasma via column-switching high performance liquid chromatography. Chromatographia, 39 (1994) 79-84.

For additional information see C.A.: 120 (1994) 296895c.

See also 4147, 4478, 4975, 5000.

32f. Cytostatics

- 5029 Camacho, M.A., Torres, A.I., Gil, M.E., Oberegón, M.M. and Ruz, V.: Qualitative and quantitative determination of two new antitumor agents from 1-8 naphthalimides in tablets. Validation of a high performance liquid chromatography method. Arzneim.-Forsch., 44 (1994) 659-662.
- 5030 Cummings, J., MacLellan, A., Langdon, S.P. and Smyth, J.F.: Stability and in vitro metabolism of the mitogenic neuropeptide antagonists [D-Arg¹, D-Phe⁵, D-Trp⁻,9, Leu¹¹]-substance P and [Arg⁶, D-Trp⁻,9, MePhe³]-substance P (6-11) characterized by high-performance liquid chromatography. J. Pharm. Biomed. Anal., 12 (1994) 811-819.
- 5031 Del Nozal, M.J., Bernal, J.L., Marinero, P. and Pampliega, A.: Extraction procedures for the HPLC determination of 5fluorouracil in biological samples. *J. Liq. Chromatogr.*, 17 (1994) 1621-1636.
- 5032 Del Nozal, M.J., Bernal, J.L., Pampliega, A., Marinero, P. and Pozuelo, M.: Determination of the concentrations of 5fluorouracil and its metabolites in rabbit plasma and tissues by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 397-405.
- 5033 Ehrsson, H., Stone-Elander, S., Moshashaee, S., Andersson, A., Thorell, J.-O. and Elander, N.: Derivatization of carboplatin with diethyldithiocarbamate - optimization of reaction conditions by microwave treatment. J. High Resolut. Chromatogr., 17 (1994) 283-284.

- 5034 Erdélyi-Tóth, V., Pap, E., Kralovánszky, J., Bojti, E. and Klebovich,
 I.: Determination of panomifene in human plasma by high-performance liquid chromatography. J. Chromatogr. A, 668 (1994) 419-425.
- 5035 Fried, K.M. and Wainer, I.W.: Direct determination of tamoxifen and its four major metabolites in plasma using coupled column high-performance liquid chromatography. *J. Chromatogr. B*, 655 (1994) 261-268.
- 5036 Golich, T.G., Elrod, L., Jr. and Morley, J.A.: Determination of minor impurities and diastereomers of 6-[3-[(2-amino-1oxopentyl)amino]-1-pyrrolidinyl}-5-fluoro-3-oxo-3H-pyrido [3,2,1-KL]phenoxazine-2-carboxylic acid hydrochloride by high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 2005-2016.
- 5037 Hinz, H.R., Harris, N.J., Natelson, E.A. and Giovanella, B.C.: Pharmacokinetics of the *in vivo* and *in vitro* conversion of 9-nitro-20(S)-camptothecin to 9-amino-20(S)-camptothecin in humans, dogs, and mice. *Cancer Res.*, 54 (1994) 3096-3100.
- 5038 Lim, C.K., Chow, L.C.L., Yuan, Z.-X. and Smith, L.L.: High performance liquid chromatography of tamoxifen and metabolites in plasma and tissues. *Biomed. Chromatogr.*, 7 (1993) 311-314.
- 5039 Lim, C.K., Yuan, Z.-X., Ying, K.-C. and Smith, L.L.: High-performance liquid chromatography of toremifene and metabolites. *J. Liq. Chromatogr.*, 17 (1994) 1773-1783.
- 5040 Quitasol, J. and Krastins, L.: Analysis of pamidronate disodium in pharmaceutical dosage forms by ion chromatography. J. Chromatogr. A, 671 (1994) 273-279.
- 5041 Shim, H.J., Lee, E.D., Yoon, E.J., Lee, S.D., Kim. W.B., Yang, J. and Lee, M.G.: Simultaneous determination of a new anthracycline, DA-125, and its metabolites M1, M2, M3 and M4 in plasma and urine by high-performance liquid chromatography. *J. Chromatogr. B*, 656 (1994) 407-414.
- 5042 Thibault, A., Cooper, M.R., Figg, W.D., Venzon, D.J., Sartor, A.O., Tompkins, A.C., Weinberger, M.S., Headlee, D.J., McCall, N.A., Samid, D. and Myers, C.E.: A phase I and pharmacokinetic study of intravenous phenylacetate in patients with cancer. Cancer Res., 54 (1994) 1690-1694.
- 5043 Wagner, H. and Gerhaeuser, C.: Purification of podophyllotoxin and/or its derivatives for use in pharmaceutical preparations. Ger. Offen. DE 4,230,186 (Cl. C07D493/04), 10 Mar. 1994, Appl. 09 Sep. 1992; 6 p.; C.A., 120 (1994) 331097t.
- 5044 Walash, M.I., Belal, F., Metwally, M.E. and Hefnawy, M.M.: Application of high performance liquid chromatography in the determination of tauromustine in presence of its metabolites and degradation products. *J. Liq. Chromatogr.*, 17 (1994) 1597-1604.

See also 4496, 4774, 4776, 4855.

32g. Other drug categories

- 5045 Al-Khamis, K.I., El-Sayed, Y.M., Al-Rashood, K.A. and Al-Yamani, M.: High-performance liquid chromatographic method for determination of glibenclamide in human plasma. *Anal. Lett.*, 27 (1994) 1277-1293.
- 5046 Bakare, M.T., Mustapha, A. and Abdu-Aguye, I.: An improved high-performance liquid chromatographic determination of chlorpipamide in human plasma. *Chromatographia*, 39 (1994) 107-109.

B398 BIBLIOGRAPHY SECTION

- 5047 Celma, C.: Determination of the platelet activating factor antagonist 6-(2-chlorophenyl)-9-[(4-methoxyphenyl)thiocarbamoyl]-1-methyl-7,8,9,10-tetrahydro-4H-pyrido[4',3'-4,5]-thieno[3,2-f][1,2,4]triazolo[4,3-a][1,4] diazepine in human plasma by liquid chromatography-thermospray mass spectrometry. J. Chromatogr. B, 657 (1994) 214-218.
- 5048 Fardella, G., Barbetti, P., Chiappini, I. and Grandolini, G.: (Method for the HPLC determination of flupirtine and measurement of its release from pharmaceuticals). Acta Technol. Legis Med., 3 (1992) 77-85; C.A., 120 (1994) 331258w.
- 5049 Flesch, G., Mann, C., Boss, E., Lang, M., Degen, P.H. and Dieterle, W.: Quantitative determination of CGP 53 437, a new HIV protease inhibitor, in plasma by high-performance liquid chromatography and fluorescence detection. J. Chromatogr. B, 657 (1994) 155-161.
- 5050 Hasinoff, B.B.: Quantitation of the dexrazoxane hydrolysis product ADR-925 by fluorescence detection of its terbium(III) complex after high-performance liquid chromatographic separation. J. Chromatogr. B, 656 (1994) 451-455.
- 5051 Hsyu, P.-H. and Lloyd, T.L.: Automated high-performance liquid chromatographic analysis of (-)-2'-deoxy-3'-thiacytidine in biological fluids using the automated sequential trace enrichment of dialysate systems. J. Chromatogr. B, 655 (1994) 253-259.
- 5052 Indrayanto, G. and Handajani, R.: Quantitative determination of ambroxol hydrochloride in syrups by RP-HPLC and UV spectroscopy. *Drug. Dev. Ind. Pharm.*, 20 (1994) 1639-1647; C.A., 120 (1994) 307637y.
- 5053 Kabanda, L., de Muynck, C., Lefebvre, R.A. and Remon, J.P.: Validation of a HPLC method for the determination of propylthiouracil in plasma. J. Liq. Chromatogr., 17 (1994) 2069-2083.
- 5054 Kominami G., Okabe, H., Imoda, K. an Mizojiri, K.: Combined high-performance liquid chromatography and radioimmunoassay for ceruletide and its metabolites in dog plasma and urine. J. Pharm. Biomed. Anal., 12 (1994) 413-418.
- 5055 Krasnova, L.V., Afanasyeva, L.I., Berg, A.A., Baltina, L.A., Murinov, Yu.I. and Tolstikov, G.A.: (Determining the composition of the veterinary agent clatraprostin). Khim.-Pharm. Zh., 27 (1993) 47-49; C.A., 120 (1994) 331260r.
- 5056 Lal, J., Paliwal, J.K., Grover, P.K. and Gupta, R.C.: Simultaneous liquid chromatographic determination of centchroman and its 7-demethylated metabolite in serum and milk. *J. Chromatogr. B*, 658 (1994) 193-197.
- 5057 Lee, S.H. and Lee, M.G.: Determination of azosemide and its metabolite in plasma, blood, urine and tissue homogenates by high-performance liquid chromatography. J. Chromatogr. B, 656 (1994) 367-372.
- 5058 Lee, S.H., Lee, M.G. and Kim, N.D.: Pharmacokinetics and pharmacodynamics of bumetanide after intravenous and oral administration to rats: absorption from various GI segments. J. Pharmacokin. Biopharm., 22 (1994) 1-17.
- 5059 Lorusso, V., Poggesi, I., Arbughi, T., Dal Fiume, D. and Tirone, P.: High-performance liquid chromatographic assay of the magnetic resonance imaging contrast agent gadobenate in plasma, urine and bile. J. Chromatogr. B, 656 (1994) 415-422.
- 5060 Lovdahl, M.J., Reher, K.E., Mann, H.J. and Remmel, R.P.: Determination of 4-methyl umbelliferone nad metabolites in Williams E media and dog plasma by high performance liquid chromatography. J. Liq. Chromatogr., 17 (1994) 1795-1809.

- 5061 Nagy, J.: Purification of the anorectic agent satietin from bovine serum. *Pharmacol., Biochem. Behav.*, 48 (1994) 17-22; C.A., 120 (1994) 290279h.
- 5062 Nayak, V.G., Malkar, V.B., Gaitonde, C.D., Vaidya, A.J. and Gangrade, M.G.: Quantitative determination of troventol from aerosol by reversed phase liquid chromatography. *Drug. Dev. Ind. Pharm.*, 20 (1994) 1485-1491; C.A., 120 (1994) 307636x.
- 5063 Sakurai, E., Gunji, E., Iizuka, Y., Hikichi, N., Maeyama, K. and Watanabe, T.: The disposition of thioperamide, a histamine H₃-receptor antagonist, in rats. *J. Pharm. Pharmacol.*, 46 (1994) 209-212; C.A., 120 (1994) 289366c.
- 5064 Sasaki, S., Hashimoto, R., Kiuchi, M., Inoue, K., Ikumoto, T., Hirose, R., Chiba, K., Hoshino, Y., Okumoto, T. and Fujita, T.: Fungal metabolites. Part 14. Novel potent immunosuppressants, mycestericins, produced by *Mycelia sterilia*. *J. Antibiot.*, 47 (1994) 420-433.
- 5065 Schrive, I. and Plasse, J.C.: Quantification of zidovudine and one of its metabolites in plasma and urine by solid-phase extraction and high-performance liquid chromatography. *J. Chro*matogr. B, 657 (1994) 233-237.
- 5066 Shintani, T., Takamoto, M., Sawada, M., Aishita, H. and Nakagawa, T.: Simultaneous determination of human neutrophil elastase inhibitor (ONO-5046) and its metabolite in plasma and urine by direct injection column-switching HPLC. J. Pharm. Biomed. Anal., 12 (1994) 397-405.
- 5067 Singh, S.K., Paliwal, J.K., Grover, P.K. and Gupta, R.C.: Quantification of 2,3-dihydro-7-methoxypyrrolo-[2,1-b]-quinazolin-9(1H)-one, a new antiallergic agent, by high-performance liquid chromatography in serum. J. Chromatogr. B, 658 (1994) 198-201.
- 5068 Takahara, E., Nagata, O., Kato, H., Ohta, S. and Hirobe, M.: Analysis of urinary and biliary metabolites of (+)-4-[4-(4-methylphenyl)phenylmethoxy-1-piperidinyl]butyric acid in rats by liquid chromatography-frit-fast atom bombardment mass spectrometry. J. Chromatogr. B, 658 (1994) 154-160.
- 5069 Van Boven, M., Daenens, P., Cokelaere, M. and Decuypere, E.: Extraction and liquid chromatographic method for the determination of simmondsin in plasma. *J. Chromatogr. B*, 655 (1994) 281-285.
- 5070 Wu, S.T., Stampfli, H.F., Banks, C.M., Emm, T.A., Kapil, R.P., Padovani, P.K., Lee, W.M., Jr. and Huang, S.-M.: Determination of DMP 728, a Ilb/Illa receptor antagonist, in rat and dog plasma by high-performance liquid chromatography with fluorimetric detection. J. Chromatogr. B, 657 (1994) 254-260.
- 5071 Zhou, X.-J. and Sommadossi, J.-P.: Quantification of 3'-amino-3'-deoxythymidine, a toxic catabolite of 3'-azido-3'-deoxythymidine (zidovudine) in human plasma by high-performance liquid chromatography using precolumn derivatization with fluorescamine and fluorescence detection. J. Chromatogr. B, 656 (1994) 389-396.
- For additional information see C.A.: 120 (1994) 296025u, 315097n.

See also 4533, 4776, 4802, 4829, 4866, 4935, 5006.

LIQUID COLUMN CHROMATOGRAPHY
B399

32h. Toxicological and forensic applications

- 5072 Bogusz, M. and Erkens, M.: Reversed-phase high-performance liquid chromatographic database of retention indices and UV spectra of toxicologically relevant substances and its interlaboratory use. J. Chromatogr. A, 674 (1994) 97-126.
- 5073 Chen, Y.-P., Hsu, M.-C. and Chien, C.S.: Analysis of forensic samples using precolumn derivatization with (+)-1-(9-fluorenyl)ethyl chloroformate and liquid chromatography with fluorimetric detection. *J. Chromatogr. A,* 672 (1994) 135-140.
- 5074 De Zeeuw, R.A., Hartstra, J. and Franke, J.P.: Potential and pitfalls of chromatographic techniques and detection modes in substance identification for systematic toxicological analysis. J. Chromatogr. A, 674 (1994) 3-13.
- 5075 Kaine, L.A. and Wolnik, K.A.: Forensic investigation of gentamicin sulfates by anion-exchange ion chromatography with pulsed electrochemical detection. *J. Chromatogr. A*, 674 (1994) 255-261
- 5076 Moore, J.M. and Casale, J.F.: In-depth chromatographic analyses of illicit cocaine and its precursor, coca leaves. *J. Chromatogr. A*, 674 (1994) 165-205 a review with 76 refs.
- 5077 Sato, K., Kumazawa, T. and Katsumata, Y.: On-line high-performance liquid chromatography-fast atom bombardment mass spectrometry in forensic analysis. *J. Chromatogr. A*, 674 (1994) 127-145 - a review with 86 refs.
- 5078 Speers, S.J., Doolan, K., McQuilan, J. and Wallace, J.S.: Evaluation of improved methods for the recovery and detection of organic and inorganic cartridge discharge residues. *J. Chromatogr. A*, 674 (1994) 319-327.
- 5079 Stafford, R.G. and Hines, H.B.: Method for the identification of saxitoxin in rat urine. *J. Chromatogr. B*, 657 (1994) 119-124.
- 5080 Tagliaro, F., Antonioli, C., de Battisti, Z., Ghielmi, S. and Marigo, M.: Reversed-phase high-performance liquid chromatographic determination of cocaine in plasma and human hair with direct fluorimetric detection. J. Chromatogr. A, 674 (1994) 207-215.
- See also 4191, 4329, 4343, 4705, 4788, 4789, 4801, 4826, 4902, 4903, 4990, 4991.

32i. Plant extracts

- 5081 Betz, J.M.: Plant toxins. J. Assoc. Off. Anal. Chem., 77 (1994) 142-145 a review with 65 refs.
- 5082 Mesbah, M.K.: Determination of khellin and visnagin in Ammi visnaga fruits and in renal teas by high-performance liquid chromatography. Egypt. J. Pharm. Sci., 33 (1992) 897-904; C.A., 120 (1994) 253458v.
- 5083 Reynolds, T.: A chromatographic examination of some old samples of drug aloes. *Pharmazie*, 49 (1994) 524-529.
- See also 4336, 4363, 4494, 4495, 4792, 4795, 4907, 5017.

33. CLINICO-CHEMICAL APPLICATIONS

- Complex mixtures and profiling (single compounds by cross-reference only)
- 5084 Hu, W. and Haraguchi, H.: Simultaneous determination of organic and inorganic ultraviolet-absorbing compounds in human saliva by electrostatic ion chromatography. *Anal. Chim. Acta*, 285 (1994) 335-341.
- See also 4360, 4421, 4427, 4460, 4463, 4464, 4465, 4467, 4469, 4508, 4518, 4519, 4537, 4540, 4643, 4668, 4671, 4673, 4676, 4685, 4686, 4708, 4743, 4803, 4836, 4853, 5139, 5161.

34. FOOD ANALYSIS

- 34a. General papers and reviews
- 5085 Parriot, D.: Performance verification testing of high performance liquid chromatography equipment. *LC-GC*, 12 (1994) 135-140; C.A., 120 (1994) 288790z.
- See also 4369.
- 34b. Complex mixtures (single compounds by cross-reference only)
- 5086 Brizzi, V., Colosimo, M., Corsi, G. and Pasetti, U.: A novel HPLC method to detect tonic components. *Acta Technol. Legis Med.*, 3 (1992) 25-32; C.A., 120 (1994) 280413h.
- 5087 Saito, K., Nakazato, M., Ishikawa, F., Fujinuma, K., Moriyasu, T., Nagayama, T., Kobayashi, M., Shioda, H., Kamimura, H., et al.: (Determination of methyl isothiocyanate in wine and dibutyl phthalate in vodka). Kenkyu Nenpo-Tokyo-toritsu Eisei Kenkyusho, 44 (1993) 119-127; C.A., 120 (1994) 321607v.
- For additional information see C.A.: 120 (1994) 296904e, 297143t, 321599u; 121 (1994) 7553h, 7570m, 7876r.
- See also 4345, 4400, 4401, 4406, 4426, 4429, 4452, 4479, 4705, 4846, 4865, 4868, 4874, 4891, 5009, 5024, 5026, 5101, 5154, 5164, 5172.
- 34c. Organoleptically important compounds (flavors, odors, volatiles)
- See 5095.
- 35. ENVIRONMENTAL ANALYSIS
- 35a. General papers and reviews
- See 4259, 4883, 4885, 5024, 5085, 5132.

- Air pollution (complex mixtures; single compounds by cross-reference only)
- 5088 Tamaki, M., Shoga, M. and Hiraki, T.: (Advanced monitoring system using automated acid rain analyzers. I. Function and performance of automated analyzers). Shigen Kankyo Taisaku, 30 (1994) 219-230; C.A., 120 (1994) 330417k - a review with 8 refs.
- 5089 Tanaka, K., Nakajima, K., Furukawa, M. and Ohta, K.: (Simultaneous measurements of ionic components in acid rain by ion exclusion- and cation exchange-ion chromatographies). *PPM*, 25 (1994) 49-56; C.A., 120 (1994) 330593q.
- See also 4301, 4332, 4916, 5174.
- Water pollution (complex mixtures; single compounds by crossreference only)
- 5090 Ledo de Medina, H., Colina de Vargas, M., Marin, J. and Pirela, D.: Determination of total nitrogen in water samples by means of high-pressure bombs and ion chromatography. J. Chromatogr. A, 671 (1994) 287-293.
- 5091 Passell, T.O.: Use of on-line ion chromatography in controlling water quality in nuclear power plants. *J. Chromatogr. A*, 671 (1994) 331-337.
- 5092 Prenesti, E., Fiorito, M., Melchionna, G. and Pavone, F.: (Determination of hydroquinone, p-quinone, phenidone, and glutaral-dehyde in spent radiograph processing bath by liquid chromatography with spectrometry detector). Boll. Chim. Ig., Parte Sci., 44 (1993) 251-267; C.A., 120 (1994) 226297k.
- 5093 Shubinok, A.V.: (Ion-exchange-chromatographic process for utilisation of copper in industry wastewater). *Tsv. Metallurgiya*, (1992) 7-14; C.A., 121 (1994) 14413r.
- 5094 Tartari, G., Valsecchi, S. and Savalli, S.: (Detection limits, linearity and reproducibility in determination of anions in waters by ion chromatography). Acqua Aria, (1993) 873-882; C.A., 120 (1994) 226296j.
- See also 4137, 4157, 4281, 4299, 4306, 4325, 4327, 4364, 4402, 4418, 4571, 4810, 4880, 4896, 4898, 5099, 5100, 5133, 5138, 5150, 5156, 5173, 5174.
- 35d. Soil pollution (complex mixtures; single compounds by cross-reference only)
- See 4300, 4402, 4413, 4884, 4894, 5171.
- 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 5095 Morin, P. and Richard, H.: Instrumental methods of analysis of aromas: Liquid chromatography. In: Richard, H. and Multon, J.-L. (Editors), Aromes Aliment., Tec. Doc.-Lavoisier, Paris, 1992, pp. 317-336; C.A., 120 (1994) 296863r - a review with 15 refs.

- 36a. Surfactants
- 5096 Anghel, D.F., Balcan, M., Voicu, A. and Elian, M.: Analysis of alkylphenol-based non-ionic surfactants by high-performance liquid chromatography. J. Chromatogr. A, 668 (1994) 375-383.
- 5097 Chen, S. and Pietrzyk, D.J.: Reversed phase liquid chromatographic separation of linear alkylbenzenesulfonates. Effect of mobile phase ionic strength. J. Chromatogr. A, 671 (1994) 73-82.
- 5098 Di Corcia, A., Samperi, R. and Marcomini, A.: Monitoring aromatic surfactants and their biodegradation intermediates in raw and treated sewages by solid-phase extraction and liquid chromatography. *Environ. Sci. Technol.*, 28 (1994) 850-858; C.A., 120 (1994) 226335w.
- 5099 Popenoe, D.D., Morris, S.J., III, Horn, P.S. and Norwood, K.T.: Determination of alkyl sulfates and alkyl ethoxysulfates in waste-water treatment plant influents and effluents and in river water using liquid chromatography/ion spray mass spectrometry. Anal. Chem., 66 (1994) 1620-1629.
- 5100 Zerbinati, O. and Ostacoli, G.: Determination of aromatic sulphonates in surface waters by high-performance liquid chromatography with coupled fluorescence and UV detection. J. Chromatogr. A, 671 (1994) 217-223.
- See also 4919, 4926.
- 36b. Antioxidants and preservatives
- 5101 Rustan, I., Damiano, M.A. and Lesgards, G.: (Determination of antioxidants in food). Ann. Falsif. Expert. Chim. Toxicol., 86 (1993) 201-214; C.A., 120 (1994) 321626a.
- 5102 Zodda, J.P., Monteferrante, J.A. and Eakins, M.N.: Separation and simultaneous determination of methyl paraben and propyl paraben in Choletec[®] (kit for the preparation of Tc-99m mebrofenin) by high-performance liquid chromatography. *J. Pharm. Biomed. Anal.*, 12 (1994) 573-577.
- For additional information see C.A.: 120 (1994) 296893a.
- 36c. Complex mixtures, technical products and unidentified compounds
- 5103 Januszkiewicz, K.R., Heenan, D.F. and Stratford, G.: Chromatographic and titrimetric characterization of synthetic esters used in aluminum hot rolling lubricants. *Lubr. Eng.*, 49 (1993) 969-974; C.A., 120 (1994) 274903b.
- 5104 Stoelting, J., Maurer, K. and Bacher, W.: (Analytics: liquid chromatographic and polarographic determination of bath components of a suphitic gold electrolyte). *Metalloberflaeche*, 48 (1994) 172-176; C.A., 120 (1994) 314655f.
- 5105 Weatherell, C.J. and Lai, E.P.C.: Factorial experimental design and principal component analysis of the interaction of animal glues with polymeric and silica-based stationary phases in size exclusion chromatography. J. Chromatogr. A, 669 (1994) 31-44
- For additional information see C.A.: 120 (1994) 316631y.

See also 4221, 4222, 4912.

- 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUC-TURES
- 5106 Kataoka, K.: (Development of separation technique for B- and T-lymphocytes by hybrid field-flow fractionation/adhesion chromatography). *Ikagaku Oyo Kenkyu Zaidan Kenkyu Hokoku*, 11 (1992, Pub. 1993) 33-39; C.A., 120 (1994) 318482v.
- 5107 Qiu, R. and MacDonald, R.C.: A metastable state of high surface activity produced by sonication of phospholipids. *Biochim. Biophys. Acta*, 1191 (1994) 343-353.

See also 4409, 4804.

38. INORGANIC COMPOUNDS

38a. Cations

- 5108 Abe, H., Usuda, S. and Tachimori, S.: Characteristics of centrifugal partition chromatography for lanthanoid separation in HDEHP extraction system. J. Liq. Chromatogr., 17 (1994) 1821-1835.
- 5109 Al-Shawi, A.W. and Dahl, R.: Determination of lanthanides in Kola nitrophosphate solution by cation-exchange ion chromatography. *J. Chromatogr. A,* 671 (1994) 173-179.
- 5110 Bagur, G., Sánchez, M. and Gázquez, D.: Determination of vanadium in clam tissue (Citterea sp.) by normalphase high-performance liquid chromatography with N-phenylbenzohydroxamic acid. Analyst (Cambridge), 119 (1994) 1157-1159.
- 5111 Carnevale, J. and Jackson, P.E.: Analysis of aluminium in pharmaceutical products by post-column derivatization ion chromatography. J. Chromatogr. A, 671 (1994) 115-120.
- 5112 Chen, H., Shen, F., Wang, X. and Zou, F.: Extraction-chromatographic separation of microamount scandium(III) with HEH(EHP) resin and its analytical application. *Rare Met. (Beijing)*, 12 (1993) 288-294; C.A., 120 (1994) 337867r.
- 5113 De Blas, O.J., Gonzales, S.V., Rodriguez, R.S. and Mendez, J.H.: Determination and speciation of arsenic in human urine by ionexchange chromatography/flow injection analysis with hydride generation/atomic absorption spectroscopy. J. Assoc. Off. Anal. Chem., 77 (1994) 441-445.
- 5114 El-Jammal, A. and Templeton, D.M.: Reversed-phase high-performance liquid chromatography of non-transferrin-bound iron and some hydroxypyridone and hydroxypyrone chelators. *J. Chromatogr. B,* 658 (1994) 121-127.
- 5115 Elefterov, A.I., Nosal, S.N., Nesterenko, P.N. and Shpigun, O.A.: Dipicolinic acid as eluent for the high-performance liquid chromatographic determination of transition metals using imino-diacetic acid-bonded silica. *Analyst (Cambridge)*, 119 (1994) 1329-1332.
- 5116 Flieger, A.: Extraction-spectrophotometric investigation of palladium and platinum reactions with calcon and calmagite and separation of these metals by extraction chromatography. *Chem. Anal. (Warsaw)*, 38 (1993) 483-489; C.A., 120 (1994) 260027g.

- 5117 Gailer, J. and Irgolic, K.J.: The ion-chromatographic behavior of arsenite, arsenate, methylarsinic acid, dimethylarsinic acid on the Hamilton PRP-X100 anion-exchange column. *Appl. Organomet. Chem.*, 8 (1994) 129-140; C.A., 121 (1994) 25713g.
- 5118 González Rodríguez, V., Castro Romero, J.M., Fernández Solís, J.M., Pérez Iglesias, J. and Seco Lago, H.M.: Simultaneous determination of cobalt and nickel by reversed-phase high-performance liquid chromatography with diethyldithiocarbamic acid. J. Chromatogr. A, 673 (1994) 291-294.
- 5119 González Rodríguez, V., Castro Romero, J.M., Fernández Solís, J.M., Pérez Iglesias, J. and Seco Lago, H.M.: Simultaneous determination of copper, cobalt and nickel by HPLC and solvent extraction with diethyldithiocarbamic acid as reagent. *Anal. Lett.*, 27 (1994) 1399-1406.
- 5120 Horwitz, E.P., Dietz, M.L., Rhoads, S., Felinto, C., Gale, N.H. and Houghton, J.: A lead-selective extraction chromatographic resin and its application to the isolation of lead from geological samples. *Anal. Chim. Acta*, 292 (1994) 263-273.
- 5121 Imato, T. and Ishibashi, N.: Indirect potentiometric detection of metals by use of metal buffer. *Proc. Electrochem. Soc.*, 93-97 (1993) 156-161; C.A., 120 (1994) 260052m.
- 5122 Inoue, Y., Kawabata, K., Takahashi, H. and Endo, T.: Determination of arsenic compounds using inductively coupled plasma mass spectrometry with ion chromatography. *J. Chromatogr.* A. 675 (1994) 149-154.
- 5123 Jackson, P.E., Carnevale, J., Fuping, H. and Haddad, P.R.: Determination of thorium and uranium in mineral sands by ion chromatography. J. Chromatogr. A, 671 (1994) 181-191.
- 5124 Jones, P., Foulkes, M. and Paull, B.: Determination of barium and strontium in calcium-containing matrices using high-performance chelation ion chromatography. *J. Chromatogr. A*, 673 (1994) 173-179.
- 5125 Kawasaki, N., Tanimoto, T., Tanaka, A., Hayakawa, T. and Miyasaka, N.: Determination of non-protein-bound iron in human synovial fluid by high-performance liquid chromatography with electrochemical detection. J. Chromatogr. B, 656 (1994) 436-440
- 5126 Litvina, M.L., Voloschik, I.N. and Rudenko, B.A.: Application of a dynamically coated sorbent and conductimetric and UV detectors to the determination of alkaline earth and trasition metal cations. *J. Chromatogr. A*, 671 (1994) 29-32.
- 5127 Lucy, C.A. and Ye, L.: Displacement post-column detection reagents based on the fluorescent magnesium 8-hydroxyquino-line-5-sulfonic acid complex. J. Chromatogr. A, 671 (1994) 121-129.
- 5128 Messerschmidt, J., Alt, F. and Tölg, G.: Platinum species analysis in plant material by gel permeation chromatography. *Anal. Chim. Acta*, 291 (1994) 161-167.
- 5129 Nair, L.M., Saari-Nordhaus, R. and Anderson, J.M., Jr.: Ion chromatographic separation of transition metals on a polybutadiene maleic acid-coated stationary phase. *J. Chromatogr. A*, 671 (1994) 43-49.
- 5130 Nesterenko, P.N. and Ivanov, A.V.: Detection of transition metals during their separation in an isoconductive pH gradient. *J. Chromatogr. A*, 671 (1994) 95-99.
- 5131 Nesterenko, P.N., Tarasenko, D.A. and Shpigun, O.A.: (Simultaneous determination of anions and cations by ion chromatography). *Zh. Anal. Khim.*, 49 (1994) 244-256; C.A., 120 (1994) 288732g a review with 63 refs.

B402 BIBLIOGRAPHY SECTION

- 5132 Nickus, U. and Kuhn, M.: Ion chromatographic determination of anions and cations at ultra-low concentrations in Alpine snow. J. Chromatogr. A, 671 (1994) 225-229.
- 5133 Oikawa, K., Murano, K., Enomoto, Y., Wada, K. and Inomata, T.: Automatic monitoring system for acid rain and snow based on ion chromatography. J. Chromatogr. A, 671 (1994) 211-215.
- 5134 Oriñák, A., Matisová, E., Györyová, K. and Šlesárová, L.: Chromatographic behaviour of novel zinc(II) carboxylates with nitrogen-donor ligands. Part I. Formates and acetates. *Anal. Chim. Acta*, 291 (1994) 169-181.
- 5135 Paull, B., Foulkes, M. and Jones, P.: High-performance chelation ion-chromatographic determination of trace metals in coastal sea-water using dye-impregnated resins. *Analyst (Cambridge)*, 119 (1994) 937-941.
- 5136 Rabin, S. and Stillian, J.: Practical aspects on the use of organic solvents in ion chromatography. J. Chromatogr. A, 671 (1994) 63-71
- 5137 Rapsomanikis, S.: Derivatization by ethylation with sodium tetraethylborate for the speciation of metals and organometallics in environmental samples. A review. *Analyst (Cambridge)*, 119 (1994) 1421-1439.
- 5138 Tanaka, K., Ohta, K., Fritz, J.S., Matsushita, S. and Miyanaga, A.: Simultaneous ion-exclusion chromatography - cation-exchange chromatography with conductimetric detection of anions and cations in acid rain waters. J. Chromatogr. A, 671 (1994) 239-248.
- 5139 Thienpont, L.M., van Nuwenberg, J.E. and Stöckl, D.: Ion chromatography as potential reference methodology for the determination of total calcium and magnesium in human serum. Anal. Chem., 66 (1994) 2404-2408.
- 5140 Uchara, N., Katamine, A. and Shijo, Y.: High-performance liquid chromatographic determination of cobalt(II) as the 2-(5-bromo-2-pyridilazo)-5-diethylaminophenol chelate after preconcentration with a cation-exchange resin. *Analyst (Cambridge)*, 119 (1994) 1333-1335.
- 5141 Voloschik, I.N., Litvina, M.L. and Rudenko, B.A.: Application of multi-dimensional liquid chromatography to the separation of some transition and heavy metals. *J. Chromatogr. A*, 671 (1994) 205-209.
- 5142 Voloschik, I.N., Litvina, M.L. and Rudenko, B.A.: Separation of transition and heavy metals on an amidoxime complexing sorbent. J. Chromatogr. A, 671 (1994) 51-54.
- 5143 Yadav, S.K., Singh, O.V. and Tandon, S.N.: Reversed phase TLC and column chromatographic separations of 3d transition metal ions using mono(2-ethylhexyl) acid phosphate as impregnant. J. Planar Chromatogr., 7 (1994) 75-77.
- 5144 Yoshikawa, M. and Nakamura, E.: Precize isotope determination of trace amounts of strontium in magnesium-rich samples. *Ganko*, 88 (1993) 548-561; C.A., 120 (1994) 260091y.
- See also 4178, 4186, 4190, 4202, 4238, 4262, 4362, 5089, 5154, 5169, 5170, 5174.

38b. Anions

- 5145 Demkowicz, M.P., Chauhan, V., Stern, D.A. and Vasquez, F.G.: Simultaneous determination of anions and triclosan in dentifrices by gradient ion chromatography and isocratic high-performance liquid chromatography interfaced with conductivity and ultraviolet detection. *J. Chromatogr. A*, 671 (1994) 351-357.
- 5146 Fang, R., She, X. and Zhong, Z.: (Ion chromatography with amperometric detection for the measurement of trace amount of iodine in serum, urine and hair). Sepu, 12 (1994) 152-154; C.A., 121 (1994) 4256c.
- 5147 Frelich, P., Weber, A., Shaposhnik, V.A. and Desyaterik, N.V.: (Determination of nitrates and chlorides by ion-exchange chromatography with precipitation reaction). *Zh. Anal. Khim.*, 49 (1994) 274-276; C.A., 120 (1994) 288982p.
- 5148 Fung, Y.S. and Tam, W.M.: LC separation and indirect detection of analyte anions using Ru(phen)₃(ClO₄)₂ as a mobile phase additive: wavelength selection and application. *J. Chromatogr. Sci.*, 32 (1994) 157-161.
- 5149 Galceran, M.T. anld Diez, M.: Column-switching techniques in the analysis of phosphate by ion chromatography. *J. Chroma-togr. A*, 675 (1994) 141-147.
- 5150 Gros, N. and Gorenc, B.: Improvement of a computer program for the ion chromatographic determination of some anions in natural waters. *J. Chromatogr. A*, 668 (1994) 385-393.
- 5151 Haddad, P.R. and Laksana, S.: On-line analysis of alkaline samples with a flow-through electrodialysis device coupled to an ion chromatograph. J. Chromatogr. A, 671 (1994) 131-139.
- 5152 Haldna, U. and Yakovleva, I.: A novel eluent for single-column ion chromatography with conductometric detection. *Eesti Tead Akad. Toim., Keem.*, 43 (1994) 20-26; C.A., 120 (1994) 288851v.
- 5153 Haldna, U., Yakovleva, I. and Kudryashova, M.: Ion chromatography with carbonate eluents. UV detector responses to some inorganic anions. *Eesti Tead. Akad. Toim., Keem.*, 42 (1993) 165-171; C.A., 120 (1994) 314660d.
- 5154 Heitkemper, D.T., Kaine, L.A., Jackson, D.S. and Wolnik, K.A.: Practical applications of element-specific detection by inductively coupled plasma atomic emission spectroscopy and inductively coupled plasma mass spectrometry to ion chromatography of foods. J. Chromatogr. A, 671 (1994) 101-108.
- 5155 Janos, P., Broul, M., Novobilsky, V. and Kolsky, V.: Normal-phase high-performance liquid chromatographic separation of halocyclophosphazenes. J. Chromatogr. A, 676 (1994) 451-454.
- 5156 Joyce, R.J. and Dhillon, H.S.: Trace level determination of bromate in ozonated drinking water using ion chromatography. J. Chromatogr. A, 671 (1994) 165-171.
- 5157 Kaiser, E. and Wojtusik, M.J.: Determination of trace anions in isopropanol. *J. Chromatogr. A*, 671 (1994) 253-258.
- 5158 Kreling, J.R., Cowan, J.S., Block, F. and DeZwaan, J.: Progress and problems in organic microanalysis by ion chromatography. *J. Chromatogr. A*, 671 (1994) 295-302.
- 5159 Kumagai, H., Sakai, T., Matsumoto, K. and Hanaoka, Y.: Determination of anions at the ng/l level by means of switching valves to eliminate the water-dip interference. *J. Chromatogr. A*, 671 (1994) 15-22.

- 5160 Lamb, J.D., Smith, R.G., Anderson, R.C. and Mortensen, M.K.: Anion separations on columns based on transition metalmacrocycle complex exchange sites. *J. Chromatogr. A*, 671 (1994) 55-62.
- 5161 Rendl, J., Seybold, S. and Börner, W.: Urinary iodide determined by paired-ion reversed-phase HPLC with electrochemical detection. Clin. Chem. (Washington), 40 (1994) 908-913.
- 5162 Riedmann, M. and Glatz, B.: Sensitive HPLC analysis of inorganic anions using standard equipment. *Int. Lab.*, 24, No. 8 (1994) P7-P14.
- 5163 Saari-Nordhaus, R., Nair, L.M. and Anderson, J.M., Jr.: Elimination of matrix interferences in ion chromatography by the use of solid-phase extraction disks. *J. Chromatogr. A*, 671 (1994) 159-163.
- 5164 Sen, N.P., Baddoo, P.A. and Seaman, S.W.: Rapid and sensitive determination of nitrite in foods and biological materials by flow injection or high-performance liquid chromatography with chemiluminescence detection. J. Chromatogr. A, 673 (1994) 77-84
- 5165 Sergeev, G.M., Lukuttsov, A.A. and Zorin, A.D.: (Anion liquid chromatography for detection impurities in acetone). *Zh. Anal. Khim.*, 49 (1994) 432-436; C.A., 120 (1994) 338075t.
- 5166 Smith, R.G.: Anion separations using macrocycle-based ion exchange columns. Avail. *Univ. Microfilms Int.*, Order No. DA9409601, 1993, 200 p.; C.A., 121 (1994) 25722s.
- 5167 Smith, R.G. and Lamb, J.D.: Use of step gradients on different polymeric substrates in the separation of anions by macrocyclebased ion chromatography. J. Chromatogr. A, 671 (1994) 89-94

- 5168 Sopok, S.: Utilization of ion chromatography and statistics to determine important acids in chromium plating and electropolishing solutions. J. Chromatogr. A, 671 (1994) 265-271.
- 5169 Udisti, R., Bellandi, S. and Piccardi, G.: Analysis of snow from Antarctida: a critical approach to ion-chromatographic methods. Fresenius J. Anal. Chem., 349 (1994) 289-293.
- 5170 Voloschik, I.N., Litvina, M.L. and Rudenko, B.A.: Determination of carbonate, inorganic anions and anionic metal complexes by single-column ion chromatography with conductimetric and UV detection. J. Chromatogr. A, 671 (1994) 249-252.
- 5171 Watkinson, J.H. and Kear, M.J.: High-performance ion chromatography measurement of sulfate in 20 mM phosphate extracts of soil. Commun. Soil Sci. Plant Anal., 25 (1994) 1015-1033; C.A., 120 (1994) 322021m.
- 5172 Weber, L. and Putz, B.: (Determination of nitrate in potatoes). Veroeff. Arbeitsgem. Kartoffelforsch., 15 (1993) 33-44; C.A., 121 (1994) 7563m.
- 5173 Weinberg, H.: Pre-concentration techniques for bromate analysis in ozonated waters. *J. Chromatogr. A*, 671 (1994) 141-149.
- 5174 Zhang, X. and Jiang, X.: Low-pressure ion chromatography. J. Chromatogr. A, 671 (1994) 23-28.
- See also 4209, 4262, 4368, 4506, 4926, 5084, 5089, 5090, 5091, 5094, 5131, 5132, 5133, 5136, 5138.
- 39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

See 4557, 5123.

B404

Gas Chromatography

REVIEWS AND BOOKS

- 1968 Bruner, F.: Gas Chromatographic Environmental Analysis: Principles, Techniques, Instrumentation. VCH, New York, 1993, 233 pp.; C.A., 120 (1994) 225587t.
- 1969 Dondi, F. and Guiochon, G. (Editors): Theoretical Advancement in Chromatography and Related Separation Techniques. NATO ASI Ser., Ser. C, Vol. 383, Kluwer, Dordrecht-Boston-London, 1992, XX + 641 pp.
- 1970 Eiceman, G.A., Hill, H.H., Jr. and Davani, B.: Gas chromatography. *Anal. Chem.*, 66 (1994) 621R-633R a review with 326 refs.
- 1971 Jinno, K. (Editor): Hyphenated Techniques in Supercritical Fluid Chromatography and Extraction. J. Chromatogr. Library, Vol. 53, Elsevier, Amsterdam, 1992, X + 334 pp.
- 1972 Vreuls, J.J., de Jong, G.J., Ghijsen, R.T. and Brinkman, U.A.T.: Liquid chromatography coupled on-line with gas chromatography: state of art. J. Assoc. Off. Anal. Chem., 77 (1994) 306-327 - a review with 123 refs.
- See also 1992, 1995, 2003, 2008, 2010, 2032, 2044, 2077, 2097, 2101, 2113, 2169, 2172, 2315, 2320, 2371, 2374, 2470, 2480, 2551.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

1973 Wu, N., Wei, W. and Ren, X.: (One case on the fitting of chromatographic peak with log-normal distribution function.) Sepu, 12 (1994) 103-104.

See also 2100.

- 2b. Thermodynamics and theoretical relationships
- 1974 Castello, G., Vezzani, S. and Moretti, P.: Theoretical calculation of gas hold-up time in capillary gas chromatography. Influence of column, instrument parameters and analysis conditions and comparison of different methods of dead time determination. J. Chromatogr. A, 677 (1994) 95-106.
- 1975 Katritzky, A.R., Ignatchenko, E.S., Barcock, R.A., Lobanov, V.S. and Karelson, M.: Prediction of gas chromatographic retention times and response factors using a general quantitative structure–property relationship treatment. *Anal. Chem.*, 66 (1994) 1799-1807.
- 1976 Li, J.: Solvatochromic and thermodynamic studies of retention in gas chromatography and gas-liquid equilibria. (Volumes I and II). Avail. *Univ Microfilms Int.*, Order No. DA9239139, 1993, 478 pp.; C.A., 120 (1994) 260246c.

- 1977 Li, J. and Carr, P.W.: Extra-thermodynamic relationships in chromatography. Enhalpy-entropy compensation in gas chromatography. J. Chromatogr. A, 670 (1994) 105-116.
- 1978 Reddy, K.S., Cloux, R. and Kováts, E.sz.: Pair-wise interactions by gas chromatography. IV. Interaction free enthalpies of solutes with trifluoromethyl-substituted alkanes. J. Chromatogr. A, 673 (1994) 181-209.
- 1979 Reznikov, S.A.: (Use of gas chromatography to study the mobility of adsorbed molecules.) Zh. Fiz. Khim., 68 (1994) 382-384.
- 1980 Rohrschneider, L.: Explanatory coefficients for stationary phases in gas chromatography from McReynolds phase constants. Chromatographia, 38 (1994) 679-688.
- 1981 Santiuste, J.M.: Molecular structural coefficients of Takács. Their dependence on column temperature, stationary phase polarity and solute chemical nature. *Chromatographia*, 38 (1994) 701-708.
- 1982 Zhang, X., Ye, F., Di, L., Luo, C., Zhang, Y. and Lu, P.: (Study of fuzzy identification in gas chromatography.) Fenxi Ceshi Xuebao, 12, No. 1 (1993) 15-20; C.A., 120 (1993) 289143c.

See also 2094, 2103, 2107.

- Relationship between structure and chromatographic behaviour
- 1983 Bicchi, C., D'Amato, A. and Orlandin, M.: Identification of the constituents of a complex mixture by combined use of retention indices and specific multidetection responses. J. High Resolut. Chromatogr., 17 (1994) 335-338.
- 1984 Bruchmann, A., Zinn, P. and Haffer, C.M.: Prediction of gas chromatographic retention index data by neural networks. *Anal. Chim. Acta*, 283 (1993) 869-880.
- 1985 Cai, Y. and Yao, L.: (Prediction of gas chromatographic retention values by artificial neural networks.) Fenxi Huaxue, 21 (1993) 1250-1253; C.A., 120 (1994) 68463e.
- 1986 Cha, K.W. and Lee, D.J.: (Prediction of retention indexes of various compounds in gas-liquid chromatography.) J. Korean Chem. Soc., 38 (1994) 108-121; C.A., 120 (1994) 260237a.
- 1987 Wang, F., Guo, Y., Jiang, Y. and Cai, R.: (Relation between retention value and carbon number of homologs in supercritical fluid chromatography.) Fenxi Shiyanshi, 12, No. 4 (1993) 72-74; C.A., 120 (1993) 289137d.
- See also 2052, 2112, 2120, 2126, 2200, 2212, 2291.
- 2d. Measurement of physico-chemical and related values
- 1988 Abraham, M.H.: Application of solvation equations to chemical and biochemical processes. *Pure Appl. Chem.*, 65 (1993) 2503-2512; C.A., 120 (1994) 211957b.
- 1989 Abraham, M.H., Du, C.M., Osei-Owusu, J.P., Sakellariou, P. and Shuely, W.J.: On the prediction of polymer-probe X and Ω [activity coefficient] values from inverse gas chromatographic data. Eur. Polym. J., 30 (1994) 635-639; C.A., 120 (1994) 271651g.

GAS CHROMATOGRAPHY B405

1990 Aleman, C.: (New method for calculation of the partition constant of hexanal for determination of the degree of lipid oxidation and the shelf life of foods.) Quim. Ind. (Madrid), 40, No. 6 (1993) 28-33; C.A., 120 (1994) 53002e.

- 1991 Borovskaya, M.K., Reznikov, S.A., Khva, K. and Shmidt, F.K.: (Gas chromatographic study of the adsorption of thiophene and thiophane on sulfidized alumina-molybdenum and silicamolybdenum catalysts.) Zh. Fiz. Khim., 68 (1994) 123-126.
- 1992 Bruner, F.: Gas chromatographic techniques to elucidate the working mechanism of graphitized carbon black-liquid modifier-eluate interactions. In: Dondi, F. and Guiochon, G. (Editors), Theoretical Advancement in Chromatography and Related Separation Techniques. NATO ASI Ser., Ser. C, Vol. 383, Kluwer, Dordrecht-Boston-London, 1992, pp. 369-395 - a review with 54 refs.
- 1993 Dallas, A.J. and Carr, P.W.: Critical evaluation of predicted and measured gas-liquid partition coefficients in n-hexadecane. J. Phys. Chem., 98 (1994) 4927-4939; C.A., 120 (1994) 254142z.
- 1994 Guan, H., Tong, X., Li, J. and Zhang, Y.: (Study of maceral pore structure by gas chromatography.) Meitan Zhuanhua, 16, No. 3 (1993) 49-54; C.A., 120 (1994) 248955a.
- 1995 Hegedus, C.R. and Kamel, I.L.: A review of inverse gas chromatography theory used in the thermodynamic analysis of pigment and polymer surfaces. J. Coat. Technol., 65 (1993) 23-30; C.A., 120 (1994) 220401t a review with 51 refs.
- 1996 Khalfaoui, B. and Newsham, D.M.T.: Determination of infinite dilution activity coefficients and second virial coefficients using gas-liquid chromatography. I. The dilute mixtures of water and unsaturated chlorinated hydrocarbons and of water and benzene. J. Chromatogr. A, 673 (1994) 85-92.
- 1997 Kuruc, J. and Sahoo, M.K.: GC-MS and GC-FTIR identification of volatile radiolytic products in water-nitrobenzene-carbon tetrachloride two phase systems. J. Radioanal. Nucl. Chem., 173 (1993) 395-407; C.A., 120 (1994) 191206a.
- 1998 Liu, D., Xu, H., Song, C., Zhao, J., Sun, P. and Xu, J.: (Application of gas chromatographic intersections in the study of deactivated catalysts. I. The benzene-deactivated cracking catalyst system.) *Huaxue Xuebao*, 51 (1993) 1048-1052; C.A., 120 (1994) 58086v.
- 1999 Miyabe, K. and Suzuki, M.: Adsorption characteristics of octadecylsilyl-silica gel in gaseous systems. AIChE J., 39 (1993) 1791-1798; C.A., 120 (1994) 63224t.
- 2000 Pleil, J.D. and Stroupe, M.L.: Measurement of vapor-phase organic compounds at high concentrations. J. Chromatogr. A, 676 (1994) 399-408.
- 2001 Pyda, M., Stanley, B.J., Xie, M. and Guiochon, G.: Analysis of the surface heterogeneity of unmodified and modified silica by capillary inverse gas-solid chromatography at finite dilution. *Langmuir*, 10 (1994) 1573-1579; C.A., 120 (1994) 308203r.
- 2002 Spieksma, W., Luik, R. and Govers, H.A.J.: Determination of the liquid vapour pressure of low-volatility compounds from the Kováts retention index. J. Chromatogr. A, 672 (1994) 141-148.
- 2003 Staby, A. and Mollerup, J.: Separation of constituents of fish oil using supercritical fluids: a review of experimental solubility, extraction, and chromatographic data. *Fluid Phase Equilib.*, 91 (1993) 349-386; C.A., 120 (1994) 52942z.

2004 Tang, Z., Zheng, Y., Zhao, W. and Shi, J.: (Study on vapor-liquid equilibrium of benzene-thiphene-DMF system. (II). Activity coefficient measurement of dilute solution with gas chromatography.) Nanjing Huagong Xueyan Xuebao, 15, No. 4 (1993) 63-67; C.A., 120 (1994) 308546e.

- 2005 Valitov, N.Kh., Zagidullin, R.R., Gimaev, R.N., Minibaev, A.V., Rozenbaum, B.L. and Prokopyuk, S.G.: (Method for catalytic agents acidity and-or alkalinity measuring.) U.S.S.R. SU 1,763,974 (Cl. G01N30/06), 23 Sep. 1992, Appl. 4,832,277, 29 Mar. 1990; C.A., 120 (1994) 314819n.
- 2006 Voelkel, A. and Janas, J.: Inverse gas chromatographic determination of solubility parameter and binary parameters of α,ω-diamino oligoethers. J. Chromatogr. A, 669 (1994) 89-95.
- 2007 Zhao, J., Wang, W., Zhou, Y. and Liu, J.: (Study on the source of optical activity. IV. The chirasil-val capillary column gas chromatographic study of the stereoselective beta radiolysis of D-, L-leucine by ⁹⁰Sr-⁹⁰Y.) He Huaxue Yu Fangshe Huaxue, 15 (1993) 46-49; C.A., 120 (1994) 192247b.

See also 2216, 2421, 2423.

GENERAL TECHNIQUES

3a. Apparatus and accessories

- 2008 Berkley, R.E.: Field-deployable monitors for volatile organic compounds in air. Process Control Qual., 5 (1993) 159-164; C.A., 120 (1994) 278580s - a review with 9 refs.
- 2009 Bruns, M.W.: High-speed portable gas chromatography. Silicon micromachining. Erdoel Kohle, Erdgas, Petrochem., 47, No. 3 (1994) 80-84; C.A., 120 (1993) 289108v.
- 2010 Ding, L., Zhang, Z. and An, D.: (HPLC-GC multidimensional chromatography and its applications.) Zhongguo Yiyuan Yaoxue Zazhi, 13 (1993) 460-465; C.A., 120 (1994) 62363a a review with 26 refs.
- 2011 Greenberg, J.P., Lee, B., Helmig, D. and Zimmerman, P.R.: Fully automated gas chromatograph–flame ionization detector system for the *in situ* determination of atmospheric non-methane hydrocarbons an low par per trillion concentration. *J. Chromatogr. A*, 676 (1994) 389-398.
- 2012 Harvey, M.C., Robinson, R.E., Harvey, M.C. and Stearns, S.D.: Further studies on high-speed switching of chromatographic valves. J. Chromatogr. Sci., 32 (1994) 190-194.
- 2013 Ivanov, P.B., Astakhov, A.V. and Shadrin, A.M.: (Method of quantitative chromatographic analysis.) *U.S.S.R.* SU 1,728,796 (Cl. G01N30/86), 23 Apr. 1992, Appl. 4,656,431, 27 Feb. 1989; C.A., 120 (1994) 314952a.
- 2014 Jiang, K.K. and Bernard, B.B.: Water management device for gas chromatography sample concentration. U.S. US 5,250,093 (Cl. 96-102; B01D15/08), 5 Oct. 1993, Appl. 848,395, 9 Mar. 1992; 11 pp.; C.A., 120 (1994) 260156y.
- 2015 Kane, P. and Rothman, N.: Testing GC method ruggedness and improving injection technique by design – not chance. LC-GC, 11 (1993) 813-820; C.A., 120 (1994) 68454c.
- 2016 Kim, M.G., Shim, J.H., Lee, D.S. and Lee, Y.K.: (Development of portable gas chromatography/photoionization detector system.)
 J. Korean Chem. Soc., 38 (1994) 151-159; C.A., 120 (1994) 254304d.

- 2017 Krebs, G.: (Gas chromatographs with separatory columns especially capillary columns and a system for heating the columns.) Ger. DE 4,227,509 (Cl. G01N30/30), 2 Dec. 1993, Appl. 20 Aug. 1992; 6 pp.; C.A., 120 (1994) 235166u.
- 2018 Kurono, H.: (Flow-rate detector for carrier gas in gas chromatography.) Jpn. Kokai Tokkyo Koho JP 05,312,793 [93,312,793] (Cl. G01N30/26), 22 Nov. 1993, Appl. 92/119,234, 12 May 1992; 4 pp.; C.A., 120 (1994) 211989p.
- 2019 Ligon, W.V., Jr. and Pauly, D.: Column switching in gas chromatography utilizing a magnetically controlled valve. J. Chromatogr. Sci., 32 (1994) 204-206.
- 2020 Mainga, A.M.: Development of a portable and selective volatile organic compound analyzer based on an enhanced microchip gas chromatograph. Avail. *Univ. Microfilms Int.*, Order No. DA9301081, 1992, 237 pp.; C.A., 120 (1993) 289105s.
- 2021 Mori, H.: (Gas chromatograph for determinations of inorganic gas and organic gas.) *Jpn. Kokai Tokkyo Koho*, JP 06 18,502 [94 18,502] (Cl. G01N30/46), 25 Jan. 1994, Appl. 92/173,455, 30 Jun. 1992; 4 pp.; *C.A.*, 120 (1994) 314774u.
- 2022 Reston, R.R.: Design and performance evaluation of a gas chromatograph micromachined in a single crystal silicon substrate. Avail. *Univ. Microfilms Int.*, Order No. DA9315559, 1993, 366 pp.; C.A., 120 (1994) 314547x.
- 2023 Staphanos, S.J.: Natural gas and trace moisture measurements by online process gas chromatograph. Adv. Instrum. Control, 48 (1993) 271-281; C.A., 120 (1994) 195429y.
- 2024 Watanabe, C.: (Pyrolysis apparatus for gas chromatography.) Jpn. Kokai Tokkyo Koho JP 06 82,434 [94 82,434] (Cl. G01N30/06), 22 Mar. 1994, Appl. 92/236,182, 3 Sep. 1992; 7 pp.; C.A., 120 (1993) 289188w.

See also 2076, 2083, 2110, 2114.

3b. Detectors and detection reagents

- 2025 Alvarez Bolainez, R.M.: Design and evaluation of a gas chromatographic detector based on the measurement of the power reflected from a microwave plasma. Avail. Univ. Microfilms Int., Order No. DA9217987, 1992, 126 pp.; C.A., 120 (1994) 228315p.
- 2026 Ciganek, M., Dressler, M. and Lang, V.: Relative electron-capture detector response of selected polychlorinated biphenyl congeners. Influence of detector temperature and design. *J. Chromatogr. A*, 668 (1994) 441-448.
- 2027 Cook, B. and Piepmeier, E.H.: Frequency, current, and amplitude maps of oscillating-plasma glow discharge GC detectors. Anal. Chem., 66 (1994) 1249-1253.
- 2028 Criddle, W.J. and Hansen, N.R.S.: Fuel cell detector for gas chromatography. *Anal. Proc.*, 31 (1994) 3-5.
- 2029 Gallagher, M.M.: Characterization of a sheathed flow hydrogen atmosphere flame ionization detector after capillary gas chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9238400, 1992, 219 pp.; C.A., 120 (1993) 289104r.
- 2030 Guan, Y., Li, L., Zhu, D. and Zhou, L.: (Minus pressure thermal conductivity detector in capillary gas chromatography.) Fenxi Huaxue, 21 (1993) 1383-1386; C.A., 120 (1994) 207641b.
- 2031 Guan, Y., Zhou, L., Zhu, D. and Li, L.: (Thermal conductivity detector for temperature-programmed capillary gas chromatography.) Yiqi Yibiao Xuebao, 14 (1993) 225-230; C.A., 120 (1993) 289107u.

- 2032 Lobinski, R.: Gas chromatography with element selective detection in speciation analysis. Status and future prospects. *Analusis*, 22 (1994) 37-48; C.A., 120 (1994) 314854v a review with 67 refs.
- 2033 Millier, B., Sun, X.-Y. and Aue, W.A.: Multichannel chromatography and on-line spectra from a flame photometric detector. J. Chromatogr. A, 675 (1994) 155-175.
- 2034 Poshemanskij, V.M.: (Flame ionization detector.) U.S.S.R. SU 1,791,769 (Cl. G01N30/68), 30 Jan. 1993, Appl. 4,756,462, 9 Nov. 1989; C.A., 120 (1993) 289008n.
- 2035 Ryerson, T.B., Barkley, R.M. and Sievers, R.E.: Selective chemiluminescence detector for sulfur-containing compounds coupled with nitrogen-phosphorus detection for gas chromatography. J. Chromatogr. A, 670 (1994) 117-126.
- 2036 Smith, D.L. and Piepmeier, E.H.: Fingerprint identification of organic compounds using an oscillating plasma glow discharge detector for gas chromatography. *Anal. Chem.*, 66 (1994) 1323-1329.
- 2037 Wang, G., Li, J., Li, R. and Ou, Q.: (Development and application of oxygen-flame ionization detector.) Fenxi Huaxue, 22 (1994) 101-105; C.A., 120 (1994) 207644e.
- 2038 Yang, J.: (A BASIC program for control analysis of sulfide by gas chromatography.) Shiyou Huagong, 22 (1993) 688-689, 683; C.A., 120 (1994) 303048j.

See also 1983, 2016, 2113, 2117, 2185, 2470.

- 3c. Sorbents and columns, packing procedures
- 2039 Berzin, G.I., Sidorov, P.F., Avgul, N.N., Khudyakov, V.L., Uvarov, L.A., Buryak, A.K. and Avgul, T.V.: (Capillary gas chromatography column.) U.S.S.R. SU 1,728,795 (Cl. G01N30/60), 23 Apr. 1992, Appl. 4,737,877, 18 Sep. 1989; C.A., 120 (1994) 314934w.
- 2040 Davydov, V.Ya., Mandrugin, A.A., Roshchina, T.M., Fedoseev, V.M. and Shishkina, M.M.: (Gas-chromatographic properties of silochromes with grafted guanidine ethane thiol moieties.) Vestn. Mosk. Univ., Ser. 2: Khim., 34 (1993) 361-366; C.A., 120 (1994) 201141s.
- 2041 Fu, R., Jing, P., Gu, J., Huang, Z. and Chen, Y.: (A new stationary phase for capillary column gas chromatography side chain liquid crystalline polysiloxane containing crown ether.) Fenxi Huaxue, 21 (1993) 896-899; C.A., 120 (1994) 68433v.
- 2042 Gawdzik, B. and Matynia, T.: Characterization of methacrylic ester of p,p'-dihydroxydiphenylpropane diglycidyl ether-divinylbenzene copolymer for GC. Chromatographia, 38 (1994) 643-648.
- 2043 Gu, X., Wang, L. and Son, W.: (Gas chromatographic properties of butylammonium nitrate and isobutylammonium nitrate.) Hebei Daxue Xuebao, Ziran Kexueban, 13, No. 3 (1993) 72-76; C.A., 120 (1994) 314897m.
- 2044 Guthrie, E.J. and Harland, J.J.: Overview of phase development in capillary gas chromatography. *LC-GC*, 12 (1994) 80-86 - a review with 11 refs.
- 2045 Hagglund, I., Blomberg, L.G., Janák, K., Claude, S.G. and Tabacchi, R.: Silicone gum of OV-225 type for open-tubular gas chromatography. J. Chromatogr. A, 673 (1994) 93-99.

- 2046 He, L., Yin, H., Huang, A. and Sun, Y.: (Permethylated β-cyclodextrin as a stationary phase of fused silica open tubular column for separation of isomers of substituted benzenes.) Beijing Daxue Xuebao, Ziran Kexueban, 29 (1993) 423-427; C.A., 120 (1994) 314897m.
- 2047 Heijmans, H., de Zeeuw, J., Buyten, J., Peene, J. and Mohnke, M.: The use of PLOT columns in gas chromatography. *Int. Lab.*, 24, No. 8 (1994) P2-P6.
- 2048 Jiang, H., Liu, X., Zhao, D. and Xu, W.: (Study on a rapid static method for coating capillary column.) Sepu, 12 (1994) 126-127
- 2049 Komarek, K.: Short glass micro-packed columns for gas chromatography. Coll. Czech. Chem. Commun., 59 (1994) 589-594.
- 2050 Kraus, G., Thierfelder, J.M. and Soják, L.: Highly selective liquid crystalline polysiloxane stationary phase for gas chromatographic separation of isomers. *J. Chromatogr. A*, 677 (1994) 197-200.
- 2051 Li, S., He, D. and Dai, X.: (A further comparison of real peak numbers with other parameters of gas chromatographic column efficiency.) Sepu, 12 (1994) 79-82.
- 2052 Morales, R., Blanco, C. and Furton, K.G.: The gas-liquid chromatographic stationary phase properties of liquid organic salts: anomalous selectivity variation when employing the Rohrschneider/McReynolds system. *Talanta*, 40 (1993) 1541-1549
- 2053 Nanba, T.: (Manufacture of gas chromatography column filler for analysis of carbon dioxide mixed gases.) *Jpn. Kokai Tokkyo Koho* JP 05,253,477 [93,253,477] (Cl. B01J20/18), 5 Oct. 1993, Appl. 92/89,905, 13 Mar. 1992; 3 pp.; C.A., 120 (1994) 68356x.
- 2054 Okano, H., Tokunaga, T. and Ito, R.: (Manufacture of capillary for gas chromatography.) *Jpn. Kokai Tokkyo Koho* JP 04,273,060 [92,273,060] (Cl. G01N30/56), 29 Sep. 1992, Appl. 91/34,362, 28 Feb. 1991; 4 pp.; C.A., 120 (1994) 260275m.
- 2055 Onuchak, L.A., Surzhikova, G.V. and Maslova, N.E.: (Effects of the nature of the solid support on chromatographic properties of columns with nematic p,p'-methoxyethoxyazoxybenzene.) Zh. Fiz. Khim., 68 (1994) 127-132.
- 2056 Qureshi, M.S.: Application of non-purified silica gel in residue analysis via on-column suppression of interference in gas chromatography with electron capture detector. Fresenius Environ. Bull., 2 (1993) 214-219; C.A., 120 (1994) 68512v.
- 2057 Ruan, Z., Liu, H. and Wang, Q.: (Preparation of organic porous bead polymer fused silica (PLOT) column and evaluation of its characteristics.) Sepu. 12 (1994) 105-107.
- 2058 Sander, L.C., Schneider, M., Wise, S.A. and Woolley, C.: Shape selectivity assessment of stationary phases in gas chromatography. J. Microcolumn Sep., 6 (1994) 115-125.
- 2059 Sarafyan, G.D., Ter-stepanyan, E.S., Tataryan, G.A. and Ovsepyan, A.M.: (Liquid stationary phase for separation of hydrocarbons and water by gas chromatography.) U.S.S.R. SU 1,735,763 (Cl. G01N30/00), 23 May 1992, Appl. 4,734,040, 8 Jun. 1989; C.A., 120 (1994) 68539i.
- 2060 Varga, M., Somogvi, G., Posta, J. and Buris, J.: Effect of different columns and internal standards on the quality assurance of the gas chromatographic determination of blood ethanol. Eur. J. Clin. Chem. Clin. Biochem., 31 (1993) 773-776; C.A., 120 (1994) 47530j.

- 2061 Vigdergauz, M.S., Pakhomonova, V.I. and Sutzhikova, G.V.: (Synthesis and use of a series of high temperature liquid crystals and their eutectic mixtures in chromatographic analysis of polynuclear aromatic compounds.) *Izv. Vyssh. Uchebn. Zaved, Khim. Khim. Tekhnol.*, 36, No. 6 (1993) 20-23; C.A., 120 (1994) 314876d.
- 2062 Villalobos, R.: Computer aided chromatograph column design for process GC. Adv. Instrum. Control, 48/1 (1993) 291-304; C.A.: 120 (1994) 273647i.
- 2063 Yan, Z. and Nikelly, J.G.: The use of precolumns for solvent focusing in capillary column gas chromatography. J. High Resolut. Chromatogr., 17 (1994) 522-526.
- 2064 Yi, G., Bradshaw, J.S., Rossiter, B.E., Malik, A. Li, W. and Lee, M.L.: New permethyl-substituted β-cyclodextrin polysiloxanes for use as chiral stationary phases in open tubular column chromatography. *J. Org. Chem.*, 58 (1993) 4844-4850; C.A., 120 (1994) 299104e.
- 2065 Yi, G., Bradshaw, J.S., Rossiter, B.E., Malik, A., Li, W., Yun, H. and Lee, M.L.: Large-rim-tethered permethyl-substituted β-cyclodextrin polysiloxanes for use as chiral stationary phases in open tubular column chromatography. *J. Chromatogr. A*, 673 (1994) 219-230.
- 2066 Zhou, Y.W., Jaroniec, M., Hann, G.L. and Gilpin, R.K.: Gas chromatographic and infrared studies of 4'-cyano-4-biphenyl 4-(4-pentenyloxy)benzoate coated on porous silica. *Anal. Chem.*, 66 (1994) 1454-1458.
- 2067 Zou, G., Zheng, Q. and Hu, G.: (Synthesis of cellulose tribenzoate and gas-solid chromatographic analysis of alcohols.) Sepu, 12 (1994) 114-116.

See also 1999, 2096, 2148, 2238, 2287.

- 3d. Quantitative analysis
- 2068 Nerin, C., Cacho, J., Tornés, A.R. and Echarri, I.: Some observations on the standard addition procedure in gas chromatographic analysis. *J. Chromatogr. A*, 672 (1994) 159-165.
- 2069 Sun, J.J. and Roston, D.A.: Matrix effects during standard addition quantitation of a trace volatile impurity in a drug substance sample. J. Chromatogr. A, 673 (1994) 211-218.
- 2070 Yu, Z., Yun, X., Kou, D. and Li, Y.: (Preparation of the two component standards for gas chromatography.) Huaxue Shiji, 15 (1993) 132-134; C.A., 120 (1994) 68428x.

See also 2082, 2425.

- 3e. Preparative scale chromatography
- See 2099, 2452.
- 3f. Programmed temperature, pressure, vapors, gradients
- See 2031, 2072, 2126.

BIBLIOGRAPHY SECTION

4. SPECIAL TECHNIQUES

4a. Automation

2071 Elling, J.W., Mniszewski, S.M., Zahrt, J.D. and Klatt, L.N.: Automated chromatographic data interpretation using an expert system. *J. Chromatogr. Sci.*, 32 (1994) 213-218.

4b. Computerization and modelling

- 2072 Guan, Y., Zhou, L. and Li, L.: (Simulation of retention values with high accuracy in temperature-programmed capillary gas chromatography.) Fenxi Huaxue, 21 (1993) 1378-1382; C.A., 120 (1994) 207665n.
- 2073 Lysakowski, R.: Standards for chromatographic data communications, storage, and archiving. *J. Chromatogr. Sci.*, 32 (1994) 236-242.
- 2074 Solomon, B.P.: ChromGraph: The chromatography data system with "Windows" into the 21st century. *Curr. Sep.*, 12 (1993) 149-151; C.A., 120 (1994) 186718q.
- 2075 Takeda, I.: (Relationship between the experimental conditions of gas chromatography and peak parameters. Construction of a nomograph using a computer-assisted plotter.) Kuromatogurafi, 14, No. 6 (1993) 71R-78R; C.A., 120 (1994) 227926b.

See also 2038, 2062.

- Combination with other physico-chemical techniques (MS, IR etc.)
- Brand, W.: Interface between a gas chromatograph and a mass spectrometer. *Brit. UK Pat. Appl.* GB 2,270,977 (CI. B01D59/44), 30 Mar. 1994, DE Appl. 4,232,301, 26 Sep. 1992; 12 pp.; *C.A.*, 120 (1994) 311059d.
- 2077 Gohlke, R.S. and McLaferty, F.W.: Early gas chromatography/mass spectrometry. J.Am. Soc. Mass Spectrom., 4 (1993) 367-371; C.A., 120 (1994) 207619a a review with 36 conference.
- 2078 Goode, S.R. and Thomas, C.L.: Determination of oxygen-containing additives in gasoline by gas chromatography-microwave-induced plasma atomic emission spectrometry. J. Anal. At. Spectrom., 9 (1994) 73-78; C.A., 120 (1994) 248855t.
- 2079 Huang, W., Wang, Q., Zhu, D., Che, X., Song, G. and Zhou, L.: (Online capillary SFC/FTIR method.) Guangpuxue Yu Guangpu Fenxi, 12, No. 6 (1992) 37-40, 98; C.A., 120 (1994) 68449e.
- 2080 Kostiainen, R.: Effect of operating parameters in purge-andtrap GC-MS of polar and nonpolar organic compounds. Chromatographia, 38 (1994) 709-714.
- 2081 McClure, G.L., McGrattan, B.J. and Rau, A.: (Online supercritical-fluid extraction/gas chromatography/FTIR analysis (SFE/GC/FTIR) of basil.) GIT Spez. Chromatogr., 13, No. 1 (1993) 30-32; C.A., 120 (1994) 49187b.
- 2082 Sato, M. and Mitsui, T.: Comparison between multivariate analysis and the conventional method for quantitative calculation using a gas chromatograph/mass spectrometer. *Anal. Sci.*, 10 (1994) 485-490.

- 2083 Schultz, G.A.: Design and development of a beam deflection time-of-flight mass spectrometer: applications in gas chromatography/mass spectrometry and potassium ion ionization of desorbed species. Avail. *Univ. Microfilms Int.*, Order No. DA9216358, 1991, 161 pp.; C.A., 120 (1994) 230695f.
- 2084 Via, J. and Taylor, L.T.: Packed-column supercritical fluid chromatography/chemical ionization mass spectrometry of energetic material extracts using a thermospray interface. *Anal. Chem.*, 66 (1994) 1385-1395.
- 2085 Xu, Y., Wang, X. and Chen, B.: (Combination of glass capillary gas chromatography with Fourier transform infrared spectroscopy.) Fenxi Huaxue, 22 (1994) 214; C.A., 120 (1994) 27487511
- 2086 Zeng, Y.: Gas chromatography-atomic emission spectroscopy for metal selective detection. Avail. *Univ. Microfilms Int.*, Order No. DA9316730, 1993, 253 pp.; C.A., 120 (1994) 314586j.
- 2087 Zeng, Y., Mukai, H., Bandow, H. and Nojiri, Y.: Application of gas chromatography-combustion-isotope ratio mass spectrometry to carbon isotopic analysis of methane and carbon monoxide in environmental samples. *Anal. Chim. Acta*, 289 (1994) 195-204.
- See also 1971, 2088, 2128, 2250, 2271, 2278, 2362, 2370, 2391, 2522, 2548.

4e. Functional analysis

- 2088 Lamrini, R., Crouzet, J.M., Francina, A., Guillui, R., Steghens, J.P. and Brazier, J.L.: Evaluation of hydroxyl radicals production using ¹³CO₂ gas chromatography-isotope ratio mass spectrometry. *Anal. Biochem.*, 220 (1994) 129-136.
- 2089 Ohtani, H., Luo, Y.F., Nakashima, Y., Tsukahara, Y. and Tsuge, S.: Determination of end group functionality in poly(methyl methacrylate) macromonomers by pyrolysis simultaneous multidetection gas chromatography. *Anal. Chem.*, 66 (1994) 1438-1443.
- 4f. Trace analysis and preseparation techniques
- 2090 Helmig, D. and Greenberg, J.P.: Automated in situ gas chromatographic-mass spectrometric analysis of ppt level volatile organic trace gases using multistage solid-adsorbent trapping. J. Chromatogr. A, 677 (1994) 123-132.
- 2091 Liu, H. and Wehmeyer, K.R.: Supercritical fluid extraction as a sample preparation technique for the direct isolation of drugs from plasma prior to analysis. *J. Chromatogr. B*, 657 (1994) 206-213.
- 2092 Ndiege, I.O., Otieno, D.O., Budesberg, W.J. and Hassanali, A.: The use of reverse-phase C₁₈-bonded silica for the trapping, concentration and analysis of headspace vapor from model organic compounds, banana pseudostem and black pepper. J. Sci. Food Agric., 64 (1994) 47-52; C.A., 120 (1994) 189972d.
- 2093 Peters, A.J. and Sacks, R.D.: Adsorbent trap for gas chromatography. U.S. US 5,288,310 (Cl. 96-104; B01D15/08), 22 Feb. 1994, Appl. 953,893, 30 Sep. 1992; 11 pp.; C.A., 120 (1994) 314782v
- 2094 Veress, T.: Sample preparation by supercritical fluid extraction for quantitation. A model based on the diffusion-layer theory for determination of extraction time. J. Chromatogr. A, 668 (1994) 285-291.

GAS CHROMATOGRAPHY B409

- 2095 Yang, M.J., Harms, S., Luo, Y.Z. and Pawliszyn, J.: Membrane extraction with a sorbent interface for capillary gas chromatography. *Anal. Chem.*, 66 (1994) 1339-1346.
- See also 2011, 2014, 2069, 2080, 2141, 2164, 2502.
- 4g. Enantiomers, separation
- 2096 Wan, H. and Ou, Q.: (β-Cyclodextrin derivatives as chiral stationary phases for capillary gas chromatographic separation of enantiomers.) *Sepu*, 12 (1994) 183-185.
- See also 2064, 2065, 2109, 2152, 2215, 2289, 2296, 2322, 2323, 2327, 2329, 2332, 2337, 2342, 2385, 2429, 2431, 2452, 2479.
- 4h. Other special techniques
- 2097 Seto, Y.: Determination of volatile substances in biological samples by headspace gas chromatography. *J. Chromatogr. A*, 674 (1994) 25-62 - a review with 328 refs.

See also 2415, 2437.

- 4i. Supercritical fluid chromatography
- 2098 Cramers, C.A., Schoenmakers, P.J. and Janssen, H.G.: The position of supercritical-fluid chromatography between gas- and liquid chromatography from a kinetic point of view. In: Dondi, F. and Guiochon, G. (Editors), Theoretical Advancement in Chromatography and Related Separation Techniques. NATO ASI Ser., Ser. C, Vol. 383, Kluwer, Dordrecht-Boston-London, 1992, pp. 289-314.
- 2099 Cretier, G., Neffati, J. and Rocca, J.L.: Experimental study of band broadening and solute interferences in preparative supercritical fluid chromatography. *J. Chromatogr. A*, 670 (1994) 173-179.
- 2100 Goodman, K.J. and Brenna, J.T.: Curve fitting for restoration of accuracy for overlapping peaks in gas chromatography/combustion isotope ratio mass spectrometry. *Anal. Chem.*, 66 (1994) 1294-1301.
- 2101 Hiarat, Y.: (Application of supercritical fluid in analytical chemistry.) Koatsuryoku no Kagaku to Gijutsu, 2 (1993) 302-307; C.A., 120 (1994) 207618z a review with 12 refs.
- 2102 Lynam, K.G. and Nicolas, E.C.: Chiral HPLC versus chiral SFC: evaluation of long-term stability and selectivity of Chiralcel OD using various eluents. J. Pharm. Biomed. Anal., 11 (1993) 1197-1206; C.A., 120 (1993) 281194z.
- 2103 Martire, D.E., Riester, R.L. and Zhang, X.: Unified approach to the theory of chromatography. II. Compressible, neat mobile phase (supercritical fluid chromatography). In: Dondi, F. and Guiochon, G. (Editors), Theoretical Advancement in Chromatography and Related Separation Techniques. NATO ASI Ser., Ser. C, Vol. 383, Kluwer, Dordrecht-Boston-London, 1992, pp. 275-288.
- 2104 Melda, K.J.: Supercritical fluid chromatography. Adv. Instrum. Control, 48 (1993) 283-290; C.A., 120 (1994) 248056h.
- 2106 Pyo, D., and Ju, D.: Simple method for the preparation of water-modified or methanol-modified carbon dioxide as the mobile phase in supercritical fluid chromatography. *Anal. Sci.*, 10 (1994) 171-174.

2107 Shang, D.Y., Grandmaison, J.L. and Kaliaguine, S.: Some ther-modynamic aspects of packed column supercritical fluid chromatography. J. Chromatogr. A, 672 (1994) 185-201.

- 2108 Smith, R.M. and Briggs, D.A.: Effect of the sample solvent and instrument design on the reproducibility of retention times and peak shapes in packed-column supercritical fluid chromatography. J. Chromatogr. A, 670 (1994) 161-171.
- 2109 Stringham, R.W., Lynam, K.G. and Grasso, C.C.: Application of subcritical fluid chromatography to rapid chiral method development. *Anal. Chem.*, 66 (1994) 1949-1954.
- 2110 Takeuchi, M.: (Supercritical fluid chromatograph and washing of its column.) *Jpn. Kokai Tokkyo Koho* JP 06 11,497 [94 11,497] (Cl. G01N30/02), 21 Jan. 1994, Appl. 92/170,562, 29 Jun. 1992; 7 pp.; *C.A.*, 120 (1994) 314945a.
- 2111 Via, J., Taylor, L.T. and Schweighardt, F.K.: Experimental determination of changes in methanol modifier concentration in premixed carbon dioxide cylinders. *Anal. Chem.*, 66 (1994) 1459-1461.
- 2112 Wang, F. Guo, Y., Cao, T. and Wang, Y.: (Relation between retention value and normal boiling point of homologs in supercritical fluid chromatography.) Shiyou Huagong, 22 (1993) 825-828; C.A., 120 (1994) 314901h.
- 2113 Xu, Y.: (Supercritical fluid chromatography with Fourier transform infrared detection.) *Daxue Huaxue*, 8, No. 6 (1993) 26-29; C.A., 120 (1994) 235089w a review with 13 refs.
- 2114 Zegers, B.N., de Geus, H.J., Wildenburg, S.H.J., Lingeman, H. and Brinkman, U.A.T.: Large-volume injection in packed-capillary supercritical fluid chromatography. *J. Chromatogr. A*, 677 (1994) 141-150.
- 2115 Zhang, X.: Thermodynamic and theoretical study of packed column supercritical fluid chromatography. Avail. *Univ. Micro-films Int.*, Order No. DA9231469, 1992, 292 pp.; C.A., 120 (1994) 221112m.
- See also 1971, 1987, 2003, 2048, 2065, 2079, 2084, 2091, 2094, 2133, 2135, 2147, 2191, 2197, 2291, 2303, 2305, 2310, 2313, 2329, 2338, 2345, 2370, 2388, 2400, 2412, 2418, 2426, 2464, 2497, 2517.
- HYDROCARBONS AND HALOGEN DERIVATIVES
- 5a. Aliphatic hydrocarbons
- 2116 Reid, G.L., III and Armstrong, D.W.: Cyclodextrin PLOT columns for the gas-solid chromatographic separation of light hydrocarbons and inorganic gases. *J. Microcolumn Sep.*, 6 (1994) 151-157
- 2117 Greenberg, J.P., Zimmermann, P.R., Taylor, B.E. and Silver, G.M.: Sub-parts per billion of isoprene using a reduction gas detectors with a portable gas chromatograph. *Atmos. Environ. A*, 27A (1993) 2689-2692; *C.A.*, 120 (1994) 61211n.
- 2118 Liaw, S.-J., Tso, T.-L. and Lo, J.-G.: Measurement of C₂-C₆ non-methane hydrocarbons in the background atmosphere of Tai-wan by using the canister-gas chromatography method. *Anal. Sci.*, 10 (1994) 325-331.

B410 BIBLIOGRAPHY SECTION

- 2119 Mendis, S., Sobotka, P.A. and Euler, D.E.: Pentane and isoprene in expired air from humans: Gas-chromatographic analysis of single breath. *Clin. Chem. (Washington)*, 40 (1994) 1485-1488.
- 2120 Sidorov, R.I.: (Relation of retention indexes of saturated hydrocarbons to the polarity of the liquid phase and its molar volume in gas-liquid chromatography.) Zh. Fiz. Khim., 68 (1994) 119-122.
- 2121 Takizawa, K.: (Separation of gases by means of gas chromatography. (V). Separation of unsaturated hydrocarbons by molecular sieve 3A and mechanism of surface adsorption.) Kanagawa Koka Daigaku Kenkyu Hokoku, B-16 (1992) 301-305; C.A., 120 (1994) 63211m.
- 2122 Urabe, Y. and Takamizawa, K.: The determination of the homologous purity of higher normal alkanes up to dohectane with capillary gas chromatography. *Polym. J. (Tokyo)*, 26 (1994) 283-289; C.A., 120 (1993) 289172m.

See also 2011, 2021, 2518, 2547.

5b. Cyclic hydrocarbons, fullerenes

- 2123 Andronikashvili, T.G., Eprikashvili, L.G., Pirtskhalava, N.V., Kirov, G.N. and Valtchev, V.P.: Gas chromatographic separation of isomeric benzene derivatives using molecular sieves, combined with partition columns. *Chromatographia*, 38 (1994) 613-616.
- 2124 Barakat, A.O.: Computerized GC/MS detection of monoaromatic and triaromatic steroid hydrocarbons in Alamein crude oil. J. High Resolut. Chromatogr., 17 (1994) 549-552.
- 2125 Bertsch, W.: Volatiles from carpet: a source of frequent misinterpretation in arson analysis. *J. Chromatogr. A*, 674 (1994) 329-333
- 2126 Chu, S. and Xu, X.: System for calculating the linear temperature-programmed retention indices of polycyclic aromatic compounds. J. High Resolut. Chromatogr., 17 (1994) 339-342.
- 2127 Escrivá, C., Viana, E., Moltó, J.C., Picó, Y. and Maòes, J.: Comparison of four methods for the determination of polycyclic aromatic hydrocarbons in airborne particulates. *J. Chromatogr.* A, 676 (1994) 375-388.
- 2128 Gremm, T.J. and Frimmel, F.H.: Application of liquid chromatography-particle beam mass spectrometry and gas chromatography-mass spectrometry for the identification of metabolites of polycyclic aromatic hydrocarbons. Chromatographia, 38 (1994) 781-788.
- 2129 Henderickx, H.J.W. and Ramaekers, J.J.M.: Analysis of a C₉-C₁₀ aromatic hydrocarbon pyrolysis distillate by multidimensional capillary GC and multidimensional capillary GC-MS. *J. High Resolut. Chromatogr.*, 17 (1994) 407-410.
- 2130 Kiseleva, T.G., Bulycheva, Z.Yu. and Rudenko, B.A.: (Gas-chromatographic determination of polycyclic aromatic hydrocarbons in the pitch products from thermal processing of coal.) Zh. Anal. Khim., 49 (1994) 226-229.
- 2131 Kolb, B., Bichler, C., Auer, M. and Voice, T.C.: Simultaneous determination of volatile aromatic and halogenated hydrocarbons in water and soil by dual-channel ECD/PID equilibrium headspace analysis. J. High Resolut. Chromatogr., 17 (1994) 299-302.
- 2132 Lee, S.W.: Comparison of methods for determination of aromatic component types in transportation fuels. *Fuel*, 73 (1994) 93-97; C.A., 120 (1994) 58119h.

- 2133 Lopez-Avila, V., Young, R., Tehrani, J., Damian, J., Hawthorne, S., Dankers, J. and van der Heiden, C.: Mini-round-robin study of a supercritical fluid extraction method for polynuclear aromatic hydrocarbons in soils with dichloromethane as a static modifier. J. Chromatogr. A, 672 (1994) 167-175.
- 2134 Oestman, C., Carlsson, H., Bemgaard, A. and Colmsjoe, A.: Online LC-GC for the analysis of PAH in small sample volumes. Polycyclic Aromat. Compd., 3 (1993) 485-492; C.A., 120 (1994) 306114p.
- 2135 Reindl, S. and Höfler, F.: Optimization of the parameters in supercritical fluid extraction of polynuclear aromatic hydrocarbons from soil samples. *Anal. Chem.*, 66 (1994) 1808-1816.
- 2136 Sarna, L.P., Webster, G.R.B., Friesen-Fischer, M.R. and Ranjan, R.S.: Analysis of the petroleum components benzene, toluene, ethyl benzene and the xylenes in water by commercialy available solid-phase microextraction and carbon-layer open tubular capillary column gas chromatography. J. Chromatogr. A, 677 (1994) 201-205.
- 2137 Scheepers, P.T.J., Velders, D.D., Martens, M.H.J., Noordhoek, J. and Bos, R.P.: Gas chromatographic—mass spectrometric determination of nitro polycyclic aromatic hydrocarbons in airborne particulate matter from workplace atmospheres contaminated with diesel exhaust. J. Chromatogr. A, 677 (1994) 107-121.
- 2138 Sun, F.: Preconcentration and determination of naphtalene in air and water using activated carbon adsorption, carbon disulfide extraction and gas chromatography. *Mikrochim. Acta*, 113 (1994) 91-99.
- 2139 Tan, Y.L., Kong, A. and Chiu, Y.O.: Sample preparation for analyzing polycyclic aromatic hydrocarbons and polychlorinated dibenzo-p-dioxins and dibenzofurans in sediment by gas chromatography/mass spectrometry. Estuaries, 16 (1993) 427-432; C.A., 120 (1994) 306863g.
- 2140 Wang, Y.: (Gas chromatographic analysis of industrial methylnaphtalene.) Fenxi Huaxue, 22 (1994) 209; C.A., 120 (1994) 260248e.
- 2141 Whalen, M., Driscoll, J.N. and Wood, C.D.: Detection of aromatic hydrocarbons in the atmosphere at ppt levels. Atmos. Environ., 28 (1994) 567-570; C.A., 120 (1994) 278622g.
- 2142 Xu, W., Wang, S. and Zhang, W.: (GC-FTIR determination of organic pollutants in industrial wastewater.) Guangpuxue Yu Guangpu Fenxi, 14 (1994) 37-42; C.A., 120 (1994) 279598r.
- See also 1996, 2046, 2050, 2058, 2061, 2087, 2146, 2154, 2177.

5c. Halogen derivatives

- 2143 Al-Haddad, A.: Determination of polychlorinated biphenyls with non-o-chlorine substituent in Aroclor mixtures and in soil using porous graphitic carbon column. J. Assoc. Off. Anal. Chem., 77 (1994) 437-440.
- 2144 Alvarez Piòeiro, E., Simal Lozano, J. and Lage Yusty, A.: Gas chromatographic determination of polychlorinated biphenyls in mussels from Galicia, Spain. J. Assoc. Off. Anal. Chem., 77 (1994) 985-988.
- 2145 Amaral, O.S., Olivella, L., Grimalt, J.O. and Albaiges, J.: Combined solvent extraction-purge and trap method for the determination of volatile organic compounds in sediments. J. Chromatogr. A, 675 (1994) 177-187.

GAS CHROMATOGRAPHY B411

2146 Berset, J.D. and Holzer, R.: Separation of important PCBs and PAHs on a prototype smectic liquid-crystalline polysiloxane stationary phase capillary column. *Chemosphere*, 28 (1994) 2087-2099.

- 2147 Bowadt, S., Johansson, B., Fruekilde, P., Hansen, M., Zilli, D., Larsen, B. and de Boer, J.: Supercritical fluid extraction of polychlorinated biphenyls from lyophilized fish tissue. *J. Chroma*togr. A, 675 (1994) 189-204.
- 2148 Bruno, T.J. and Caciari, M.: Retention of halocarbons on a hexafluoropropylene epoxide modified graphitized carbon black. I. Methane-based compounds. J. Chromatogr. A, 672 (1994) 149-158.
- 2149 Caixach, J., Rivera, J., Galceran, M.T. and Santos, F.J.: Homologue distributions of polychlorinated terphenyls by high-resolution gas chromatography and high-resolution mass spectrometry. J. Chromatogr. A, 675 (1994) 205-211.
- 2150 Cui, D., Chen, Y. and Wang, B.: (Gas chromatographic determination of benzyl chloride in the air.) *Zhonghua Yufang Yixue Zazhi*, 27 (1993) 236-237; C.A., 120 (1994) 251926x.
- 2151 Edgell, K.W. and Longbottom, J.E.: Determination of 1,2-dibromoethane and 1,2-dibromo-3-chloropropane in water by microextraction and gas chromatography: collaborative study. J. Assoc. Off. Anal. Chem., 77 (1994) 989-994.
- 2152 Glausch, A., Nicholson, G.J., Fluck, M. and Schurig, V.: Separation of the enantiomers of stable atropisomeric polychlorinated biphenyls (PCBs) by multidimensional gas chromatography on Chirasil-Dex. J. High Resolut. Chromatogr., 17 (1994) 347-349.
- 2153 Kaminishi, T., Kikuchi, M., Mishima, Y. and Seki, T.: (Simultaneous determination of volatile halogenated hydrocarbons by capillary gas chromatography.) Sendai-shi Eisei Kenkyushoho, 22 (1993) 258-262; C.A., 120 (1994) 226306n.
- 2154 Koistinen, J., Paasivirta, J., Nevalainen, T. and Lahtiperä, M.: Chlorinated fluorenes and alkylfluorenes in bleached kraft pulp and pulp mill discharges. Chemosphere, 28 (1994) 2139-2150.
- 2155 Kylin, H., Grimvall, E. and Östmann, C.: Environmental monitoring of polychlorinated biphenyls using pine needles as passive samplers. *Environ. Sci. Technol.*, 28 (1994) 1320-1324.
- 2157 Ling, Y.-C., Chang, M.-Y. and Huang, I.-P.: Matrix solid-phase dispersion extraction and gas chromatographic screening of polychlorinated biphenyls in fish. *J. Chromatogr. A*, 669 (1994) 119-124.
- 2158 Lu, P., Zhang, X., Yang, L., Xu, G. and Zhang, Y.: Optimization of gas chromatographic analytical methods for toxic compounds in air. *Anal. Sci.*, 10 (1994) 241-245 a review with 24 refs.
- 2159 Nilsson, U.L. and Colmsjoe, A.L.: A fast clean-up method for chlorinated PAHs in environmental samples. *Polycyclic Aromat. Compd.*, 3 (1993) 347-354; C.A., 120 (1994) 306113n.
- 2160 Schlett, C. and Pfeifer, B.: (Gas chromatographic determination of vinyl chloride by purge-and-trap enrichment and mass spectrometric detection.) *Vom Wasser*, 81 (1993) 1-6; *C.A.*, 120 (1994) 199930c.
- 2161 Seto, Y., Tsunoda, N., Ohta, H. and Shinohara, T.: Determination of chloroform levels in blood using a headspace capillary gas chromatographic method. *J. Anal. Toxicol.*, 17 (1993) 415-420; C.A., 120 (1994) 47525m.
- 2162 Seymour, M.J., and Lucas, M.F.: Evaluation of sampling and analytical methods for the determination of chlorodifluoromethane in air. Am. Ind. Hyg. Assoc. J., 54 (1993) 253-259; C.A., 120 (1994) 306111k.

2163 Sugiyama, H. and Abe, A.: (Gas chromatographic determination of volatile chlorinated hydrocarbons in soil gas and sampling apparatus therefor.) Kanagawa-ken Kankyo Kagaku Senta Kenkyu Hokoku, 16 (1993) 23-27; C.A., 120 (1994) 243256p.

- 2164 Thompson, D.W.: Determination of volatile organic contaminants in bulk oils (edible, injectable, and other internal medicinal) by purge-and-trap gas chromatography/mass spectrometry. J. Assoc. Off. Anal. Chem., 77 (1994) 647-654.
- 2165 Wells, D.E. and Echarri, I.: Determination of chlorobiphenyls, with the separation of non-ortho, mono-ortho and di-ortho chloro congeners in fish and sea mammals. *Anal. Chim. Acta*, 286 (1994) 431-449.
- 2166 Zhang, L., Zhang, J. and Du, W.: (Gas chromatography-mass spectrometry analysis of bromofluorohydrocarbons.) Fenxi Huaxue, 21 (1993) 914-917; C.A., 120 (1994) 207675r.
- See also 1996, 1997, 2026, 2090, 2097, 2131.
- 5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)
- 2167 Buchanan, J.S. and Nicholas, M.E.: Analysis of olefinic gasolines with multidimensional gas chromatography. *J. Chromatogr. Sci.*, 32 (1994) 199-203.
- 2168 Karkkainen, M., Seppala, I. and Himberg, K.: Detection of trace levels of gasoline in arson cases by gas chromatography-mass spectrometry with an automatic online thermal desorber. *J. Forensic Sci.*, 39 (1994) 186-193; C.A., 120 (1994) 263184s.
- 2169 Kelly, G.W. and Bartle, K.D.: The use of combined LC-GC for the analysis of fuel products: a review. J. High Resolut. Chromatogr., 17 (1994) 390-397 - a review with 25 refs.
- 2170 Liao, S. and Chen, D.: (Determining the eight indexes of gasoline with capillary gas chromatography.) Shiyou Huagong, 22 (1993) 404-408; C.A., 120 (1994) 302859n.
- 2171 Nowicki, J.: Automated data analysis of fire debris samples using gas chromatography–mass spectrometry and macro programming. *J. Forensic Sci.*, 38 (1993) 1354-1362; C.A., 120 (1994) 210159f.
- 2172 Philip, R.P.: High temperature gas chromatography for the analysis of fossil fuels: a review. *J. High Resolut. Chromatogr.*, 17 (1994) 398-406 - a review with 68 refs.
- 2173 Teng, S.T., Williams, A.D. and Urdal, K.: Detailed hydrocarbon analysis of gasoline by GC-MS (SI-PIONA). J. High Resolut. Chromatogr., 17 (1994) 469-475.
- 2174 Xu, Y., Cui, H. and Yang, Z.: (Fast analysis of paraffins, naphtenes and aromatics in naphta fraction by packed column gas chromatography.) Shiyou Huagong, 22 (1993) 475-480; C.A., 120 (1994) 274861m.
- 2175 Zhang, R.: (Automatic determination of gasoline composition by gas chromatography.) Fenxi Shiyanshi, 12, No. 5 (1993) 78-80; C.A., 120 (1994) 58089y.

See also 2508, 2534.

ALCOHOLS

- 2176 Ceccon, L., Procida, G., Pertoldi Marletta, G. and Gabrielli Favretto, L.: Gas chromatographic determination of ethanol content in spirits by direct sample injection. *Ind. Bevande*, 22 (1993) 557-560; C.A., 120 (1994) 53046x.
- 2177 Chen, Q. and Guo, C.: (Determination of alcohols and benzenes in wastewater and waste gas by PEG-20M quartz capillary gas chromatography.) Huanjing Wuran Yu Fangzhi, 15, No. 1 (1993) 39-41; C.A., 120 (1994) 260266j.
- 2178 Izotova, V.I., Krasnova, R.R., Salomatin, E.M., Silaeva, I.A., Chichuev, Yu.A. and Yanovskii, S.M.: (Small-scale chromatograph for measuring blood and urinary C₁–C₅ alcohols.) Sud.-Med. Ekspert., 36, No. 3 (1993) 27-31; C.A., 120 (1994) 184794n.
- 2179 Mielczarska, J., Burska-Szaifler, D., Banaszewska, G. and Kolacinski, Z.: (Application of gas chromatography for quick determination of ethylene glycol in biological material in the diagnosis of acute poisonings.) Bromatol. Chem. Toxicol., 26 (1993) 35-39; C.A., 120 (1994) 184789q.
- 2180 Moore, S.J., Porter, A.C., Ezell, A.E., Hume, A.S. and Ho, I.K.: The rapid determination of ethanol in postmortem brain samples by solvent extraction and gas chromatography. *Yaowu Shipin Fenxi*, 1 (1993) 245-249; C.A., 120 (1994) 47526n.
- 2181 Nakashima, S., Iwama, M., Aoyama, T., Ohno, H., Suzuki, M. and Yamamoto, K.: (Interfering substances on analysis of methanol in aerosol commodities.) Nagoya-shi Eisei Kenkyushoho, 39 (1993) 24-26; C.A., 120 (1994) 237649c.
- 2182 Phelps, J.L., Chasteen, C.E. and Render M.M.: Extraction and analysis of low molecular weight alcohols and acetone from fire debris using passive headspace concentration. *J. Forensic Sci.*, 39 (1994) 194-206; C.A., 120 (1994) 263185t.
- 2183 Suzuki, S., Ikeda, K., Amemiya, T., Itoh, K. and Nakamura, H.: Analysis of glycols in cosmetics by capillary gas chromatography and chemical ionization mass spectrometry. *Kenkyu Nenpo* – Tokyo-toritsu Eisei Kenkyusho, 44 (1993) 89-93; C.A., 120 (1994) 279831m.
- 2184 Torok, B., Szegletes, Z. and Molnár, Á.: Separation and identification of stereoisomeric cyclobutanediols by gas chromatography-mass spectrometry. J. Chromatogr. A, 668 (1994) 463-467.
- 2185 Wittkamp, B.L. and Tilotta, D.C.: Detection of alcohols in gas chromatographic effluent by laser-light scattering. *J. Chroma*togr. A, 670 (1994) 145-152.
- 2186 Yuan, G., He, M. and He, X.: Identification of double-bond position in the sex pheromone of China corn borer by mass spectrometry. *Rapid Commun. Mass Spectrom.*, 7 (1993) 1118-1120; C.A., 120 (1994) 239564x.

See also 2220, 2267, 2342, 2418.

7. PHENOLS

2187 Booth, R.A. and Lester, J.N.: A method for the analysis of phenol and monochlorinated and brominated phenols from comlex aqueous samples. *J. Chromatogr. Sci.*, 32 (1994) 259-264.

- 2188 Chiriac, G., Nita, M., Pandele, C. and Voicu, E.: (Gas chromatographic analysis of methyl-, dimethyl- and trimethylphenols.) Rev. Chim. (Bucharest), 44 (1993) 914-919; C.A., 120 (1993) 289159n.
- 2189 Green, J.B., Yu, S.K.-T. and Vrana, R.P.: GC-MS analysis of phenolic compounds in fuels after conversion to trifluoroacetate. J. High Resolut. Chromatogr., 17 (1994) 439-451.
- 2190 Strickland, P.T., Kang, D., Bowman, E.D., Fitzwilliam, A., Downing, T.E., Rothman, N., Groopman, J.D. and Weston, A.: Identification of 1-hydroxypyrene glucuronide as a major pyrene metabolite in human urine by synchronous fluorescence spectroscopy and gas chromatography-mass spectrometry. Carcinogenesis, 15 (1994) 483-487; C.A., 120 (1994) 237666f.
- 2191 Tang, P.H.-T. and Ho, J.S.: Liquid-solid disk extraction followed by supercritical fluid elution and gas chromatography of phenols from water. J. High Resolut. Chromatogr., 17 (1994) 509-518.
- 2192 Veningerová, M., Prachar, V., Uhnák, J., Lukácsová, M. and Trnovec, T.: Determination of chlorinated phenols and cresols in human urine using solid-phase extraction and gas chromatography. J. Chromatogr. B, 657 (1994) 103-110.
- 2194 Voznáková, Z. and Tesarová, E.: (Determination of nitrophenols and alkylphenols by GC and HPLC.) Chem. Listy, 88 (1994) 393-400.

See also 2508.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 2195 Chouchi, D. and Barth, D.: Rapid identification of some coumarin derivatives in deterpenated citrus peel oil by gas chromatography. J. Chromatogr. A, 672 (1994) 177-183.
- 2196 Gao, L. and Mazza, G.: Rapid method for complete chemical characterization of simple and acylated anthocyanins by high performance liquid chromatography and capillary gas-liquid chromatography. J. Agric. Food. Chem., 42 (1994) 118-125.
- 2197 Hadj-Mahhamed, M., Badjah-Hadj-Ahmed, Y. and Meklati, B.Y.: Behavior of polymethoxylated and polyhydroxylated flavones by carbon dioxide supercritical fluid chromatography with flame ionization and Fourier transform infrared detectors. *Phyto-chem. Anal.*, 4 (1993) 275-278; C.A., 120 (1994) 186404j.
- 2198 Morrison, W.H., III and Mulder, M.M.: Pyrolysis mass spectrometry and pyrolysis gas chromatography—mass spectrometry of ester- and ether-linked phenolic acids in coastal bermudagrass cell walls. *Phytochemistry*, 35 (1994) 1143-1151; C.A., 120 (1994) 265857n.
- 2200 Shmidt, T.J., Merfort, I. and Willuhn, G.: Gas chromatographymass spectrometry of flavonoid aglycones. II. Structure-retention relationships and a possibility of differentiation between isomeric 6- and 8-methoxyflavones. J. Chromatogr. A, 669 (1994) 236-240.

GAS CHROMATOGRAPHY B413

- 8b. Aflatoxins and other mycotoxins
- 2201 Croteau, S.M., Prelusky, D.B. and Trenholm, H.L.: Analysis of trichothecene mycotoxins by gas chromatography with electron-capture detection. *J. Agric. Food Chem.*, 42 (1994) 928-933.
- 2202 Feng, J. and Luo, Y.: (Analysis of ten trichothecene mycotoxins in blood by gas chromatography and gas chromatographymass spectrometry.) Sepu, 12 (1994) 119-121.
- 2203 Li, N., Li, L. and Zhu, T.: (Systematic test of four kinds of fusariotoxin by gas chromatography.) *Huanjing Kexue*, 14, No. 3 (1993) 73-75; C.A., 120 (1994) 242736h.
- 2204 Ward, R.S., Pelter, A., Galletti, G.C. and Li, Q.: Pyrolysis–GC/MS of podophyllotoxin and related compounds. J. Anal. Appl. Pyrolysis, 27 (1993) 187-197; C.A., 120 (1994) 298340s.
- 2205 Xu, Y. and Mirocha, C.J.: Analysis of wortmannin (H-1) by liquid chromatography and gas chromatography. J. Assoc. Off. Anal. Chem., 77 (1994) 942-947.

See also 2352.

- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 2206 Pehlivan, M. and Pehlivan, E.: Identification and quantitative analysis of specific isomers of polychlorodibenzodioxins in fly ash. J. Chromatogr. Sci., 32 (1994) 270-274.
- 2207 Qiao, S., Wu, R., Gao, J. and Zhao, A.: (Determination of 2,3,7,8-TCDD in soil samples by GC/MID/MS.) Huanjing Kexue Xuebao, 12 (1992) 502-505; C.A., 120 (1994) 243254m.

See also 2139.

- OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- 2208 Bikfalvi, I.: (Determination of the acetaldehyde content in high-fructose corn syrups.) Szeszipar, 41, No. 3 (1993) 89-91; C.A., 120 (1994) 215543m.
- 2209 Bringmann, G., Gassen, M. and Schneider, S.: Toxic aldehydes formed by lipid peroxidation. I. Sensitive, gas chromatographybased stereoanalysis of 4-hydroxyalkenals, toxic products of lipid peroxidation. J. Chromatogr. A, 670 (1994) 153-160.
- 2210 Cardeal, Z.L., Pradeau, D., Lejeune, B. and Hamon, M.: Determination of residual ethylene oxide by two gas chromatographic methods. *Analusis*, 22 (1994) 23-26.
- 2211 Fukunaga, T., Sillanaukee, P. and Eriksson, C.J.P.: Problems involved in the determination of endogenous acetaldehyde in human blood. *Alcohol Alcohol.*, 28 (1993) 535-541; C.A., 120 (1994) 186402g.
- 2212 Kurz, J., and Ballschmiter, K.: Relationships between structure and retention of polychlorinated diphenyl ethers (PCDE) in HRGC in comparison with other groups of halogenated aromatic compounds. Fresenius J. Anal. Chem., 349 (1994) 533-527
- 2213 Martineau, B., Acree, T. and Henick-Kling, T.: A simple and accurate GC/MS method for the quantitative analysis of diacetyl in beer and wine. *Biotechnol. Tech.*, 8 (1994) 7-12; C.A., 120 (1994) 268411y.

2214 Shipulina, Z.V., Tepikina, L.A. and Kartashova, A.V.: (Substantiation of maximum permissible concentration and method for determination of trichloroacetaldehyde in ambient air.) Gig. Sanit., No. 10 (1993) 6-7; C.A., 120 (1994) 278608g.

- 2215 Staerk, D.U., Shitangkoon, A. and Vigh, G.: Gas chromatographic separation of the enantiomers of volatile fluoroether anesthetics by derivatized cyclodextrins. III. Preparative-scale separation for enflurane. J. Chromatogr. A, 677 (1994) 133-140
- 2216 Voelkel, A. and Janas, J.: Inverse gas chromatographic determination of solubility parameter and binary parameters of α,ω-diamino oligoethers. J. Chromatogr. A, 669 (1994) 89-95.
- 2217 Wong, J.W., Ebeler, S.E., Rivkah-Isserroff, R. and Shibamoto, T.: Analysis of malondialdehyde in biological samples by capillary gas chromatography. *Anal. Biochem.*, 220 (1994) 73-81.
- 2218 Yasuhara, A. and Shibamoto, T.: Gas chromatographic determination of trace amounts of aldehydes in automobile exhaust by a cysteamine derivatization methods. *J. Chromatogr. A*, 672 (1994) 261-266.
- 2219 Yeo, A.C., Helbock, H.J., Chyu, D.W. and Ames, B.N.: Assay of malondialdehyde in biological fluids by gas chromatographymass spectrometry. *Anal. Biochem.*, 220 (1994) 391-396.

See also 1990, 2182, 2240, 2346.

- 10. CARBOHYDRATES
- 10a. Mono and oligosaccharides. Structural studies
- 2220 Antonelli, A., Carnacini, A. and Versari, A.: Liquid-liquid extraction of silylated polyalcohols from vinegar, and their determination by capillary GC. J. High Resolut. Chromatogr., 17 (1994) 553-555.
- 2221 Chang, L., Guo, Q., Yu, Z. and Xu, G.: (Chromatographic microanalysis of gangliosides in serum.) Sepu, 12 (1994) 189-191.
- 2222 Goromaru, T., Matsuki, K. and Matsuki, O.: Gas chromatographic–mass spectrometric determination of ¹³C-glucose level for evaluating the effect of α-glucosidase inhibitor acarbose on the digestion of [U-¹³C]starch in rat. *Biol. Pharm. Bull.*, 17 (1994) 156-159; C.A., 120 (1994) 293511p.
- 2223 Herderich, M. and Schreier, P.: High resolution gas chromatography-mass spectral analysis of carbohydrates using methoxyoxime acetates. *Phytochem. Anal.*, 4 (1993) 256-260; C.A., 120 (1994) 211956a.
- 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides
- 2224 Anonymous: MAFF validated methods for the analysis of food-stuffs. No. V2. Dietary fiber (GLC). J. Assoc. Public Anal., 28 (1993) 25-35; C.A., 120 (1994) 268431e.

B414 BIBLIOGRAPHY SECTION

ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 2225 Ackman, R.G. and Macpherson, E.J.: Coincidence of cis- and trans-monoethylenic fatty acids simplifies the open-tubular gasliquid chromatography of butyl esters of butter fatty acids. Food Chem., 50 (1994) 45-52; C.A., 120 (1994) 268453p.
- 2226 Aitzetmuller, K., Werner, G. and Tsevegsuren, N.: Screening of seed lipids for γ-linolenic acid: capillary gas-liquid chromatographic separation of 18:3 fatty acids with Δ5 and Δ6 double bonds. *Phytochem. Anal.*, 4 (1993) 249-255; C.A., 120 (1994) 239343x.
- 2227 Anonymous: MAFF validated methods for the analysis of food-stuffs. No. V3. Erucic acid in oil and fats. J. Assoc. Public Anal., 28 (1993) 37-42; C.A., 120 (1994) 268432f.
- 2228 Bousquet, O., Sellier, N. and le Goffic, F.: Characterization and purification of polyunsaturated fatty acids from microalgae by gas chromatography-mass spectrometry and countercurrent chromatography. *Chromatographia*, 39 (1994) 40-44.
- 2229 Brossard, N., Pachaudi, C., Croset, M., Normand, S., Lecerf, J., Chirouze, V., Riou, J.P., Tayot, J.L. and Lagarde, M.: Stable isotope tracer and gas-chromatography combustion isotope mass spectrometry to study the *in vivo* compartmental metabolism of docosahexaneoic acid. *Anal. Biochem.*, 220 (1994) 192-199.
- 2230 Cheng, Z. and Wu, H.: (Rapid determination of free fatty acids in wine by GC/MS SIM.) Fenxi Ceshi Tongbao, 11, No. 6 (1992) 5-8; C.A., 120 (1994) 53017p.
- 2231 Dong, W., Li, X. and Meng, X.: (Determination of arachidonic acid in rat cell membrane by gas chromatography.) Sepu, 12 (1994) 152, 154.
- 2232 Garrido, J.L. and Medina, I.: One-step conversion of fatty acids into their 2-alkenyl-4,4-dimethyloxazoline derivatives directly from total lipids. J. Chromatogr. A, 673 (1994) 101-105.
- 2233 Grav, H.J., Asiedu, D.K. and Berge, R.K.: Gas chromatographic measurement of 3- and 4-thia fatty acids incorporated into various classes of rat liver lipids during feeding experiments. J. Chromatogr. B, 658 (1994) 1-10.
- 2234 Green, J.B., Yu, S.K.-T. and Vrana, R.P.: GC-MS analysis of carboxylic acids in petroleum after esterification with fluoroalcohols. J. High Resolut. Chromatogr., 17 (1994) 427-438.
- 2235 House, S.D., Larson, P.A., Johnson, R.R., de Vries, J.W. and Martin, D.L.: Gas chromatographic determination of total fat extracted from food samples using hydrolysis in the presence of antioxidant. J. Assoc. Off. Anal. Chem., 77 (1994) 960-965.
- 2236 Hu, J.: (Gas chromatographic analysis of benzoic and sorbic acids esterified as the *n*-butyl esters.) Sepu, 12 (1994) 215-216.
- 2237 Hušek, P. and Liebich, H.M.: Organic acid profiling by direct treatment of deproteinized plasma with ethyl chloroformate. J. Chromatogr. B, 656 (1994) 37-43.
- 2238 Jiang, B., Hu, R. and Wang, D.: (Application of glass capillary column coated with graphitized carbon black in the analysis of fatty acids by gas chromatography.) Fenxi Ceshi Xuebao, 12, No. 3 (1993) 61-64; C.A., 120 (1993) 289140z.

- 2239 Karlsson, S., Sares, C., Renstad, R. and Albertsson, A.-C.: Gas chromatographic, liquid chromatographic and gas chromatographic-mass spectrometric identification of degradation products in accelerated aged microbial polyhydroxyalkanoates. J. Chromatogr. A, 669 (1994) 97-102.
- 2240 Langbehn, A. and Steinhart, H.: Determination of organic acids and ketones in contaminated soil. J. High Resolut. Chromatogr., 17 (1994) 293-298.
- 2241 Liebich, H.M., Schmieder, N., Wahl, H.G. and Wöll, J.: Separation and identification of unsaturated fatty acid isomers in blood serum and therapeutic oil preparations in the form of their oxazoline derivatives by GC-MS. J. High Resolut. Chromatogr., 17 (1994) 519-521.
- 2242 Magni, F., Arnoldi, L., Galati, G. and Kienle, M.G.: Simultaneous determination of plasma levels of α -ketoisocaproic acid and leucine and evaluation of α -[1-13C]isocaproic acid and [1-13C]leucine enrichment by gas chromatography–mass spectrometry. *Anal. Biochem.*, 220 (1994) 308-314.
- 2243 Magni, F., Piatti, P.M., Monti, L.D., Lecchi, P., Pontiroli, A.E., Pozza, G. and Kienle, M.G.: Fast gas chromatographic-mass spectrometric method for the evaluation of plasma fatty acid turnover using [1-13C]palmitate. J. Chromatogr. B, 657 (1994) 1-7.
- 2244 Peng, R.Y., Lin, T.Y.C., Hsu, P.C.B. and Tau, H.: (A newly developed "purge and trap-GC method" for the determination of volatile fatty acids in high lipid-foam-forming wastewater.) Huanjing Baohu (Taipei), 16, No. 2 (1993) 28-40; C.A., 120 (1994) 306892r.
- 2245 Pepe, C., Dagaut, J., Scribe, J. and Saliot, A.: Double-bond location in monounsaturated wax esters by gas chromatography/mass spectrometry in their dimethyl disulphide derivatives. Org. Mass Spectrom., 28 (1993) 1365-1367; C.A., 120 (1994) 269441v.
- 2246 Sturaro, A., Parvoli, G. and Doretti, L.: A simple and fast sampling method for the characterization of volatile compounds released by Nezara viridula. Chromatographia, 39 (1994) 103-106.
- 2247 Török, B., Pálinkó, I., Tasi, G., Nyerges, L. and Bogár, F.: Gas chromatographic-mass spectrometric determination of α-phenylcinnamic acid isomers: practical and theoretical aspects. J. Chromatogr. A, 668 (1994) 353-358.
- 2248 Tvrzická, E., Cvrcková, E., Máca, B. and Jirásková, M.: Changes in the liver, kidney and heart fatty acid composition following administration of ibuprofen to mice. *J. Chromatogr. B*, 656 (1994) 51-57.
- 2249 Vicanová, J., Tvrzická, E. and Štulík, K.: Capillary gas chromatography of underivatized fatty acids with a free fatty acid phase column and a programmed temperature vaporizer injector. J. Chromatogr. B, 656 (1994) 45-50.
- 2250 Wahl, H.G., Havel S.-Y., Schmieder, N. and Liebich, H.M.: Identification of cis/trans isomers of methyl ester and oxazoline derivatives of unsaturated fatty acids using GC-FTIR-MS. J. High Resolut. Chromatogr., 17 (1994) 543-548.
- 2251 Wahl, H.G., Liebich, H.M. and Hoffmann, A.: Identification of fatty acid methylesters as minor components of fish oil by multidimensional GC-MSD: new furan fatty acids. *J. High Resolut. Chromatogr.*, 17 (1994) 308-311.

GAS CHROMATOGRAPHY B415

- 2252 Wang, X., Ma, B., Lu, J. and Zhai, F.: (Determination of fatty acids in orange oil by high performance liquid chromatography and gas chromatography–mass spectrometry.) Sepu, 12 (1994) 137-138.
- 2253 Yu, X., Li, Y. and Liu, Z.: (Gas chromatographic determination of butyl acrylate in the air.) Zhonghua Laodong Weisheng Zhiyebing Zazhi, 11 (1993) 377-379; C.A., 120 (1994) 225319g.
- 2254 Zhai, G., Ding, C., Tian, Y., Xue, X. and Gu, Y.: (Rapid determination of ethyl caproate and ethyl lactate in Chinese spirits by gas chromatography.) Sepu. 12 (1994) 155-156.
- 2255 Zhang, H. and Liu, F.: (Qualitative and semi-quantitative analysis of Blackcurrant seed oil.) Zhongguo Yaoxue Zazhi, 28 (1993) 610-611; C.A., 120 (1994) 62397q.
- 2256 Zhou, L., Fan, M., Chen, J., Cai, H., Zhou, F. and Zhou, H.: (Analysis of fatty acid composition of spotted fever group *Rickettsiae* isolated in China by gas chromatography.) Weishengwu Xuebao, 33 (1993) 290-296; C.A., 120 (1994) 49680g.
- 2257 Zhou, Y. and Zhuang, W.: (Determination of α-naphtale-neacetic acid residues in fruits and vegetables by GC using Series 530 μm column.) Fenxi Ceshi Xuebao, 12, No. 4 (1993) 49-51; C.A., 120 (1994) 296879a.

See also 2273, 2441, 2484.

11b. Prostaglandins

- 2258 Ishibashi, M. and Mizugaki, M.: (A new derivatization technique to improve GC/SIM analysis of 11-dehydrothromboxane B₂ in human urine. Feasibility of using the lactone ring opening reaction.) Nippon Yo Masu Supekutoru Gakkai Koenshu, 18 (1993) 21-30; C.A., 120 (1994) 49488a.
- 2259 Mizugaki, M., Hishinuma, T., Yu, G.S.P., Ito, K., Nishikawa, M., Ohyama, Y., Isibashi, M., Nakagawa, Y. and Harima, N.: Microdetermination of 2,3-dinor-6-ketoprostaglandin F_{1α} in human urine using gas chromatography-high-resolution selected-ion monitoring. J. Chromatogr. B, 658 (1994) 11-19.
- 2260 Nagakura, T., Obata, T., Kanmuri, M., Masaki, T. and Mackawa, K.: (Prostaglandins measured by GC/MS in patients with exercise-induced asthma.) *Med. Philos.*, 12 (1993) 549-552; C.A., 120 (1994) 28487j.
- 2261 Obata, T., Nagakura, T., Kammuri, M., Masaki, T., Maekawa, K. and Yamashita, K.: Determination of 9α,11β-prostaglandin F₂ in human urine and plasma by gas chromatography-mass spectrometry. J. Chromatogr. B, 655 (1994) 173-178.
- 2262 Schweer, H., Meese, C.O., Watzer, B. and Seyberth, H.W.: Determination of prostaglandin E₁ and its main plasma metabolites 15-keto-prostaglandin E₀ and prostaglandin E₀ by gas chromatography/negative ion chemical ionization triple-stage quadrupole mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 165-170; C.A., 120 (1994) 236316e.
- 2263 Tagari, P., Callaghan, D.H., Black, C. and Yerge, J.A.: Measurement of canine urinary thromboxanes by GC-MS and HPLC-RIA. Prostaglandins, 47 (1994) 293-306; C.A., 120 (1994) 290277f.

11c. Lipids and their constituents

- 2264 Contarini, G., Leardi, R., Pezzi, C. and Toppino, P.M.: (Evaluation of butter genuineness by using triglycerides and fatty acid analysis.) *Riv. Ital. Sostanze Grasse*, 70 (1993) 491-499; C.A., 120 (1994) 297052n.
- 2265 Dasgupta, A. and Banerjee, P.: Microwave-induced rapid preparation of acetyl, trifluoroacetyl and tert.-butyl dimethylsilyl derivatives of fatty alcohols and diacylglycerols for gas chromatography-mass spectrometry. Chem. Phys. Lipids, 65 (1993) 217-224; C.A., 120 (1994) 49507f.
- 2266 Firestone, D.: Gas chromatographic determination of monoand diglycerides in fats and oils: summary of collaborative study. J. Assoc. Off. Anal. Chem., 77 (1994) 677-680.
- 2267 Frega, N., Bocci, F. and Lercker, G.: High-resolution gas chromatographic determination of alkanols in oils extracted from olives. J. Am. Oil Chem. Soc., 70 (1993) 919-921.
- 2268 Gelin, F., de Leeuw, J.W., Damste, J.S.S., Derenne, S., Largeau, C. and Metzger, P.: Scope and limitations of flash pyrolysis-gas chromatography/mass spectrometry as revealed by the thermal behavior of high-molecular-weight lipids derived from the green microalga *Botryococcus braunii*. J. Anal. Appl. Pyrolysis, 28 (1994) 183-204; C.A., 120 (1994) 293328i.
- 2269 Havenga, W.J. and Rohwer, E.R.: Rapid screening of rolling mill oils using high-temperature capillary gas chromatography. J. Chromatogr. A, 669 (1994) 139-150.
- 2270 Heron, C., Nemcek, N., Bonfield, K.M., Dixon, D. and Ottaway, B.S.: The chemistry of neolithic beeswax. *Naturwissenschaften*, 81 (1994) 266-269.
- 2271 Kaplan, M., Davidson, G. and Polyakov, M.: Capillary supercritical fluid chromatography–Fourier transform infrared spectroscopy study of triglycerides and the qualitative analysis of normal and "unsaturated" cheeses. J. Chromatogr. A, 673 (1994) 231-237.
- 2272 Karlsson, S., Sares, C., Renstad, R. and Albertsson, A.-C.: Gas chromatographic, liquid chromatographic and gas chromatographic—mass spectrometric identification of degradation products in accelerated aged microbial polyhydroxyalkanoates. J. Chromatogr. A, 669 (1994) 97-102.
- 2273 Kwon, S.J., Lee, S.Y., Cho, S.W. and Rhee, J.S.: A rapid gas chromatography method for quantitation of free fatty acids, monoacyl-, diacyl-, and triacylglycerols without derivatization. *Biotechnol. Tech.*, 7 (1993) 727-732; C.A., 120 (1994) 49222j.
- 2274 Lin, S.W. and Lam, N.W.: Analysis of lipids in palm oil by on-column capillary gas-liquid chromatography. J. Chromatogr. Sci., 32 (1994) 185-189.
- 2275 Nichols, P.D., Shaw, P.M., Mancuso, C.A. and Franzmann, P.D.: Analysis of archaeal phospholipid-derived di- and tetraether lipids by high temperature capillary gas chromatography. *J. Microbiol. Methods*, 18 (1993) 1-9; C.A., 120 (1994) 239340u.
- 2276 Sassano, G.J. and Jeffrey, B.S.J.: Gas chromatography of triacyl-glycerols in palm oil fractions with medium-polarity wide-bore columns. J. Am. Oil Chem. Soc., 70 (1993) 1111-1114.

B416 BIBLIOGRAPHY SECTION

12. ORGANIC PEROXIDES

2277 Wang, Y., Wu, Y., Bi, L. and Li, R.: (Determination of t-butyl hydroperoxide and di-t-butyl peroxide by gas chromatography.) Sepu, 12 (1994) 204-205.

STEROIDS

13a. General techniques

2278 Hubbard, W.C., Bickel, C. and Schleimer, R.P.: Simultaneous quantitation of endogenous levels of cortisone and cortisol in human nasal and bronchoalveolar lavage fluids and plasma via gas chromatography-negative ion chemical ionization mass spectrometry. Anal. Biochem., 221 (1994) 109-117.

13b. Pregnane and androstane derivatives

- 2279 Becchi, M., Aguilera, R., Farizon, I., Flament, M.M., Casabiance, H. and James, P.: Gas chromatography/combustion/isotope-ratio mass spectrometry analysis of urinary steroids to detect misuse of testosterone in sport. *Rapid Commun. Mass Spectrom.*, 8 (1994) 304-308; C.A., 120 (1994) 291583q.
- 2280 Lurie, I.S., Sperling, A.R. and Meyers, R.P.: The determination of anabolic steroids by MECC, gradient HPLC, and capillary GC. J. Forensic Sci., 39 (1994) 74-85; C.A., 120 (1994) 291563h.
- 2281 Rossi, S.A.: Development of short-column GC/MS and GC/MS/MS strategies: fundamentals and applications to anabolic steroid analysis. Avail. *Univ. Microfilms Int.*, Order No. DA9219235, 1991, 271 pp.; C.A., 120 (1994) 183118h.
- 2282 Wudy, S.A., Wachter, U.A., Homoki, J. and Teller, W.M.: Determination of dehydroepiandrosterone sulfate in human plasma by gas chromatography/mass spectrometry using a deuterated internal standard: a method suitable for routine clinical use. Horm. Res., 39 (1993) 235-240; C.A., 120 (1994) 183136n.

See also 2468.

13d. Sterols

- 2283 Kheifets, G.M. and Alekseeva, E.M.: (Gas chromatographic determination of traces of blood plasma cholesteryl esters.) Zh. Anal. Khim., 49 (1994) 307-314.
- 2284 Rezvukhin, A.I., Berezovskaya, E.V. and Shalaurova, I.Yu.: (Chromato-mass spectrometric estimation of oxidized derivatives of cholesterol in blood serum.) Vopr. Med. Khim., 40, No. 1 (1994) 56-58; C.A., 120 (1994) 293509u.
- 2285 Rodriguez-Palmero, M., de la Presa-Owens, S., Castellote-Bargallo, A.I., López Sabater, M.C., Rivero-Urgell, M. and de la Torre-Boronat, M.C.: Determination of sterol content in different food samples by capillary gas chromatography. J. Chromatogr. A, 672 (1994) 267-272.
- 2286 Yoshida, T., Honda, A., Tanaka, N., Matsuzaki, Y., Shoda, J., He, B., Osuga, T. and Miyazaki, H.: Determination of 7α-hydroxy-4-cholesten-3-one level in plasma using isotope-dilution mass spectrometry and monitoring its circadian rhythm in human as an index of bile acid biosynthesis. *J. Chromatogr. B*, 655 (1994) 179-187.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 2287 Betts, T.J.: Use of esterified and unesterified dipentylated γ -, β and α -cyclodextrins as gas chromatographic stationary phases to indicate the structure of monoterpenoid constituents of volatile oils. *J. Chromatogr. A*, 672 (1994) 254-260.
- 2288 Hennig, P., Steinborn, A. and Engewald, W.: Investigation of the composition of *Pinus peuce* needle oil by GC-MS and GC-GC-MS. *Chromatographia*, 38 (1994) 689-693.
- 2289 Konig, W.A., Rieck, A., Hardt, I., Gehrcke, B., Kubeczka, K.-H. and Muhle, H.: Enantiomeric composition of the chiral constituents of essential oils. Part 2: Sesquiterpene hydrocarbons. J. High Resolut. Chromatogr., 17 (1994) 315-320.
- 2290 Li, Q.: (Determination of eugenol in *Flos caryophylli* and its preparation.) *Sepu*, 12 (1994) 224-225.
- 2291 Sakaki, K., Shinbo, T. and Kawamura, M.: Retention behavior of β-carotene on polar and nonpolar stationary phases in supercritical fluid chromatography. *J. Chromatogr. Sci.*, 32 (1994) 172-178.
- 2292 Shamaila, M., Skura, B., Daubeny, H. and Anderson, A.: Sensory, chemical and gas chromatographic evaluation of five raspberry cultivars. Food Res. Int., 26 (1993) 443-449; C.A., 120 (1994) 215685j.
- 2293 Steinbrecher, R., Eichstadter, G., Schurmann, W., Torres, L., Clement, B., Simon, V., Kotzias, D., Daiber, R. and van Eijk, J.: Monoterpenes in air samples: European intercomparison experiments. *Int. J. Environ. Anal. Chem.*, 54 (1994) 283-297.
- 2294 Wang, Q., Yeung, H.W. and Chan, K.: (Determination of borneol and isoborneol in 27 species of Liushenwan by GC.) Zhongguo Yaoke Daxue Xuebao, 24 (1993) 318-320; C.A., 120 (1994) 62408u.

15b. Essential oils

- 2295 Cen, L. and He, Z.: (Determination of ingredients in Ruicao oil by GC.) Fenxi Ceshi Xuebao, 12, No. 2 (1993) 30-32; C.A., 120 (1994) 226661z.
- 2296 Derbesy, M. and Uzio, R.: (Application of chiral phase chromatography to coriander essential oil control.) Ann. Falsif. Expert. Chim. Toxicol., 86 (1993) 369-378; C.A., 120 (1994) 307040y.
- 2297 Guo, Y., Dai, L., Qing, R. and Yang, L.: (A study of the chemical constituents of the headspace volatiles from the flower of *Jasminum sambac* (L.) aiton by an adsorption-thermal desorption sampling device.) Sepu, 12 (1994) 110-113.
- 2298 Heikes, D.L.: SFE with GC nad MS determination of safrole and related allylbenzenes in sassafras teas. J. Chromatogr. Sci., 32 (1994) 253-258.
- 2299 Li, X. and Yang, X.: (GC-MS assay of the ingredient and content of Atractylodes oil before and after inclusion with β-cyclodextrin complexation.) Zhongguo Yiyuan Yaoxue Zazhi, 13 (1993) 212-214; C.A., 120 (1994) 61901n.
- 2300 Luning, P.A., de Rijk, T., Wichers, H.J. and Roozen, J.P.: Gas chromatography, mass spectrometry, and sniffing port analyses of volatile compounds of fresh bell peppers (Capsicum annuum) at different ripening stages. J. Agric. Food Chem., 42 (1994) 977-983.

- 2301 Mondello, L., Bartle, K.D., Dugo, G. and Dugo, P.: Automated HPLC-HRGC: a powerful method for essential oil analysis. Part III. Aliphatic and terpene aldehydes of orange oil. J. High Resolut. Chromatogr., 17 (1994) 312-314.
- 2302 Reverchon, E. and Senatore, F.: Supercritical carbon dioxide extraction of chamomile essential oil and its analysis by gas chromatography-mass spectrometry. J. Agric. Food Chem., 42 (1994) 154-158.
- 2303 Smith, R.M. and Burford, M.D.: GLC of supercritical fluid extracts of essential oils from the medicinal herbs, feverfew, tansy, and German chamomile. J. Chromatogr. Sci., 32 (1994) 265-269.
- 2304 Yang, S. and Li, K.: (GC-MS study on the essential oil of citrus peel. II. Analysis on the sweet orange oil.) Zhongsan Daxue Xuebao, Ziran Kexueban, 32 (1993) 97-100; C.A., 120 (1994) 307033y.
- 2305 Yarita, T., Nomura, A. and Horimoto, Y.: Type analysis of citrus essential oils by multidimensional supercritical fluid chromatography/gas chromatography. *Anal. Sci.*, 10 (1994) 25-29.
- 2307 Ye, F., Luo, C., Zhang, X. and Zhang, Y.: (An improved method for the analysis of residual solvent in evening primrose oil.) Sepu. 12 (1994) 138-139.

See also 2195, 2252, 2483.

16. NITRO AND NITROSO COMPOUNDS

- 2308 Kolla, P.: Gas chromatography, liquid chromatography and ion chromatography adapted to the trace analysis of explosives. J. Chromatogr. A, 674 (1994) 309-318.
- 2309 Pensabene, J.W. and Fiddler, W.: Gas chromatographic/thermal energy analyser method for N-nitrosodibenzylamine in hams processed in elastic rubber netting. J. Assoc. Off. Anal. Chem., 77 (1994) 981-984.
- 2310 Slack, G.C.: Coupled solid phase extraction–supercritical fluid extraction online gas chromatography of explosives from water. Avail. *Univ. Microfilms Int.*, Order No. DA 9234280, 1992, 170 pp.; C.A., 120 (1994) 248719b.

See also 2194.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 2311 Andersons, A., Simonyan, S. and Shymanska, M.: (Gas-liquid chromatography of some aliphatic and heterocyclic mono- and polyfunctional amines. 34. Application of the electron-capture detector in the analysis of amino compounds.) Latv. Kim. Z., 5 (1993) 558-563; C.A., 120 (1993) 289134a.
- 2312 Gavlick, W.K. and Davis, P.K.: Gas chromatographic determination of p-chloroaniline in a chlohexidine digluconate-containing alcohol foam surgical scrub product. J. Assoc. Off. Anal. Chem., 77 (1994) 583-586.
- 2313 Janda, V., Kríz, J., Vejrosta, J. and Bartle, K.D.: Supercritical fluid extraction and chromatography of aromatic amines. *J. Chromatogr. A*, 669 (1994) 241-245.

- 2315 Karoum, F., Chrapusta, S. and Egan, M.: Combined gas chromatography-mass spectrometry for the analysis of central and peripheral biogenic amines. *Tech. Behav. Neural Sci.*, 11 (1993) 127-149; C.A., 120 (1994) 236226a a review with 53 refs.
- 2316 Lin, L. and Wu, J.: (Analysis of 3-chloro-4-fluoroaniline and its reaction intermediates by gas chromatography.) *Huaxue Shijie*, 34 (1993) 128-129; C.A., 120 (1994) 307624s.
- 2317 Persson, P., Dalene, M., Skarping, G., Adamsson, M. and Hagmar, L.: Biological monitoring of occupational exposure to toluene diisocyanate: measurement of toluenediamine in hydrolyzed urine and plasma by gas chromatography–mass spectrometry. Br. J. Ind. Med., 50 (1993) 1111-1118; C.A., 120 (1994) 225561e.
- 2318 Thomson, J.S., Green, J.B., McWilliams, T.B. and Yu, S.K.-T.: Analysis of amines in petroleum. J. High Resolut. Chromatogr., 17 (1994) 415-426.

See also 2331.

- 17d. Other amine derivatives and amides (excl. peptides)
- 2319 Dalene, M., Skarping, G. and Tinnerberg, H.: Biological monitoring of hexamethylene diisocyanate by determination of 1,6-hexamethylene diamine as the trifluoroethyl chloroformate derivative using capillary gas chromatography with thermionic and selective-ion monitoring. *J. Chromatogr. B*, 656 (1994) 319-328
- 2320 Durden, D.A. and Davis, B.A.: Quantitative methods for trace amines. *Tech. Behav. Neural Sci.*, 11 (1993) 229-254; *C.A.*, 120 (1994) 183054j - a review with 121 refs.
- 2321 Ulsaker, G.A. and Teien, G.: Dealkylation and rearrangement of phenacylammonium salts in a gas chromatographic injector. J. Anal. Appl. Pyrolysis, 27 (1993) 199-206.

See also 2311.

- 18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PRO-TEINS
- 18a. Amino acids and their derivatives
- 2322 Abe, I., Fujimoto, N. and Nakahara, T.: Enantiomer separation of amino acids by capillary gas chromatography using cyclodextrin derivatives as chiral stationary phases. *J. Chromatogr. A*, 676 (1994) 469-473.
- 2323 Abe, I., Nishiyama, T. and Nakahara, T.: Enantiomer separation of amino acids after derivatization with alkyl chloroformates by chiral phase capillary gas chromatography. *Anal. Sci.*, 10 (1994) 501-504.
- 2324 Badoud, R. and Fay, L.B.: Mass spectrometric analysis of N-car-boxymethylamino acids as periodate oxidation derivatives of Amadori compounds. Application to glycosylated hemoglobin. Amino Acids, 5 (1993) 367-375; C.A., 120 (1994) 265223c.
- 2326 Kataoka, H., Tanaka, H., Fujimoto, A., Noguchi, I. and Makita, M.: Determination of sulphur amino acids by gas chromatography with flame photometric detection. *Biomed. Chromatogr.*, 8 (1994) 119-124.

B418 BIBLIOGRAPHY SECTION

- 2327 Liu, D.: (Gas chromatographic separation of amino acid derivatives on Chirasil-Val stationary phases.) Fenxi Ceshi Xuebao, 12, No. 3 (1993) 37-40; C.A., 120 (1993) 289139f.
- 2328 Oh, C.-H., Kim, J.-H., Kim, K.-R., Brownson, D.M. and Mabry, T.J.: Simultaneous gas chromatographic analysis of non-protein and protein amino acids as N(O,S)-isobutyloxycarbonyl tert.-butyldimethylsilyl derivatives. J. Chromatogr. A, 669 (1994) 125-137.
- 2329 Petersson, P., Malmquist, J., Markides, K.E. and Sjöberg, S.: Determination of enantiomeric purity of (S)-carboranylalanine using capillary column supercritical fluid chromatography. J. Chromatogr. A, 670 (1994) 239-242.
- 2330 Takahashi, S., Kagawa, M., Shiwaku, K. and Matsubara, K.: Determination of S-benzyl-N-acetyl-L-cysteine by gas chromatography/mass spectrometry as a new marker of toluene exposure. J. Anal. Toxicol., 18 (1994) 78-80; C.A., 120 (1994) 252096p.
- 2331 Tsugita, A., Kamo, M. and Sano, M.: (Gas chromatograph with derivatives of 2-anilino-5-oxothiazolinylamino acid and volatile primary amine for N-terminus protein sequence determination.) PCT Int. Appl. WO 94 02,854 (Cl. G01N33/68), 3 Feb. 1994, JP Appl. 92/199,684, 27 Jul. 1992; 17 pp.; C.A., 120 (1994) 212026j.
- 2332 Wan, H., Zhou, X. and Ou, Q.: Gas chromatographic separation of aminoacid enantiomers and their recognition mechanism on a 2,6-di-O-butyl-3-O-trifluororacetylated-γ-cyclodextrin capillary column. J. Chromatogr. A, 673 (1994) 107-111.

See also 2007, 2242.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

20a. Oxidoreductases

See 2355.

- 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITU-FNTS
- 21a. Purines, pyrimidines, nucleosides, nucleotides
- 2333 Blount, B.C. and Ames, B.N.: Analysis of uracil in DNA by gas chromatography–mass spectrometry. *Anal. Biochem.*, 219 (1994) 195-200.
- 2334 Boukraa, M.S., Deruaz, D., Bannier, A., Desage, M. and Brazier, J.L.: Detection of ¹³C-labeled compounds by gas chromatography coupled to atomic emission detection – application to caffeine metabolites. *J. Pharm. Biomed. Anal.*, 12 (1994) 185-194; C.A., 120 (1994) 260412d.
- 2335 Markey, S.P., Markey, C.J., Wang, T.C.L. and Rodriguez, J.B.: Gas chromatographic-mass spectrometric method for the assessment of oxidative damage to double-stranded DNA by quantification of thymine glycol residues. J. Am. Soc. Mass Spectrom., 4 (1993) 336-342; C.A., 120 (1994) 237652y.
- 21c. Nucleic acids, DNA

22. ALKALOIDS

- 2336 Betz, J.M., Eppley, R.M., Taylor, W.C. and Andrzejewski, D.: Determination of pyrrolyzidine alkaloids in commercial comfrey products (Symphytum sp.) J. Pharm. Sci., 83 (1994) 649-653; C.A., 120 (1994) 280382x.
- 2337 LeBelle, M.J., Laurinault, G. and Lavoie, A.: Gas chromatographic-mass spectrometric identification of chiral derivatives of the alkaloids of khat. Forensic Sci. Int., 61 (1993) 53-64; C.A., 120 (1994) 237686n.
- 2338 Scandola, M., Games, D.E., Costa, C., Allegri, G., Bertazzo, A., Curcuruto, O. and Traldi, P.: Structural study of alkaloids from Securidaca longipedunculata roots. II. Isolation and characterization by supercritical fluid chromatography/mass spectrometry. J. Heterocycl. Chem., 31 (1994) 219-224; C.A., 120 (1994) 294169v.
- 2339 Sinkkonen, S., Kolehmainen, E., Paasivirta, J., Koistinen, J., Lahtiperä, M. and Lammi, R.: Identification and level estimation of chlorinated neutral aromatic sulfur compounds and their alkylated derivatives in pulp mill effluents and sediments. Chemosphere, 28 (1994) 2049-2066.

See also 2451, 2474.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

- 23c. Indole derivatives and plant hormones (gibberelins)
- 2340 Jensen, M.T. and Jensen, B.B.: Gas chromatographic determination of indole and 3-methylindole (skatole) in bacterial culture media, intestinal contents and faeces. J. Chromatogr. B, 655 (1994) 275-280.
- 23d. Pyridine derivatives
- 2341 Niwa, T., Naoi, M., Yoshida, M. and Nagatsu, T.: Analysis of tetrahydroisoquinolines in the brain by gas chromatography mass spectrometry. *Tech. Behav. Neural Sci.*, 11 (1993) 255-278; C.A., 120 (1994) 263096q.
- 23e. Other N-heterocyclic compounds
- 2342 Briody, J.M., Keenan, D., Nicholson, G.J. and Koppenhoefer, B.: Direct resolution of enantiomers of basic imidazol-2-yl-substituted alcohols by gas chromatography on Chirasil-Val. Chirality, 5 (1993) 229-231; C.A., 120 (1994) 298541h.
- 2343 Fardman, S.Sh. and Sarycheva, Ye.N.: (Use of GLC in the analytical control during production of N-methylpiperazine.) Khim.-Farm. Zh., 27, No. 10 (1993) 59-60; C.A., 120 (1994) 307610j.
- 2344 Lund, E.D.: Determination of 2-methoxy-3-alkylpyrazines in carrot products by gas chromatography/nitrogen-phosphorus detection. J. Assoc. Off. Anal. Chem., 77 (1994) 416-420.
- 2345 Messer, D.C. and Taylor, L.T.: Inverse analytical supercritical fluid extraction of Zovirax Ointment 5%. Anal. Chem., 66 (1994) 1591-1592.

2346 Oldham, N.J., Keegans, S.J., Morgan, E.D., Paiva, R.V.S., Brandao, C.R.F., Schoeters, E. and Billen, J.P.J.: Mandibular gland contents of a colony of the queenless Ponerine ant *Dinoponera australis*. Naturwissenschaften, 81 (1994) 313-316.

See also 2217.

- 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)
- 2347 Aoyama, M., Tachibana, M., Anabuki, K., Kumagai, K. and Inoue, N.: (Determination of methyl isothiocyanate in wine.) Tokyo-to Suginami-ku Eisei Shikensho Nenpo, 11 (1993) 86-89; C.A., 120 (1994) 296894b.
- 2348 Cermák, J., Sebránek, M. and Kulhánek, J.: Application of capillary GC/MS to the analysis of wastes from chemical plants. II. Identification of naphtylbenzo[b]thiophenes and binaphtyls in gaseous releases from the production of 2-naphtol. Coll. Czech. Chem. Commun., 59 (1994) 119-125.
- 2349 Christensen, T.B. and Senning, A.: The contaminants of commercial trichloromethanesulfenyl chloride, including previously unobserved dichloromethanedisulfenyl dichloride. *Sulfur Lett.*, 16 (1993) 31-33; C.A., 120 (1994) 68483m.
- 2350 Fu, Z., Ni, S., and Pang, Z.: (Determination of thiocyanide (SCN-) in vegetables by head-space gas chromatography.) Fenxi Shi-yanshi, 12, No. 6 (1993) 85-86; C.A., 120 (1994) 215534j.
- 2351 Kataoka, H., Tanaka, H. and Makita, M.: Determination of total cysteamine in urine and plasma samples by gas chromatography with flame photometric detection. *J. Chromatogr. B*, 657 (1994) 9-13.
- 2352 Sinkkonen, S., Vattulainen, A., Aittola, J.-P., Paasivirta, J., Tarhanen, J. and Lahtiperä, M.: Metal reclamation produces sulphur analogues of toxic dioxins and furans. *Chemosphere*, 28 (1994) 1279-1288.
- 2353 Sinninghe Damsté, J.S., Rijpstra, W.I.C., de Leeuw, J.W. and Lijmbach, G.W.M.: Molecular characterization of organicallybound sulfur in crude oils. A feasibility study for the application of Raney Ni desulfurization as a new method to characterize crude oils. J. High Resolut. Chromatogr., 17 (1994) 489-500.
- 2354 Sung, N.J., Johnson, S.J. and Parrott, S.L.: Determination of the boiling point distribution of sulfur compounds in light cycle oil using GC with a flame photometric detector and pyrolyzer. *J. High Resolut. Chromatogr.*, 17 (1994) 457-462.

See also 1991, 2035, 2038, 2233, 2551.

- ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOS-PHATES)
- 2355 Buffoni, F.: Isolation and identification by gas chromatographic mass spectrometry of the carbonyl-active site of pig kidney diamine oxidase. *Anal. Biochem.*, 220 (1994) 185-191.
- 2356 Nakashima, H., Matsunaga, I. and Miyano, N.: (Determination of tris(2-butoxyethyl)phosphate in textiles and household wax products by capillary gas chromatography.) *Jpn. J. Toxicol. Environ. Health*, 39 (1993) 549-553; C.A., 120 (1994) 260264g.
- 2357 Yan, W. and Shan, W.: (Gas chromatographic determination of 2,2'-diaminobenzyl diphosphate.) Sepu, 12 (1994) 212, 214.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

- 26a. Organometallic compounds
- 2358 Arakawa, Y., Takahashi, K., Asano, T. and Fujisawa, M.: (Analysis for trace lead and chlorine compounds in gasoline using gas-chromatography with atomic emission detector (AED).) Aromatikkusu, 45 (1993) 368-373; C.A., 120 (1994) 221968v.
- 2359 Bai, W. and Wang, Y.: (Study on GC in combination with a silica furnace (type III) AAS and on the analysis of chemical species of alkyl lead.) Guangpuxue Yu Guangpu Fenxi, 14 (1994) 99-104; C.A., 120 (1994) 235158t.
- 2360 Cai, Y., Rapsomanikis, S. and Andreae, M.O.: Determination of butyltin compounds in sediments using an improved aqueous ethylation method. *Talanta*, 41 (1994) 589-594.
- 2361 Dirkx, W.M.R., Lobinski, R. and Adams, F.C.: Speciation analysis of organotin in water and sediments by gas chromatography with optical spectrometric detection after extraction separation. *Anal. Chim. Acta*, 286 (1994) 309-318 - a review with 56 refs.
- 2362 Lasson, G. and Ostah, N.: Enhanced detection level in the GC/MS analysis of organometallic compounds, based on preand post-acquisition data manipulation. *Appl. Organomet.* Chem., 7 (1993) 517-524; C.A., 120 (1994) 314911m.
- 2363 Liang, L., Bloom, N.S. and Horvat, M.: Simultaneous determination of mercury speciation in bilogical materials by GC/CVAFs after ethylation and room-temperature precollection. Clin. Chem. (Washington), 40 (1994) 602-607.
- 2364 Liu, Y., Lopez-Avila, V. and Alcaraz, M.: Simultaneous determination of organotin, organolead, and organomercury compounds in environmental samples using capillary gas chromatography with atomic emission detection. J. High Resolut. Chromatogr., 17 (1994) 527-536.
- 2365 Martin, F.M., Tseng, C.-M., Belin, C., Quevauviller, P. and Donald, O.F.X.: Interferences generated by organic and inorganic compounds during organotin speciation using hydride generation coupled with cryogenic trapping, gas chromatographic separation and detection by atomic absorption spectrometry. Anal. Chim. Acta, 286 (1994) 343-355.
- 2366 Pannier, F., Astruc, A. and Astruc, M.: Extraction and determination of butyltin compounds in shellfish by hydride generation–gas chromatography–quartz furnace atomic absorption spectrometry.) Anal. Chim. Acta, 287 (1994) 17-24; C.A., 120 (1994) 215556t.
- 2367 Sarradin, P.M., Pannier, F., Astruc, A. and Astruc, M.: (Organotin speciation in waters, sediments and biota by hydride generation/gas chromatography/quartz furnace atomic absorption spectrometry.) J. Fr. Hydrol., 24 (1993) 69-79; C.A., 120 (1994) 252889z.
- 2368 Szpunar-Lobinska, J., Ceulemans, M., Dirkx, W., Witte, C., Lobinski, R. and Adams, F.C.: Interferences in ultratrace speciation of organolead and organotin by gas chromatography with atomic spectrometric detection. *Mikrochim. Acta*, 113 (1994) 287-298.
- 2369 Tsunoda, M.: Simultaneous determination of organotin compounds in fish and shellfish by gas chromatography with a flame photometric detector. *Tohoku J. Exp. Med.*, 169 (1993) 167-178; C.A., 120 (1994) 215612h.

2370 Vela, N.P.: Speciation of organotin compounds by supercritical fluid chromatography with plasma mass spectrometric detection. Avail. Univ. Microfilms Int., Order No. DA9232391, 1992, 208 pp.; C.A., 120 (1994) 207710y.

See also 2033.

- 26b. Boranes, silanes and related non-metallic compounds
- 2371 Dauchy, X., Potin-Gautier, M., Astruc, A. and Astruc, M.: Analytical methods for the speciation of selenium compounds: A review. Fresenius J. Anal. Chem., 348 (1994) 792-805 a review with 208 refs.
- 2372 Hawkins, L.G.: Gas chromatographic analysis of methylchlorosilanes produced by the direct reaction. Stud. Org. Chem. (Amsterdam), 49 (1993) 189-205; C.A., 120 (1994) 298654x.
- 2373 Li, B., Zhu, X. and Zhang, Q.: (Gas chromatographic determination of trace trichlorosilane in high purity silicon tetrachloride for optical fibers.) Sepu, 12 (1994) 108-109, 113.
- 2374 Rotzche, H., Hahnewald, H. and Proske, A.: Gas chromatographic analysis in the manufacture of chlorosilanes. *Stud. Org. Chem. (Amsterdam)*, 49 (1993) 207-218; C.A., 120 (1994) 314856x a review with 46 refs.
- 2375 Stibilj, V., Dermelj, M., Byrne, A.R., Šimenc, T. and Stekar, J.M.: Determination of trace amounts of selenium in poultry feedstuffs by gas chromatography. *J. Chromatogr. A*, 668 (1994) 449-453.

See also 2461.

- VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 2376 Poon, P.M.K., Mak, Y.T. and Pang, C.P.: Gas chromatographic-mass fragmentographic determination of serum 1α,25-dihy-droxyvitamin D₃. Clin. Biochem., 26 (1993) 461-469; C.A., 120 (1994) 261450b.

28. ANTIBIOTICS

- 2377 Munns, R.K., Holland, D.C., Roybal, J.E., Storey, J.M., Long, A.R., Stehly, G.R. and Plakas, S.M.: Gas chromatographic determination of chloramphenicol residues in shrimp: interlaboratory study. J. Assoc. Off. Anal. Chem., 77 (1994) 596-601.
- 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

2378 Cardinali, D.: (Use of SPE (solid-phase extraction) in the determination of fungicides, insecticides, chlorinated acaricides and pyrethroids, in legumes and fruits, using capillary GLC.) Riv. Soc. Ital. Sci. Aliment., 21 (1992) 461-469; C.A., 120 (1994) 215545b.

- 2379 Centrich, F.: (Systematic monitoring of pesticides in food.) Aliment., Equipos Tecnol., 12, No. 7 (1993) 105-108; C.A., 120 (1994) 52996v.
- 2380 Crespo, C., Marcé, R.M. and Borrull, F.: Determination of various pesticides using membrane extraction discs and gas chromatography–mass spectrometry. *J. Chromatogr. A*, 670 (1994).
- 2381 Koinecke, A., Kreuzig, R., Bahadir, M., Siebers, J. and Nolting, H.G.: Investigations on the substitution of dichloromethane in pesticide residues analysis of plant materials. *Fresenius J. Anal. Chem.*, 349 (1994) 301-305.
- 2382 Liang, L., Horvat, M. and Bloom, N.S.: An improved speciation method for mercury by GC/CVAFS after aqueous phase ethylation and room temperature precollection. *Talanta*, 41 (1994) 371-379; C.A., 120 (1994) 260137t.
- 2383 Tajima, H., Shimamura, N., Takaoka, M. and Nakazono, K.: (Development of large volume injection method for capillary gas chromatography and applications for pesticide analysis.) Kankyo Kagaku, 3 (1993) 761-769; C.A., 120 (1994) 185251v.

29b. Chlorinated insecticides

- 2384 Kenmotsu, K., Takano, H., Koeduka, K., Ogino, Y. and Mori, T.: (Analytical method for GC/MS monitoring of toxic chemicals in water and sediment.) Kankyo Kagaku, 3 (1993) 279-293; C.A., 120 (1994) 252828d.
- 2385 Müller, M.D. and Buser, H.-R.: Identification of the (+)- and (-)-enantiomers of chiral chlordane compounds using chiral high-performance liquid chromatography/chiroptical detection and chiral high-resolution gas chromatography/mass spectrometry. *Anal. Chem.*, 66 (1994) 2155-2162.
- 2386 Parreno, M. and Larsen, B.: Determination of organochlorine pesticides in vegetables by cyclic steam distillation and capillary GC-ECD. *Trace Microprobe Tech.*, 11 (1993) 133-142; C.A., 120 (1994) 268416d.
- 2387 Schenck, F.J., Wagner, R., Hennessy, M.K. and Okrasinski, J.L., Jr.: Screening procedure for organochlorine and organophosphorus pesticide residues in eggs using a solid-phase extraction cleanup and gas chromatographic detection. J. Assoc. Off. Anal. Chem., 77 (1994) 1036-1040.
- 2388 Snyder, J.L.: Determination of selected organochlorine and organophosphate pesticides in soils using supercritical fluid extraction, solid-phase extraction, and gas chromatography with electron capture detection. Avail. Univ. Microfilms Int., Order No. DA9327806, 1993, 203 pp.; C.A., 120 (1994) 291974t.
- 2389 Yao, J., Zheng, Y., Zhao, J., Wang, Z. and Jiao, S.: Determination of trace amounts of chlorinated insecticides and fungicides in ginseng using capillary gas chromatography and ⁶³Ni electron capture detector. *J. Environ. Sci. (China)*, 5 (1993) 336-341; C.A., 120 (1994) 253465v.
- 2390 Zhou, Y. and Zhuang, W.: (A method for determination of 15 organochlorine pesticide residues in fruits and vegetables by gas chromatography with large bore capillary.) Sepu, 12 (1994) 122-123.
- 2391 Zhu, J., Mulvihill, M.J. and Norstrom, R.J.: Characterization of technical toxaphene using combined high-performance liquid chromatography—gas chromatography—electron capture negative ionization mass spectrometry techniques. J. Chromatogr. A, 669 (1994) 103-117.

B421

See also 2056, 2068.

29c. Phosphorus insecticides

- 2393 D'Agostino, P.A. and Provost, L.R.: Capillary column gas chromatographic-tandem mass spectrometric analysis of phosphate esters in the presence of interfering hydrocarbons. *J. Chromatogr. A*, 670 (1994) 127-134.
- 2394 Feng, S. and Yu, Z.: (Determination of parathion in prawn and seawater by gas chromatography.) Nongyao Kexue Yu Guanli, No. 4 (1993) 34-36; C.A., 120 (1994) 260263f.
- 2395 He, C.: (Analytical method of quizalofop-ethyl by gas chromatography.) Nongyao Kexue Yu Guanli, No. 4 (1993) 26-28, 43; C.A., 120 (1994) 185248z.
- 2396 Mueller, S., Efer, J., Wennrich, L., Engewald, W. and Levsen, K.: (Gas chromatographic trace analysis of methamidophos and buminafos in drinking water. Influence of parameters on PTV injection of large sample volumes.) Vom Wasser, 81 (1993) 135-150; C.A., 120 (1994) 226284d.
- 2397 Wang, W.K. and Huang, S.D.: Determination of organophosphorus pesticides in water using C₁₈ or Florisil Sep-Pak cartridge and gas chromatography with flame-photometric detection. *J. Chin. Chem. Soc. (Taipei)*, 41 (1994) 109-113; C.A., 120 (1994) 199977y.
- 2398 Ye, W. and Chen, Z.: (Determination of mephospholan by gas chromatography.) Nongyao Kexue Yu Guanli, No. 3 (1993) 17-18; C.A., 120 (1994) 185246x.
- 2399 Zhuang, W. and Zhou, Y.: (Determination of 20 organophosphorus pesticide residues in fruits and vegetables by capillary gas chromatography.) Sepu, 12 (1994) 202-203.

See also 2387, 2388.

29d. Carbamates

- 2400 Berger, T.A., Wilson, W.H. and Deye, J.F.: Analysis of carbamate pesticides by packed column supercritical fluid chromatography. J. Chromatogr. Sci., 32 (1994) 179-184.
- 2401 Zhang, H. and Luo, Y.: (Separation and detection of eight carbarnate pesticides in blood by gas chromatography and gas chromatography–mass spectrometry.) Sepu, 12 (1994) 117-118.

29e. Herbicides

- 2402 Cassada, D.A., Spalding, R.F., Cai, Z. and Gross, M.L.: Determination of atrazine, deethylatrazine and deisopropylatrazine in water and sediment by isotope dilution gas chromatographymass spectrometry. *Anal. Chim. Acta*, 287 (1994) 7-15.
- 2403 Gascón, J. and Barceló, D.: Rapid magnetic particle-based ELISA assay compared with gas chromatography–nitrogen phosphorus detection for determining atrazine in freeze-dried water samples. Chromatographia, 38 (1994) 633-636.
- 2404 Sánchez-Brunete, C., García-Valcárcel, A.I. and Tadeo, J.L.: Determination of bromoxynil and ioxynil residues in cereals and soil by GC-ITD. Chromatographia, 38 (1994) 624-628.
- 2405 Sánchez-Brunete, C., García-Valcárcel, A.I. and Tadeo, J.L.: Determination of residues of phenoxy acid herbicides in soil and cereals by gas chromatography-ion trap detection. *J. Chromatogr. A*, 675 (1994) 213-218.

- 2406 Tang, G. and Liu, K.: (Determination of deltamethrin in soil by GC-ECD with sulfuric acid purification.) *Nongyao Kexue Yu Guanli*, No. 4 (1993) 32-33, 45; C.A., 120 (1994) 210621a.
- 2407 Valverde-García, A., Fernández-Alba, A.R., Herrera, J.C. and Roldán, E.: Analysis of buprofezin residues in vegetable crops by gas chromatography with mass selective detection in selected ion monitoring mode. J. Assoc. Off. Anal. Chem., 77 (1994) 1041-1046.

29f. Fungicides

- 2408 Guinivan, R.A. and Gagnon, M.R.: Analysis of flusilazole and its major phenyl metabolite (IN-F7321) by approaches based on gas chromatography. J. Assoc. Off. Anal. Chem., 77 (1994) 728-735.
- 2409 Lancas, F.M., Galbiane, M.S. and Barbirato, M.A.: Supercritical fluid extraction of oxadixyl from food crops. *Chromatographia*, 39 (1994) 11-14.

See also 2516.

- 29g. Other types of pesticides and various agrochemicals
- 2410 Bando, T., Shizukuishi, K., Kato, Y., Senda, N. and Takahashi, T.: (Simultaneous agrochemicals gas chromatographic determination using trifluoroacetic anhydride for DEP (pesticide) stabilization.) *Jpn. Kokai Tokkyo Koho* JP 06 11,498 [94 11,498] (Cl. G01N30/06), 21 Jan. 1994, Appl. 92/168,760, 26 Jun. 1992; 7 pp.; C.A., 120 (1994) 210791f.
- 2411 DeMilo, A.B., Warthen, J.D., Jr. and Leonhardt, B.A.: Capillary gas chromatography method for the analysis of the *trans* isomers of ceralure, a medfly attractant. *J. Chromatogr. A*, 673 (1994) 295-298.
- 2412 Hillmann, R. and Bachmann, K.: On-line supercritical fluid derivatization and extraction capillary gas chromatography of polar compounds. *J. High Resolut. Chromatogr.*, 17 (1994) 350-352.
- 2413 Pang, G.-F., Fan, C.-L., Chao, Y.-Z. and Zhao, T.-S.: Packed-column gas chromatographic method for the simultaneous determination of 10 pyrethroid insecticide residues in fruits, vegetables, and grains. J. Assoc. Off. Anal. Chem., 77 (1994) 738-747.
- 2414 Zheng, Y., Yao, J., Zhao, J., Jiao, S. and Wang, Z.: (Determination of multiresidue of pyrethroid insecticides in vegetables by gas chromatography.) Sepu, 12 (1994) 124-125.

31. PLASTICS AND THEIR INTERMEDIATES

- 2415 Fuchslueger, U., Grether, H.-J. and Grasserbauer, M.: Hyphenation of Curie-point-pyrolytic high-resolution gas chromatography with several spectroscopic methods for the analysis of curred epoxy resins. Fresenius J. Anal. Chem., 349 (1994) 283-288.
- 2416 Ishida, Y., Ohtani, H., Tsuge, S. and Yano, T.: Determination of styrene copolymer sizing agents in paper by pyrolysis gas chromatography. *Anal. Chem.*, 66 (1994) 1444-1447.

B422 BIBLIOGRAPHY SECTION

- 2417 Ma, Y., Guo, H., Yang, M. and Shen, J.: (Determination of the initiating active species of plasma-initiated polymerization by gas chromatography/mass spectrometry.) Gaodeng Xuexiao Huaxue Xuebao, 14 (1993) 1019-1022; C.A., 120 (1994) 245832x.
- 2418 Macka, M., Mettler, H.-P., Bokel, M. and Röder, W.: Analysis of silanised polyglycerols by supercritical fluid chromatography. J. Chromatogr. A, 675 (1994) 267-270.
- 2419 Onishi, A., Uchino, S., Oguri, N. and Jin, X.: Simultaneous hydrothermal decomposition and derivatizations: gas chromatography/mass spectrometry for the characterization of polyamides. *Anal. Sci.*, 10 (1994) 271-276.
- 2421 Romansky, M. and Guillet, J.E.: The use of inverse gas chromatography to study liquid crystalline polymers. *Polymer*, 35 (1994) 584-589; C.A., 120 (1994) 192874d.
- 2422 Sanchez, R., Hernandez, C., Jalsovszky, G. and Czira, G.: Thermal degradation of furfuraldehyde resins. Pyrolysis-gas chromatography-mass spectrometry and Fourier transform infrared. Eur. Polym. J., 30 (1994) 37-42; C.A., 120 (1994) 55822w.
- 2423 Wang, J.: (Use of moment analysis in gas-liquid chromatography and application to the study of a liquid crystalline polymer, ethyl cellulose.) Avail. NLC, Order No. DANN 73468, 1992, 229 pp.; C.A., 120 (1994) 273337h.
- 2424 Wu, J., Liu, M. and Wang, G.: (Graft copolymerization of acrylamide onto potato starch by pyrolysis gas chromatography.) Gaofenzi Cailiao Kexue Yu Gongcheng, 9, No. 5 (1993) 87-90; C.A., 120 (1994) 299475b.

See also 1989, 2006, 2089, 2272.

- DRUG ANALYSIS
- 32a. Drug analysis, general techniques
- 2425 Armbruster, D.A., Tillman, M.D. and Hubbs, L.M.: Limit of detection (LOD)/limit of quantitation (LOQ): Comparison of the empirical and the statistical methods exemplified with GC-MS assays of abused drugs. Clin. Chem. (Washington), 40 (1994) 1233-1238.
- 2426 Wong, S.H.Y.: Advances in chromatography for clinical drug analysis: supercritical fluid chromatography, capillary electrophoresis, and selected high-performance liquid chromatography techniques. *Ther. Drug Monit.*, 15 (1993) 576-580; C.A., 120 (1994) 260339k - a review with 32 refs.
- 2427 Wu, A.B.H., Ostheimer, D., Cremese, M., Forte, E. and Hill, D.: Characterization of drug interferences caused by coelution of substances in gas chromatography/mass spectrometry confirmation of targeted drugs in full-scan and selected-ion monitoring modes. Clin. Chem. (Washington), 40 (1994) 216-220.

See also 2069.

- 32b. Antirheumatics and antiinflammatory drugs
- 2428 Maurer, H.H., Kraemer, T. and Weber, A.: Toxicological detection of ibuprofen and its metabolites in urine using gas chromatography-mass spectrometry. *Pharmazie*, 49 (1994) 148-150; C.A., 120 (1994) 291550b.

2429 Zhao, M.-J., Peter, C., Holtz, M.-C., Hugenell, N., Koffel, J.-C. and Jung, L.: Gas chromatographic-mass spectrometric determination of ibuprofen enantiomers in human plasma using R(-)-2,2,2-trifluoro-1-(9-anthryl)ethanol as derivatizing reagent. J. Chromatogr. B, 656 (1994) 441-446.

- 32c. Autonomic and cardiovascular drugs
- 2430 Heinig, R., Mushalek, V. and Ahr, G.: Determination of the enantiomers of nisoldipine in human plasma using high-performance liquid chromatography on a chiral stationary phase and gas chromatography with mass-selective detection. J. Chromatogr. B, 655 (1994) 286-292.
- 2431 Jin, H.L. and Beesley, T.E.: Enantiomeric separation of amphetamine and methamphetamine by capillary gas chromatography. Chromatographia, 38 (1994) 595-598.
- 2432 Kristinsson, J., Snorradottir, I. and Magnus, J.: The metabolism of mebeverine in man: identification of urinary metabolites by gas chromatography/mass spectrometry. *Pharmacol. Toxicol.* (Copenhagen), 74 (1994) 174-180; C.A., 120 (1994) 289365b.
- 2433 Rosseel, M.T. and Lefebvre, R.A.: Capillary gas chromatographic determination with nitrogen-phosphorus detection of the calcium antagonist nicardipine and its pyridine metabolite M-5 in plasma. J. Chromatogr. A, 668 (1994) 475-480.
- 2434 Ryu, J.C., Song, Y.S., Kim, M., Cho, J.-H. and Yun-Choi, H.S.: Identification of higenamine and its metabolites in rat by gas chromatography/mass spectrometry. *Arch. Pharmacol Res.*, 16 (1993) 213-218; C.A., 120 (1994) 182272s.
- 2435 Scharpf, F., Riedel, K.-D., Laufen, H. and Leitold, M.: Enantiose-lective gas chromatographic assay with electron-capture detection for amlodipine in biological samples. *J. Chromatogr. B*, 655 (1994) 225-233.
- 2436 Schmid, J., Bücheler, A. and Müller, B.: Assay of zatebradine in plasma by fully automated sample clean-up, capillary gas chromatography and ammonia chemical ionisation mass spectrometry. J. Chromatogr. B, 658 (1994) 93-101.
- 2437 Wang, S.M., Tsai, L.C., Giang, Y.S. and Ling, Y.C.: (Role of potassium carbonate on the detection of methamphetamine in urine by headspace gas chromatography/mass spectrometry.) Huaxue, 51 (1993) 261-272; C.A., 120 (1994) 263176r.
- 2438 Wilson, R.T., Groneck, J.M., Holland, K.P. and Henry, A.C.: Determination of clenbuterol in cattle, sheep, and swine tissues by electron ionization gas chromatography/mass spectrometry. J. Assoc. Off. Anal. Chem., 77 (1994) 917-924.
- 2439 Xu, Y., Shen, L., Liu, X., Cui, K., Wu, Y., Wang, S. and Zhang, C.: (Detection of clenbuterol in human urine.) Fenxi Huaxue, 21 (1993) 1432-1434; C.A., 120 (1994) 182208a.
- 32d. Central nervous system drugs
- 2440 Berrabah, M., Andre, D., Prevot, F., Orecchioni, A.M. and Lafont, O.: GC-MS determination of phenobarbitone entrapped in poly-ε-caprolactone nanocapsules. *J. Pharm. Biomed. Anal.*, 12 (1994) 373-378; C.A., 120 (1994) 253500c.
- 2441 Darius, J. and Meyer, F.P.: Sensitive capillary gas chromatographic-mass spectrometric method for the therapeutic drug monitoring of valproic acid and seven of its metabolites in human serum. Application of the assay for a group of pediatric epileptics. J. Chromatogr. B, 656 (1994) 343-351.

- 2442 De Giovanni, N. and Rossi, S.S.: Simultaneous detection of cocaine and heroin metabolites in urine by solid-phase extraction and gas chromatography-mass spectrometry. J. Chromatogr. B, 658 (1994) 69-73.
- 2443 Feng, C., Liu, Y. and Luo, Y.: (Systematic analysis for 24 soporific and sedative drugs by gas chromatography and gas chromatography-mass spectrometry.) Sepu, 12 (1994) 180-182.
- 2444 Feng, C., Liu, Y. and Luo, Y.: (Systematic analysis for twenty soporific and sedative drugs by gas chromatography–NPD two capillary columns methods.) Sepu, 12 (1994) 200-201.
- 2445 Fitzgerald, R.L., Rexin, D.A. and Herold, D.A.: Detecting benzodiazepines: immunoassays compared with negative chemical ionization gas chromatography/mass spectrometry. *Clin. Chem.* (Washington), 40 (1994) 373-380.
- 2446 Grosse, C.M., Davis, J.M., Arrendale, R.F., Jersey, J. and Amin, J.: Determination of remifentanil in human blood by liquid-liquid extraction and capillary GC-HRMS-SIM using a deuterated internal standard. J. Pharm. Biomed. Anal., 12 (1994) 195-203; C.A., 120 (1994) 260413e.
- 2447 Johnson, R., Christensen, J. and Lin, C.-C.: Sensitive gas-liquid chromatographic method for the determination of loratadine and its major active metabolite, descarboethoxyloradatine, in human plasma using a nitrogen-phosphorus detector. *J. Chro*matogr. B, 657 (1994) 125-131.
- 2448 Kintz, P. and Mangin, P.: Determination of meprobamate in human plasma, urine, and hair by gas chromatography and electron impact mass spectrometry. *J. Anal. Toxicol.*, 17 (1993) 408-410; C.A., 120 (1994) 45084t.
- 2449 Madden, J.E., Pearson, J.R. and Rowe, J.E.: Differentiation of side chain isomers of methamphetamine using gas chromatography, high performance liquid chromatography and mass spectrometry. Forensic Sci. Int., 61 (1993) 169-174; C.A., 120 (1994) 291561f.
- 2450 Mautz, D.S., Labroo, R. and Kharasch, E.D.: Determination of alfentanil and noralfentanil in human plasma by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 658 (1994) 149-153.
- 2451 Miller, S.R., Salo, A.L., Boggan, W.O. and Patrick, K.S.: Determination of plasma cocaine and ethylcocaine (cocaethylene) in mice using gas chromatography-mass spectrometry and deuterated internal standards. *J. Chromatogr. B*, 656 (1994) 335-341.
- 2452 Schurig, V., Grosenick, H. and Green, B.S.: (Preparative enantiomer separation of the anesthetic enflurane by inclusion gas chromatography.) *Angew. Chem.*, 105 (1993) 1690-1691; C.A., 120 (1994) 191055a.
- 2453 Seno, H., Hattori, H., Kumazawa, T. and Suzuki, O.: Positive-and negative-ion mass spectrometry of diphenylmethane anti-histaminics and their analogs and rapid clean-up of them from biological samples. Forensic Sci. Int., 62 (1993) 187-208; C.A., 120 (1994) 289277z.
- 2454 Seno, H., Kumazawa, T., Ishii, A., Sato, K. and Suzuki, O.: Determination of some butyrophenones in body fluids by gas chromatography with surface-ionization detection. *Nippon Hoigaku Zasshi*, 47 (1993) 367-371; C.A., 120 (1994) 237699u.
- 2455 Song, D., Zhang, S. and Kohlhof, K.: Gas chromatographic-mass spectrometric method for the determination of flurazepam and its major metabolites in mouse and rat plasma. J. Chromatogr. B, 658 (1994) 142-148.

- 2456 Thomas, B.F., Jeffcoat, A.R., Myers, M.W., Mathews, J.M. and Cook, C.E.: Determination of *I*-α-acetylmethadol, *I*-α-noracetylmethadol and *I*-α-dinoracetylmethadol in plasma by gas chromatography–mass spectrometry. *J. Chromatogr. B*, 655 (1994) 201-211
- 2457 Virag, L., Jamdar, S., Chao, C.R. and Morishima, H.O.: Sensitive assay for cocaine and benzoylecgonine using solid-phase extraction and gas chromatography. *J. Chromatogr. B*, 658 (1994) 135-141.
- 32e. Chemotherapeutics (exc. cytostatics and antibiotics)
- 2458 Birkel, M., Erking, W. and Wetzelsberger, N.: Improved internally standardized GC-ECD method for the determination of free and conjugated triclosan (irgasan DP300) in human plasma. Methods Find. Exp. Clin. Pharmacol., 15 (1993) 623-627; C.A., 120 (1994) 235232n.
- 2459 Kamakura, K., Hasegawa, M., Koiguchi, S., Miyata, M., Okamoto, K., Narita, M., Mirahara, Y., Yamana, T., Tonogai, Y. and Ito, Y.: (Identification of sulfamidine in pork by high-performance liquid chromatography and gas chromatographymass spectrometry. *Eisei Shikensho Hokoku*, 111 (1993) 61-65; C.A., 120 (1994) 296895c.
- 2460 Wallace, J.E., Mojaverian, P., Lin, C.C., Kim, H.K., Harris, S.C., Chen, T.J.H. and Rinaldi, M.G.: Determination of SCH 39304 by megabore capillary gas-liquid chromatography. *J. Anal. Toxicol.*, 18 (1994) 118-121; C.A., 120 (1994) 289284z.
- 32f. Cytostatics
- 2461 Aggarwal, S.K., Kinter, M., Nicholson, J. and Herold, D.A.: Determination of tellurium in urine by isotope dilution gas chromatography/mass spectrometry using (4-fluorophenyl) magnesium bromide as a derivatizing agent and a comparison with electrothermal atomic absorption spectrometry. *Anal. Chem.*, 66 (1994) 1316-1322.
- 2462 Cone, E.J., Darwin, W.D. and Wang, W.-L.: The occurence of cocaine, heroin and metabolites in hair of drug abusers. Forensic Sci. Int., 63 (1993) 55-68; C.A., 120 (1994) 291568p.
- 2463 Cone, E.J., Hillsgrove, M. and Darwin, W.D.: Simultaneous measurement of cocaine, cocaethylene, their metabolites, and "crack" pyrolysis products by gas chromatography-mass spectrometry. Clin. Chem. (Washington), 40 (1994) 1299-1305.
- 2464 Edder, P., Staub, C., Veuthey, J.L., Pierroz, I. and Haerdi, W.: Subcritical fluid extraction of opiates in hair of drug addicts. J. Chromatogr. B, 658 (1994) 75-86.
- 2465 Momerency, G., van Cauwenberghe, K., Slee, P.H.T.J., van Oosterom, A.T. and de Bruin, E.A.: The determination of cyclophosphamide and its metabolites in blood plasma as stable trifluoroacetyl derivatives by electron capture chemical ionization gas chromatography/mass spectrometry. *Biol. Mass Spectrom.*, 23 (1994) 149-158; C.A., 120 (1994) 260403b.

See also 2425.

32g. Other drug categories

See 2109, 2312.

- 32h. Toxicological and forensic applications
- 2466 Baiker, C., Serrano, L. and Lindner, B.: Hypochlorite adulteration of urine causing decreased concentration of Δ9-THC-COOH by GC/MS. J. Anal. Toxicol., 18 (1994) 101-103; C.A., 120 (1994) 237706u.
- 2467 Corburt, M.R. and Koves, E.M.: Gas chromatography/mass spectrometry for the determination of cocaine and benzoylecgonine over a wide concentration range (-5 mg/dL) in postmortem blood. *J. Forensic Sci.*, 39 (1994) 139-149; C.A., 120 (1994) 263182q.
- 2468 Daeseleire, E., Vanoosthuyze, K. and van Peteghem, C.: Application of high-performance thin-layer chromatography and gas chromatography-mass spectrometry to the detection of new anabolic steroids used as growth promotors in cattle fattening. J. Chromatogr. A, 674 (1994) 247-253.
- 2469 Goldberger, B.A. and Cone, E.J.: Confirmatory tests for drugs in the workplace by gas chromatography—mass spectrometry. J. Chromatogr. A, 674 (1994) 73-86 - a review with 54 refs.
- 2470 Hattori, H., Yamada, T. and Suzuki, O.: Gas chromatography with surface ionization detection in forensic analysis. *J. Chro-matogr. A*, 674 (1994) 15-23 - a review with 16 refs.
- 2471 Krueger, S.T.: New application for the quantitation of cocaine base by gas chromatography. J. Forensic Sci., 39 (1994) 177-185; C.A., 120 (1994) 263183r.
- 2472 Li, S., Gemperline, P.J., Briley, K. and Kazmierczak, S.: Identification and quantitation of drugs of abuse in urine using the generalized rank annihilation method of curve resolution. J. Chromatogr. B, 655 (1994) 213-223.
- 2473 Lora-Tamayo, C., Tena, T. and Rodriguez, A.: Cocaine-related deaths. J. Chromatogr. A, 674 (1994) 217-224.
- 2474 Moore, J.M. and Casale, J.F.: In-depth chromatographic analyses of illicit cocaine and its precursor, coca leaves. *J. Chromatogr. A*, 674 (1994) 165-205 a review with 76 refs.
- 2475 Moore, J.M. and Cooper, D.A.: The application of capillary gas chromatography-electron capture detection in the comparative analyses of illicit cocaine samples. *J. Forensic Sci.*, 38 (1993) 1286-1304; C.A., 120 (1994) 237684k.
- 2476 Nakahara, Y., Kikura, R. and Takahashi, K.: Hair analysis for drugs of abuse. VIII. Effective extraction and determination of 6-acetylmorphine and morphine in hair with trifluoroacetic acid-methanol for the confirmation of retrospective heroin use by gas chromatography-mass spectrometry. J. Chromatogr. B, 657 (1994) 93-101.
- 2477 Nelson, C.C. Fraser, M.D., Wilfahrt, J.K. and Foltz, R.L.: Gas chromatography/tandem mass spectrometry measurement of Δ9-tetrahydrocannabinol, naltrexone, and their active metabolites in plasma. *Ther. Drug Monit.*, 15 (1993) 557-562; C.A., 120 (1994) 260391w.
- 2478 Schuberth, J.: Joint use of retention index and mass spectrum in post-mortem tests for volatile organics by headspace capillary gas chromatography with ion-trap detection. *J. Chroma*togr. A, 674 (1994) 63-71.
- 2479 Shin, H.S. and Park, J.: (Source differentiation of medicines from illicit drugs by use of the enantiomeric composition of metabolites.) Korean Biochem J., 26 (1993) 741-745; C.A., 120 (1994) 210173f.

- 2480 Wasels, R. and Belleville, F.: Gas chromatographic-mass spectrometric procedures used for the identification and determination of morphine, codeine and 6-acetylmorphine. J. Chromatogr. A, 674 (1994) 225-234 a review with 71 refs.
- 2481 Zweipfenning, P.G.M., Wilderink, A.H.C.M., Horsthuis, P., Franke, J.-P. and de Zeeuw, R.A.: Toxilogical analysis of whole blood samples by means of Bond-Elut Certify columns and gas chromatography with nitrogen-phosphorus detection. *J. Chro-matogr. A*, 674 (1994) 87-95.

See also 2060, 2179, 2180, 2442, 2451, 2456.

32i. Plant extracts

- 2482 Lin, Y.F., Ma, C.P., Shieh, S.D., Deng, J.F., Pai, L., Lee, A.R., Chang, D.M., Chiu, W.C. and Shu, R.W.: (Detection of medications adulterated in Chinese herb drugs by GC/MS.) Yixue Yan-jiu, 14 (1993) 21-34; C.A., 120 (1994) 280383y.
- 2483 Ma, X., Pan, H. and Chen, Z.: Off-line two-dimensional gas chromatography-mass spectrometry for analysis of essential oil of medicinal herb: use of absorption trap as interface. Chin. Chem. Lett., 5 (1994) 73-76; C.A., 120 (1994) 279966j.

See also 2303.

33. CLINICO-CHEMICAL APPLICATIONS

- 33b. Complex mixtures and profiling (single compounds by cross-reference only)
- 2484 Guo, Q., Yu, Z., Chang, L. and Liu, S.: (Metabolic profile analysis of organic acids in urine by capillary gas chromatographymass spectrometry application to diagnosis of phenylketonuria.) Fenxi Huaxue, 21 (1993) 1075-1077; C.A., 120 (1994) 49480s.
- 2485 Yakovchenko, V.A., Shilov, V.N. and Krekhnov, B.V.: (Method of alcoholism diagnosis.) U.S.S.R. SU 1,806,376 (CI. G01N33/48), 30 Mar. 1993, Appl. 4,843,424, 27 Jun. 1990; C.A., 120 (1994) 238084b.

See also 2237, 2248, 2260, 2286.

34. FOOD ANALYSIS

- 34b. Complex mixtures (single compounds by cross-reference only)
- 2486 Hetmanski, J. and Dolegowska, W.: (The application of capillary gas chromatography to beer quality evaluation.) Przem. Ferment. Owocowo-Warzywny, 37, No. 8 (1993) 3-5; C.A., 120 (1994) 52983p.
- 2487 Leino, M., Francis, I.L., Kallio, H. and Williams, P.J.: Gas chromatographic headspace analysis of Chardonay and Semillon wines after thermal processing. Z. Lebensm.-Unters. Forsch., 197 (1993) 29-33; C.A., 120 (1994) 53343s.

GAS CHROMATOGRAPHY B425

- See also 2144, 2147, 2157, 2162, 2165, 2176, 2208, 2213, 2220, 2224, 2227, 2230, 2235, 2257, 2266, 2276, 2285, 2347, 2366, 2369, 2379, 2386, 2390, 2399, 2409, 2413, 2414, 2540.
- 34c. Organoleptically important compounds (flavors, odors, volatiles)
- 2488 Frankel, E.N.: Formation of headspace volatiles by thermal decomposition of oxidized fish oils vs. oxidized vegetable oils. J. Am. Oil Chem. Soc., 70 (1993) 767-772.
- 2489 Gonzáles, L.M. and Gonzáles-Lara, R.: A selective separation of alcoholic beverages and distilled wines by gas chromatography. J. Chromatogr. Sci., 32 (1994) 195-198.
- 2490 Karl, V., Dietrich, A. and Mosandl, A.: Gas chromatographyisotope ratio mass spectrometry measurements of some carboxylic esters from different apple varieties. *Phytochem. Anal.*, 5 (1994) 32-37; C.A., 120 (1994) 296876x.
- 2491 Kihara, K., Ohtani, H., Masuda, K. and Sakakibara, J.: (Characterization of the extra-large peak in the GC pattern of soy sauce flavour.) Nippon Shoyu Kenkyusho Zasshi, 20, No. 1 (1994) 7-17; C.A., 120 (1994) 242840n.
- 2492 Marsili, R.T., Miller, N., Kilmer, G.J. and Simmons, R.E.: Identification and quantitation of the primary chemicals responsible for the characteristic malodor of beet sugar by purge-and-trap GC-MS-OD techniques. *J. Chromatogr. Sci.*, 32 (1994) 165-171.
- 2493 Morales, M.T., Aparicio, R. and Rios, J.J.: Dynamic headspace gas chromatographic method for determining volatiles in virgin olive oil. J. Chromatogr. A, 668 (1994) 455-462.
- 2494 Overton, S.V. and Manura, J.J.: Flavor and aroma in commercial bee honey. A purge-and-trap thermal desorption technique for the identification and quantification of volatiles and semivolatiles in honey. Am. Lab. (Shelton), 26, No. 6 (1994) 45-53.
- 2495 Pereira da Silva, M.A.A.: Flavor properties and stability of a corn-based snack: Aroma profiles by gas chromatography (GC), GC-olfactometry, mass spectrometry, and descriptive sensory analysis. Avail. *Univ. Microfilms Int.*, Order No. DA9404196, 1993, 171 pp.; C.A., 120 (1994) 268778y.
- 2496 Sakuma, S. and Kowaka, M.: Flavor characteristics of *cis*-3-nonenal in beer. *J. Am. Soc. Brew. Chem.*, 52 (1994) 37-41; C.A.: 120 (1994) 297143t.
- 2497 Snyder, J.M. and King, J.W.: Analysis of volatile compounds from supercritical extracted soybeans by headspace gas chromatography and thermal desorption of a polymer adsorbent. J. Sci. Food Agric., 64 (1994) 257-263; C.A., 120 (1994) 268450k.
- 2498 Vallejo-Cordoba, B. and Nakai, S.: Keeping-quality assessment of pasteurized milk by multivariate analysis of dynamic headspace gas chromatographic data. 1. Shelf-life prediction by principal components regression. *J. Agric. Food Chem.*, 42 (1994) 989-993.
- 2499 Vallejo-Cordoba, B. and Nakai, S.: Keeping-quality assessment of pasteurized milk by multivariate analysis of dynamic headspace gas chromatographic data. 2. Flavor classification by linear discriminant analysis. J. Agric. Food Chem., 42 (1994) 994-999.

2500 Vodovotz, Y., Arteaga, G.E. and Nakai, S.: Principal component similarity analysis for classification and its application to GC data of mango. Food Res. Int., 26 (1993) 355-363; C.A., 120 (1994) 268406a.

See also 2092, 2292, 2298, 2344.

35. ENVIRONMENTAL ANALYSIS

35a. General papers and reviews

2501 Sun, S.: (Quality control for determination of volatile organic pollutants by GC-MS.) Huanjing Kexue, 14, No. 4 (1993) 81-86; C.A., 120 (1993) 289161g.

See also 2361.

- 35b. Air pollution (complex mixtures; single compounds by cross-reference only)
- 2502 Cao, X.-L. and Hewitt, C.N.: Study of the degradation by ozone of adsorbents and of hydrocarbons adsorbed during the passive sampling of air. *Environ. Sci. Technol.*, 28 (1994) 757-762.
- 2503 Chan, C.C., Lin, S.H. and Her, G.R.: (Determination of volatile organic compounds in ambient air using a sampling and analytical method of Tenax resin adsorption, thermal desorption procedure, and gas chromatograph/mass spectrometer.) *Huaxue*, 51 (1993) 273-286; C.A., 120 (1994) 278597c.
- 2504 Henry, R.C., Lewis, C.W. and Collins, J.F.: Vehicle-related hydrocarbon source compositions from ambient data: the GRACE/SAFER method. *Environ. Sci. Technol.*, 28 (1994) 823-832.
- 2505 Sergeev, S.K.: (Sorption concentration in gas-chromatographic sanitary-ecological air quality monitoring.) Zavod. Lab., 59, No. 11 (1993) 1-3.
- 2506 Smith, D.F., Kleindienst, T.E., Hudgens, E.E. and Bufalini, J.J.: Measurement of organic atmospheric transformation products by gas chromatography. *Int. J. Environ. Anal. Chem.*, 54 (1994) 265-281.
- 2507 Sun, S. and Liu, X.: (Quality control for analyzing for prior pollutants by GC-MS. I. Semivolatile compounds.) Huanjing Kexue Xuebao, 13 (1993) 59-72; C.A., 120 (1994) 314914q.
- See also 2008, 2118, 2127, 2137, 2138, 2141, 2150, 2158, 2177, 2214, 2218, 2253, 2293, 2548.
- Water pollution (complex mixtures; single compounds by crossreference only)
- 2508 Korenman, Ya.A. and Fokin, V.N.: (Gas chromatographic determination of petroleum products and volatile phenols in raw and treated wastewaters.) Khim. Tekhnol. Vody, 15 (1993) 530-533; C.A., 120 (1994) 199983x.
- 2509 Malysheva, A.G., Sotnikov, E.E. and Rastyannikov, E.G.: (High performance gas chromatographic analysis of water.) Gig. Sanit., No. 10 (1993) 69-70; C.A., 120 (1994) 279651c.

- 2510 Müller, S., Efer, J. and Engewald, W.: Gas chromatographic water analysis by direct injection of large sample volume in an adsorbent-packed PTV injector. *Chromatographia*, 38 (1994) 694-700.
- 2511 Schroeder, H.F.: (Polar, non-biodegradable, organic compounds in wastewater. Detection, identification, and determination.) Vom Wasser, 81 (1993) 299-314; C.A., 120 (1994) 226283c.
- 2512 Xu, H. and Yakushi, S.: (Analysis of volatile organic compounds in water using the ion trap mass spectrometer.) Kankyo Kagaku, 3 (1993) 835-841; C.A., 120 (1994) 252837f.
- See also 2095, 2131, 2136, 2138, 2142, 2151, 2160, 2177, 2187, 2191, 2244, 2384, 2394, 2396, 2397, 2402, 2403.
- 35d. Soil pollution (complex mixtures; single compounds by cross-reference only)
- 2513 Gadel, F., Charriere, B. and Serve, L.: Chemical characterization of suspended particulate organic matter by pyrolysis-gas chromatography coupled with mass spectrometry and high performance liquid chromatography in the bottom nepheloid layer of the Rhone delta. Estuarine, Coastal Shelf Sci., 37 (1993) 221-236; C.A., 120 (1994) 199688e.
- 2514 Lee, S.-S., Park, G.-B. and Lee, S.-G.: (Simultaneous analysis of semi-volatile organic acid priority pollutants in soil.) *J. Korean Chem. Soc.*, 38 (1994) 246-253; C.A., 120 (1994) 279134m.
- See also 2131, 2133, 2135, 2139, 2143, 2145, 2163, 2207, 2240, 2360, 2384, 2388, 2402, 2404, 2406.
- 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36b. Antioxidants and preservatives
- 2515 Castle, L., Jickells, S.M., Nichol, J., Johns, S.M. and Gramshaw, J.W.: Determination of high- and low-molecular-mass plasticisers in stretch-type packaging films. J. Chromatogr. A, 675 (1994) 261-266.
- 2516 Horn, W. and Harutzky, R.: A rapid pyrolytical method for the determination of wood preservation in treated wood. Fresenius J. Anal. Chem., 348 (1994) 832-835.
- 2517 Page, S.H.: Evaluation of modifiers in supercritical fluid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9238606, 1992, 408 pp.; C.A., 120 (1993) 289141a.
- See also 2078, 2313.
- 36c. Complex mixtures, technical products and unidentified com-
- 2518 Beroual, A.: Spectral analysis of light emitted by streamers and gas chromatography in liquid dielectrics. *Jpn. J. Appl. Phys.*, *Part 1*, 32 (1993) 5615-5620; C.A., 120 (1994) 203221s.
- 2519 Blomberg, J., Schoenmakers, P.J. and van den Hoed, N.: Automated sample cleanup using on-line coupling of size exclusion chromatography to high resolution gas chromatography. J. High Resolut. Chromatogr., 17 (1994) 411-414.

- 2520 Eversed, R.: Archaeology and analysis: GC/MS studies of pottery fragments shed new light on the past. Spectrosc. Eur., 5, No. 4 (1993) 21-26; C.A., 119 (1993) 270022v.
- 2521 Frega, N., Bocci, F. and Lercker, G.: High resolution gas chromatographic method for determination of *Robusta* coffee in commercial blends. *J. High Resolut. Chromatogr.*, 17 (1994) 303-307.
- 2522 Goñi, M.A. and Eglinton, T.I.: Analysis of kerogens and kerogen precursors by flash pyrolysis in combination with isotope-ratio-monitoring gas chromatography-mass spectrometry (irm-GC-MS). J. High Resolut. Chromatogr., 17 (1994) 476-488.
- 2523 Havenga, W.J. and Rohwer, E.G.: Rapid screening of rolling mill oils using high-temperature capillary gas chromatography. J. Chromatogr. A, 669 (1994) 139-150.
- 2524 Ishiguro, H. and Asanuma, Y.: (Method and apparatus for online determination of reaction products in gas-phase catalytic oxidation of o-xylene in manufacture of phtalic anhydride.) Jpn. Kokai Tokkyo Koho JP 05,256,831 [93,256,831] (Cl. G01N30/02), 8 Oct. 1993, Appl. 92/87,685, 11 Mar. 1992; 9 pp.; C.A., 120 (1994) 260284p.
- 2525 Ishiguro, H. and Asanuma, Y.: (Method and apparatus for online determination of the gaseous reaction products from gasphase catalytic oxidation of naphtalene to manufacture naphtoquinone and phtalic anhydride.) *Jpn. Kokai Tokkyo Koho* JP 05,256,832 [93,256,832] (Cl. G01N30/02), 8 Oct. 1993, Appl. 92/87,686, 11 Mar. 1992; 11 pp.; C.A., 120 (1994) 260283n.
- 2526 Ishiguro, H. and Asanuma, Y.: (Method and apparatus for online determination of the gaseous reaction products from maleic anhydride preparation in gas-phase oxidation of benzene.) *Jpn. Kokai Tokkyo Koho* JP 05,256,833 [93,256,833] (Cl. G01N30/02), 8 Oct. 1993, Appl. 92/87,687, 11 Mar. 1992; 9 pp.; C.A., 120 (1994) 260282m.
- 2527 Kuroda, K. and Kokki, S.: Analysis of lignin by pyrolysis–gas chromatography. II. Effect of borosilicate glass fibers on pyrolysis product composition. *Mokuzai Gakkaishi*, 39 (1993) 584-589; C.A., 120 (1994) 56942x.
- 2528 Kuwahara, M., Kato, T. and Onodera, S.: (Formation of polycyclic aromatic compounds by pyrolysis of cellulose. (2). The effect of oxygen on the thermal reactions.) Kankyo Kagaku, 3 (1993) 432-433; C.A., 120 (1994) 220613p.
- 2529 Qin, R.Y. and Donnet, J.B.: Influence of thermal and surface treatments on surface properties of pitch-based carbon fibers studied by inverse gas chromatography. *Carbon*, 32 (1994) 165-174; C.A., 120 (1994) 224945w.
- 2530 Speers, S.J., Doolan, K., McQuillan, J. and Wallace, J.S.: Evaluation of improved methods for the recovery and detection of organic and inorganic cartridge discharge residues. *J. Chromatogr. A*, 674 (1994) 319-327.
- 2531 Stout, S.A.: Lasers in organic petrology and organic geochemistry. II. In-situ laser micropyrolysis–GC/MS of coal macerals. Int. J. Coal Geol., 24 (1993) 309-331; C.A., 120 (1994) 248954z.
- 2532 Terron, M.C., Fidalgo, M.L., Gonzales, A.E., Almendros, G. and Galletti, G.C.: Pyrolysis–gas chromatography/mass spectrometry of wheat straw fractions obtained by alkaline treatments used in pulping processes. J. Anal. Appl. Pyrolysis, 27 (1993) 57-71; C.A., 120 (1994) 56955d.

B427

- 2533 Toth-Allen, J., Torzilli, A.P. and Isbister, J.D.: Analysis of low-molecular mass products from biosolubilized coal. FEMS Microbiol. Lett., 116 (1993) 283-286; C.A., 120 (1994) 222142h.
- 2534 Trisciani, A. and Munari, F.: Characterization of fuel samples by on-line LC-GC with automatic group-type separation of hydrocarbons. J. High Resolut. Chromatogr., 17 (1994) 452-456.
- 2535 Vas, G., Vekey, K., Czira, G., Tamas, J., Favretto, D., Traldi, P., Bertazzo, A., Costa, C. and Allegri, G.: Characterization of melanins by pyrolysis/gas chromatography/mass spectrometry. Rapid Commun. Mass Spectrom., 7 (1993) 870-873; C.A., 120 (1994) 49495a.
- 2536 Vogl, O. and Bartus, J.: Oriental lacquers. 1. The urushiol components. *Polym. Prepr.*, 34 (1993) 582-583; C.A., 120 (1994) 273137t.
- 2537 Yancey, J.A., Kosman, J.J., Grills, J.J., III, Cavalier, R.C. and Irion, J.W.: Importance of quality control in a gas chromatographic method to characterize crude oils. J. High Resolut. Chromatogr., 17 (1994) 463-468.
- See also 1995, 2023, 2129, 2130, 2148, 2167, 2169, 2172, 2173, 2174, 2181, 2183, 2189, 2234, 2239, 2245, 2269, 2310, 2318, 2339, 2349, 2353, 2354, 2358, 2416, 2515.
- 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUC-
- 2538 Emokhonov, V.N., Groznov, I.N., Monastirskii, O.A. and Pergomorov, A.Yu.: Detection of grain infection with specific toxicogenous fungal species. Gas chromatography-mass spectrometric analysis of volatile metabolites. In: Mass Spectrometry for the Characterization of Microorganisms. ACS Symp. Ser., Vol. 541, ACS, Washington, 1994, pp. 85-90; C.A., 120 (1994) 53060x.

See also 2256.

38. INORGANIC COMPOUNDS

38b. Anions

- 2539 Chen, S.-H., Wu, S.-M., Kou, H.-S. and Wu, H.-S.: Electron-capture gas chromatographic determination of cyanide, iodide, nitrite, sulfide, and thiocyanate anions by phase-transfer-catalyzed derivatization with pentafluorobenzyl bromide. J. Anal. Toxicol., 18 (1994) 81-85; C.A., 120 (1994) 237675h.
- 2540 Fu, Z., Nie, X. and Zhu, Y.: (Headspace gas chromatographic determination of cyanides in Baijiu.) Zhonghua Yufang Yixue Zazhi, 27 (1993) 173-175; C.A., 120 (1994) 52975n.
- 2541 Sarafraz-Yazdi, A. and Stephen, W.I.: Comparative gas chromatography of halides using different substituted phenylboronic acids as derivatizing reagents. *Iran. J. Chem. Chem. Eng.*, 11, No. 2 (1992) 29-34; C.A., 120 (1994) 68131v.

- 2542 Sarafraz-Yazdi, A. and Stephen, W.I.: Gas chromatographic determination of chloride using 2,4-dichlorophenylboronic acid as a derivatizing reagent. *J. Chem. Soc. Pak.*, 15 (1993) 168-172; C.A., 120 (1994) 68294a.
- 2543 Yiin, S.L., Chen, S.H., Kou, H.S. and Wu, H.L.: Determination of thiocyanate anion as an organic derivative by gas chromatography. *Gaoxiong Yixue Kexue Zazhi*, 9 (1993) 494-500; C.A., 120 (1994) 239335w.
- 38c. Permanent and rare gases
- 2544 Hirata, T., Nishiyama, T., Ishikawa, Y., Shiina, T. and Ishitani, T.: A fast gas chromatographic method for the separation of nitrogen, oxygen, carbon dioxide and argon and its application to in-package modified atmosphere. Nippon Hoso Gakkaishi, 2 (1993) 15-24; C.A., 120 (1993) 288841s.
- 2545 Lu, H. and Chen, K.: (Determination of hydrogen content in films by gas chromatographic method.) Bandaoti Xuebao, 14 (1993) 189-193; C.A., 120 (1993) 288930v.
- 2546 Song, Z.: (Determination of oxygen in aluminium-molybdenum alloys by pulse heating gas chromatography.) Fenxi Shiyanshi, 12, No. 6 (1993) 80-82; C.A., 120 (1994) 260031d.
- 2547 Zhao, T., Sa, X., Wang, X. and Lu, W.: (Simultaneous determination of H₂ and hydrocarbons by a pulse microreactor-gas chromatography system.) Sepu., 12 (1994) 192-193.

See also 2021, 2087, 2116.

38d. Volatile inorganic compounds

- 2548 Bandy, A.R., Thornton, D.C. and Driedger, A.R., Ill: Airborne measurements of sulfur dioxide, dimethyl sulfide, carbon disulfide, and carbonyl sulfide by isotope dilution gas chromatography/mass spectrometry. J. Geophys. Res. [Atmos.], 98 (1993) 23423-23433; C.A., 120 (1994) 199041p.
- 2549 Ikebuchi, J., Yamamoto, Y., Nishi, K., Okada, K. and Irizawa, Y.: (Toxicological findings in a death involving hydrogen sulfide.) Nippon Hoigaku Zasshi, 47 (1993) 406-409; C.A., 120 (1994) 237701p.
- 2550 Ren, R.: (Determination of hydrocyanic acid in blood by gas chromatography.) Sepu, 12 (1994) 153-154.
- 2551 Tuan, H.P., Janssen, H.-G., Cramers, C.A., Smit, A.L.C. and van Loo, E.M.: Determination of sulfur components in natural gas: a review. *J. High Resolut. Chromatogr.*, 17 (1994) 373-389 - a review with 87 refs.
- 2552 Yao, R., Yu, Z., Xu, X., Shao, K., Li, Z. and Tang, X.: (GC-ECD measurement of atmospheric N₂O.) Huanjing Huaxue, 13 (1994) 22-29; C.A., 120 (1994) 278588a.

See also 2116, 2373, 2544.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

See 2088, 2229, 2242, 2243, 2334.

Planar Chromatography

REVIEWS AND BOOKS

- 613 Sherma, J.: Modern high performance thin-layer chromatography. J. Assoc. Off. Anal. Chem., 77 (1994) 297-306 a review on HPTLC.
- 614 Sherma, J.: Planar chromatography. *Anal. Chem.*, 66 (1994) 67R-83R a review with 497 refs.
- 615 Taki, T.: (Development and applications of TLC-blotting). Fragrance J., 22 (1994) 85-90; C.A., 121 (1994) 30093s.

See also 632, 660, 707.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 616 Biagi, G.L., Barbaro, A.M., Sapone, A. and Recanatini, M.: Determination of lipophilicity by means of reversed-phase thin-layer chromatography. II. Influence of the organic modifier on the slope of the thin-layer chromatographic equation. J. Chromatogr. A, 669 (1994) 246-253.
- 617 Kowalska, T. and Klama, B.: On the mechanism of retention in adsorption TLC with isopropanol - n aliphatic hydrocarbon eluents. J. Planar Chromatogr., 7 (1994) 63-69.
- 2c. Relationship between structure and chromatographic behaviour
- 618 Pyka, A.: The application of topological indexes (I_t) for prediction of the R_M values of isomeric alcohols. Part V. J. Planar Chromatogr., 7 (1994) 41-49.

See also 624, 719, 723.

2d. Measurement of physico-chemical and related values

See 710.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 619 Berezkin, V.G. and Guglya, E.B.: (Chromatographic device from thin sorbent layer). U.S.S.R. SU 1,800,361 (Cl. G01N/90), 07 Mar. 1993, Appl. 4,881, 615, 15 Nov. 1990; C.A., 120 (1994) 314935x.
- 620 Ni, Z., Zhou, Z., Wang, Y. et al.: Method and equipment for making thin-layer chromatography developing container. Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1,070,735 (Cl. G01N30/94), 07 Apr. 1993, Appl. 92,108,546, 03 Sep. 1992, 10 pp.; C.A., 120 (1994) 289018r.

- 3b. Detectors and detection reagents
- 621 Konopski, L. and Pawlowska, E.: 2-Trichloromethylbenzimidazole as a selective chromogenic reagent for the detection of some azoles on thin-layer plates. J. Chromatogr. A, 669 (1994) 275-276.
- 622 Patil, V.B. and Shingare, M.S.: Thin-layer chromatographic spray reagent for the screening of biological materials for the presence of carbaryl. *Analyst (Cambridge)*, 119 (1994) 415-416; C.A., 121 (1994) 51643m.

See also 647, 705, 706, 731, 735.

- 3c. Sorbents and columns, packing procedures
- 623 Cserháti, T.: Relationship between the physicochemical parameters of 3,5-dinitrobenzoic acid esters and their retention behaviour on β-cyclodextrin polymer support. *Anal. Chim. Acta*, 292 (1994) 17-22.
- 624 Forgács, E.: Comparison of various multivariate mathematicalstatistical methods for the evaluation of the retention behavior of β-cyclodextrin polymer coated silica column. *Anal. Lett.*, 27 (1994) 1075-1093.
- 625 Katoh, H., Nakamura, H. and Okutani, T.: (Titania thin-layer chromatography). *Kuromatogurafi*, 14, No. 5 (1993) 36-37; C.A., 120 (1994) 332133p.
- 626 Lohmann, D. and Dappen, R.: Use of chiral β-lactones for the synthesis of chiral LC phases. Chirality, 5 (1993) 168-172; C.A., 120 (1994) 289184r.
- 627 Nabi, S.A., Farooqui, W.U. and Rahman, N.: Stannic sulfosalicy-late: a new adsorbent for quantitative TLC separation of uranium from other important metal ions using mixed dimethylformamide systems. J. Planar Chromatogr., 7 (1994) 38-40.
- 628 Phillips, C.P. and Snow, R.A.: Lyophilized formulations of polyethylene oxide-modified proteins with increased shelf-life. U.S. US 5,298,410 (Cl. 435-188; C12N9/96), 29 Mar. 1994, Appl. 23,182, 25 Feb. 1993; 11 p.; C.A., 120 (1994) 331092n.
- 3d. Quantitative analysis

See 754.

3e. Preparative scale chromatography

See 664.

3g. High performance procedures

629 Fernando, W.P.N.: Optimization of Kinetic Parameters for Commercial Silica Gel Layers by Overpressure Layer Chromatography: A Planar HPLC Technique. Wayne State Univ., Detroit, MI USA, 1992, 161 p.; C.A., 120 (1994) 337869t.

See also 630.

- SPECIAL TECHNIQUES
- 4b. Computerization and modelling

See 617, 723.

- Combination with other physico-chemical techniques (MS, IR etc.)
- 630 Bouffard, S.P., Katon, A.J., Sommer, A.J. and Danielson, N.D.: Development of microchannel thin-layer chromatography with infrared microspectroscopic detection. *Anal. Chem.*, 66 (1994) 1937-1940.

See also 644, 667, 674, 736, 744, 745, 781.

- 4d. Affinity chromatography (advances)
- See 789
- 4q. Enantiomers, separation
- See 702, 724.
- 4h. Other special techniques
- See 615, 651.
- 5. HYDROCARBONS AND HALOGEN DERIVATIVES
- 5c. Halogen derivatives
- See 778.
- Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)
- 631 Lin, Y.: (Determination of olefin contents in cracked heavy oils by rapid TLC/FID method). Shiyou Lianzhi, 24, No. 10 (1993) 56-59; C.A., 120 (1994) 302904y.
- 632 Lundanes, E. and Greibrokk, T.: Separation of fuels, heavy fractions, and crude oils into compound classes: a review. *J. High Resolut. Chromatogr.*, 17 (1994) 197-202 a review with 109 refs.
- ALCOHOLS
- 633 Vioque, J., Pastor, J. and Vioque, E.: Leaf wax alcohols in Coincya (Brassicaceae). J. Am. Oil Chem. Soc., 71 (1994) 671-673.

See also 618.

- PHENOLS
- 634 Shaftan, L.M., Rybalka, V.B., Serbinovich, V.V. and Miridonova, L.V.: (Volatile phenols determination method). U.S.S.R. SU 1,806,373 (Cl. G01N31/00), 30 Mar. 1993, Appl. 4,951,614, 28 Jun. 1991; C.A., 120 (1994) 314963e.
- 8 SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN
- 8a. Flavonoids
- 635 Bartolomé, E.R.: Crystallization and thin layer chromatographic separation of flavonones from traces of other types of flavonoid compound. J. Planar Chromatogr., 7 (1994) 70-72.
- 636 Hiermann, A. and Bucar, F.: Diphenyltin dichloride as a chromogenic reagent for the detection of flavonoids on thin-layer plates. J. Chromatogr. A, 675 (1994) 276-281.

See also 769.

- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 637 Matysik, G., Glowniak, K., Soczewinski, E. and Garbacka, M.: Chromatography of esculin from stems and bark of Aesculus hippocastanum L. for consecutive vegetative period. Chromatographia, 38 (1994) 766-770.

See also 721, 774.

- 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- See 747, 755, 768.
- CARBOHYDRATES
- 10a. Mono and oligosaccharides. Structural studies
- 638 Chiu, M.H., Tamura, T., Wadhwa, M.S. and Rice, K.G.: In vivo targeting function of N-linked oligosaccharides with terminating galactose and N-acetylgalactosamine residues. J. Biol. Chem., 269 (1994) 16195-16202.
- 639 Ivanova, V., Rouseva, R., Kolarova, M., Serkedjieva, J., Rachev, R. and Manolova, M.: Isolation of a polysaccharide with antiviral effect from *Ulva lactuca*. *Prepar. Biochem.*, 24 (1994) 83-97.
- 640 Lodi, G., Betti, A., Brandolini, V., Menziani, E. and Tosi, B.: Automated multiple development HPTLC analysis of sugars on hydrophilic layers: I. Amino layers. J. Planar Chromatogr., 7 (1994) 29-33.
- 641 Peelen, G.O.H., de Jong, J.G.N. and Wevers, R.A.: HPLC analysis of oligosaccharides in urine from oligosaccharidosis patients. *Clin. Chem. (Washington),* 40 (1994) 914-921.

See also 687.

- 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides
- 642 Huang, M., Huang, B., Cai, T., Liu, Q., Li, D. and Chen, A.: (Extraction, separation, and analyses of polysaccharides from noble dendrobium (*Dendrobium nobile*)). *Zhongcaoyao*, 25 (1994) 128-129; C.A., 120 (1994) 331230f.
- 643 Robyt, J.F. and Mukerjea, R.: Separation and quantitative determination of nanogram quantities of maltodextrins and isomal-todextrins by thin-layer chromatography. Carbohydr. Res., 251 (1994) 187-202; C.A., 120 (1994) 314916s.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 644 De Koster, C.G., Vos, B., Versluis, C., Heerma, W. and Haverkamp, J.: High-performance thin-layer chromatography/fast atom bombardment (tandem) mass spectrometry of *Pseudomonas rhamnolipids. Biol. Mass Spectrom.*, 23 (1994) 179-185; C.A., 120 (1994) 293508t.
- 645 Iskric, S., Hadzija, O. and Kveder, S.: Behaviour of humic acid on Fe(III)-impregnated silica gel compared with model substances. J. Liq. Chromatogr., 17 (1994) 1653-1657.
- 646 Kaneshiro, T., Vesonder, R.F., Peterson, R.E., Weisleder, D. and Bagby, M.O.: 9(Z)-Octadecenamide and fatty amides by Bacillus megaterium (B-3437) conversion of oleic acid. J. Am. Oil Chem. Soc., 71 (1994) 491-494.
- 647 Martinez-Lorenzo, M.J., Marzo, I., Naval, J. and Pineiro, A.: Self-staining of polyunsaturated fatty acids in argentation thinlayer chromatography. *Anal. Biochem.*, 220 (1994) 210-212.
- 648 Ríos, J.J., Pérez-Camino, M.C., Márquez-Ruiz, G. and Dobarganes, M.C.: Isolation and characterization of sucrose polyesters. J. Am. Oil Chem. Soc., 71 (1994) 385-390.
- 649 Sebedio, J.L., Bonput, A., Prevost, J. and Grandgirard, A.: Lipid composition of some commercial frozen prefried french fires. Fat Sci. Technol., 96 (1994) 235-239.
- 650 Xu, Y., Chen, J. and Guo, R.: (Phospholipids and fatty acids in traditional Chinese medicinal materials Hippocampus and Syngnathus). *Zhongguo Haiyang Yaowu*, 13, No. 1 (1994) 14-18; C.A., 120 (1994) 330943d.
- 651 Zhou, Z. and Dong, Z.: (Determination of oleanolic acid in its β-cyclodextrin inclusion-complex by TLC-scanning). Zhongguo Yiyuan Yaoxue Zazhi, 14, No. 1 (1994) 29-30; C.A., 120 (1994) 331265w.

See also 623, 655, 777.

11b. Prostaglandins

652 Lecomte, M., Laneuville, O., Ji, C., DeWitt, D.L. and Smith, W.L.: Acetylation of human prostaglandin endoperoxide synthase-2 (cyclooxygenase-2) by aspirin. *J. Biol. Chem.*, 269 (1994) 13207-13215.

See also 616.

11c. Lipids and their constituents

- 653 Bernhard, W., Linck, M., Creutzburg, H., Postler, A.D., Arning, A., Martin-Carrera, I. and Sewing, K.-F.: High-performance liquid chromatographic analysis of phospholipids from different sources with combined fluorescence and ultraviolet detection. Anal. Biochem., 220 (1994) 172-180.
- 654 Bogdanov, A.A., Jr., Martin, C., Weissleder, R. and Brady, T.J.: Trapping of dextran-coated colloids in liposomes by transient binding to aminophospholipid: preparation of ferrosomes. *Bio-chim. Biophys. Acta*, 1193 (1994) 212-218.
- 655 Brühl, L., Schulte, E. and Thier, H.-P.: Zusammensetzung und Aufbau der Triglyceride von Muttermilch und einiger Rohstoffe für Säuglingsnahrung. Fat Sci. Technol., 96 (1994) 147-154.
- 656 Cedergren, R.A. and Hollingsworth, R.L.: Occurence of sulfoquinnovosyl diacylglycerol in some members of the family *Rhi*zobiaceae. J. Lipid Res., 35 (1994) 1452-1461.
- 657 Cho, Y. and Ziboh, V.A.: Expression of protein kinase C isozymes in guinea pig epidermis: selective inhibition of PKC-β activity by 13-hydroxyoctadecadienoic acid-containing diacylglycerol. J. Lipid Res., 35 (1994) 913-921.
- 658 Felouati, B.-E., Pageaux, J.-F., Fayard, J.-M., Lagarde, M. and Laugier, C.: Oestradiol-induced changes in the composition of phospholipid classes of quail oviduct: specific replacement of arachidonic acid by docosahexaenoic acid in alkenylacyl-glycerophosphoethanolamine. *Biochem. J.*, 301 (1994) 361-366.
- 659 Gaspar, M.L., Pollero, R.J. and Cabello, M.N.: Triacylglycerol consumption during spore germination of vesicular - arbuscular mycorrhizal fungi. J. Am. Oil Chem. Soc., 71 (1994) 449-452.
- 660 Grünler, J., Ericsson, J. and Dallner, G.: Branch-point reactions in the biosynthesis of cholesterol, dolichol, ubiquinone and prenylated proteins. *Biochim. Biophys. Acta*, 1212 (1994) 259-277 - a review with 174 refs.
- 661 Guo, R., Xu, Y. and Zhang, A.: (Phospholipid determination in Ziheche (human placenta) by ³¹P nuclear magnetic resonance and thin-layer chromatography scanning combined with absorbance proportional coefficient correction). Fenxi Shiyanshi, 12, No. 3 (1993) 25-30; C.A., 120 (1994) 253471u.
- 662 Guther, M.L.S., Masterson, W.J. and Ferguson, M.A.J.: The effects of phenylmethylsulfonyl fluoride on inositol-acylation and fatty acid remodeling in african trypanosomes. *J. Biol. Chem.*, 269 (1994) 18694-18701.
- 663 Helmy, F.M. and Hack, M.: Some TLC observations on the in vitro formation of N-acyl phosphatidyl ethanolamine by endogenous components of bovine and porcine retina. J. Planar Chromatogr., 7 (1994) 14-17.
- 664 Hoffman, L.M., Brooks, S.E., Stein, M.R. and Schneck, L.: Cyclic AMP causes differentiation and decreases the expression of neutral glycosphingolipids in cell cultures derived from a malignant glioma. *Biochim. Biophys. Acta*, 1222 (1994) 37-44.
- 665 Jennemann, R., Gnewuch, C., Bosslet, S., Bauer, B.L. and Wiegandt, H.: Specific immunization using keyhole limpet hemocyanin-ganglioside conjugates. *J. Biochem. (Tokyo)*, 115 (1994) 1047-1052.
- 666 Kastrau, D.H.W., Heiss, B., Kroneck, P.M.H. and Zumft, W.G.: Nitric oxide reductase from *Pseudomonas stutzeri*, a novel cytochrome bc complex. Phospholipid requirement, electron paramagnetic resonance and redox properties. *Eur. J. Biochem.*, 222 (1994) 293-303.

PLANAR CHROMATOGRAPHY B431

- 667 Kim, J.H., Chang, S.Y. and Kim, Y.K.: (Structural determination of cerebrosides from soybean embryo by mass spectrometer).
 Anal. Sci. Technol., 6 (1993) 335-343; C.A., 120 (1994) 293466c.
- 668 Leming, L., Jun, Z., Shenggi, H., Changcun, H. and Jiexin, T.: Identification of fetal lung maturity by one-dimensional thin layer chromatographic determination of several phospholipids in amniotic fluid. *J. Planar Chromatogr.*, 7 (1994) 25-28.
- 669 Marai, L., Kuksis, A. and Myher, J.J.: Reversed-phase liquid chromatography-mass spectrometry of the uncommon triacylglycerol structures generated by randomization of butteroil. *J. Chromatogr. A*, 672 (1994) 87-99.
- 670 McKinnon, M. and Parker, P.J.: Phospholipase-D activation can be negatively regulated through the action of protein kinase C. Biochim. Biophys. Acta, 1222 (1994) 109-112.
- 671 Müthing, J.: Improved thin-layer chromatographic separation of gangliosides by automated multiple development. *J. Chromatogr. B*, 657 (1994) 75-81.
- 672 Müthing, J. and Unland, F.: Improved separation of isomeric gangliosides by anion-exchange high-performance liquid chromatography. J. Chromatogr. B, 658 (1994) 39-45.
- 673 Müthing, J., Steuer, H., Peter-Katalinic, J., Marx, U., Bethke, U., Neumann, U. and Lehmann, J.: Expression of gangliosides G_{M3}(NeuAc) and G_{M3}(NeuGc) in myelomas and hybridomas of mouse, rat, and human origin. *J. Biochem. (Tokyo)*, 116 (1994) 64-73.
- 674 Nikolova-Damyanova, B. and Amidzhin, B.: Comparative analysis of cocoa butter and cocoa butter substitutes. *Bulg. Chem. Commun.*, 25 (1992) 361-366; C.A., 121 (1994) 56055f.
- 675 Ota, T., Kawabata, Y. and Ando, Y.: Positional distribution of 24:6(n-3) in triacyl-sn-glycerols from flathead flounder liver and flesh. *J. Am. Oil Chem. Soc.*, 71 (1994) 475-478.
- 676 Perillo, M.A., Yu, R.K. and Maggio, B.: Modulation of the activity of Clostridium perfuingens neuraminidase by the molecular organization of gangliosides in monolayers. *Biochim. Biophys. Acta*, 1193 (1994) 155-164.
- 677 Santi, P., Mancini, P. and Barnes, C.: Identification and localization of the GM1 ganglioside in the cochlea using thin-layer chromatography and cholera toxin. *J. Histochem. Cytochem.*, 42 (1994) 705-716; C.A., 121 (1994) 30153m.
- 678 Schnaar, R.L. and Needham, L.K.: Thin-layer chromatography of glycosphingolipids. *Methods Enzymol.*, 230 (1994) 371-389; C.A., 121 (1994) 53276t.
- 679 Seyfried, T.N., Novikov, A.M., Irvine, R.A. and Brigande, J.V.: Ganglioside biosynthesis in mouse embryos: sialyltransferase IV and the asialo pathway. J. Lipid Res., 35 (1994) 993-1001.
- 680 Shin, H.-S. and Kim, S.-W.: Lipid composition of perilla seeds. J. Am. Oil Chem. Soc., 71 (1994) 619-622.
- 681 Stoll, U.: Methoden zur Phosphatidanalytik am Beispiel der Lipide aus Seren und Eigelb. Fat Sci. Technol., 96 (1994) 188-194
- 682 Stoll, U.: Zur Charakterisierung von Speisefetten durch Subfraktionierung nach Polarität. Fat Sci. Technol., 96 (1994) 199-203
- 683 Stults, C.L.M., Sullivan, M.T., Macher, B.A., Johnston, R.F. and Stack, R.J.: Analysis of glycosphingolipid glycosyltransferase products on TLC plates by combined storage phosphor and immunostaining technique. *Anal. Biochem.*, 219 (1994) 61-70.

- 684 Sugiura, T., Tokumura, A., Gregory, L., Nouchi, T., Weintraub, S.T. and Hanahan, D.J.: Biochemical characterization of the interactions of lipid phosphoric acids with human platelets: comparison with platelet activating factor. *Arch. Biochem. Biophys.*, 311 (1994) 358-368.
- 685 Vilcheze, C. and Bittman, R.: An efficient asymmetric synthesis of diacylglycerols. J. Lipid Res., 35 (1994) 734-738.
- 686 Xu, Y.-F. O, K. and Choy, P.C.: Plasmenylcholine (1-O-alk-1'-enyl-2-acyl-sn-glycero-3-phosphocholine) biosynthesis in guinea-pig heart and liver. Cholinephosphotransferase is a bifunctional enzyme for the synthesis of phosphatidylcholine and plasmenylcholine. *Biochem. J.*, 301 (1994) 131-137.

See also 615, 644, 650, 691, 726.

STEROIDS

13a. General techniques

687 Klaus, R., Fischer, W. and Hauck, H.E.: Analysis and chromatographic separation of some steroid hormones on NH₂ layers. Chromatographia, 39 (1994) 97-102.

See also 616.

13b. Pregnane and androstane derivatives

See 763.

13d. Sterols

- 688 Gerst, N., Pinkerton, F.D., Kisic, A., Wilson, W.K., Swaminathan, S. and Schroepfer, G.J., Jr.: Inhibitors of sterol synthesis. Effects of a new fluorinated analog of 3β-hydroxy-5α-cholest-8(14)-en-15-one in rats. J. Lipid Res., 35 (1994) 1040-1056.
- 689 Izumi, A., Pinkerton, F.D., Nelson, S.O., Pyrek, J.S., Neill, P.J.G., Smith, J.H. and Schroepfer, G.J., Jr.: Inhibitors of sterol synthesis. Submicromolar 14α-ethyl-5α-cholest-7-ene-3β,15α-diol causes a major modification of the sterol composition of CHO-K1 cells and a marked change in cell morphology. J. Lipid Res., 35 (1994) 1251-1266.
- 690 Maor, I. and Aviram, M.: Oxidized low density lipoprotein leds to macrophage accumulation of unesterified cholesterol as a result of lysosomal trapping of the lipoprotein hydrolyzed cholesteryl ester. J. Lipid Res., 35 (1994) 803-819.
- 13e. Bile acids and alcohols
- 691 Field, F.J., Born, E., Chen, H., Murthy, S. and Mathur, S.N.: Regulation of apolipoprotein B secretion by biliary lipids in CaCo-2 cells. J. Lipid Res., 35 (1994) 749-762.
- 692 Une, M., Inoue, A., Kurosawa, T., Tohma, M. and Hoshita, T.: Identification of (24E)-3α,7α-dihydroxy-5β-cholest-24-enoic acid and (24R,25S)-3α,7α,25-trihydroxy-5β-cholestanoic acid as intermediates in the conversion of 3α,7α-dihydroxy-5βcholestanoic acid to chenodeoxycholic acid in rat liver homogenates. J. Lipid Res., 35 (1994) 620-624.

14. STEROID GLYCOSIDES AND SAPONINS

- 693 Vampa, G., Benvenuti, S. and Melegari, M.: Determination of glycyrrhizin in pharmaceutical preparations and in licorice products by high-performance thin-layer chromatographic densitometry. Acta Technol. Legis Med., 2 (1991) 87-93; C.A., 120 (1994) 280386b.
- 694 Zhang, G., Xu, S. and Zhou, M.: (Quantitative determination of sarsasapogenin in "antivirotic oral liquid" by double-wavelength TLC scanner). *Zhongcaoyao*, 25 (1994) 69, 90; C.A., 120 (1994) 331241k.

See also 772.

- 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS
- 15a. Terpenes

See 733.

- 15b. Essential oils
- 695 Mancini, M.A.D. and Hanai, L.W.: (Identification of essential oils or isolated compounds in pharmaceutical preparations. II. Parenteral preparations). Rev. Cienc. Farm. (Sao Paulo), 14 (1992) 169-178; C.A., 120 (1994) 253463t.
- 16. NITRO AND NITROSO COMPOUNDS
- 696 Shinde, V.M., Desai, B.S. and Tendolkar, N.M.: Selective determination of nitrendipine and nimodipine in pharmaceutical dosage by high performance thin layer chromatography. *Indian Drugs*, 31 (1994) 119-121; C.A., 121 (1994) 18179s.

See also 623, 721.

- 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17a. Amines and polyamines
- 697 Novitskaya, L.P., Lutsenko, A.Ya. and Chmil, V.D.: (Thin layer chromatographic method for N,N-dimethylbenzylamine identification in air in sanitary and chemical investigations of polymeric materials). Gig. Sanit., No. 11 (1993) 63-64; C.A., 120 (1994) 278602a.
- 698 Trubinikova, L.L.: (Determination of ethylenediamine and its hydroxyethyl derivatives in a thin layer of a sorbent). Zh. Org. Khim., No. 4 (1993) 737-741; C.A., 121 (1994) 16629q.

See also 624.

- 17b. Catecholamines and their metabolites
- 699 Alemany, G., Nicolau, M.C., Gamundí, A. and Rial, R.: Thin-layer chromatographic determination of brain catecholamines and 5-hydroxytryptamine. *Biomed. Chromatogr.*, 7 (1993) 315-316.

See also 687.

- 17d. Other amine derivatives and amides (excl. peptides)
- 700 Gocan, S., Irimie, F. and Cimpan, G.: Prediction of the lipophilicity of some plant growth-stimulating amido esters of ethanolamine using reversed-phase thin-layer chromatography. J. Chromatogr. A, 675 (1994) 282-285.
- 701 Liu, B., Ding, T., Kang, S. and Liu, S.: (Purification and analysis of acetanilide). Fenxi Shiyanshi, 12, No. 3 (1993) 52-57; C.A., 120 (1994) 289171k.

See also 755, 756.

- 18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PRO-TEINS
- 18a. Amino acids and their derivatives
- 702 Armstrong, D.W. and Zhou, Y.: Use of a macrocyclic antibiotic as the chiral selector for enantiomeric separations by TLC. J. Liq. Chromatogr., 17 (1994) 1695-1707.
- 703 Clift, J., Hall, S.K., Carter, R.A., Denmeade, R. and Green, A.: An improved thin layer chromatography technique for neonatal screening for amino acid disorders using dried blood spots. *Screening*, 4 (1994) 39-43; C.A., 121 (1994) 4238y.
- 704 Degtiar, W.G., Tyaglov, B.V., Degterev, E.V., Krylov, V.M., Malakhova, I.I. and Krasikov, V.D.: Quantitative analysis of L-lysine, L-threonine, L-homoserine and cobalamines in fermentation broths. J. Planar Chromatogr., 7 (1994) 54-57.
- 705 Sinhababu, A., Basak, B. and Laskar, S.: Novel spray reagent for the identification of amino acids on thin-layer chromatography plates. *Anal. Proc.*, 31 (1994) 65-66; C.A., 120 (1994) 293217x.
- 706 Suli-Vargha, H. and Sohar, P.: Reaction with 4-(π-nitrobenzyl)pyridine allows detection of urethane-protected pyroglutamyl residues. *Pept. Res.*, 7 (1994) 24-26; C.A., 120 (1994) 293447x
- 707 Van der Geer, P., Luo, K., Sefton, B.M. and Hunter, T.: Phosphopeptide mapping and phosphoamino acid analysis on cellulose thin-layer plates). *Protein Phosphorylation*, (1993) 31-59; C.A., 120 (1994) 293156b a review with 19 refs.

See also 711.

- 18b. Peptides, peptidic and proteinous hormones, growth factors
- 708 Curmi, P.A., Maucuer, A., Asselin, S., Lecourtois, M., Chaffotte, A., Schmitter, J.-M. and Sobel, A.: Molecular characterization of human stathmin expressed in *Escherichia coli*: site-directed mutagenesis of two phosphorylatable serines (Ser-25 and Ser-63). *Biochem. J.*, 300 (1994) 331-338.

PLANAR CHROMATOGRAPHY B433

See also 706, 707, 711.

18c. Elucidation of structure of proteins and enzymes

709 Amrein, K.E., Panholzer, B., Molnos, J., Flint, N.A., Scheffler, J., Lahm, H.-W., Bannwarth, W. and Burn, P.: Mapping of the p56lck-mediated phosphorylation of GAP and analysis of its influence on p21ras-GTPase activity in vitro. Biochim. Biophys. Acta, 1222 (1994) 441-446.

19. PROTEINS

19b. Proteins of cells, viruses and subcellular particles

See 709.

19g. Protamines, histones and other nuclear proteins

See 700

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

See 683.

20e. Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)

710 Hulea, S.A., Arnstein, H.R.V. and Kumerow, F.A.: Determination of the molecular weigth of extracellular ribonuclease isoenzymes from Aspergillus niger in crude extracts by thin layer gel filtration and polyacrylamide gel electrophoresis. Anal. Lett., 27 (1994) 1703-1711.

20f. Other hydrolases

- 711 Goudreau, N., Guis, C., Soleihac, J.-M. and Roques, B.P.: Dns-Gly-(p-NO₂)Phe-βAla, a specific fluorogenic substrate for neutral endopeptidase 24.11. *Anal. Biochem.*, 219 (1994) 87-95.
- PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITU-ENTS
- 21a. Purines, pyrimidines, nucleosides, nucleotides

See 687.

21c. Nucleic acids, DNA

712 Cajigas, A., Gayer, M., Beam, C. and Steinberg, J.J.: Ozonation of DNA forms adducts: A ³²P-DNA labeling and thin-layer chromatography technique to measure DNA environmental biomarkers. Arch. Environ. Health, 49 (1994) 25-36; C.A., 121 (1994) 52057k.

22. ALKALOIDS

- 713 Balíková, M. and Večerková, J.: High-performance liquid chromatographic confirmation of cocaine and benzoylecgonine in biological samples using photodiode-array detection after toxicological screening. J. Chromatogr. B, 656 (1994) 267-273.
- 714 Chizzola, R.: Rapid sample preparation technique for the determination of pyrrolizidine alkaloids in plant extracts. *J. Chromatogr. A*, 668 (1994) 427-433.
- 715 Duez, P., Milcamp, A., Lompo, M., Guissou, P. and Hanocq, M.: Comparison of HPTLC-fluorodensitometry and HPLC for the assay of strictosamide in the leaves, root and stem bark of *Nauclea latifolia*. *J. Planar Chromatogr.*, 7 (1994) 5-9.
- 716 Parvais, O., Stricht, B.V., Vanhaelen-Fastré, R. and Vanhaelen, M.: TLC detection of pyrrolizidine alkaloids in oil extracted from the seeds of *Borago officinalis*. J. Planar Chromatogr., 7 (1994) 80-82.
- 717 Tombesi, O.L., Maldoni, B.E., Bartolomé, E.R., Haurie, H.M. and Faraoni, M.B.: Purification of alkaloids by thin layer chromatographic decomposition of their picrates. J. Planar Chromatogr., 7 (1994) 77-79.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23a. Porphyrins and other pyrroles

- 718 Asagami, H., Hino, Y., Kang, D., Minakami, S. and Takeshige, K.: Preferential heme transport through endoplasmic reticulum associated with mitochondria in rat liver. *Biochim. Biophys. Acta*, 1193 (1994) 345-352.
- 719 Li, M., Larter, S.R., Frolov, Y.B. and Bjoroy, M.: Adsorptive interaction between nitrogen compounds and organic and/or mineral phases in subsurface rocks. Models for compositional fractionation of pyrrolic nitrogen compounds in petroleum during petroleum migration. J. High Resolut. Chromatogr., 17 (1994) 230-236.
- 23c. Indole derivatives and plant hormones (gibberelins)

See 699.

23d. Pyridine derivatives

See 760.

23e. Other N-heterocyclic compounds

- 720 Citores, M.J., Alonso, R.M. and Fernandez, L.A.: A study of the purification and acid-base behavior of the commercial extractants KELEX 100 and LIX 26. Sep. Sci. Technol., 29 (1994) 1441-1459; C.A., 120 (1994) 314871y.
- 721 Waalash, M.I., El-Brashy, A.M. and Sultan, M.A.: Stability-indicating first-derivative spectrophotometric determination of furozolidone. *Acta Pharm. Hung.*, 64, No. 1 (1994) 5-8; C.A., 120 (1994) 331270u.
- 722 Zhou, B., Luo, S. and Cai, H.: (Determination of allantoin in common yam (*Dioscorea opposita*) by TLC-scanning). *Zhong-caoyao*, 25 (1994) 132-133; C.A., 120 (1994) 331232h.

See also 616, 687, 748.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 723 Antón-Fos, G.M., García-March, F.J., Pérez-Giménez, F., Salabert-Salvador, M.T. and Cercós-del-Pozo, R.A.: Calculation of chromatographic parameters by molecular topology: sulphamides. J. Chromatogr. A, 672 (1994) 203-211.
- 724 Bojarski, J., Kubaszek, M., Barton, H. and Chmiel, E.: Chromatography of methyl derivatives of 5-ethyl-5-phenyl-2-thiobarbituric acid. J. Chromatogr. A, 668 (1994) 481-484.
- 725 Petroviv, S.M., Loncar, E., Perisic-Janjic, N.U. and Popov-Pergal, K.I.: Normal and reversed phase thin-layer chromatography of some azolidones. *Chromatographia*, 38 (1994) 744-748.

See also 656, 756, 759.

- ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOS-PHATES)
- 726 Maffei Facino, R., Carini, M., Aldini, G., Bombardelli, E., Morazzoni, P. and Morelli, R.: Free radicals scavening action and anti-enzyme activities of procyanidines from *Vitis vinifera*. A mechanism for their capillary protective action. *Arzneim.-Forsch.*, 44 (1994) 592-601.

See also 707, 708.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. Organometallic compounds

See 782.

26c. Coordination compounds

727 Ray, R.K. and Kauffman, G.B.: Chromatographic studies of metal complexes. VII. Thin-layer chromatography of cobalt(III) complexes. J. Chromatogr. A, 675 (1994) 271-275.

See also 784.

- VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 728 Bargagna, A., Mariani, E. and Dorato, S.: TLC, HPTLC and HPLC determination of cis and trans-retinoic acids, retinol and retinyl acetate in topically applied products. Acta Technol. Legis Med., 2 (1991) 75-86; C.A., 120 (1994) 280385a.

See also 704.

28. ANTIBIOTICS

- 729 Bhanot, S.K., Chatterjee, N.R. and Naik, S.R.: Synthesis and antimicrobial activities of some new quinolonyl-3'-penicillin and -4'-cephalosporin derivatives. Arzneim.-Forsch., 44 (1994) 663-667.
- 730 Colombo, N., Depaoli, A., Gobetti, M. and Saorin, M.G.: Analytical-physical profile of the novel macrolide antibiotic flurithromycin ethylsuccinate. *Arzneim.-Forsch.*, 44 (1994) 850-855.
- 731 Funk, W., Küpper, T., Wirtz, A. and Netz, S.: Quantitative TLC/HPTLC determination of neomycins A, B, and C. Part 1: Chromatographic separation and postchromatographic derivatization. J. Planar Chromatogr., 7 (1994) 10-13.
- 732 Hochlowski, J.E., Hill, P., Whittern, D.N., Scherr, M.H., Rasmussen, R.R., Dorwin, S.A. and McAlpine, J.B.: Aselacins, novel compounds that inhibit binding of endothelin to its receptor. II. Isolation and elucidation of structures. *J. Antibiot.*, 47 (1994) 528-535.
- 733 Kaneto, R., Dobashi, K., Kojima, I., Sakai, K., Shibamoto, N., Yoshioka, T., Nishida, H., Okamoto, R., Akagawa, H. and Mizuno, S.: Mer-NF5003B, E and F, novel sesquiterpenoids as avian myeloblastosis virus protease inhibitors produced by Stachybotrys sp. J. Antibiot., 47 (1994) 727-730.
- 734 Lawen, A., Traber, R., Reuille, R. and Ponelle, M.: In vitro biosynthesis of ring-extended cyclosporins. Biochem. J., 300 (1994) 395-399.
- 735 Lin, S.Y. and Kondo, F.: Simple bacteriological and thin-layer chromatographic methods for determination of individual drug concentrations treated with penicillin G in combination with one of the aminoglycosides. *Microbios*, 77 (1994) 223-229; C.A., 121 (1994) 7556m.
- 736 Oka, H., Ikai, Y., Hayakawa, J., Harada, K., Masuda, K., Suzuki, M., Himei, R., Horie, M. and Nakazawa, H.: (Identification of residual tetracyclines in honey by TLC/FABMS). Shokuhin Eiseigaku Zasshi, 34 (1993) 517-523; C.A., 120 (1994) 268401v.
- 737 Tsurumi, Y., Ohhata, N., Iwamoto, T., Shigematsu, N., Sakamoto, K., Nishikawa, M., Kiyoto, S. and Okuhara, M.: WS79089A, B and C, new endothelin converting enzyme inhibitors isolated from Streptosporangium roseum No. 79089. Taxonomy, fermentation, isolation, physico-chemical properties and biological activities. J. Antibiot., 47 (1994) 619-630.
- 738 Zhang, S., Zhang, Y. and Zhang, R.: (Determination of erythromycins by TLC scanning method). Zhongguo Yaoke Daxue Xuebao, 25, No. 1 (1994) 12-14; C.A., 120 (1994) 331237p.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

739 Cserháti, T. and Forgács, E.: Relationship between the high-performance liquid and thin-layer chromatographic retention of non-homologous series of pesticides on an alumina support. J. Chromatogr. A, 668 (1994) 495-500.

29d. Carbamates

See 622.

PLANAR CHROMATOGRAPHY B435

29e. Herbicides

740 Perišic-Janjic, N.U., Djakovic, T. and Vojinovic-Miloradov, M.: Quantitative determination of s-triazine herbicides by fluorescence quencing after TLC separation. J. Planar Chromatogr., 7 (1994) 72-74.

30. SYNTHETIC AND NATURAL DYES

30a. Synthetic dyes

- 741 Ahmed, A.K.S., Fattah, L.E.A. and El-Gendy, A.E.: Thin-layer chromatography of some coloring matters in foods and pharmaceutical preparations. *Egypt. J. Pharm. Sci.*, 33 (1992) 485-501; C.A., 112 (1994) 307577d.
- 742 Ganz, J. and Jork, H.: Quantitative determination of erythrosine in hard gelatine capsules. *J. Planar Chromatogr.*, 7 (1994) 18-21.
- 743 Ge Zaochua, and Lin, H.: (Determination of synthetic colorants in food and capsule shells by micellar thin layer chromatographic scanning densitometry). Fenxi Ceshi Xuebao, 12 (1993) 45-48; C.A., 120 (1994) 296899g.
- 744 Oka, H., Ikai, Y., Ohno, T., Kawamura, N., Hayakawa, J., Harada, K.-i. and Suzuki, M.: Identification of unlawful food dyes by thin-layer chromatography-fast atom bombardment mass spectrometry. *J. Chromatogr. A*, 674 (1994) 301-307.
- 745 Ozeki, N., Oka, H., Ikai, Y., Ohno, T., Hayakawa, J., Sato, T., Ito, M. and Suzuki, R.: (Identification of coal tar dyes by reversed-phase TLC/FABMS with a sample condensation technique). Shokuhin Eiseigaku Zasshi, 34 (1993) 512-516; C.A., 120 (1994) 268400u.

30b. Chloroplast and other natural pigments

746 Holbach, B. and Wilken, R.: (Thin-layer chromatographic detection of the adulteration of Burgundy wine with other grape varieties). *Lebensmittelchemie*, 48 (1994) 4-5; C.A., 121 (1994) 56054e.

31. PLASTICS AND THEIR INTERMEDIATES

747 Luca, C. and Josceanu, A.M.: Thin-layer chromatographic behavior of some common macrocyclic polyethers. *Rev. Roum. Chim.*, 38 (1993) 1197-1204; C.A., 120 (1994) 314889k.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 748 Darwish, Y., Cserháti, T. and Forgács, E.: Reversed-phase retention characteristics of some bioactive heterocyclic compounds. J. Chromatogr. A, 668 (1994) 485-494.
- 749 Dross, K., Sonntag, C. Mannhold, R.: Determination of the hydrophobicity parameter R_{MW} by reversed-phase thin-layer chromatography. J. Chromatogr. A, 673 (1994) 113-124.

See also 616.

- 32b. Antirheumatics and antiinflammatory drugs
- 750 Li, Z., Shi, T. and Wu, J.: (Determination of compound amidopyrine injection by thin-layer chromatograph densitometry). Liaoning Shifan Daxue Xuebao, Ziran Kexueban, 15, No. 1 (1992) 226-28, 56; C.A., 120 (1994) 307626u.
- 751 Shinde, V.M., Tendolkar, N.M. and Desai, B.S.: Simultaneous determination of paracetamol and diclofenac sodium in pharmaceutical preparations by quantitative TLC. J. Planar Chromatogr., 7 (1994) 50-53.
- 752 Wu, W.-N. and Masucci, J.A.: Identification of two new surprofen metabolites in human urine. J. Pharm. Biomed. Anal., 12 (1994) 569-571.
- 753 Xu, S., Xu, F. and Wang, W.: (Determination of ibuprofen in microbial enzymic reaction by TLCS). Weishengwuxue Tongbao, 20 (1993) 311-313; C.A., 121 (1994) 17824m.

See also 772.

32c. Autonomic and cardiovascular drugs

See 696.

- 32d. Central nervous system drugs
- 754 Ahrens, B., Schütz, H., Seno, H. and Weiler, G.: Screening, identification and determination of the two new hypnotic zolpidem and zopiclone. *Arzneim.-Forsch.*, 44 (1994) 799-802.
- 755 Sotiropoulou, E. and Kourounakis, P.N.: Synthesis and pharmacochemistry of some new aminoketones with local anaesthetic activity. Arzneim.-Forsch., 44 (1994) 702-706.

See also 767.

- 32e. Chemotherapeutics (exc. cytostatics and antibiotics)
- 756 Trnus, N.V., Chichirov, V.E., Krachmar, I.I. and Krachmarova, I.P.: (Chromatographic mobility of sulfanilamide drugs in a thin sorbent layer). *Dostizh. v Obl. Farmats. i Khim.-Toksikol. Anal., Mosk. Med. Akad., M.,* (1991) 88-92; C.A., 120 (1994) 331283a.

See also 725.

- 32g. Other drug categories
- 757 Dashbalyn, T., Egorov, A.E., Prodof'eva, V.I., Nechaeva, E.B. and Kashtanova, V.V.: (Determination of the quality of etmozin by thin-layer and high-performance liquid chromatography). Dostizh. v Obl. Farmats. i Khim.-Toksikol. Anal., Mosk. Med. Akad., M., (1991) 39-41; C.A., 120 (1994) 331285c.
- 758 Guo, Y., Tan, Z., Hong, B., Liu, F., Wu, G. and Yan, Z.: (Analysis of xiaoqinglong compound mixture by TLC and HPLC for quality control). *Zhongguo Zhongyao Zazhi*, 19, No. 1 (1994) 28-29; C.A., 120 (1994) 331246r.
- 759 Lachmann, G., Lorenz, D., Radeck, W. and Steiper, M.: Untersuchungen zur Pharmakokinetik der mit 355 markierten Knoblauchinhaltsstoffe Aliin, Allicin und Vinyldithiine. Arzneim.-Forsch., 44 (1994) 734-743.

B436 BIBLIOGRAPHY SECTION

- 760 Liu, S. and Lin, Y.: (Thin layer chromatography for examination of purity of ciclopirox olamine). Zhongguo Yaoxue Zazhi, 29 (1994) 161-163; C.A., 120 (1994) 331262t.
- 761 Vajda, M., Csarnyi, A., Valko, K. and Forgacs, T.E.: (Development of methods for the chromatographic determination of Hevizos). Acta Pharm. Hung., 63 (1993) 188-192; C.A., 120 (1994) 307597k.

See also 734.

- 32h. Toxicological and forensic applications
- 762 Alemany, G., Gamindí, A., Nicolau, M.C. and Saro, D.: A simple method for plasma cannabinoid separation and quantification. *Biomed. Chromatogr.*, 7 (1993) 273-274.
- 763 Daeseleire, E., Vanoosthuyze, K. and van Peteghem, C.: Application of high-performance thin-layer chromatography and gas chromatography-mass spectrometry to the detection of new anabolic steroids used as growth promotors in cattle fattening. J. Chromatogr. A, 674 (1994) 247-253.
- 764 De Zeeuw, R.A., Hartstra, J. and Franke, J.P.: Potential and pitfalls of chromatographic techniques and detection modes in substance identification for systematic toxicological analysis. J. Chromatogr. A, 674 (1994) 3-13.
- 765 Ojanperä, I. and Vuori, E.: Identification of drugs in autopsy liver samples by instrumental qualitative thin-layer chromatography. J. Chromatogr. A, 674 (1994) 147-152.

See also 713.

32i. Plant extracts

- 766 Bui, T.B.: (Rapid quantitative determination of artemisinin in plant material by ultraviolet spectroscopy). *Tap Chi Duoc Hoc.*, No. 5 (1993) 21-22; C.A., 120 (1994) 280389e.
- 767 Matsunaga, T., Nagatomo, H., Narimatsu, S., Yamamoto, I. and Yoshimura, H.: (Studies on identification of cannabis seeds. I. Qualitative and quantitative analysis of cannabinoids in cannabis seeds). Hochudoku, 11 (1993) 158-165; C.A., 120 (1994) 331239r.
- 768 Matysik, G. and Wojtasik, E.: Stepwise gradient HPTLC analysis of Frangula anthraquinones. *J. Planar Chromatogr.*, 7 (1994) 34-37.
- 769 Nikolova-Damyanova, B., Ilieva, E., Handjieva, N. and Bankova, V.: Quantitative thin layer chromatography of iridoid and flavonoid glucosides in species of *Linaria. Phytochem. Anal.*, 5, No. 1 (1994) 38-40; C.A., 120 (1994) 307579f.
- 770 Pal, S.K., Mukherjee, P.K. and Saha, B.P.: Characterization of tinctures prepared from plant and animal resources by cochemical and thin-layer chromatographic behavior. *Res. Ind.*, 39 (1994) 16-17; C.A., 120 (1994) 307182w.
- 771 Reynolds, T.: A chromatographic examination of some old samples of drug aloes. *Pharmazie*, 49 (1994) 524-529.
- 772 Sappe, F., Archavlis, A., Latrides, M.C. and Artaud, J.: Identification and determination of 18α- and 18β-glycyrrhetic acid. Ann. Falsif. Expert. Chim. Toxicol., 86, No. 19 (1993) 223-232; C.A., 120 (1994) 331240j.
- 773 Stojakowska, A.: (TLC/FID in quantification of proscillaridin A in Urginea maritima (L) baker extracts). Herba Pol., 39 (1993) 113-119; C.A., 120 (1994) 294224j.

- 774 Waksmundzka-Hajnos, M. and Wawrzynowicz, T.: Optimization of the separation of plant extracts with the aid of the horizontal DS chamber. J. Planar Chromatogr., 7 (1994) 58-62.
- 775 Wang, L., Zhang, B., Li, L. and Zhou, Z.: (Quantitative determination of rhapontin in root of *Rheum hotaoense* by TLC-scanning). *Zhongguo Zhongyao Zazhi*, 19 (1994) 37; C.A., 121 (1994) 5193s.

See also 642, 693, 694, 715, 716, 722, 758.

- CLINICO-CHEMICAL APPLICATIONS
- Complex mixtures and profiling (single compounds by cross-reference only)
- See 641, 668, 681.
- 34. FOOD ANALYSIS
- 34b. Complex mixtures (single compounds by cross-reference only)
- See 674, 735, 736, 743, 744, 745, 746.
- 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36a. Surfactants
- 776 Kruse, A., Buschmann, N. and Cammann, K.: Separation of different types of surfactant by thin layer chromatography. J. Planar Chromatogr., 7 (1994) 22-24.
- 36b. Antioxidants and preservatives
- 777 Li, X., Wang, J. and Wang, X.: (Determination of 2"-O-galloyl-hyperin in Pyrola calliantha H. Andress). Zhongguo Zhongyao Zazhi, 19 (1994) 103-104; C.A., 121 (1994) 31117q.
- 778 Zitko, V.: TLC detection of brominated flame retardants by Styrofoam. *Chemosphere*, 28 (1994) 1211-1215; C.A., 120 (1994) 300133x.
- 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- See 788.
- 38. INORGANIC COMPOUNDS
- 38a. Cations
- 779 Gaibakyan, D.S., Kharito, E.B. and Gaibakyan, R.D.: (Preparative thin-layer chromatography of elements). *Teoriya i Prakt. Sorbts. Protsessov*, 21 (1991) 82-88; C.A., 120 (1994) 314581d.

- 780 Ishida, K. and Takeda, Y.: (Properteis and TLC separation of rare earth elements). Kagaku to Kyoiku, 42 (1994) 166-171; C.A., 120 (1994) 288728k.
- 781 Listov, S.A., Morozov, P.I., Pakhomov, V.P. and Petrov, N.V.: (Combination of thin-layer chromatography and atomic-adsorption spectroscopy for determination of heavy metal impurities in drugs). Dostzh. v Obl. Farmats. i Khim.-Toksikol. Anal., Mosk. Med. Akad., M., (1991) 80-83; C.A., 120 (1994) 331291b.
- 782 Oriñák, A., Matisová, E., Györyová, K. and Slesárová, L.: Chromatographic behaviour of novel zinc(II) carboxylates with nitrogen-donor ligands. Part I. Formates and acetates. *Anal. Chim. Acta*, 291 (1994) 169-181.
- 783 Soljic, Z. and Hrestak, Z.: (Systematic qualitative analysis of cations by thin-layer chromatography). Kem. Ind., 42 (1993) 359-367; C.A., 121 (1994) 25726w.
- 784 Wenclawiak, B.W. and Fleming, M.: HPTLC separation of platinum metal 8-hydroxyquinolinates. J. High Resolut. Chromatogr., 17 (1994) 343-346.
- 785 Yadav, S.K., Singh, O.V. and Tandon, S.N.: Reversed phase TLC and column chromatographic separations of 3d transition metal ions using mono(2-ethylhexyl) acid phosphate as impregnant. J. Planar Chromatogr., 7 (1994) 75-77.

See also 627, 727.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 786 Mutalib, A., Sekine, T., Omori, T. and Yoshihara, K.: Preparation of ^{99m}Tc nitrido core β-diketonate complexes for radiopharmaceuticals. *Radiochim. Acta*, 63 (1993) 117-121; *C.A.*, 120 (1994) 307433d.
- 787 Tonelli, D., Zappoli, S. and Marengo, M.: Determination of radiochemical purity of technetium-99m-labeled complexes by TLC. Appl. Radiat. Isot., 45 (1994) 549-552; C.A., 120 (1994) 280442s.
- 788 Zamora, P.O., Domalewski, M.D., Marek, M.J., Budd, P. and Rhodes, B.A.: Quantitation of radiolabeled antibody binding to cells by thin-layer chromatography. *Nucl. Med. Biol.*, 21 (1994) 205-210; C.A., 121 (1994) 6750h.
- 789 Zamora, P.Q., Sass, K., Cardillo, A.S., Lambert, C.R., Budd, P., Marek, M.J. and Rhodes, B.A.: Affinity thin-layer chromatography test of the immunoreactive fraction of radiolabeled antibodies. *BioTechniques*, 16 (1994) 306-311; C.A., 120 (1994) 264650c.

BIBLIOGRAPHY SECTION

Electrophoresis

REVIEWS AND BOOKS

- 1978 Cammann, K., Kleiböhmer, W., Mussenbrock, E., Ross, B. and Zuther, F.: Fast chromatographic separation techniques as competitor to chemical and biochemical sensor systems. Fresenius J. Anal. Chem., 349 (1994) 338-345.
- 1979 Monnig, C.A. and Kennedy, R.T.: Capillary electrophoresis.

 Anal. Chem., 66 (1994) 280R-414R a review with 801 refs.
- 1980 Stermer, B.A., Bianchini, G.M. and Korth, K.L.: Regulation of HMG-CoA reductase activity in plants. J. Lipid Res., 35 (1994) 1133-1140.
- See also 1983, 1997, 1999, 2005, 2031, 2037, 2040, 2045, 2055, 2057, 2065, 2105, 2166, 2400, 2447, 2501, 2516, 2532, 2536.

FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 1981 Cole, S.R.: Mobile phase additives for separation improvement in reversed phase liquid chromatography and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9302390, 1992, 187 p.; C.A., 121 (1994) 18929m.
- 1982 Griess, G.A., Harris, R.A. and Serwer, P.: The trajectories of spheres during agarose gel electrophoresis. *Appl. Theor. Electrophor.*, 3 (1993) 305-315; C.A., 120 (1994) 332098f.
- 1983 Muralidhara, H.S.: Enhance separations with electricity. CHEMTECH, 24 (1994) 36-41; C.A., 121 (1994) 12475p - a review with 31 refs.
- 1984 Prescott, J.H.: Hydrodynamic and electrophoretic fingerprinting in the pH, pλ domain. Avail. *Univ. Microfilms Int.*, Order No. DA9305884, 1992, 158 p.; C.A., 120 (1994) 246247x.

See also 1986, 2044, 2047, 2541.

2b. Thermodynamics and theoretical relationships

- 1985 Heinrich, J., Clifton, M.J. and Wagner, H.: Use of *in situ* conductivity measurements to calculate the flow field and heat transfer in continuous-flow electrophoresis. *Int. J. Heat Mass Transfer*, 36 (1993) 3703-3710; C.A., 120 (1994) 221211t.
- 1986 Turco, G.P.: Polyelectrolyte dynamics; diffusion and electrophoresis in complex media. Avail. *Univ. Microfilms Int.*, Order No. DA9238581, 1992, 331 p.; C.A., 120 (1994) 246557y.

See also 2030, 2038, 2042, 2060, 2076, 2489.

2c. Relationship between structure and electrophoretic behaviour

2d. Measurement of physico-chemical and related values

1987 Gomez, F.A., Avila, L.Z., Chu, Y.-H. and Whitesides, G.M.: Determination of binding constants of ligands to proteins by affinity capillary electrophoresis: compensation for electroosmotic flow. Anal. Chem., 66 (1994) 1785-1791.

See also 2014, 2059, 2371, 2506, 2521, 2535.

GENERAL TECHNIQUES

3a. Apparatus and accessories

- 1988 Boerner, R.M. and Woodward, W.S.: A computer-controlled bipolar magnetic-field-gradient driver for NMR electrophoretic and self-diffusion measurements. J. Magn. Reson., Ser. A, 106 (1994) 195-202; C.A., 120 (1994) 234480e.
- 1989 Burggraf, N., Manz, A., de Rooij, N.F. and Widmer, H.M.: Synchronized cyclic capillary electrophoresis: a novel concept for high-performance separations using low voltages. *Anal. Meth*ods Instrum., 1 (1993) 55-59; C.A., 120 (1994) 289135b.
- 1990 Disanto, F.J. and Krusos, D.A.: Filling and electrophoretic dispaly. U.S. US 5,279,511 (Cl. 445-24; C25D13/00), 18 Jan. 1994, Appl. 964,350, 21 Oct. 1992; 10 p.; C.A., 120 (1994) 257598p.
- 1991 Grateful, T.M.: Development of a production-scale electrophoresis device. Avail. Univ. Microfilms Int., Order No. DA9306403, 1992, 212 p.; C.A., 120 (1994) 301721z.
- 1992 Ivory, C.F. and Gobie, W.A.: Electrophoretic processor. U.S. US 5,298,143 (Cl. 204-301; GO1N27/26), 29 Mar. 1994, US Appl. 782,692, 25 Oct. 1991; 29 pp.; C.A., 120 (1994) 293565j.
- 1993 Jacobson, S.C., Hergenröder, R., Koutny, L.B. and Ramsey, J.M.: High-speed separations on a microchip. *Anal. Chem.*, 66 (1994) 1114-1118.
- 1994 Jacobson, S.C., Hergenröder, R., Koutny, L.B. and Ramsey, J.M.: Open channel electrochromatography on a microchip. *Anal. Chem.*, 66 (1994) 2369-2373.
- 1995 Jacobson, S.C., Hergenröder, R., Koutny, L.B., Warmack, R.J. and Ramsey, J.M.: Effects of injection schemes and column geometry on the performance of microchip electrophoresis devices. *Anal. Chem.*, 66 (1994) 1107-1113.
- 1996 Majors, R.E.: New chromatography columns and accessories at the 1994 Pittsburgh Conference, Part II. LC-GC Int., 7 (1994) 310-324.
- 1997 Oda, R.P., Spelsberg, T.C. and Landers, J.P.: Commercial capillary electrophoresis instrumentation. LC-GC, 12 (1994) 50-51; C.A., 120 (1994) 288704z a review with 2 refs.

See also 2010, 2381, 2464.

See 2150.

- 3b. Detectors and detection procedures
- 1998 Chan, K.T., Yao, Y.J., Ng, C.L. and Li, S.F.Y.: Fluorescence detection in capillary electrophoresis using a variable wavelength epifluorescence microscope. *Fresenius J. Anal. Chem.*, 349 (1994) 487-490.
- 1999 Ewing, A.G., Mesaros, J.M. and Gavin, P.F.: Electrochemical detection in microcolumn separations. *Anal. Chem.*, 66 (1994) 527A-537A
- 2000 Hogan, B.L.: Fluorescence detection for gel and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9234814, 1992, 120 p.; C.A., 121 (1994) 18935k.
- 2001 Huang, X. and Zare, R.N.: End-column conductivity detector for capillary zone electrophoresis. U.S. US 5,298,139 (Cl. 204-299R; GO1N27/26), 29 Mar. 1994, US Appl. 580, 259, 10 Sep. 1990; 10 pp.; C.A., 120 (1994) 293564h.
- 2002 Klein, G.L.: Fiber-optic flow cell and its manufacture for detection of electrophoretic separation with a capillary column. U.S. US 5,302,272 (Cl. 204-299R; GO1N27/26), 12 Apr. 1994, Appl. 847,783, 05 Mar. 1992; 6 pp.; C.A., 120 (1994) 293558j.
- 2003 Myrick, J.E., Lemkin, P.F., Robinson, M.K. and Upton, K.M.: Comparison of the Bio Image Visage 2000 and the GELLAB-II two-dimensional electrophoresis image analysis systems. *Appl. Theor. Electrophor.*, 3 (1993) 335-346; C.A., 120 (1994) 318637z.
- 2004 Onuska, F.I. and Terry, K.A.: UV longitudinal cell design with enhanced sensitivity for capillary electrophoresis. J. Microcolumn Sep., 5 (1993) 255-260; C.A., 120 (1994) 260206q.
- 2005 Rabilloud, T., Vuillard, L., Gilly, C. and Lawrence, J.-J.: Silver-staining of proteins in polyacrylamide gels: a general overview. Cell. Mol. Biol. (Paris), 40 (1994) 57-75; C.A., 120 (1994) 318656e - a review with many refs.
- 2006 Takahashi, S., Murakami, K., Anazawa, T. and Kambara, H.: Multiple sheath-flow gel capillary-array electrophoresis for multicolor fluorescent DNA detection. *Anal. Chem.*, 66 (1994) 1021-1026
- 2007 Tracht, S., Thoma, V. and Sweedler, J.V.: Postcolumn radionuclide detection of low-energy β emitters in capillary electrophoresis. *Anal. Chem.*, 66 (1994) 2382-2389.
- 2008 Waska, F.L., Klein, G.L. and Johnson, W.S.: Capillary electrophoresis detection. Can. Pat. Appl. CA 2,099,511 (Cl. GO1N27/447), 18 Jan. 1994, US Appl. 917,640, 17 Jul. 1992; 80 pp.; C.A., 120 (1994) 293563g.
- 2009 Wu, J. and Pawliszyn, J.: Diode laser-based concentration gradient detector for capillary isotachophoresis. J. Microcolumn Sep., 5 (1993) 217-222; C.A., 120 (1994) 260205p.
- See also 2015, 2043, 2065, 2138, 2167, 2170, 2174, 2177, 2338, 2349, 2403, 2448, 2451, 2556.
- 3c. Stabilization media for electrophoresis
- 2010 Bender, B., Wiestler, O.D. and von Deimling, A.: A device for processing large acrylamide gels. *BioTechniques*, 16 (1994) 204-206; C.A., 120 (1994) 293213t.
- 2011 Jacobs, M. and Leka, G.T.: Gel electrophoresis device and method of forming a sample well in the device. U.S. US 5,304,292 (Cl. 204-299R; C25B9/00), 19 Apr. 1994, Appl. 968,296, 29 Oct. 1992; 9 pp.; C.A., 120 (1994) 318839s.

- See also 1996, 2037, 2056, 2057, 2458.
- 3d. Quantitative analysis
- See 2030, 2171, 2498.
- 3e. Preparative scale electrophoresis
- See 1991.
- 3f. Programmed voltage and buffer gradients
- See 1988, 2039, 2053.
- SPECIAL TECHNIQUES
- 4a. Automation
- See 2135.
- 4b. Computerization and modelling
- 2012 Sahota, R.S. and Khaledi, M.G.: Target factor modeling of migration behavior in capillary electrophoresis. *Anal. Chem.*, 66 (1994) 2374-2381.
- See also 1988, 2003, 2041, 2171.
- Combination with other physicochemical techniques, (MS, IR etc.)
- See 2043, 2048, 2077, 2156, 2498, 2519.
- 4d. Affinity electrophoresis
- See 1987, 2168, 2506.
- 4e. Capillary zone electrophoresis and electrokinetic chromatography
- 2013 Ahuja, E.S., Preston, B.P. and Foley, J.P.: Anionic-zwitterionic mixed micelles in micellar electrokinetic chromatography: sodium dodecyl sulfate-N-dodecyl-N,N-dimethylammonium-3-propane-1-sulfonic acid. J. Chromatogr. B, 657 (1994) 271-284.
- 2014 Blum, W.: (Capillary electrophoretic separation of biomolecules according to molecular weight). *Bioforum*, 16 (1993) 366-369; C.A., 120 (1994) 318659h.
- 2015 Bruno, A.E., Maystre, F., Krattiger, B., Nussbaum, P. and Gassmann, E.: The pigtailing approach to optical detection in capillary electrophoresis. *TrAC*, 13 (1994) 190-198.
- 2016 Chen, D.Y. and Dovichi, N.J.: Yoctomole detection limit by laser-induced fluorescence in capillary electrophoresis. J. Chromatogr. B, 657 (1994) 265-269.
- 2017 Coufal, P., Štulík, K., Claessens, H.A. and Cramers, C.A.: The magnitude and reproducibility of the electroosmotic flow in silica capillary tubes. *J. High Resolut. Chromatogr.*, 17 (1994) 325-334.

- 2018 Crabtree, H.J., Ireland, I.D. and Dovichi, N.J.: Effect of acetonitrile in the sampling solution on the analyte peak shape in micellar electrokinetic capillary chromatography. J. Chromatogr. A, 669 (1994) 263-267.
- 2019 Dickens, J.E., Gorse, J., Everhart, J.A. and Ryan, M.: Dependence of electroosmotic flow in capillary electrophoresis on Group I and II metal ions. *J. Chromatogr. B*, 657 (1994) 401-407.
- 2020 Fishman, H.A., Amudi, N.M., Lee, T.T., Scheller, R.H. and Zare, R.N.: Spontaneous injection in microcolumn separations. *Anal. Chem.*, 66 (1994) 2318-2329.
- 2021 Fuchigami, T. and Imasaka, T.: Capillary micellar electrokinetic chromatography based on indirect semiconductor laser fluorescence detection. *Anal. Chim. Acta*, 291 (1994) 183-188.
- 2022 Gilges, M., Kleemiss, M.H. and Schomburg, G.: Capillary zone electrophoresis separations of basic and acidic proteins using poly(vinyl alcohol) coatings in fused siliça capillaries. *Anal. Chem.*, 66 (1994) 2038-2046.
- 2023 Heegaard, N.H.H. and Robey, F.A.: The emerging role of capillary electrophoresis as a tool for the study of biomolecular non-covalent interactions. *Int. Lab.*, 24, No. 7 (1994) P2-P8.
- 2024 Hibi, K., Senda, M. and Tanaka, N.: Electrokinetic chromatography. *Jpn. Kokai Tokkyo Koho* JP 05,322,849, [93,322,849], (Cl. G01N27/447), 07 Dec. 1993, Appl. 92/151, 537, 19 May 1992; 11 p.; C.A., 120 (1994) 314962d.
- 2025 Hjertén, S., Liao, J.-L. and Zhang, R.: New approaches to concentration on a microliter scale of dilute samples, particularly biopolymers with special reference to analysis of peptides and proteins by capillary electrophoresis. I. Theory. *J. Chromatogr. A*, 676 (1994) 409-420.
- 2026 Jones, W.R., Fuchs, M. and Merion, M.: Method for sample analysis using capillary electrophoresis. U.S. US 5,286,356 (Cl. 204-182.8; C25B7/00), 15 Feb. 1994, Appl. 6,434, 21 Jan. 1993; 13 p.; C.A., 120 (1994) 260182d.
- 2027 Kamahori, M.: Automated capillary electrophoretic method and apparatus for nucleic acid or protein analysis. *Jpn. Kokai Tokkyo Koho* JP 06 74,936 [94 74,936] (Cl. GO1N27/447), 18 Mar. 1994, Appl. 92/226,894, 26 Aug. 1992; 6 pp.; C.A., 120 (1994) 293585r.
- 2028 Landman, A., Sun, P. and Hartwick, R.A.: Enhanced micellar electrokinetic capillary chromatography separations on anionic polymer-coated capillary with pH-independent electroosmotic flow. J. Chromatogr. A, 669 (1994) 259-262.
- 2029 Lee, T.T.: Instrumental and theoretical development of capillary electrophoresis and its application to biological systems. Avail. Univ. Microfilms Int., Order No. DA9302007, 1992, 250 pp.; C.A., 120 (1994) 318627w.
- 2030 Leube, J. and Roeckel, O.: Quantification in capillary zone electrophoresis for samples differing in composition from the electrophoretic buffer. *Anal. Chem.*, 66 (1994) 1090-1096.
- 2031 Li, H. and Shen, Z.: (New bioseparation technique using electrical field high-performance capillary electrophoresis). Huagong Jinzhan, (1993) 29-33; C.A., 120 (1994) 318418d - a review with 24 refs.
- 2032 Liao, J.-L., Zhang, R. and Hjertén, S.: New approaches to concentration on a microliter scale of dilute samples, particularly biopolymers with special reference to analysis of peptides and proteins by capillary electrophoresis. II. Applications. J. Chromatogr. A, 676 (1994) 421-430.

- 2033 Little, E.L.: Comparative study of anionic and nonionic/anionic surfactant systems in micellar electrokinetic capillary chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9302914, 1992, 215 p.; C.A., 120 (1994) 288848z.
- 2034 Liu, Z., Sam, P., Sirimanne, S.R., McClure, P.C., Grainger, J. and Patterson, D.G., Jr.: Field-amplified sample stacking in micellar electrokinetic chromatography for on-column sample concentration of neutral molecules. J. Chromatogr. A, 673 (1994) 125-132
- 2035 McCormack, K.A.: Capillary electrophoresis and electrochromatography. Avail. *Univ. Microfilms Int.*, Order No. BRD-96063, 1991, 230 p.; C.A., 120 (1994) 260244a.
- 2036 Ng, C.L., Ong, C.P., Lee, H.K. and Li, S.F.Y.: Systematic optimization of capillary electrophoretic separations using the overlapping resolution mapping scheme. *J. Microcolumn Sep.*, 5 (1993) 191-197; C.A., 120 (1994) 260223t.
- 2037 Novotny, M., Soini, H. and Stefansson, M.: Chiral separation through capillary electromigration methods. *Anal. Chem.*, 66 (1994) 646A-655A - a review with 62 refs.
- 2038 Okada, Y. and Terabe, S.: (Effects of experimental conditions on reproducibility in MEKC). *Kuromatogurafi*, 14 (1993) 118-119; C.A., 120 (1994) 338073c.
- 2039 Powell, A.C.: Optimization of micellar electrokinetic capillary chromatography with solvent-gradients. Avail. *Univ. Microfilms Int.*, Order No. DA9331727, 1993, 101 p.; C.A., 121 (1994) 25968b.
- 2040 Qi, S., Zhu, T. and Sun, Y.: (Capillary gel electrophoresis). Sepu, 12 (1994) 98-102; C.A., 120 (1994) 318435g - a review with 56 refs.
- 2041 Quang, C., Strasters, J.K. and Khaledi, M.G.: Computer-assisted modeling, prediction and multifactor optimization in micellar electrokinetic chromatography of ionizable compounds. *Anal. Chem.*, 66 (1994) 1646-1653.
- 2042 Rebscher, H. and Pyell, U.: A method for the experimental determination of contributions to band broadening electrochromatography with packed capillaries. *Chromatographia*, 38 (1994) 737-743.
- 2043 Reinhoud, N.J., Tjaden, U.R. and van der Greef, J.: Automated on-capillary isotachophoretic reaction cell for fluorescence derivatization of small sample volumes at low concentrations followed by capillary zone electrophoresis. *J. Chromatogr. A*, 673 (1994) 255-266.
- 2044 Reinhoud, N.J., Tjaden, U.R. and van der Greef, J.: Correlation between zone velocity and current in automated single capillary isotachophoresis-zone electrophoresis. J. Chromatogr. A, 673 (1994) 239-253.
- 2045 Rogan, M.M., Altria, K.D. and Goodall, D.M.: Enantioselective separations using capillary electrophoresis. *Chirality*, 6 (1994) 25-40; C.A., 120 (1994) 314853u - a review with 82 refs.
- 2046 Rogan, M.M., Altria, K.D. and Goodall, D.M.: Placket-Burman experimental design in chiral analysis using capillary electrophoresis. *Chromatographia*, 38 (1994) 723-729.
- 2047 Sahota, R.S. and Khaledi, M.G.: Nonaqueous capillary electrophoresis. Anal. Chem., 66 (1994) 1141-1146.
- 2048 Sänger-van de Griend, C.E., Kientz, C.E. and Brinkman, U.A.T.: Capillary electrophoresis coupled on-line with flame photometric detection. *J. Chromatogr. A*, 673 (1994) 299-302.
- 2049 Sharnez, R.: Alleviation of transport limitations in freeflow zone electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9408394, 1993, 239 p.; C.A., 121 (1994) 12523c.

- 2050 Smith, J.T. and El Rassi, Z.: Micellar electrokinetic capillary chromatography with in situ charged micelles: II. Evaluation and comparison of octylmaltoside and octylsucrose surfactants as anionic borate complexes in the separation of herbicides. J. Microcolumn Sep., 6 (1994) 127-138; C.A., 120 (1994) 291972r.
- 2051 Smith, J.T., Nashabeh, W. and El Rassi, Z.: Micellar electrokinetic capillary chromatography with in situ charged micelles. 1. Evaluation of N-D-gluco-N-methylalkanamide surfactants as anionic borate complexes. Anal. Chem., 66 (1994) 1119-1133.
- 2052 Song, L., Ou, Q. and Yu, W.: Study on phosphate of ethylenediamine, 1,3-diaminopropane and 1,4-diaminobutane as carrying electrolyte in open-tubular capillary electrophoresis. J. Liq. Chromatogr., 17 (1994) 1953-1969.
- 2053 Sudor, J. and Novotny, M.: Pulsed-field capillary electrophoresis: optimizing separation parameters with model mixtures of sulfonated polystyrenes. *Anal. Chem.*, 66 (1994) 2139-2147.
- 2054 Sziele, D., Brüggemann, O., Döring, M., Freitag, R. and Schügerl, K.: Adaptation of a microdrop injector to sampling in capillary electrophoresis. *J. Chromatogr. A*, 669 (1994) 254-258.
- 2055 Takagi, T. and Karim, M.R.: (Capillary electrophoresis in the presence of SDS using polymer solution as the molecular sieve). Tanpakushitsu Kakusan Koso, 39 (1994) 930-940; C.A., 121 (1994) 4179e - a review with 22 refs.
- 2056 Tsai, P., Wu, C.-T. and Lee, C.S.: Electrokinetic studies of inorganic coated capillaries. *J. Chromatogr. B*, 657 (1994) 285-290.
- 2057 Ward, T.J.: Chiral media for capillary electrophoresis. *Anal. Chem.*, 66 (1994) 632A-640A a review with 48 refs.
- 2058 Welch, B.P. and Bredt, B.M.: Capillary electrophoresis method and apparatus. U.S. US 5,302,264 (Cl. 204-180.1; GO1N27/26), 12 Apr. 1994, Appl. 939,061, 02 Sep. 1992; 10 pp.; C.A., 120 (1994) 293559k.
- 2059 Yao, Y.J. and Li, S.F.Y.: Determination of diffusion coefficients by capillary zone electrophoresis. J. Chromatogr. Sci., 32 (1994) 117-120.
- 1979, 1987, 1989, 1993, 1994, 1995, 1997, 1998, See also 2000, 2001, 2002, 2004, 2006, 2007, 2008, 2009, 2012, 2061, 2062, 2063, 2064, 2075, 2076, 2077, 2078, 2079, 2082, 2084, 2096, 2097, 2098, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2142, 2143, 2146, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2163, 2164, 2165, 2168, 2169, 2170, 2175, 2178, 2181, 2218, 2240, 2257, 2262, 2360, 2369, 2381, 2401, 2402, 2403, 2404, 2447, 2452, 2458, 2463, 2464, 2485, 2487, 2489, 2490, 2496, 2497, 2498, 2500, 2502, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2527, 2528, 2529, 2531, 2532, 2542, 2543, 2544, 2545, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2556, 2557, 2558, 2559.

4f. Isotachophoresis

- 2060 Slais, K.: Electrophoretic focusing in a naturel steady state moving pH gradient. *J. Microcolumn Sep.*, 5 (1993) 469-479; C.A., 120 (1994) 254374b.
- See also 2044, 2240, 2499, 2503, 2510, 2530, 2555.
- 4g. Enantiomers, separation
- 2061 Jung, M., Mayer, S. and Schurig, V.: Enantiomer separation by GC, SFC, and CE on immobilized polysiloxane-bonded cyclodextrins. *LC-GC Int.*, 7 (1994) 340-347.
- 2062 Kurosu, Y., Shisa, Y. and Satou, Y.: (Investigation of enantiomer excess by capillary electrophoresis). *Kuromatogurafi*, 14 (1993) 124-125; C.A., 121 (1994) 25980z.
- 2063 St. Pierre, L.A. and Sentell, K.B.: Cyclodextrins as enantioselective mobile phase modifiers for chiral capillary electrophoresis. Effects of pH and cyclodextrin concentration. *J. Chromatogr. B*, 657 (1994) 291-300.
- 2064 Szemán, J. and Ganzler, K.: Use of cyclodextrins and cyclodextrin derivatives in high-performance liquid chromatography and capillary electrophoresis. J. Chromatogr. A, 668 (1994) 509-517.
- See also 2037, 2045, 2046, 2057, 2098, 2129, 2132, 2135, 2140, 2512, 2518.
- 4h. Two dimensional electrophoresis
- 2065 Collins, P.J., Juhl, C. and Lognonne, J.-L.: Image analysis of 2D gels: considerations and insights. *Cell. Mol. Biol. (Paris)*, 40 (1994) 77-83; *C.A.*, 120 (1994) 318427f a review with 4 refs.
- 2066 Harrington, M.G., Lee, K.H., Yun, M., Zewert, T., Bailey, J.E. and Hood, L.: Mechanical precision in two-dimensional electrophoresis can improve protein spot positional reproducibility. *Appl. Theor. Electrophor.*, 3 (1993) 347-353; C.A., 120 (1994) 318638a.
- 2067 Lognonne, J.-L.: 2D-page analysis: a practical guide to principle critical parameters. *Cell. Mol. Biol. (Paris)*, 40 (1994) 41-55; C.A., 120 (1994) 318426e.
- 2068 Merril, C.R., Creed, G.J., Joy, J. and Olson, A.D.: Identification and use of constitutive proteins for the normalization of high resolution electrophoretograms. *Appl. Theor. Electrophor.*, 3 (1993) 329-333; C.A., 120 (1994) 318636y.
- 2069 Rabilloud, T., Vincens, P., Asselineau, D., Pennetier, J.-L., Darmon, M. and Tarroux, P.: Computer analysis of two-dimensional electrophoresis gels as a tool in cell biology: study of the protein expression of human keratinocytes from normal to tumor cells. Cell. Mol. Biol. (Paris), 40 (1994) 17-27; C.A., 120 (1994) 318655d.
- 2070 Zahnd, A., Tissot, J.-D. and Hochstrasser, D.F.: Wave packets analysis of two-dimensional protein maps: a new approach to study the diversity of immunoglobulins. *Appl. Theor. Electro*phor., 3 (1993) 321-328; C.A., 120 (1994) 320841e.
- See also 2003, 2159, 2160, 2176, 2182; 2185, 2191, 2209, 2229, 2230, 2266, 2274.

Other special techniques

- 2071 Bao, J., Harmon, B.J., Patterson, D.H. and Regnier, F.E.: Electro-phoretically mediated chemical analysis. *PCT Int*. Appl. WO 94 07,132 (Cl. GO1N27/447), 31 Mar. 1994, US Appl. 944,846, 14 Sep. 1992; 15 pp.; *C.A.*, 120 (1994) 318838r.
- 2072 Culbertson, C.T. and Jorgenson, J.W.: Flow counterbalanced capillary electrophoresis. *Anal. Chem.*, 66 (1994) 955-962.
- 2073 Levine, M.L.: Electrophoresis of solutes in aqueous two-phase systems. Avail. *Univ. Microfilms Int.*, Order No. DA9310596, 1992, 282 pp.; C.A., 121 (1994) 4344e.
- 2074 Shea, L.D., Feke, D.L. and Landau, U.: Counteracting flow electrophoresis: a technique for separating biochemicals or charged macromolecules. *Biotechnol. Prog.*, 10 (1994) 246-252; C.A., 121 (1994) 4343d.

See also 1992, 2136, 2172, 2456, 2464, 2496.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5b. Cyclic hydrocarbons, fullerenes

- 2075 Copper, C.L., Staller, T.D. and Sepaniak, M.J.: Characterization of polyaromatic hydrocarbon mixtures by micellar electrokinetic capillary chromatography. *Polycyclic Aromat. Compd.*, 3 (1993) 121-135; C.A., 120 (1994) 289120t.
- 2076 Otsuka, K., Koike, R., Higashimori, M., Karuhaka, K., Okada, Y. and Terabe, S.: (Separation of lipophilic compounds by micellar electrokinetic chromatography with organic modifiers). *Kuromatogurafi*, 14 (1993) 120-121; C.A., 121 (1994) 25979f.

ALCOHOLS

2077 Ren, J., Deng, Y. and Cheng, J.: (Separation and determination of polyols by high-performance capillary electrophoresis with laser-based interferometric refractive index detector). Fenxi Huaxue, 21 (1993) 1374-1377; C.A., 120 (1994) 289129c.

7. PHENOLS

2078 Rony, C., Jacquier, J.C. and Desbène, P.L.: Analytical study of biomass pyrolysis oils. II. Optimization of analytical conditions for the phenolic fraction using micellar electrokinetic chromatography. J. Chromatogr. A, 669 (1994) 195-204.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

2079 Ferreres, F., Blázquez, M.A., Gil, M.I. and Tomás-Barberán, F.A.: Separation of honey flavonoids by micellar electrokinetic capillary chromatography. *J. Chromatogr. A*, 669 (1994) 268-274.

See also 2036.

CARBOHYDRATES

- 10a. Mono and oligosaccharides. Structural studies
- 2080 Hughes, D.E.: Capillary electrophoretic examination of underivatized O-linked and N-linked oligosaccharide mixtures and immunoglobulin G antibody-released oligosaccharide libraries. J. Chromatogr. B, 657 (1994) 315-326.
- 2081 Stefansson, M. and Novotny, M.: Separation of complex oligosaccharide mixtures by capillary electrophoresis in the opentubular format. *Anal. Chem.*, 66 (1994) 1134-1140.
- 2082 Zhao, J.Y., Diedrich, P., Zhang, Y., Hindsgaul, O. and Dovichi, N.J.: Separation of aminated monosaccharides by capillary zone electrophoresis with laser-induced fluorescence detection. J. Chromatogr. B, 657 (1994) 307-313.

See also 2015, 2084.

- 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides
- 2083 Binette, J.P., Burgi, W., Ohishi, H., Grundboeck-Jusko, J., Burki, R., Maekawa, Y., Tschopp, F.A., Kimura, A. and Schmid, K.: The glycosaminoglycan composition of human tracheas and the changes observed during aging and in disease. Clin. Chim. Acta, 225 (1994) 179-185.
- 2084 Damm, J.B.L., Overklift, G.T. and van Dedem, G.W.K.: Determination of structural differences in the glycosaminoglycan chain of heparin and heparan sulphate by analysis of the constituting disaccharides with capillary electrophoresis. *Pharm. Pharmacol. Lett.*, 3 (1993) 156-160; C.A., 120 (1994) 253469z.
- 2085 Lee, H.G. and Cowman, M.K.: An agarose gel electrophoretic method for analysis of hyaluronan molecular weight distribution. *Anal. Biochem.*, 219 (1994) 278-287.
- 10c. Glycoproteins and their constituents
- 2086 Berger, S., Karamanos, Y. Schoentgen, F. and Julien, R.: Characterization and use of biotinylated *Escherichia coli* K99 lectin. *Biochim. Biophys. Acta*, 1206 (1994) 197-202.
- 2087 Cherchi, G.M., Formato, M., Demuro, P., Masserini, M., Varani, I. and DeLuca, G.: Modifications of low density lipoprotein induced by the interaction with human plasma glycosaminoglycan-protein complexes. *Biochim. Biophys. Acta*, 1212 (1994) 345-352.
- 2088 Damhof, R.A., Feijlbrief, M., Welling-Wester, S. and Welling, G.W.: Purification of the integral membrane glycoproteins D of Herpes simples virus types 1 and 2, produced in the recombinant baculovirus expression system, by ion-exchange high-performance liquid chromatography. J. Chromatogr. A, 676 (1994) 43-49.
- 2089 Gilljam, G., Siridewa, K. and Hammar, L.: Purification of simian immunodeficiency virus, SIV_{MAC251}, and of its external envelope glycoprotein, gp148. J. Chromatogr. A, 675 (1994) 89-100.
- 2090 Hatakeyama, T., Kohzaki, H., Nagatomo, H. and Yamasaki, N.: Purification and characterization of four Ca²⁺-dependent lectins from the marine invertebrate, Cucumaria echinata. J. Biochem. (Tokyo), 116 (1994) 209-214.
- 2091 Henson, P.: Monosaccharide and oligosaccharide analysis of glycoproteins electrotransferred onto PVDF membranes. Am. Biotechnol. Lab., 12 (1994) 18-20; C.A., 120 (1994) 293354q.

- 2092 Holló, Z., Homolya, L., Davis, C.W. and Sarkadi, B.: Calcein accumulation as a fluorometric functional assay of the multidrug transporter. *Biochim. Biophys. Acta*, 1191 (1994) 384-388.
- 2093 Kimura, T., Nishikawa, M. and Ohyama, A.: Intracellular membrane traffic of human immunodeficiency virus type 1 envelope glycoproteins: Vpu liberates Golgi-targeted gp160 from CD4-dependent retention in the endoplasmic reticulum. J. Biochem. (Tokyo), 115 (1994) 1010-1020.
- 2094 Nag, B., Arimilli, S., Koukis, B., Rhodes, W., Baichwal, V. and Sharma, S.D.: Intramolecular change heterogeneity in purified major histocompatibility class IIα and β polypeptide chains. J. Biol. Chem., 269 (1994) 10061-10070.
- 2095 Yamasaki, M., Asano, M., Okabe, M., Morimoto, M. and Yokoo, Y.: Modification of recombinant human granulocyte colony-stimulating factor (rhG-CSF) and its derivative ND 28 with polyethylene glycol. J. Biochem. (Tokyo), 115 (1994) 814-819.

See also 2115, 2155, 2282, 2293.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 2096 Reid, R.H.P.: Electrophoretic behaviour of a group of organic anions of biochemical interest in a functionally coherent series of buffers. J. Chromatogr. A, 669 (1994) 151-183.
- 2097 Schneede, J., Mortensen, J.H., Kvalheim, G. and Ueland, P.M.: Capillary zone electrophoresis with laser-induced fluorescence detection for analysis of methylmalonic acid and other shortchain dicarboxylic acids derivatized with 1-pyrenyldiazomethane. J. Chromatogr. A, 669 (1994) 185-193.
- 2098 Valkó, I.E., Billiet, H.A.H., Frank, J. and Luyben, K.C.A.M.: Factors affecting the separation of mandelic acid enantiomers by capillary electrophoresis. *Chromatographia*, 38 (1994) 730-736.

See also 2511, 2551, 2552.

11d. Lipoproteins and their constituents

- 2099 Berglund, L.F., Beltz, W.F., Elam, R.L. and Witztum, J.L.: Altered apolipoprotein B metabolism in very low density lipoprotein from lovastatin-treated guinea pigs. J. Lipid Res., 35 (1994) 956-965.
- 2100 Chen, Q. and Nilsson, Å.: Interconversion of α -linolenic acid in rat intestinal mucosa: studies *in vivo* and in isolated villus and crypt cells. *J. Lipid Res.*, 35 (1994) 604-609.
- 2101 Choi, S.Y., Komaromy, M.C., Chen, J., Fong, L.G. and Cooper, A.D.: Acceleration of uptake of LDL but not chylomicrons or chylomicron remnants by cells that secrete apoE and hepatic lipase. J. Lipid Res., 35 (1994) 848-859.
- 2102 De Silva, H.V., Más-Oliva, J., Taylor, J.M. and Mahley, R.W.: Identification of apolipoprotein B-100 low density lipoproteins, apolipoprotein B-48 remnants, and apolipoprotein E-rich high density lipoproteins in the mouse. J. Lipid Res., 35 (1994) 1297-1310.

- 2103 Gebhardt, A., Peters, A., Gerding, G. and Niendorf, A.: Rapid quantitation of mRNA species in ethidium bromide-stained gels of competitive RT-PCR products. J. Lipid Res., 35 (1994) 976-981
- 2104 Gorenewegen, W.A., Averna, M.R., Pulai, J., Krul, E.S. and Schonfeld, G.: Apolipoprotein B-38.9 does not associate with apo[a] and forms two distinct HDL density particle populations that are larger than HDL. J. Lipid Res., 35 (1994) 1012-1025.
- 2105 Grünler, J., Ericsson, J. and Dallner, G.: Branch-point reactions in the biosynthesis of cholesterol, dolichol, ubiquinone and prenylated proteins. *Biochim. Biophys. Acta*, 1212 (1994) 259-277 - a review with 174 refs.
- 2106 Guyard-Dangremont, V., Lagrost, L. and Gambert, P.: Comparative effects of purified apolipoproteins A-I, A-II, and A-IV on cholesteryl ester transfer protein activity. *J. Lipid Res.*, 35 (1994) 982-992.
- 2107 Inui, Y., Giannoni, F., Funahashi, T. and Davidson, N.O.: REPR and complementation factor(s) interact to modulate rat apolipoprotein B mRNA editing in response to alternations in cellular cholesterol flux. J. Lipid Res., 35 (1994) 1477-1489.
- 2108 Jaid, M., Steinmetz, J., Gambert, P., Galteau, M.M. and Siest, G.: (Adaptation of the "Phast System" to a method for the nonimmunological determination of apolipoprotein A-I). In: Galteau, M.-M. (Editor), Pont-a-Mousson, 5th 1992, Libbey, Montrouge, 1993, pp. 553-556; C.A., 121 (1994) 4354h.
- 2109 Jonas, A., Bottum, K., Theret, N., Duchateau, P. and Castro, G.: Transfer of cholesterol from Ob 1771 cells or LDL to reconstituted, defined high density lipoproteins. *J. Lipid Res.*, 35 (1994) 860-870.
- 2110 Kajikawa, M., Ohta, T., Takase, M., Kawase, K., Shimamura, S. and Matsuda, I.: Lactoferrin inhibits cholesterol accumulation in macrophages mediated by acetylated or oxidized low-density lipoproteins. *Biochim. Biophys. Acta*, 1213 (1994) 82-90.
- 2111 Karpe, F. and Hamsten, A.: Determination of apolipoproteins B-48 and B-100 in triglyceride-rich lipoproteins by analytical SDS-PAGE. J. Lipid Res., 35 (1994) 1311-1317.
- 2112 Kronenberg, F., Lobentanz, E.-M., Koonig, P., Utermann, G. and Dieplinger, H.: Effect of sample storage on the measurement of lipoprotein a, apolipoproteins B and A-IV, total and high density lipoprotein cholesterol and triglycerides. J. Lipid Res., 35 (1994) 1318-1328.
- 2113 Leroy, A. and Jonas, A.: Native-like structure and self-association behavior of apolipoprotein A-I in a water/n-propanol solution. *Biochim. Biophys. Acta*, 1212 (1994) 285-294.
- 2114 Liang, H.-Q., Rye, K.-A. and Barter, P.J.: Dissociation of lipid-free apolipoprotein A-I from high density lipoproteins. *J. Lipid Res.*, 35 (1994) 1187-1199.
- 2115 Lüttmann, S., von Eckardstein, A., Wei, W., Funke, H., Köhler, E., Mahley, W. and Assmann, G.: Electrophoretic screening for genetic variation in apolipoprotein C-III: identification of a novel apoC-III variant, apoC-III (Asp 45—Asn), in a Turkish patient. J. Lipid Res., 35 (1994) 1431-1440.
- 2116 Miserez, A.R., Laager, R., Chiodetti, N. and Keller, U.: High prevalence of familial defective apolipoprotein B-100 in Switzerland. J. Lipid Res., 35 (1994) 574-583.
- 2117 Rea, T.J., Bisgaier, C.L., DeMattos, R.B. and Pape, M.E.: Rabbit liver apolipoprotein A-I synthesis is under nonparenchymal cell paracrine control. *J. Lipid Res.*, 35 (1994) 1274-1282.

- 2118 Robert, B., Grandhomme, M., Mainard, F. and Madec, Y.: Effect of storage of sera and apolipoprotein(a) phenotypes on detection of lipoprotein(a) by a new agarose gel. Clin. Chim. Acta, 225 (1994) 195-201.
- 2119 Rye, K.-A. and Barter, P.J.: The influence of apolipoproteins on the structure and function of spheroidal, reconstituted high density lipoproteins. J. Biol. Chem., 269 (1994) 10298-10303.
- 2120 Scaccini, C., Chiesa, G. and Jialal, I.: A critical assessment of the effects of aminoguanidine and ascorbate on the oxidative modification of LDL: evidence for interference with some assays of lipoprotein oxidation by aminoguanidine. *J. Lipid Res.*, 35 (1994) 1085-1092.
- 2121 Schaefer, E.J., Lamon-Fava, S., Cohn, S.D., Schaefer, M.M., Ordovas, J.M., Castelli, W.P. and Wilson, P.W.F.: Effects of age, gender, and menopausal status on plasma low density lipoprotein cholesterol and apolipoprotein B levels in the Framingham Offspring Study. J. Lipid Res., 35 (1994) 779-792.
- 2122 Schreiber, B.M., Jones, H.V. and Franzdau, C.: Apolipoprotein E expression in aortic smooth muscle cells: the effect of βVLDL. J. Lipid Res., 35 (1994) 1177-1186.
- 2123 Walzem, E.L., Davis, P.A. and Hansen, E.J.: Overfeeding increases very low density lipoprotein diameter and causes the appearance of a unique lipoprotein particle in association with failed yolk deposition. *J. Lipid Res.*, 35 (1994) 1354-1366.
- 2124 White, A.L., Hixson, J.E., Rainwater, D.L. and Lanford, R.E.: Molecular basis for "null" lipoprotein(a) phenotypes and the influence of apolipoprotein(a) size on plasma lipoprotein(a) level in the baboon. J. Biol. Chem., 269 (1994) 9060-9066.
- 2125 Wu, X., Sakata, N., Dixon, J. and Ginsberg, H.N.: Exogenous VLDL stimulates apolipoprotein B secretion from HepG2 cells by both pre-and post-translational mechanisms. J. Lipid Res., 35 (1994) 1200-1210.
- 2126 Yao, Z. and McLeod, R.S.: Synthesis and secretion of hepatic apolipoprotein B-containing lipoproteins. *Biochim. Biophys. Acta*, 1212 (1994) 152-166.

See also 2184, 2282.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

2127 Chan, K.C., Alvarado, A.B., McGuire, M.T., Muschik, G.M., Issaq, H.J. and Snader, K.M.: High-performance liquid chromatography and micellar electrokinetic chromatography of taxol and related taxanes from bark and needle extracts of *Taxus* species. J. Chromatogr. B, 657 (1994) 301-306.

16. NITRO AND NITROSO COMPOUNDS

2128 Ng, C.L., Ong, C.P., Lee, H.K. and Li, S.F.Y.: Capillary electrophoretic separation of nitrosamines using combined open-tubular and packed capillary columns. *J. Chromatogr. Sci.*, 32 (1994) 121-125.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 2129 Armstrong, D.W., Rundlett, K. and Reid, G.L., III: Use of a macrocyclic antibiotic, rifamycin B, and indirect detection for the resolution of racemic amino alcohols by CE. *Anal. Chem.*, 66 (1994) 1690-1695.
- 2130 Brumley, W.C. and Brownrigg, C.M.: Applications of MEKC in the determination of benzidines following extraction from water, soil, sediment, and chromatographic adsorbents. J. Chromatogr. Sci., 32 (1994) 69-75.

See also 2041.

17b. Catecholamines and their metabolites

See 2129, 2138.

- 17d. Other amine derivatives and amides (excl. peptides)
- 2131 Jansen, E.H.J.M. and de Fluiter, P.: Determination of N-methylnicotinamide in urine with capillary zone electrophoresis. J. Liq. Chromatogr., 17 (1994) 1929-1939.
- AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PRO-TEINS
- 18a. Amino acids and their derivatives
- 2132 De Witt, P., Deias, R., Muck, S., Galletti, B., Meloni, D., Celletti, P. and Marzo, A.: High-performance liquid chromatography and capillary electrophoresis of L- and D-carnitine by precolumn diastereomeric derivatization. J. Chromatogr. B, 657 (1994)
- 2133 Nickerson, B.: The analysis of limited quantities of amino acids and peptides using capillary electrophoresis and laser induced fluorescence detection. Avail. *Univ. Microfilms Int.*, Order No. DA9216760, 1991, 404 p.; C.A., 120 (1994) 314867b.
- 2134 Okafo, G.N. and Camilleri, P.: Direct chiral resolution of amino acid derivatives by capillary electrophoresis. *J. Microcolumn* Sep., 5 (1993) 149-153; C.A., 121 (1994) 25951r.
- 2135 Ruyters, H. and van der Wal, S.: Fully automated analysis of amino acid enantiomers by derivatization and chiral separation on a capillary electrophoresis instrument. J. Liq. Chromatogr., 17 (1994) 1883-1897.
- 2136 Skočir, E., Vindevogel, J. and Sandra, P.: Separation of 23 dansylated amino acids by micellar electrokinetic chromatography at low temperature. *Chromatographia*, 39 (1994) 7-14.
- 2137 Sweedler, J.V., Fuller, R., Tracht, S., Timperman, A., Toma, V. and Khatib, K.: Novel detection schemes for the trace analysis of amino acids and peptides using capillary electrophoresis. J. Microcolumn Sep., 5 (1993) 403-412; C.A., 120 (1994) 293362r.
- 2138 Weber, P.L., O'Shea, T.J. and Lunte, S.M.: Separation and quantitation of the amino acid neurotransmitters in rat brain by capillary electrophoresis. *J. Pharm. Biomed. Anal.*, 12 (1994) 319-324.

2139 Zieboll, G. and Orgel, L.E.: The use of gel electrophoresis to study the reactions of activated amino acids with oligonucleotides. J. Mol. Evol., 38 (1994) 561-565; C.A., 121 (1994) 4362j.

See also 2043, 2072, 2151.

- 18b. Peptides, peptidic and proteinous hormones, growth factors
- 2140 Bazylak, G.: Reversed-phase high-performance liquid chromatography of the stereoisomers of some sweetener peptides with a helical nickel(II) chelate in the mobile phase. *J. Chromatogr. A*, 668 (1994) 519-527.
- 2141 Brandt, R., Normanno, N., Gullick, W.J., Lin, J., Harkins, R., Schneider, D., Jones, B.-W., Ciardiello, F., Persico, M.G., Armenante, F. et al.: Identification and biological characterization of an epidermal growth factor-related protein: cripto-1. *J. Biol. Chem.*, 269 (1994) 17320-17328.
- 2142 Castagnola, M., Cassiano, L., Messana, I., Nocca, G., Rabino, R., Rossetti, D.V. and Giardina, B.: Capillary zone electrophoresis of peptides: prediction of the electrophoretic mobility and resolution. *J. Chromatogr. B*, 656 (1994) 87-97.
- 2143 Chang, J.P., Smiley, D.L. and Coleman, M.R.: Free-solution capillary electrophoresis of tryptic digest fragments of a recombinant porcine pro-growth hormone releasing hormone. *J. Lig. Chromatogr.*, 17 (1994) 1899-1916.
- 2144 Cornelisse, M.M., Bennett, P.E., Christiansen, M., Blaakaer, J., Gluud, C., Andersen, J.R., Homann, C. and Garred, P.: Sex hormone binding globulin phenotypes: their detection and distribution in healthy adults and in different clinical conditions. Clin. Chim. Acta, 225 (1994) 115-121.
- 2145 Curmi, P.A., Maucuer, A., Asselin, S., Lecourtois, M., Chaffotte, A., Schmitter, J.-M. and Sobel, A.: Molecular characterization of human stathmin expressed in *Escherichia coli*: site-directed mutagenesis of two phosphorylatable serines (Ser-25 and Ser-63). *Biochem. J.*, 300 (1994) 331-338.
- 2146 Hurst, W.J., McLaughlin, P.J. and Zagon, I.S.: A rapid method for enkephalin analysis in tissues by capillary electrophoresis. *J. Lig. Chromatogr.*, 17 (1994) 1877-1881.
- 2147 Jarzebinski, J. and Szrajber, Z.: (Examination of certain peptides isolated from the residue left after insulin separation from pancreas. III. Analytical characteristic of the products separated by chromatography and electrophoresis). Acta Pol. Pharm., 50 (1993) 121-125; C.A., 120 (1994) 318776u.
- 2148 Kašička, V., Prusík, Z., Smékal, O., Hlaváček, J., Barth, T., Weber, G. and Wagner, H.: Application of capillary and free-flow zone electrophoresis and isotachophoresis to the analysis and preparation of the synthetic tetrapeptide fragment of growth hormone-releasing peptide. J. Chromatogr. B, 656 (1994) 99-106.
- 2149 Lerner, E.A. and Nelson, R.J.: Recovery of biological activity and determination of N-terminal sequence of maxadilan following capillary electrophoresis. *LC-GC Int.*, 7 (1994) 336-338.
- 2150 Nashabeh, W., Greve, K.F., Kirby, D., Foret, F., Karger, B.L., Reifsnyder, D.H. and Builder, S.E.: Incorporation of hydrophobic selectivity in capillary electrophoresis: analysis of recombinant insulin-like growth factor I variants. *Anal. Chem.*, 66 (1994) 2148-2154.

- 2151 Okafo, G.N., Birrell, H.C., Greenaway, M., Haran, M. and Camiller, P.: The effect of phytic acid on the resolution of peptides and proteins in capillary electrophoresis. *Anal. Biochem.*, 219 (1994) 201-206.
- 2152 Phillips, T.M. and Kimmel, P.L.: High-performance capillary electrophoretic analysis of inflammatory citokines in human biopsies. J. Chromatogr. B, 656 (1994) 259-266.
- 2153 Piccoli, G., Fiorani, M., Biagiarelli, B., Palma, F., Potenza, L., Amicucci, A. and Stocchi, V.: Simultaneous high-performance capillary electrophoretic determination of reduced and oxidized glutathione in red blood cells in the femtomole range. *J. Chro-matogr. A*, 676 (1994) 239-246.
- 2154 Reubsaet, J.L.E., Beijnen, J.H., Bult, A., Teeuwsen, J., Koster, E.H.M., Waterval, J.C.M. and Underberg, W.J.M.: Reversed phase high-performance liquid chromatography and capillary electrophoresis in the stability study of the neuropeptide growth factor antagonist [Arg6,D-Trp7,9,MePhe8]-substance P {6-11}; a comparative study. Anal. Biochem., 220 (1994) 98-102.
- 2155 Richards, R.M.E. and Xing, D.K.L.: Capillary zone electrophoresis assay of the uridine diphosphate N-acetylmuramyl peptide precursors and the disaccharide pentapeptide derivative of bacterial cell wall peptidoglycan. *J. Pharm. Biomed. Anal.*, 12 (1994) 301-305.
- 2156 Rosnack, K.J., Stroh, J.G., Singleton, D.H., Guarino, B.C. and Andrews, G.C.: Use of capillary electrophoresis-electrospray ionization mass spectrometry in the analysis of synthetic peptides. J. Chromatogr. A, 675 (1994) 219-225.
- 2157 Survay, M.A., Goodall, D.M., Wren, S.A.C. and Rowe, R.C.: Effect of pH and buffer concentration on the separation of oligoglycines by capillary electrophoresis. *Anal. Proc.*, 30 (1993) 477-479; C.A., 120 (1994) 338051g.
- 2158 Tagliaro, F., Moffa, M., Gentile, M.M., Clavenna, G., Valentini, R., Ghielmi, S. and Marigo, M.: Free solution capillary electrophoresis of calcitonins and calcitonin tryptic digests. J. Chromatogr. B, 656 (1994) 107-113.

See also 2023, 2032, 2133, 2137, 2384.

- 18c. Elucidation of structure of proteins and enzymes
- 2159 Kurosaka, D., Hattori, S., Hori, H., Yamaguchi, N., Hasegawa, T., Akimoto, H. and Nagai, Y.: Substitution of cysteine for glycine-946 in the α1(I) chain of type I procollagen causes lethal osteogenesis imperfecta. J. Biochem. (Tokyo), 115 (1994) 853-857.
- 2160 Nokihara, K., Kuriki, T. and Morita, N.: Two-dimensional electrophoresis as a complementary method of isolating peptide fragments of cleaved proteins for internal sequencing. *J. Chromatogr. A*, 676 (1994) 233-238.
- 2161 Ramshaw, J.A.M., Stephens, L.J. and Tulloch, P.A.: Methylene blue sensitized photo-oxidation of collagen fibrils. *Biochim. Biophys. Acta*, 1206 (1994) 225-230.
- 2162 Ronnenberg, J., Preitz, B., Wöstemeier, G. and Diekmann, S.: Immobilized residue-specific endoproteinases for protein sequencing. J. Chromatogr. B, 656 (1994) 169-177.
- 2163 Rudnick, S.E., Hilser, V.J., Jr. and Worosila, G.D.: Comparison of the utility of capillary zone electrophoresis and high-performance liquid chromatography in peptide mapping and separation. J. Chromatogr. A, 672 (1994) 219-229.

BIBLIOGRAPHY SECTION

2164 Vonguyen, L., Wu, J. and Pawliszyn, J.: Peptide mapping of bovine and chicken cytochrome c by capillary isoelectric focusing with universal concentration gradient imaging. *J. Chroma*togr. B, 657 (1994) 333-338.

See also 2148, 2158, 2167, 2300, 2361.

PROTEINS

19a. General techniques

- 2165 Benedek, K. and Thiede, S.: High-performance capillary electrophoresis of proteins using sodium dodecyl sulfate-poly(ethylene oxide). J. Chromatogr. A, 676 (1994) 209-217.
- 2166 Bradshaw, R.A. and Stewart, A.E.: Analysis of protein modifications: recent advances in detection, characterization and mapping. Curr. Opin. Biotechnol., 5 (1994) 85-93; C.A., 120 (1994) 293183h a review with 51 refs.
- 2167 Copeland, R.A.: Reverse fluorescence staining of proteins in polyacrylamide gels using terbium chloride. *Anal. Biochem.*, 220 (1994) 218-219.
- 2168 Gomez, F.A., Chen, J.K., Tanaka, A., Schreiber, S.L. and Whitesides, G.M.: Affinity capillary electrophoresis: insights into the binding of SH3 domains by peptides derived from an SH3-binding protein. *J. Org. Chem.*, 59 (1994) 2885-2886; C.A., 120 (1994) 293363s.
- 2169 Guttman, A., Shieh, P., Lindahl, J. and Cooke, N.: Capillary sodium dodecyl sulfate gel electrophoresis of proteins. II. On the Ferguson method in polyethylene oxide gels. *J. Chroma*togr. A, 676 (1994) 227-231.
- 2170 Hara, T., Nishida, H., Kayama, S. and Nakajima, R.: Capillary zone electrophoretic separation of protein labeled with Rhodamine B isothiocyanate and its online chemiluminescence detection. *Bull. Chem. Soc. Jpn.*, 67 (1994) 1193-1195; C.A., 120 (1994) 293385a.
- 2171 Kendrick, N.C., Johansen, J.J., Lee, P.R. and Santek, D.A.: Optimization of an HP scanjet for quantification of protein electro-phoresis gels. *Anal. Biochem.*, 219 (1994) 297-304.
- 2172 Luther, J.R. and Glatz, C.E.: Genetically engineered charge modifications to enhance protein separation in aqueous twophase systems: electrochemical partitioning. *Biotechnol. Bioeng.*, 44 (1994) 147-153; C.A., 121 (1994) 7339t.
- 2173 Mortz, E., Vorm, O., Mann, M. and Roepstorff, P.: Identification of proteins in polyacrylamide gels by mass spectrometric peptide mapping combined with database search. *Biol. Mass Spectrom.*, 23 (1994) 249-261; C.A., 120 (1994) 318607a.
- 2174 Na, D.-S., Hong, H.-Y., Yoo, G.-S. and Choi, J.-K.: Evans blue staining method for detection of proteins on polyacrylamide gels with rhodamine B. *Anal. Lett.*, 27 (1994) 1265-1275.
- 2175 Nakatani, M., Shibukawa, A. and Nakagawa, T.: High-performance capillary electrophoresis of SDS-proteins using pullulan solution as separation matrix. J. Chromatogr. A, 672 (1994) 213-218.
- 2176 Naqvi, S.M.S., Özaep, V.C., Öktem, H.A. and Yücel, M.: Two-dimensional electrophoresis of proteins with a different approach to isoelectric focusing. *Analyst (Cambridge)*, 119 (1994) 1341-1344.

2177 Nesterenko, M.V., Tilley, M. and Upton, S.J.: A simple modification of Blum's silver stain method allows for 30 min detection of proteins in polyacrylamide gels. *J. Biochem. Biophys. Methods*, 28 (1994) 239-242; C.A., 121 (1994) 4269j.

- 2178 Shieh, P.C.H., Hoang, D., Guttman, A. and Cooke, N.: Capillary sodium dodecyl sulfate gel electrophoresis of proteins. I. Reproducibility and stability. J. Chromatogr. A, 676 (1994) 219-226.
- 2179 Smejkal, G., and Gallagher, S.: Determination of semidry protein transfer efficiency with transverse gradient gel electrophoresis. *BioTechniques*, 16 (1994) 196-202; C.A., 120 (1994) 293355r
- 2180 Takahashi, S., Hatsuzawa, K., Watanabe, T., Murakami, K. and Nakayama, K.: Sequence requirements for endoproteolytic processing of precursor proteins by furin: transfection and in vitro experiments. J. Biochem. (Tokyo), 116 (1994) 47-52.
- 2181 Wu, J. and Pawliszyn, J.: Application of capillary isoelectric focusing with absorption imaging detection to the analysis of proteins. J. Chromatogr. B, 657 (1994) 327-332.
- See also 1992, 2022, 2023, 2027, 2032, 2052, 2066, 2068, 2070, 2151, 2534.
- 19b. Proteins of cells, viruses and subcellular particles
- 2182 Amrein, K.E., Panholzer, B., Molnos, J., Flint, N.A., Scheffler, J., Lahm, H.-W., Bannwarth, W. and Burn, P.: Mapping of the p56lck-mediated phosphorylation of GAP and analysis of its influence on p21ras-GTPase activity in vitro. Biochim. Biophys. Acta, 1222 (1994) 441-446.
- 2183 Asagami, H., Hino, Y., Kang, D., Minakami, S. and Takeshige, K.: Preferential heme transport through endoplasmic reticulum associated with mitochondria in rat liver. *Biochim. Biophys. Acta*, 1193 (1994) 345-352
- 2184 Azhar, S., Frazier, J.A., Tsai, L. and Reaven, E.: Effect of okadaic acid on utilization of lipoprotein-derived cholesteryl esters by rat steroidogenic cells. J. Lipid Res., 35 (1994) 1161-1176.
- 2185 Basdra, E.K., Huber, L.A., Komposch, G. and Papavassiliou, A.G.: Mechanical loading triggers specific biochemical responses in mandibular condylar chondrocytes. *Biochim. Biophys. Acta*, 1222 (1994) 315-322.
- 2186 Blaho, J.A., Mitchell, C. and Roizman, B.: An amino acid sequence shared by the herpes simplex virus 1 α regulatory proteins 0, 4, 22, and 27 predicts the nucleotidylation of the U_L21, U_L31, U_L47, and U_L49 gene products. J. Biol. Chem., 269 (1994) 17401-17410.
- 2187 Byers, D.M., Douglas, J.-A., Cook, H.W., Palmer, F.B. St. C. and Ridgway, N.D.: Regulation of intracellular cholesterol metabolism is defective in lymphoblasts from Niemann-Pick type C and type D patients. *Biochim. Biophys. Acta*, 1226 (1994) 173-180.
- 2188 Errasfa, M. and Stern, A.: Melittin inhibits epidermal growth factor-induced protein tyrosine phosphorylation: comparison with phorbol myristate acetate and calcium ionophore A23187. Biochim. Biophys. Acta, 1222 (1994) 471-476.
- 2189 Goldman, R., Ferber, E., Meller, R. and Zor, U.: A role for reactive oxygen species in zymosan and β-glucan induced protein tyrosine phosphorylation and phospholipase A₂ activation in murine macrophages. *Biochim. Biophys. Acta*, 1222 (1994) 265-276.

2190 Green, S.P. and Phillips, W.A.: Activation of the macrophage respiratory burst by phorbol myristate acetate: evidence for both tyrosine-kinase-dependent and -independent pathways. *Bjochim. Biophys. Acta*, 1222 (1994) 241-248.

- 2191 Hrabe de Angelis, M., Dannhorn, D.R., Hänel, H. and Kirchner, C.: Effect of rilopirox on rabbit blastocysts in a protein-free in vitro culture under different culture conditions. Arzneim.-Forsch., 44 (1994) 674-678.
- 2192 Iwahashi, J., Takaichi, S., Mihara, K. and Omura, T.: Reconstitution of import-competent outer membrane vesicles from mammalian mitochondria. *J. Biochem. (Tokyo)*, 116 (1994) 156-163.
- 2193 Kim, G.-D. and Milligan, G.: Concurrent specific immunological detection of both primate and rodent forms of the guanine nucleotide binding protein G₁₁α following their coexpression. Biochim. Biophys. Acta, 1222 (1994) 369-374.
- 2194 LeGrand, C.B. and Thieringer, R.: CD14-Dependent induction of protein tyrosine phosphorylation by lipopolysaccharide in murine B-lymphoma cells. *Biochim. Biophys. Acta*, 1223 (1994) 36-46.
- 2195 Liu, A.Y.-C., Bian, H., Huang, L.E. and Lee, Y.K.: Transient cold shock induces the heat shock response upon recovery at 37° C in human cells. *J. Biol. Chem.*, 269 (1994) 14768-14775.
- 2196 Luo, B.X., Mookerjee, B., Ferrari, A., Mistry, S. and Atweh, G.F.: Regulation of phosphoprotein p18 in leukemic cells. Cell cycle regulated phosphorylation by p34cdc2kinase. *J. Biol. Chem.*, 269 (1994) 10312-10318.
- 2197 Magnani, M., Crinelli, R., Antonelli, A., Casabianca, A. and Serafini, G.: The soluble but not mitochondrially bound hexokinase is a substrate for the ATP- and ubiquitin-dependent proteolytic system. *Biochim. Biophys. Acta*, 1206 (1994) 180-190.
- 2198 Merquior, V.L.C., Peralta, J.M., Facklam, R.R. and Teixeira, L.M.: Analysis of electrophoretic whole-cell protein profiles as a tool for characterization of *Enterococcus* species. *Curr. Microbiol.*, 28 (1994) 149-153; C.A., 120 (1994) 293358u.
- 2199 Moreno, F.J., Alonso, G. and Ros, M.: Bromocryptine treatment increases lipolysis and steady-state levels of G proteins in adipocytes from lactating rats. *Biochim. Biophys. Acta*, 1222 (1994) 203-207.
- 2200 Mori, K., Wada, Y., Mimuro, J., Matsuda, M., Yoshikuni, Y., Kimura, K. and Sakata, Y.: Effect of glycosidase inhibitors on the biosynthesis of α2-plasmin inhibitor and antithrombin III Hep G2 cells. *Biochim. Biophys. Acta*, 1226 (1994) 300-306.
- 2201 Munks, R.J.L. and Turner, B.M.: Suppression of heat-shock protein synthesis by short-chain fatty acids and alcohols. *Biochim. Biophys. Acta*, 1223 (1994) 23-28.
- 2202 Papadopoulos, D., Jörnvall, H., Rydström, J. and DePierre, J.W.: Purification and initial characterization of microsomal epoxide hydrolase from the human adrenal gland. *Biochim. Biophys.* Acta, 1206 (1994) 253-262.
- 2203 Reif, K., Buday, L., Downward, J. and Cantrell, D.A.: SH3 Domains of the adapter molecule Grb2 complex with two proteins in T cells: the guanine nucleotide exchange protein Sos and a 75-kDa protein that is a substrate for T cell antigen receptor-activated tyrosine kinases. J. Biol. Chem., 269 (1994) 14081-14087.

- 2204 Scheele, J.S., Pilz, R.B., Quilliam, L.A. and Boss, G.R.: Identification of a ras-related protein in murine erythroleukemia cells that is a cAMP-dependent protein kinase substrate and is phosphorylated during chemically induced differentiation. *J. Biol. Chem.*, 269 (1994) 18599-18606.
- 2205 Smith, D.M., Tran, H.M., Soo, V.W., McQuiston, S.A., Tartaglia, L.A., Goeddel, D.V. and Epsetin, L.B.: Enhanced synthesis of tumor necrosis factor-inducible proteins, plasminogen activator inhibitor-2, manganese superoxide dismutase, and protein 28/5.6, is selectively triggered by the 55-kDa tumor necrosis factor receptor in human melanoma cells. J. Biol. Chem., 269 (1994) 9898-9905.
- 2206 Wieslander, A., Rilfors, L., Dahlqvist, A., Jonsson, J., Hellberg, S., Rännar, S., Sjöström, M. and Lindblom, G.: Similar regulatory mechanisms despite differences in membrane lipid composition in Acholeplasma laidlawii strains A-EF22 and B-PG9. A multivariate data analysis. Biochim. Biophys. Acta, 1191 (1994) 331-342
- 2207 Wu, X., Lin, J., Walz, T., Häner, M., Yu, J., Aebi, U. and Sun, T.: Mammalian uroplakins. A group of highly conserved urothelial differentiation-related membrane proteins. *J. Biol. Chem.*, 269 (1994) 13716-13724.

See also 2264, 2293, 2308.

- 19c. Proteins synthesized by genetic manipulation, monoclonal antihodies
- 2208 Agraz, A., Duarte, C.A., Costa, L., Pérez, L., Páez, R., Pujol, V. and Fontirrochi, G.: Immunoaffinity purification of recombinant hepatitis B surface antigen from yeast using a monoclonal antibody. J. Chromatogr. A, 672 (1994) 25-33.
- 2209 DeManno, D.A., Jackiw, V., Brooks, E.J. and Hunzicker-Dunn, M.: Characterization of recombinant RIβ and evaluation of the presence of RIβ protein in rat brain and testicular extracts. *Bio-chim. Biophys. Acta*, 1222 (1994) 501-510.
- 2210 Hossain, S.A., Tanizawa, K., Kazuta, Y. and Fukui, T.: Overproduction and characterization of recombinant UDP-glucose pyrophosphorylase from *Escherichia coli* K-12. *J. Biochem. (Tokyo)*, 115 (1994) 965-972.
- 2211 Kawashima, H., Kusunose, E., Kikuta, Y., Kinoshita, H., Tanaka, S., Yamamoto, S., Kishimoto, T. and Kusunose, M.: Purification and cDNA cloning of human liver CYP4A fatty acid ω-hydroxylase. *J. Biochem. (Tokyo)*, 116 (1994) 74-80.
- 2212 Kawauchi, Y., Takasaki, J., Matsuura, Y. and Masuho, Y.: Preparation and characterization of human rheumatoid arthritic synovial fluid phospholipase A₂ produced by recombinant baculovirus-infected insect cells. J. Biochem. (Tokyo), 116 (1994) 81-87
- 2213 Kennedy, S.P., Weed, S.A., Forget, B.G. and Morrow, J.S.: A partial structural repeat forms the heterodimer self-association site of all β-spectrins. J. Biol. Chem., 269 (1994) 11400-11408.
- 2214 Kraus, C., Klein, E. and Ballhausen, W.G.: Purification of recombinant adenomatous polyposis coli polypeptide chains from E. coli extracts by continuous-elution electrophoresis. Appl. Theor. Electrophor., 3 (1993) 271-275; C.A., 120 (1994) 318635x.
- 2215 Lim, C.-J., Hwang, W., Park, E.-H. and Fuchs, J.A.: Cyclic AMP-dependent expression of the *Escherichia coli* serC-aroA operon. *Biochim. Biophys. Acta*, 1218 (1994) 250-253.

B448 BIBLIOGRAPHY SECTION

- 2216 Liška, V., Dyr, J.E., Suttnar, J., Hirsch, I. and Vonka, V.: Production and simple purification of a protein encoded by part of the gag gene of HIV-1 in the Escherichia coli HB101F+ expression system inducible by lactose and isopropyl-β-D-thiogalactopyranoside. J. Chromatogr. B, 656 (1994) 127-133.
- 2217 Quinn, G.B., Reeves, I.G. and Day, I.N.M.: Mapping of antigenic sites in human neuron-specific enolase by expression subcloning. Clin. Chem. (Washington), 40 (1994) 790-795.
- 2218 Rossomando, E.F., White, L. and Ulfelder, K.J.: Capillary electrophoresis: separation and quantitation of reverse transcriptase polymerase chain reaction products from polio virus. *J. Chro*matogr. B, 656 (1994) 159-168.
- 2219 Sala-Newby, G.B. and Campbell, A.K.: Stepwise removal of the C-terminal 12 amino acids of firefly luciferase results in graded loss of activity. *Biochim. Biophys. Acta*, 1206 (1994) 155-160.
- 2220 Seidler, A.: Expression of the 23 kDa protein from the oxygenevolving complex of higher plants in *Escherichia coli. Biochim. Biophys. Acta*, 1187 (1994) 73-79.
- 2221 Suttnar, J., Dyr, J.E., Hamšíková, E., Novák, J. and Vonka, V.: Procedure for refolding and purification of recombinant proteins from *Escherichia coli* inclusion bodies using a strong anion exchanger. *J. Chromatogr. B*, 656 (1994) 123-126.
- 2222 Svoboda, M., Bauhofer, A., Schwind, P., Bade, E., Rasched, I. and Przybylski, M.: Structural characterization and biological activity of recombinant human epidermal growth factor proteins with different N-terminal sequences. *Biochim. Biophys. Acta*, 1206 (1994) 35-41.
- 2223 Zhu, J., Hansen, H., Su, L., Shieh, H.-L. and Riedel, H.: Ligand regulation of bovine protein kinase C alpha response via either cysteine-rich repeat of conserved region C1. J. Biochem. (Tokyo), 115 (1994) 1000-1009.

See also 2233, 2261, 2339, 2361, 2363, 2434.

19d. Microbial and plant proteins

- 2224 Bubunenko, M.G. and Subramanian, A.R.: Recognition of novel and divergent higher plant chloroplast ribosomal proteins by Escherichia coli ribosome during in vivo assembly. J. Biol. Chem., 269 (1994) 18223-18231.
- 2225 Duman, J.G.: Purification and characterization of a thermal hysteresis protein from a plant, the bittersweet nightshade Solanum dulcamara. Biochim. Biophys. Acta, 1206 (1994) 129-135.
- 2226 Enami, I., Kitamura, M., Tomo, T., Isokawa, Y., Ohta, H. and Katoh, S.: Is the primary cause of thermal inactivation of oxygen evolution in spinach PS II membranes release of the extrinsic 33 kDa protein or of Mn? *Biochim. Biophys. Acta*, 1186 (1994) 52-58.
- 2227 Grimsley, J.K., Tjalkens, R.B., Strauch, M.A., Bird, T.H., Spiegelman, G.B., Hostomsky, Z., Whiteley, J.M. and Hoch, J.A.: Subunit composition and domain structure of the SpoOA sporulation transcription factor of *Bacillus subtilis*. *J. Biol. Chem.*, 269 (1994) 16977-16982.
- 2228 Julia, M.I.: (Electrophoretic analysis of wheat gluten proteins). Pol'nohospsodarstvo, 39 (1993) 866-876; C.A., 120 (1994) 321606u.

2229 Leduc-Brodard, V., David, B. and Peltre, G.: Comparison of three horizontal two-dimensional electrophoretic techniques to separate grass pollen allergens. *Cell. Mol. Biol. (Paris)*, 40 (1994) 1-8; C.A., 120 (1994) 320859s.

- 2230 Lopez, F., Vansuyt, G., Derancourt, J., Fourcroy, P. and Casse-Delbart, F.: Identification by 2D-PAGE analysis of salt-stress induced proteins in radish (*Raphanus sativus*). Cell. Mol. Biol. (Paris), 40 (1994) 85-90; C.A., 120 (1994) 318657f.
- 2231 Mishra, N.P., Francke, C., van Gorkom, H.J. and Ghanotakis, D.F.: Destructive role of singlet oxygen during aerobic illumination of the Photosystem II core comples. *Biochim. Biophys.* Acta, 1186 (1994) 81-90.
- 2232 Olshevsky, E.G., Lisakovsky, S.V., Volodina, T.V., Kozel'tsev, V.L. and Shain, S.S.: (Ergot strains identification using electrophoretic analysis of sclerocial body proteins). *Biokhimiya (Moscow)*, 59 (1994) 589-597; C.A., 120 (1994) 318663e.
- 2233 Schmidt, T.G.M. and Skerra, A.: One-step affinity purification of bacterially produced proteins by means of the "Strep tag" and immobilized recombinant core streptavidin. *J. Chroma*togr. A, 676 (1994) 337-345.
- 2234 Shani, N., Rosenberg, N., Kasarda, D.D. and Galili, G.: Mechanisms of assembly of wheat high molecular weight glutenins inferred from expression of wild-type and mutant subunits in transgenic tobacco. J. Biol. Chem., 269 (1994) 8924-8930.
- 2235 Zhang, J., Hu, X., Henkow, L., Jordan, B.R. and Strid, Å.: The effects of ultraviolet-B radiation on the CF₀F₁-ATPase. *Biochim. Biophys. Acta*, 1185 (1994) 295-302.

See also 2208, 2214, 2220, 2302.

19e. Proteins of blood, serum and blood cells

- 2236 Hashimoto, Y, Togo, M., Tsukamoto, K., Horie, Y., Watanabe, T. and Kurokawa, K.: Protein kinase C-dependent and -independent mechanisms of dense granule exocytosis by human platelets. *Biochim. Biophys. Acta*, 1222 (1994) 56-62.
- 2237 Moon, H.J., Lee, S.Y., Kurata, S., Natori, S. and Lee, B.L.: Purification and molecular cloning of cDNA for an inducible antibacterial protein from larvae of the coleopteran, *Tenebrio molitor*. J. Biochem. (Tokyo), 116 (1994) 53-58.
- 2238 Müller-Schulte, D., Melzer, H. and Mann, H.: Removal of β₂-microglobulin using grafted affinity adsorbents as therapeutic approach for the treatment of hemodialysis patients. *J. Chromatogr. B*, 656 (1994) 135-141.
- 2239 Nagy, J.: Purification of the anorectic agent satietin from bovine serum. *Pharmacol. Biochem. Behav.*, 48 (1994) 17-22; C.A., 120 (1994) 290779h.
- 2240 Reif, O.W., Lausch, R. and Freitag, R.: Application of CE to the quantitative and qualitative analysis of serum proteins. *Int. Lab.*, 24, No. 7 (1994) 10-14.
- 2241 Rey, C., Véricel, E., Némoz, G., Chen, W., Chapuy, P. and Lagarde, M.: Purification and characterization of glutathione peroxidase from human blood platelets. Age-related changes in the enzyme. *Biochim. Biophys. Acta*, 1226 (1994) 219-224.
- 2242 Sakata, N., Jakab, E. and Wadström, T.: Human plasma fibronectin possesses second binding site(s) to Staphylococcus aureus on its C-terminal region. J. Biochem. (Tokyo), 115 (1994) 843-848.

- 2243 Sun, T., Peng, S. and Narurkar, L.: Modified immunoselection technique for definitive diagnosis of heavy-chain disease. *Clin. Chem. (Washington)*, 40 (1994) 664.
- 2244 Tichá, M., Železná, B., Jonáková, V. and Filka, K.: Immobilization of heparin on polyacrylamide derivatives. *J. Chromatogr. B*, 656 (1994) 423-426.
- 2245 Trotter, P.J., Orchard, M.A. and Walker, J.H.: Thrombin stimulates the intracellular relocation of annexin V in human platelets. *Biochim. Biophys. Acta*, 1222 (1994) 135-140.
- 2246 Ueno, H., Masuko, T., Wang, J. and Hashimoto, Y.: Epitope mapping of bovine serum albumin using monoclonal antibodies coupled with a photoreactive crosslinker. J. Biochem. (Tokyo), 115 (1994) 1119-1127.
- 2247 Yatomi, Y., Ozaki, Y., Satoh, K. and Kume, S.: Synthesis of phosphatidylinositol 3,4-bisphosphate is regulated by proteintyrosine phosphorylation but the p85a subunit of phosphatidylinositol 3-kinase may not be a target for tyrosine kinases in thrombin-stimulated human platelets. *Biochim. Biophys. Acta*, 12112 (1994) 337-344.

See also 2087, 2260, 2291.

- 19f. Structural and muscle proteins
- 2248 Fujii, T., Oomatsuzawa, A., Kuzumaki, N. and Kondo, Y.: Calcium-dependent regulation of smooth muscle calponin by S100. J. Biochem. (Tokyo), 116 (1994) 121-127.
- 2249 Kato, K., Goto, S., Inaguma, Y., Hasegawa, K., Morishita, R. and Asano, T.: Purification and characterization of a 20-kDa protein that is highly homologous to αB crystallin. J. Biol. Chem., 269 (1994) 15302-15309.
- 2250 Pedersen, B.J. and Bonde, M.: Purification of human procollagen type I carboxyl-terminal propeptide cleaved as *in vivo* from procollagen and used to calibrate a radioimmunoassay of the propeptide. *Clin. Chem. (Washington)*, 40 (1994) 811-816.
- 2251 Price, K.M., Silman, R. and Grudzinskas, J.G.: Isolation of fetal antigen 2 and assay standardisation. *Clin. Chim. Acta*, 226 (1994) 83-88.
- 2252 Talmadge, R.J. and Roy, R.R.: Electrophoretic separation of rat skeletal muscle myosin heavy-chain isoforms. *J. Appl. Physiol.*, 75 (1993) 2337-2340; *C.A.*, 120 (1994) 293364t.

See also 2069, 2159, 2185, 2304.

- 19g. Protamines, histones and other nuclear proteins
- 2253 Brooks, W. and Jackson, V.: The rapid transfer and selective association of histones H2A and H2B onto negatively coiled DNA at physiological ionic strength. J. Biol. Chem., 269 (1994) 18155-18166.
- 2254 Davies, N. and Lindsey, G.G.: Histone H2B (and H2A) ubiquitination allows normal histone octamer and core particle reconstitution. *Biochim. Biophys. Acta*, 1218 (1994) 187-193.
- 2255 Goss, V.L., Hocevar, B.A., Thompson, L.J., Stratton, C.A., Burns, D.J. and Fields, A.P.: Identification of nuclear β_{II} protein kinase C as a mitotic lamin kinase. *J. Biol. Chem.*, 269 (1994) 19074-19080.

2256 Sobel, R.E., Cook, R.G. and Allis, C.D.: Non-random acetylation of histone H4 by a cytoplasmic histone acetyltransferase as determined by novel methodology. *J. Biol. Chem.*, 269 (1994) 18576-18582.

See also 2431.

- 19h. Chromoproteins and metalloproteins
- 2257 Harper, S.B., Hurst, W.J. and Lang, C.M.: Use of capillary electrophoresis-isoelectric focusing for the determination of bovine hemoglobin variants. J. Chromatogr. B, 657 (1994) 339-344.
- 2258 Kastner, M. and Neubert, D.: Characterization of cytochromes P-450 purified from untreated and ¹⁴C-2,3,7,8-tetrachlorodibenzo-p-dioxin - treated marmoset monkeys: Identification of the major form as a possible orthologue of P-450 1A2. *Biochim. Biophys. Acta*, 1200 (1994) 7-10.
- 2259 Kobayashi, Y., Yoshida, T., Kotani, E., Aoyagi, T., Kuroiwa, Y. and Tobinaga, S.: Involvement of testosterone in the induction of hepatic microsomal cytochrome P-450 2B1/2 (P-450 2B1/2) by 1-benzylimidazole in male and female rats: sex-differentiated induction of P-450 2B1/2 species. *Biochim. Biophys. Acta*, 1200 (1994) 11-18.
- 2260 Merruer, M.H., van Kooten, E.A.W., Sluiter, H.E. and Zuijderhoudt, F.M.J.: Influence of uraemia on the determination of blood glycohaemoglobin by HPLC, electrophoresis, and affinity chromatography in diabetic and non-diabetic patients. Eur. J. Clin. Chem. Clin. Biochem., 32 (1994) 361-364.
- 2261 Murakami, K., Mihara, K. and Omura, T.: The transmembrane region of microsomal cytochrome P450 identified as the endoplasmic reticulum retention signal. J. Biochem. (Tokyo), 116 (1994) 164-175.
- 2262 Richards, M.P.: Application of a polyamine-coated capillary to the separation of metallothionein isoforms by capillary zone electrophoresis. J. Chromatogr. B, 657 (1994) 345-355.
- 2263 Sharma, N.D., Evans, R.W., Patel, K.J., Gorinsky, B., Mallet, A.I. and Aitken, A.: Evidence for the glycosylation of porcine serum transferrin at a single site located within the C-terminal lobe. *Biochim. Biophys. Acta*, 1206 (1994) 286-288.

See also 2327.

- Proteins of glands, gland products, various zymogens (incl. milk proteins)
- 2264 Beno, D.W.A., Rapp, U.R. and Davis, B.H.: Prostaglandin E suppression of platelet-derived-growth-factor-induced Ito cell mitogenesis occurs independent of raf perinuclear translocation and nuclear proto-oncogene expression. *Biochim. Biophys. Acta*, 1222 (1994) 292-300.
- 2265 Desnoyers, L., Therien, I. and Manjunath, P.: Characterization of the major proteins of bovine seminal fluid by two-dimensional polyacrylamide gel electrophoresis. *Mol. Reprod. Dev.*, 37 (1994) 425-435; C.A., 120 (1994) 318632u.
- 2266 Druart, X., Gatti, J.-L., Dacheux, F. and Dacheux, J.-L.: Analysis by two-dimensional gel electrophoresis of ram epididymal secreted proteins. *Cell. Mol. Biol. (Paris)*, 40 (1994) 91-93; C.A., 120 (1994) 318658g.

- 2267 Heegaard, C.W., Rasmussen, L.K. and Andreasen, P.A.: The plasminogen activation system in bovine milk: differential localization of tissue-type plasminogen activator and urokinase in milk fractions is caused by binding to casein and urokinase receptor. Biochim. Biophys. Acta, 1222 (1994) 45-55.
- 2268 Kobayashi, M., Ishizaka, S., Furusawa, Y. and Tamaki, K.: Separation of salivary immunosuppressive substance by gel filtration and electrophoresis. *Jpn. Kokai Tokkyo Koho JP* 06 65,295 [94 65,295] (Cl. CO7K15/06), 08 Mar. 1994, Appl. 92/220,280, 19 Aug. 1992; 9 pp.; C.A., 120 (1994) 293572].
- 2269 Konecny, P., Brown, R.J. and Scouten, W.H.: Chromatographic purification of immunoglobulin G from bovine milk whey. J. Chromatogr. A, 673 (1994) 45-53.

See also 2244.

- 19j. Proteins of brain, cerebrospinal fluid and eye
- 2270 Deretic, D., Aebersold, R.H., Morrison, H.D. and Papermaster, D.S.: αA- and βB-crystallin in the retina. Association with the post-Golgi compartment of frog retinal photoreceptors. *J. Biol. Chem.*, 269 (1994) 16853-16861.
- 2271 Mann, S.S. and Hammarback, J.A.: Molecular characterization of light chain 3. A microtubule binding subunit of MAP1A and MAP1B. J. Biol. Chem., 269 (1994) 11492-11497.
- 2272 Patel, Y., Martin, H., Howell, S., Jones, D., Robinson, K. and Aitken, A.: Purification of 14-3-3 protein and analysis of isoforms in chicken brain. *Biochim. Biophys. Acta*, 1222 (1994) 405-409.
- 2273 Sugiyama, Y. and Mukohata, Y.: Archae-opsin expressed in Escherichia coli and its conversion to purple pigment in vitro. J. Biochem. (Tokyo), 115 (1994) 1021-1026.
- 2274 Vocanson, C., Honnorat, J., Aguera, M., Antoine, J.C., Caudie, C. and Belin, M.F.: High resolution two-dimensional polyacrylamide gel electrophoresis using immobilines. Application to the study of brain proteins. Cell. Mol. Biol. (Paris), 40 (1994) 9-16; C.A., 120 (1994) 318654c.
- 2275 Watanabe, T., Inui, M., Chen, B., Iga, M. and Sobue, K.: Annexin VI-binding proteins in brain. Interaction of annexin VI with a membrane skeletal protein, calspectin (brain spectrin or fodrin). J. Biol. Chem., 269 (1994) 17656-17662.
- 19k. Proteins of neoplastic tissue and transformed cells
- 2276 Klein, Z., Ben-Baruch, G., Marciano, D., Solomon, R., Altaras, M. and Kloog, Y.: Characterization of the prenylated protein methyltransferase in human endometrial carcinoma. *Biochim. Biophys. Acta*, 1226 (1994) 330-336.
- 2277 Kramer, W., Müller, G., Girbig, F., Gutjahr, U., Kowalewski, S., Hartz, D. and Summ, H.-D.: Differential interaction of glimepiride and glibenclamide with the β-cell sulfonylurea receptor. II. Photoaffinity labeling of a 65 kDa protein by [³H]glimepiride. Biochim. Biophys. Acta, 1191 (1994) 278-290.
- 2278 Leavitt, J., Chen, Z.P., Lockwood, C.J. and Schatz, F.: Regulation of synthesis of the transformation-induced protein, leukocyte plastin, by ovarian steroid hormones. *Cancer Res.*, 54 (1994) 3447-3454.

- 2279 Oka, T., Kikumoto, Y., Itakura, K., Morton, D.L. and Irie, R.F.: Human monoclonal antibody identified an immunoreactive tetrapeptide sequence (Lys-Tyr-Gln-lle) in Mr 43,000 protein of human melanoma. Cancer Res., 54 (1994) 3511-3515.
- 2280 Zeindl-Eberhardt, E., Junglut, P.R., Otto, A. and Rabes, H.M.: Identification of tumor-associated protein variants during rat hepatocarcinogenesis. Aldose reductase. *J. Biol. Chem.*, 269 (1994) 14589-14594.

See also 2314, 2422.

- 191. Specific binding and receptor proteins
- 2281 Azzi, L., Meijer, L., Ostvold, A.-C., Lew, J. and Wang, J.H.: Purification of a 15-kDa cdk4- and cdk5-binding protein. *J. Biol. Chem.*, 269 (1994) 13279-13288.
- 2282 Bertolini, S., Patel, D.D., Coviello, D.A., Lelli, N., Ghisellini, M., Tiozzo, R., Masturzo, P., Elicio, N., Knight, B.L. and Calandra, S.: Partial duplication of the EGF precursor homology domain of the LDL-receptor protein causing familial hypercholesterolemia (FH-Salerno). J. Lipid Res., 35 (1994) 1422-1430.
- 2283 Claret, F.-X., Chapel, S., Garces, J., Tsai-Pflugfelder, M., Bertholet, C., Shapiro, D.J., Wittek, R. and Wahli, W.: Two functional forms of the *Xenopus laevis* estrogen receptor translated from a single mRNA species. *J. Biol. Chem.*, 269 (1994) 14047-14055.
- 2284 Crossley, M. and Orkin, S.H.: Phosphorylation of the erythroid transcription factor GATA-1. J. Biol. Chem., 269 (1994) 16589-16596
- 2285 Fritz, G., Lang, P. and Just, I.: Tissue-specific variations in the expression and regulation of the small GTP-binding protein Rho. *Biochim. Biophys. Acta*, 1222 (1994) 331-338.
- 2286 Gibbs, F.E.M., Wilkinson, M.C., Rudland, P.S. and Barraclough, R.: Interactions in vitro of p9Ka, the rat S-100-related metastasis-inducing, calcium-binding protein. J. Biol. Chem., 269 (1994) 18992-18999.
- 2287 Gombocz, E.A. and Rammler, D.H.: Electrophoretic quantitation of specific binding complexes. *PCT Int.* Appl. WO 94 09,185 (Cl. C2587/00), 28 Apr. 1994, US Appl. 960,528, 14 Oct. 1992; 11 pp.; *C.A.*, 121 (1994) 4508m.
- 2288 Henricksen, L.A., Umvricht, C.B. and Wold, M.S.: Recombinant replication protein A: expression, complex formation, and functional characterization. *J. Biol. Chem.*, 269 (1994) 11121-11132
- 2289 Johnson, W.J. and Reinhart, M.P.: Lack of requirement for sterol carrier protein-2 in the intracellular trafficking of lysosomal cholesterol. *J. Lipid Res.*, 35 (1994) 563-573.
- 2290 Kallio, P.J., Palvimo, J.J., Mehto, M. and Jänne, O.A.: Analysis of androgen receptor-DNA interactions with receptor proteins produced in insect cells. J. Biol. Chem., 269 (1994) 11514-11522.
- 2291 Koistinen, H., Seppälä, M. and Koistinen, R.: Different forms of insulin-like growth factor-binding protein-3 detected in serum and seminal plasma by immunofluorometric assay with monoclonal antibodies. Clin. Chem. (Washington), 40 (1994) 531-536.
- 2292 Kowluru, A., Rabaglia, M.E., Muse, K.E. and Metz, S.A.: Subcellular localization and kinetic characterization of guanine nucleotide binding proteins in normal rat and human pancreatic islets and transformed β cells. *Biochim. Biophys. Acta*, 1222 (1994) 348-359.

- 2293 Kumagai, A.K., Dwyer, K.J. and Pardridge, W.M.: Differential glycosylation of the GLUT1 glucose transporter in brain capillaries and choroid plexus. *Biochim. Biophys. Acta*, 1193 (1994) 24-30.
- 2294 Kurose, H. and Lefkowitz, R.J.: Differential desensitization and phosphorylation of three cloned and transfected α₂-adrenergic receptor subtypes. J. Biol. Chem., 269 (1994) 10093-10099.
- 2295 Lebrun, J.-J., Ali, S., Sofer, L., Ullrich, A. and Kelly, P.A.: Prolactin-induced proluferation of Nb2 cells involves tyrosine phosphorylation of the prolactin receptor and its associated tyrosine kinase JAK2. J. Biol. Chem., 269 (1994) 14021-14026.
- 2296 Leid, M.: Ligand-induced alteration of the protease sensitivity of retinoid X receptor α. J. Biol. Chem., 269 (1994) 14175-14181
- 2297 Lo, Y.H., Bradley, T.M. and Rhoads, D.E.: High-affinity Ca²+,Mg²+-ATPase in plasma membrane-rich preparations from olfactory epithelium of Atlantic salmon. *Biochim. Biphys. Acta*, 1192 (1994) 153-158.
- 2298 Loh, C., Romeo, C., Seed, B., Bruder, J.T., Rapp, U. and Rao, A.: Association of rat with the CD3δ and γ chains of the T cell receptor-CD3 complex. J. Biol. Chem., 269 (1994) 8817-8825.
- 2299 Morton, R.E. and Greene, D.J.: Regulation of lipid transfer between lipoproteins by an endogenous plasma protein: selective inhibition among lipoprotein classes. *J. Lipid Res.*, 35 (1994) 836-847.
- 2300 Mu, J.-Z., Fallon, R.J., Swanson, P.E., Carroll, S.B., Danaher, M. and Alpers, D.H.: Expression of an endogenous asialoglycoprotein receptor in a human intestinal epithelial cell line, Caco-2. *Biochim. Biophys. Acta*, 1222 (1994) 483-491.
- 2301 Mulheron, J.G., Casañas, S.J., Arthur, J.M., Garnovskaya, M.N., Gettys, T.W. and Raymond, J.R.: Human 5-HT_{1A} receptor expressed in insect cells activates endogenous G₀-like G protein(s). J. Biol. Chem., 269 (1994) 12954-12962.
- 2302 Riballo, E., Mazón, M.J. and Lagunas, R.: cAMP-Dependent protein kinase is not involved in catabolite inactivation of the transport of sugars in Saccharomyces cerevisiae. Biochim. Biophys. Acta, 1192 (1994) 143-146.
- 2303 Rosenthal, E.R. and Guidotti, G.: Reconstitution, identification, and purification of the *Torpedo californica* electroplax chloride channel complex. *Biochim. Biophys. Acta*, 1191 (1994) 256-266.
- 2304 Sacks, D.B.: Alteration of calmodulin-protein interactions by a monoclonal antibody to calmodulin. *Biochim. Biophys. Acta*, 1206 (1994) 120-128.
- 2305 Sartorius, C.A., Groshong, S.D., Miller, L.A., Powell, R.L., Tung, L., Takomoto, G.S. and Horwitz, K.B.: New T47D breast cancer cell lines for the independent study of progesterone B- and A-receptors: only antiprogestin-occupied B-receptors are switched to transcriptional agonists by cAMP. Cancer Res., 54 (1994) 3868-3877.
- 2306 Schlossmann, J., Dietmeier, K., Pfanner, N. and Neupert, W.: Specific recognition of mitochondrial preproteins by the cytoso-lic domain of the import receptor MOM72. *J. Biol. Chem.*, 269 (1994) 11893-11901.
- 2307 Schwanstecher, M., Löser, S., Chudziak, F. and Panten, U.: Identification of a 38-kDa high affinity sulfonylurea-binding peptide in insulin-secreting cells and cerebral cortex. *J. Biol. Chem.*, 269 (1994) 17768-17771.

2308 Scita, G. and Wolf, G.: The effect of sphingosine on the release of fibronectin from human lung fibroblasts. *Biochim. Biophys.* Acta, 1223 (1994) 29-35.

- 2309 Shimizu, Y., Kielar, D., Masuno, H., Minokoshi, Y. and Shimazu, T.: Dexamethasone induces the GLUT4 glucose transporter, and responses of glucose transport to norepinephrine and insulin in primary cultures of brown adipocytes. J. Biochem. (Tokyo), 115 (1994) 1069-1074.
- 2310 Sorokin, A., Lemmon, M.A., Ullrich, A. and Schlessinger, J.: Stabilization of an active dimeric form of the epidermal growth factor receptor by introduction of an inter-receptor disulfide bond. J. Biol. Chem., 269 (1994) 9752-9759.
- 2311 Tagoe, C.E., Boustead, C.M., Higgins, S.J. and Walker, J.H.: Characterization and immunolocalization of rat liver annexin VI. Biochim. Biophys. Acta, 1192 (1994) 272-280.
- 2312 Tsao, F.H.C., Chen, X., Chen, X. and Vu, V.X.: Immunocharacterization and developmental regulation of rabbit lung calcium-dependent phospholipid-binding proteins. *Biochim. Biophys. Acta*, 1213 (1994) 91-99.
- 2313 Vassbotn, F.S., Havnen, O.K., Heldin, C.-H. and Holmsen, H.: Negative feedback regulation of human platelets via autocrine activation of the platelet-derived growth factor α-receptor. J. Biol. Chem., 269 (1994) 13874-13879.
- 2314 Wang, J., Ueno, H., Masuko, T. and Hashimoto, Y.: Binding of serum albumin on tumor cells and characterization of the albumin binding protein. J. Biochem. (Tokyo), 115 (1994) 898-903.
- 2315 Wenzel, U. and Ziegler, K.: Binding proteins for cyclosomatostatins and bile acids in basolateral plasma membranes of rat liver. *Biochim. Biophys. Acta*, 1193 (1994) 17-23.
- 2316 Yoshida, M., Kanematsu, T., Watanabe, Y., Koga, T., Ozaki, S., Iwanaga, S. and Hirata, M.: D-myo-Inositol 1,4,5-trisphosphate-binding proteins in rat brain membranes. *J. Biochem.* (*Tokyo*), 115 (1994) 973-980.
- See also 2090, 2103, 2168, 2187, 2193, 2242, 2276, 2323, 2425.

19m. Urinary proteins

- 2317 Deng, J., She, O., Wu, H., Gao, J. and Tang, H.: (Examination of molecular weight of urine proteins with horizontal SDS electrophoresis in thin pore gradient gels). *Hunan Yike Daxue Xue*bao, 19 (1994) 67-69; C.A., 121 (1994) 4360g.
- 2318 Pascali, E.: Bence Jones proteins identified by immunofixation electrophoresis of concentrated urine. Clin. Chem. (Washington), 40 (1994) 945-946.
- 19n. Other proteins (incl. proteinous inhibitors of enzymic activity)
- 2319 Berkovsky, A.L. and Potapov, P.P.: Use of metal-chelate affinity chromatography and hydrophobic interaction chromatography for purification of placental protein 12. *J. Chromatogr. B*, 656 (1994) 432-435.
- 2320 Jin, Z.X., Inaba, K., Manaka, K.-i., Morisawa, M. and Hayashi, H.: Monoclonal antibodies against the protein complex that contains the flagellar movement-initiating phosphoprotein of Oncorhynchus keta. J. Biochem. (Tokyo), 115 (1994) 885-890.

B452 BIBLIOGRAPHY SECTION

- 2321 Ntwasa, M., Buchanan, S.G.S.C. and Gay, N.J.: Sequence and expression of LRR47, a novel embryonic leucine rich repeat protein of *Drosophila*. *Biochim. Biophys. Acta*, 1218 (1994) 181-186.
- 2322 Okamoto, K., Liu, G., Yu, W.G. and Isohashi, F.: Immunochemical characterization of the ATP-stimulated glucocorticoid-receptor-translocation promoter from various organs of rat. *J. Biochem. (Tokyo)*, 115 (1994) 862-867.
- 2323 Orlov, Y.N., Zherebtsova, M.A. and Kazbekov, E.N.: Affinity identification of organic anion transporters in brush-border membrane vesicles from rat kidney. *Biochim. Biophys. Acta*, 1192 (1994) 117-124.
- 2324 Wada, Y., Fujisawa, R. and Kuboki, Y.: A simple method to survey proteins which affect in vitro mineralization. Shika Kiso Igakkai Zasshi, No. 35 (1993) 439-442; C.A., 121 (1994) 4340a.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

2325 Ashmarina, L.I., Pshezhetsky, A.V., Spivey, H.O. and Potier, M.: Demonstration of enzyme associations by countermigration electrophoresis in agarose gel. *Anal. Biochem.*, 219 (1994) 349-355.

20a. Oxidoreductases

- 2326 De Prada, P., Setchell, K.D.R. and Hylemon, P.B.: Purification and characterization of a novel 17β-hydroxysteroid dehydrogenase from an intestinal Eubacterium sp. VPI 12708. J. Lipid Res., 35 (1994) 922-929.
- 2327 Eriksson, A.C., Sjöling, S. and Glaser, E.: The ubiquinol cytochrome c oxidoreductase complex of spinach leaf mitochondria is involved in both respiration and protein processing. *Biochim. Biophys. Acta*, 1186 (12994) 221-231.
- 2328 Frye, L.L., Cusack, K.P., Leonard, D.A. and Anderson, J.A.: Oxolanosterol oximes: dual-action inhibitors of cholesterol biosynthesis. *J. Lipid Res.*, 35 (1994) 1333-1344.
- 2329 Inazu, N., Nagashima, Y., Satoh, T. and Fujii, T.: Purification and properties of six aldo-keto reductases from rat adrenal gland. J. Biochem. (Tokyo), 115 (1994) 991-999.
- 2330 Jimenez-Cervantes, C., Valverde, P., Garcia-Borron, J.C., Solano, F. and Lozano, J.A.: Improved tyrosinase activity stains in polyacrylamide electrophoresis gels. *Pigm. Cell Res.*, 6 (1993) 394-399; C.A., 120 (1994) 318085t.
- 2331 Karam, W.G. and Chiang, J.Y.L.: Expression and purification of human cholesterol 7α-hydroxylase in Escherichia coli. J. Lipid Res., 35 (1994) 1222-1231.
- 2332 Kim, K.-S., Kubota, S., Kuriyama, M., Fujiyama, J., Björkhem, I., Eggertsen, G. and Seyama, Y.: Identification of new mutations in sterol 27-hydroxylase gene in Japanese patients with cerebrotendious xanthomatosis (CTX). *J. Lipid Res.*, 35 (1994) 1031-1039.
- 2333 Nakashima, N., Sakai, Y., Sakai, H., Yanase, T., Haji, M., Umeda, F., Koga, S., Hoshita, T. and Nawata, H.: A point mutation in the bile acid biosynthetic enzyme sterol 27-hydroxylase in a family with cerebrotendious xanthomatosis. J. Lipid Res., 35 (1994) 663-668.

2334 Nellaiappan, K. and Valivittan, K.: Differentiation of tyrosine hydroxylase and phenol oxidase after electrophoresis. *Biotech. Histochem.*, 68 (1993) 281-283; C.A., 120 (1994) 292553s.

- 2335 Nishimura, C., Hamada, Y., Tachikawa, T., Ishikawa, T., Gui, T., Tsubouchi, J., Hotta, N., Tanimoto, T. and Urakami, T.: Enzyme immunoassay for erythrocyte aldose reductase. *Clin. Chem.* (Washington), 40 (1994) 889-894.
- 2336 Reiss, A.B., Martin, K.O., Javitt, N.B., Martin, D.W., Grossi, E.A. and Galloway, A.C.: Sterol 27-hydroxylase: high levels of activity in vascular endothelium. *J. Lipid Res.*, 35 (1994) 1026-1030
- 2337 Scrutton, N.S., Packman, L.C., Mathews, F.S., Rohlfs, R.J. and Hille, R.: Assembly of redox centers in the trimethylamine dehydrogenase of bacterium W₃A₁. Properties of the wild-type enzyme and a C30A mutant expressed from a cloned gene in Escherichia coli. J. Biol. Chem., 269 (1994) 13942-13950.
- 2338 Shimoni, M.: A method for activity staining of peroxidase and β-1,3-glucanase isozymes in polyacrylamide electrophoresis gels. *Anal. Biochem.*, 220 (1994) 36-38.
- 2339 Walker, S.J., Liu, X., Roskoski, R. and Vrana, K.E.: Catalytic core of rat tyrosine hydroxylase: terminal deletion analysis of bacterially expressed enzyme. *Biochim. Biophys. Acta*, 1206 (1994) 113-119

See also 1980, 2211, 2241, 2431.

20b. Transferases (excl. E.C. 2.7.-.-)

- 2340 Higman, M.A. and Niles, E.G.: Location of the S-adenosyl-L-methionine binding region of the vaccinia virus mRNA (guanine-7-)methyltransferase. *J. Biol. Chem.*, 269 (1994) 14082-14087
- 2341 Konishi-Imamura, L., Dohi, K., Sato, M. and Kobashi, K.: Improved purification of arylsulfate sulfotransferase from human intestinal bacterium by using polyclonal antibody. *J. Biochem. (Tokyo)*, 115 (1994) 1097-1100.
- 2342 Kumar, V., Heinemann, F.S. and Ozols, J.: Purification and characterization of avian oligosaccharyltransferase. Complete amino acid sequence of the 50-kDa subunit. *J. Biol. Chem.*, 269 (1994) 13451-13457.
- 2343 Matsui Lee, I.S., Takio, K., Kido, R. and Titani, K.: Purification and amino- and carboxyl-terminal amino acid sequences of alanine-glyoxylate transaminase 1 from human liver. *J. Biochem. (Tokyo)*, 116 (1994) 12-17.
- 2344 Mudgapalli, A., Roy, S.K., Holmes, E.H. and Vijay, I.K.: Photoidentification of mannosyltransferases of dolichol cycle in the mammary gland. Purification and characterization of GDP-Man:Manβ1→4GlcNAcβ1→4GlcNAc-P-P-dolichol mannosyltransferase. J. Biol. Chem., 269 (1994) 11327-11336.
- 2345 Ofman, R. and Wanders, R.J.A.: Purification of peroxisomal acyl-CoA:dihydroxyacetonephosphate acyltransferase from human placenta. *Biochim. Biophys. Acta*, 1206 (1994) 27-34.
- 2346 Shimoji, M. and Aniya, Y.: Glutathione S-transferases in rat testis microsomes: comparison with liver transferase. J. Biochem. (Tokyo), 115 (1994) 1128-1134.

- 20c. Transferases transferring phosphorus containing groups (E.C. 2.7.-.-)
- 2347 Bagrodia, S., Laudano, A.P. and Shalloway, D.: Accessibility of the c-Src SH-2 domain for binding is increased during mitosis. J. Biol. Chem., 269 (1994) 10247-10251.
- 2348 Borowski, P., Medem, S., Laufs, R. and Weber, W.: Regulation of epidermal growth factor receptor kinase activity by polyions. J. Biochem. (Tokyo), 115 (1994) 825-829.
- 2349 Bravo, J., Fernández, E., Ribó, M., de Llorens, R. and Cuchillo, C.M.: A versatile negative-staining ribonuclease zymogram. Anal. Biochem., 219 (1994) 82-86.
- 2350 Cervoni, L., Ferraro, A., Giartosio, A., Wang, C. and Turano, C.: RNA polymerase II from wheat germ: a cross-linking study of subunits topography. Arch. Biochem. Biophys., 311 (1994) 35-41.
- 2351 Cho, Y. and Ziboh, V.A.: Expression of protein kinase C isozymes in guinea pig epidermis: selective inhibition of PKC-β activity by 13-hydroxyoctadecadienoic acid-containing diacyl-qlycerol. J. Lipid Res., 35 (1994) 913-921.
- 2352 Hosomi, Y., Shii, K., Ogawa, W., Matsuba, H., Yoshida, M., Okada, Y., Yokono, K., Kasuga, M., Baba, S. and Roth, R.A.: Characterization of a 60-kilodalton substrate of the insulin receptor kinase. *J. Biol. Chem.*, 269 (1994) 11498-11502.
- 2353 Ishida, A., Kitani, T., Okuno, S. and Fujisawa, H.: Inactivation of Ca²+/calmodulin-dependent protein kinase II by Ca²+/calmodulin. *J. Biochem. (Tokyo)*, 115 (1994) 1075-1082.
- 2354 Kurken, R.A., Rui, H., Malabarba, M.G. and Farrar, W.L.: Identification of interleukin-2 receptor-associated tyrosine kinase p116 as novel leukocyte-specific Janus kinase. *J. Biol. Chem.*, 269 (1994) 19136-19141.
- 2355 Lin, L., Perryman, M.B., Friedman, D., Roberts, R. and Ma, T.S.: Determination of the catalytic site of creatine kinase by site-directed mutagenesis. *Biochim. Biophys. Acta*, 1206 (1994) 97-104
- 2356 McKinnon, M. and Parker, P.J.: Phospholipase-D activation can be negatively regulated through the action of protein kinase C. Biochim. Biophys. Acta, 1222 (1994) 109-112.
- 2357 Sommer, D. and Song, P.-S.: A plant nucleoside diphosphate kinase homologous to the human Nm23 gene product: purification and characterization. *Biochim. Biophys. Acta*, 1222 (1994) 464-470
- 2358 Zhang, S., Broome, M.A., Lawton, M.A., Hunter, T. and Lamb, C.J.: atpk1, A novel ribosomal protein kinase gene from *Arabi-dopsis*. II. Functional and biochemical analysis of the encoded protein. *J. Biol. Chem.*, 269 (1994) 17593-17599.

See also 2197, 2210, 2223, 2425.

- 20d. Hydrolases, acting on ester bonds (E.C. 3.1.-.-)
- 2359 Daum, G., Regenass, S., Sap, J., Schlessinger, J. and Fischer, E.H.: Multiple forms of the human tyrosine phosphatase RPTPα. Isozymes and differences in glycosylation. *J. Biol. Chem.*, 269 (1994) 10524-10528.
- 2360 Emmer, Å., Jansson, M. and Roeraade, J.: Separation of pig liver esterase isoenzymes and subunits by capillary zone electrophoresis in the presence of fluorinated surfactants. *J. Chroma*togr. A, 672 (1994) 231-236.

2361 Kodama, H., Asai, K., Adachi, T., Mori, Y., Hayashi, K., Hirano, K. and Stigbrand, T.: Expression of a heterodimeric (placental-intestinal) hybrid alkaline phosphatase in KB cells. *Biochim. Biophys. Acta*, 1218 (1994) 163-172.

- 2362 Mejdoub, H., Reinbolt, J. and Gargouri, Y.: Dromedary pancreatic lipase: Purification and structural properties. *Biochim. Bio*phys. Acta, 1213 (1994) 119-126.
- 2363 Pacitti, A., Stevis, P., Evans, M., Trowbridge, I. and Higgins, T.J.: High level expression and purification of the enzymatically active cytoplasmic region of human CD45 phosphatase from yeast. *Biochim. Biophys. Acta*, 1222 (1994) 277-286.
- 2364 Schwemmle, M. and Staeheli, P.: The interferon-induced 67-kDa guanylate-binding protein (hGBP1) is a GTPase that converts GTP to GMP. J. Biol. Chem., 269 (1994) 11299-11305.
- 2365 Sugawara, T., Honke, K., Gasa, S., Tanaka, T., Fujimoto, S. and Makita, A.: Serum levels of steroid sulfatase protein in gynecologic carcinomas. *Clin. Chim. Acta*, 226 (1994) 13-20.
- 2366 Tompkins, T.A. and Moscarello, M.A.: The mechanism of stimulation of brain phosholipase C-α by myelin basic protein involves specific interactions. *Biochim. Biophys. Acta*, 1206 (1994) 208-214.
- 2367 Uchida, T., Matozaki, T., Noguchi, T., Yamao, T., Horita, K., Suzuki, T., Fujioka, Y., Sakamoto, C. and Kasuga, M.: Insulin stimulates the phosphorylation of Tyr⁵³⁸ and the catalytic activity of PTP1C, a protein tyrosine phosphatase with Src homology-2 domains. *J. Biol. Chem.*, 269 (1994) 12220-12228.
- 2368 Verhoeven, A.J.M., Carling, D. and Jansen, H.: Hepatic lipase gene is transcribed in rat adrenals into a truncated mRNA. J. Lipid Res., 35 (1994) 966-975.
- 2369 Wu, D., Regnier, F.E. and Linhares, M.C.: Electrophoretically mediated micro-assay of alkaline phosphatase using electrochemical and spectrophotometric detection in capillary electrophoresis. J. Chromatogr. B, 657 (1994) 357-363.
- 2370 Zaman, Z., van Orshoven, A., Mariën, G., Fevery, J. and Blanckaert, N.: Simultaneous macroamylasemia and macrolipasemia. Clin. Chem. (Washington), 40 (1994) 939-942.

See also 2212, 2445.

- 20e. Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)
- 2371 Hulea, S.A., Arnstein, H.R.V. and Kumerow, F.A.: Determination of the molecular weight of extracellular ribonuclease isoen-zymes from Aspergillus niger in crude extracts by thin layer gel filtration and polyacrylamide gel electrophoresis. Anal. Lett., 27 (1994) 1703-1711.
- 2372 Tsuji, A., Oda, R., Sakiyama, K., Nagamune, H., Itoh, K., Kase, R., Sakuraba, H., Suzuki, Y. and Matsuda, Y.: Lysosomal enzyme replacement using α₂-macroglobulin as a transport vehicle. *J. Biochem. (Tokyo)*, 115 (1994) 937-944.
- 2373 Yoshida, K.: Demonstration and some properties of N-acetylβ,D-hexosaminidase (HEX) C isoenzyme in human renal tissues: relative increase of HEX C activity in renal cell carcinoma. Clin. Chim. Acta, 226 (1994) 55-65.

See also 2338, 2370.

B454 BIBLIOGRAPHY SECTION

- 20f. Other hydrolases
- 2374 Ariyoshi, N., Tanaka, M., Ishii, Y. and Oguri, K.: Purification and characterization of dog liver microsomal epoxide hydrolase. J. Biochem. (Tokyo), 115 (1994) 985-990.
- 2375 Arribas, J., Arizti, P. and Castáño, J.G.: Antibodies against the C2 COOH-terminal region discriminate the active and latent forms of the multicatalytic proteinase complex. *J. Biol. Chem.*, 269 (1994) 12858-12864.
- 2376 Dekeyser, P.M., de Smedt, S., Demeester, J. and Lauwers, A.: Fractionation and purification of the thiol proteinases from papaya latex. J. Chromatogr. B, 656 (1994) 203-208.
- 2377 Hawkins, C., Xu, A. and Narayanan, N.: Comparison of the effects of fluoride on the calcium pumps of cardiac and fast skeletal muscle sarcoplasmic reticulum: evidence for tissue-specific qualitative difference in calcium-induced pump conformation. *Biochim. Biophys. Acta*, 1191 (1994) 231-243.
- 2378 Hayashi, S., Jain, S., Chu, R., Alvares, K., Xu, B., Erfurth, F., Usuda, N., Rao, M.S., Reddy, S.K., Noguchi, T., Reddy, J.K. and Yeldandi, A.V.: Amphibian allantoinase. Molecular cloning, tissue distribution, and functional expression. *J. Biol. Chem.*, 269 (1994) 12269-12276.
- 2379 Hoffman, L. and Rechsteiner, M.: Activation of the multicatalytic protease. The 11 S regulator and 20 S ATPase complexes contain distinct 30-kilodalton subunits. *J. Biol. Chem.*, 269 (1994) 16890-16895.
- 2380 Lechtovirta, J. and Vartio, T.: Type IV collagenases in human amniotic fluids and amnion epithelial cells. *Biochim. Biophys.* Acta, 1206 (1994) 83-89.
- 2381 Miller, K.J. and Lytle, F.E.: Enzymatic profiling of immobilized cells using CZE. *Anal. Chem.*, 66 (1994) 2420-2423.
- 2382 Nagao, S., Saido, T.C., Akita, Y., Tsuchiya, T., Suzuki, K. and Kawashima, S.: Calpain-calpastatin interactions in epidermoid carcinoma KB cells. *J. Biochem. (Tokyo)*, 115 (1994) 1178-1184.
- 2383 Norioka, S., Ohta, S., Ohara, T., Lim, S. and Sakiyama, F.: Identification of three catalytic triad constituents and Asp-225 essential for function of lysine-specific serine protease, Achromobacter protease I. J. Biol. Chem., 269 (1994) 17025-17029
- 2384 Peng, J.-H.F., Zeng, Y., Tsai, F.Y. and Parker, J.C., Jr.: Purification and immunochemical properties of human Na,K-ATPase alpha subunits and formic acid-derived polypeptide fragments. Prepar. Biochem., 24 (1994) 113-126.
- 2385 Richo, G.R. and Conner, G.E.: Structural requirements of procathepsin D activation and maturation. *J. Biol. Chem.*, 269 (1994) 14806-14812.
- 2386 Schneider, A., Oppliger, W. and Jenö, P.: Purified inner membrane protease I of yeast mitochondria is a heterodimer. *J. Biol. Chem.*, 269 (1994) 8635-8638.
- 2387 Van Alebeek, G.-J.W.M., Keltjens, J.T. and van der Drift, C.: Purification and characterization of inorganic pyrophosphatase from Methanobacterium thermoautotrophicum (strain ΔH). Biochim. Biophys. Acta, 1206 (1994) 231-239.
- 2388 Yamada, M., Azuma, T., Matsuba, T., Iida, H., Suzuki, H., Yamamoto, K., Kohli, Y. and Hori, H.: Secretion of human intracellular aspartic proteinase cathepsin E expressed in the methylotrophic yeast, *Pichia pastoris* and characterization of produced recombinant cathepsin E. *Biochim. Biophys. Acta*, 1206 (1994) 279-285.

2389 Zolotarjova, N., Ho, C., Mellgren, R.L., Askari, A. and Huang, W.-h.: Different sensitivities of native and oxidized forms of Na+/K+-ATPase to intracellular proteinases. *Biochim. Biophys. Acta*, 1192 (1994) 125-131.

See also 2202, 2219, 2434.

20g. Lyases

2390 Kusakabe, T., Motoki, K. and Hori, K.: Human aldolase C: characterization of the recombinant enzyme expressed in Escherichia coli. J. Biochem. (Tokyo), 115 (1994) 1172-1177.

See also 1987.

20h. Isomerases

- 2391 Mochizuki, K., Hosono, K. and Kobayashi, H.: Purification and some properties of a novel racemase, which racemizes 2oxothiazolidine-4-carboxylic acid and 5-oxoproline, from Flectobacillus sp. strain B-1. Biochim. Biophys. Acta, 1200 (1994) 27-33.
- 2392 Samuels, D.S., Shimizu, Y., Nakabayashi, T. and Shimizu, N.: Phosphorylation of DNA topoisomerase I is increased during the response of mammalian cells to mitogenic stimuli. *Biochim. Biophys. Acta*, 1223 (1994) 77-83.
- 20i. Ligases
- 2393 Filolenko, V.V. abd Deutscher, M.P.: Evidence for similar structural organization of the multienzyme aminoacyl-tRNA synthetase complex in vivo and in vitro. J. Biol. Chem., 269 (1994) 17375-17378.
- 20j. Complex mixtures and incompletely identified enzymes
- 2394 Ciechanover, A., Shkedy, D., Oren, M. and Bercovich, B.: Degradation of the tumor suppressor protein p53 by the ubiquitin-mediated proteolytic system requires a novel species of ubiquitin-carrier protein, E2. J. Biol. Chem., 269 (1994) 9582-9589
- 2395 Jump, D.B., Clarke, S.D., Thelen, A. and Liimatta, M.: Coordinate regulation of glycolytic and lipogenic gene expression by polyunsaturated fatty acids. J. Lipid Res., 35 (1994) 1076-1084.
- 2396 Kelleher, D.J. and Gilmore, R.: The Saccharomyces cerevisiae oligosaccharyltransferase is a protein complex composed of Wbp1p, Swp1p, and four additional polypeptides. J. Biol. Chem., 269 (1994) 12908-12917.
- 2397 Miura, S., Miyazawa, S., Osumi, T., Hashimoto, T. and Fujiki, Y.: Post-translational impost of 3-ketoacyl-CoA thiolase into rat liver peroxisomes in vitro. J. Biochem. (Tokyo), 115 (1994) 1064-1068.
- 2398 Muruganandam, A. and Mutus, B.: Isolation of nitric oxide synthase from human platelets. *Biochim. Biophys. Acta*, 1200 (1994) 1-6.
- 2399 Shimba, S. and Reddy, R.: Purification of human U6 small nuclear RNA capping enzyme. Evidence for a common capping enzyme for γ-monomethyl-capped small RNAs. J. Biol. Chem., 269 (1994) 12419-12423.

- PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITU-ENTS
- 2400 Satoh, C. and Takahashi, N.: (Detection of variations. Denaturing gradient gel electrophoresis (DGGE)). *Jikken Igaku*, 12 (1994) 634-639; C.A., 121 (1994) 2032c a review with 14 refs.
- 21a. Purines, pyrimidines, nucleosides, nucleotides
- 2401 Gelfi, C., Orsi, A., Righetti, P.G., Zanussi, M., Carrera, P. and Ferrari, M.: Capillary zone electrophoresis in polymer networks of polymerase chain reaction-amplified oligonucleotides: the case of congenital adrenal hyperplasia. *J. Chromatogr. B*, 657 (1994) 201-205.
- 2402 Guarnieri, C., Muscari, C., Stefanelli, C., Giaccari, A., Zini, M. and di Biase, S.: Micellar electrokinetic capillary chromatography of 8-hydroxydeoxyguanosine and other oxidized derivatives of DNA. *J. Chromatogr. B*, 656 (1994) 209-213.
- 2403 Sun, P. and Hartwick, R.A.: The effect of electric fields on the dispersion of oligonucleotides using a multi-point detection method in capillary gel electrophoresis. *J. Liq. Chromatogr.*, 17 (1994) 1861-1875.
- 2404 Tadey, T. and Purdy, W.C.: Capillary electrophoretic separation of nucleotide isomers via complexation with cyclodextrin and borate. J. Chromatogr. B, 657 (1994) 365-372.

See also 2023, 2139, 2155.

21b. Nucleic acids, RNA

- 2405 Amri, E.-Z., Ailhad, G. and Grimaldi, P.A.: Fatty acids as signal transducing molecules: involvement in the differentiation of preadipose to adipose cells. *J. Lipid Res.*, 35 (1994) 930-937.
- 2406 An, S., Schmidt, F.J. and Campbell, B.J.: Molecular cloning of sheep lung dipeptidase: a glycosyl phosphatidylinositol-anchored ectoenzyme that converts leukotriene D₄ to leukotriene E₄. Biochim. Biophys. Acta, 1226 (1994) 337-340.
- 2407 Atsuchi, Y., Yamana, K., Yatsuki, H., Hori, K., Ueda, S. and Shiokawa, K.: Cloning of a brain-type aldolase cDNA and changes in its mRNA level during oogenesis and early embryogenesis in *Xenopus laevis*. *Biochim. Biophys. Acta*, 1218 (1994) 153-157.
- 2408 Campbell, I.K., Wojta, J., Nowak, U. and Hamilton, J.A.: Cytokine modulation of plasminogen activator inhibitor-1 (PAI-1) production by human articular cartilage and chondrocytes. Down-regulation by tumor necrosis factor α and up-regulation by transforming growth factor-β and basic fibroblast growth factor. Biochim. Biophys. Acta, 1226 (1994) 277-285.
- 2409 Chua, C.C., Diglio, C.A., Siu, B.B. and Chua, B.H.L.: Angiotensin II induces TGF-β1 production in rat heart endothelial cells. *Biochim. Biophys. Acta*, 1223 (1994) 141-147.
- 2410 Ciaccio, P.J. and Tew, K.D.: cDNA and deduced amino acid sequences of a human colon dihydrodiol dehydrogenase. *Bio-chim. Biophys. Acta*, 1186 (1994) 129-132.
- 2411 Dihanich, M. and Spiess, M.: A novel serine proteinase-like sequence from human brain. *Biochim. Biophys. Acta*, 1218 (1994) 225-228.

- 2412 Gao, X., Kalkhoven, E., Peterson-Maduro, J., van der Burg, B. and Destrée, O.H.J.: Expression of the glucocorticoid receptor gene is regulated during early embryogenesis of *Xenopus laevis*. *Biochim. Biophys. Acta*, 1218 (1994) 194-198.
- 2413 Goda, T., Yasutake, H. and Takase, S.: Dietary fat regulates cellular retinol-binding protein II gene expression in rat jejunum. *Biochim. Biophys. Acta*, 1200 (1994) 34-40.
- 2414 Hayashi, T., Noga, M. and Matsuda, M.: Nucleotide sequence and expression of the rat polyubiquitin mRNA. *Biochim. Bio*phys. Acta, 1218 (1994) 232-234.
- 2415 Heddi, A., Lestienne, P., Wallace, D.C. and Stepien, G.: Steady state levels of mitochondrial and nuclear oxidative phosphorylation transcripts in Kearns-Sayre syndrome. *Biochim. Biophys. Acta*, 1226 (1994) 206-212.
- 2416 Hozumi, K., Masuko, T. and Hashimoto, Y.: Pre-Kupffer like CD4/CD8 double positive mononuclear cells present in rat liver. J. Biochem. (Tokyo), 115 (1994) 904-908.
- 2417 Ishii, I. and Ui, M.: Retinoic acid-induced gene expression of tissue transglutaminase via protein kinase C-dependent pathway in mouse peritoneal macrophages. J. Biochem. (Tokyo), 115 (1994) 1197-1202.
- 2418 Kicic, E. and Palmer, T.N.: Is sorbitol dehydrogenase gene expression affected by streptozotocin-diabetes in the rat? *Biochim. Biophys. Acta*, 1226 (1994) 213-218.
- 2419 Kobayashi, M., Takamatsu, K., Fujishiro, M., Saitoh, S. and Noguchi, T.: Molecular cloning of a novel calcium-binding protein structurally related to hippocalcin from human brain and chromosomal mapping of its gene. *Biochim. Biophys. Acta*, 1222 (1994) 515-518.
- 2420 Koguma, T., Takasawa, S., Tohgo, A., Karasawa, T., Furuya, Y., Yonekura, H. and Okamoto, H.: Cloning and characterization of cDNA encoding rat ADP-ribosyl cyclase/cyclic ADP-ribose hydrolase (homologue to human CD38) from islets of Langerhans. Biochim. Biophys. Acta, 1223 (1994) 160-162.
- 2421 Komori, M. and Oda, Y.: A major glucocorticoid-inducible P450 in rat liver is not P450 3A1. *J. Biochem. (Tokyo)*, 116 (1994) 114-120.
- 2422 Kurie, J.M., Allopenna, J. and Dmitrovsky, E.: Retinoic acid stimulates protein kinase A-associated G proteins during human teratocarcinoma differentiation. *Biochim. Biophys. Acta*, 1222 (1994) 88-94.
- 2423 Luethy, M.H., Miernyk, J.A. and Randall, D.D.: The nucleotide and deduced amino acid sequences of a cDNA encoding the E1β-subunit of the Arabidopsis thaliana mitochondrial pyruvate dehydrogenase complex. Biochim. Biophys. Acta, 1187 (1994) 95-98.
- 2424 Marcos, J.F. and Flores, R.: Improved separation of glyoxalated viroid RNAs and other small nucleic acids in polyacrylamide gels containing urea. *BioTechniques*, 16 (1994) 212-214; C.A., 120 (1994) 293356s.
- 2425 Matsubara, S., Take, M., Pedraza, C. and Muramatsu, T.: Mapping and characterization of a retinoic acid-responsive enhancer of midkine, a novel heparin-binding growth/differentiation factor with neurotrophic activity. *J. Biochem. (Tokyo)*, 115 (1994) 1088-1096.
- 2426 Mimura, T., Hayashi, I., Hoshino, T. and Oh-ishi, S.: Demonstration of high-molecular-weight kininogen in kininogen-deficient rat kidneys. J. Biochem. (Tokyo), 116 (1994) 59-63.

- 2427 Nishiguchi, S., Joh, T., Horie, K., Zou, Z., Yasunaga, T. and Shimada, K.: A survey of genes expressed in undifferentiated mouse embryonal carcinoma F9 cells: characterization of low-abundance mRNAs. J. Biochem. (Tokyo), 116 (1994) 128-139.
- 2428 Ntwasa, M., Buchanan, S.G.S.C. and Gay, N.J.: *Drosophila* ribosomal protein L18a: cDNA sequence, expression and chromosomal localization of the gene. *Biochim. Biophys. Acta*, 1218 (1994) 210-212.
- 2429 Ohtsuki, T., Ikeda, M., Hatake, K., Tomizuka, H., Hoshino, Y., Suzu, S., Harigaya, K., Motoyoshi, K. and Miura, Y.: Quantitative analysis of the two macrophage colony-stimulating factor mRNA expressed in a human stromal cell line by reverse transcription-polymerase chain reaction (RT-PCR). *Biochim. Biophys. Acta*, 1222 (1994) 141-146.
- 2430 Prasad, P.D., Ramamoorthy, S., Moe, A.J., Smith, C.H., Leibach, F.H. and Ganapathy, V.: Selective expression of the high-affinity isoform of the folate receptor (FR-α) in the human placental syncytiotrophoblast and choriocarcinoma cells. *Biochim. Biophys. Acta*, 1223 (1994) 71-75.
- 2431 Renier, G., Olivier, M., Skamene, E. and Radzioch, D.: Induction of tumor necrosis factor α gene expression by lipoprotein lipase requires protein kinase C activation. *J. Lipid Res.*, 35 (1994) 1413-1421.
- 2432 Rescan, P.-Y., Gauvry, L., Paboeuf, G. and Fauconneau, B.: Identification of a muscle factor related to MyoD in a fish species. *Biochim. Biophys. Acta*, 1218 (1994) 202-204.
- 2433 Sander, P., Grünewald, S., Maul, G., Reiländer, H. and Michel, H.: Constitutive expression of the human D₂₅-dopamine receptor in the unicellular yeast Saccharomyces cerevisiae. Biochim. Biophys. Acta, 1193 (1994) 255-262.
- 2434 Scheiner-Bobis, G. and Farley, R.A.: Subunit requirements for expression of functional sodium pumps in yeast cells. *Biochim. Biophys. Acta*, 1193 (1994) 226-234.
- 2435 Shashidharan, P., Wittenberg, I. and Plaitakis, A.: Molecular cloning of human brain glutamate/aspartate transporter II. Biochim. Biophys. Acta, 1191 (1994) 393-396.
- 2436 Shima, A., Shinohara, Y., Doi, K. and Terada, H.: Normal differentiation of rat brown adipocytes in primary culture judged by their expressions of uncoupling protein and the physiological isoform of glucose transporter. *Biochim. Biophys. Acta*, 1223 (1994) 1-8.
- 2437 Shimamoto, T., Noguchi, K., Kuroda, M., Tsuda, M. and Tsuchiya, T.: Transcriptional attenuation and differential mRNA stability in the regulation of the *Escherichia coli* melibiose operon. *J. Biochem. (Tokyo)*, 115 (1994) 1185-1189.
- 2438 Simpson, G.G., Clark, G. and Brown, J.W.S.: Isolation of a maize cDNA encoding a protein with extensive similarity to an inhibitor of protein kinase C and a cyanobacterial open reading frame. *Biochim. Biophys. Acta*, 1222 (1994) 306-308.
- 2439 Spring, K.J., Mattick, J.S. and Don, R.H.: Escherichia coli gpt as a positive and negative selectable marker in embryonal stem cells. Biochim. Biophys. Acta, 1218 (1994) 158-162.
- 2440 Takahashi, Y., Taketani, Y., Endo, T., Yamamoto, S. and Kumegawa, M.: Studies on the induction of cyclooxygenase isozymes by various prostaglandins in mouse osteoblastic cell line with reference to signal transduction pathways. *Biochim. Biophys. Acta*, 1212 (1994) 217-224.

- 2441 Tanaka, S. and Hosaka, K.: Cloning of a cDNA encoding a second phosphatidylinositol transfer protein of rat brain by complementation of the yeast sec14 mutation. J. Biochem. (Tokyo), 115 (1994) 981-984.
- 2442 Tomomura, M., Imamura, Y., Tomomura, A., Horiuchi, M. and Saheki, T.: Abnormal gene expression and regulation in the liver of jvs mice with systemic carnitine deficiency. *Biochim. Biophys. Acta*, 1226 (1994) 307-314.
- 2443 Usuki, K., Gonez, L.J., Wernstedt, C., Morén, A., Miyazono, K., Claesson-Welsh, L. and Heldin, C.-H.: Structural properties of 3.0 kb and 3.2 kb transcripts encoding platelet-derived endothelial cell growth factor/thymidine phosphorylase in A431 cells. Biochim. Biophys. Acta, 1222 (1994) 411-414.
- 2444 Welihinda, A.A., Beavis, A.D. and Trumbly, R.J.: Mutations in LIS1 (ERG6) gene confer increased sodium and lithium uptake in Saccharomyces cerevisiae. Biochim. Biophys. Acta, 1193 (1994) 107-117.
- 2445 Ying, Z., Tojo, H., Komatsubara, T., Nakagawa, M., Inada, M., Kawata, S., Matsuzawa, Y. and Okamoto, M.: Enhanced expression of group II phospholipase A₂ in human hepatocellular carcinoma. *Biochim. Biophys. Acta*, 1226 (1994) 201-205.
- 2446 Zhou, J.-H., Hikono, H., Ohtaki, M., Kubota, T. and Sakurai, M.: Cloning and characterization of cDNAs encoding two normal isoforms of bovine stem cell factor. *Biochim. Biophys. Acta*, 1223 (1994) 148-150.
- See also 2027, 2103, 2200, 2235, 2300, 2321, 2455, 2470, 2482

21c. Nucleic acids, DNA

- 2447 Baba, Y.: (High-performance analysis of human genomic DNA using capillary electrophoresis). Kagaku to Kogyo (Tokyo), 47 (1994) 148-151; C.A., 120 (1994) 316763p a review with 15 refs.
- 2448 Betti, C., Davini, T., Giannessi, L., Loprieno, N. and Barale, R.: Microgel electrophoresis assay (comet test) and SCE analysis in human lymphocytes from 100 normal subjects. *Mutat. Res.*, 307 (1994) 323-333; C.A., 120 (1994) 291449a.
- 2449 Chee, D.W.: Electrophoretic orientation of DNA in viscoelastic fluids. Avail. *Univ. Microfilms Int.*, Order No. DA9319725, 1993, 183 pp.; C.A., 120 (1994) 290938x.
- 2450 Chee, D.W., Cho, Y.I., Cho, K. and Lu, P.: DNA orientation during electrophoresis in a viscoelastic solution. Sep. Techncol., 4 (1994) 55-61; C.A., 120 (1994) 318639b.
- 2451 Costello, R., Wheeler, D., Organ, L. and Chrambach, A.: Enhanced ethidium fluorescence of large DNA electrophoresed in gels submersed in an immiscible solvent. *BioTechniques*, 16 (1994) 108-113, C.A., 121 (1994) 4262b.
- 2452 Figeys, D., Arriaga, E., Renborg, A. and Dovichi, N.J.: Use of the fluorescent intercalating dyes POPO-3, YOYO-3 and YOYO-1 for ultrasensitive detection of double-stranded DNA separated by capillary electrophoresis with hydroxypropylmethyl cellulose and non-cross-linked polyacrylamide. *J. Chromatogr. A*, 669 (1994) 205-216.
- 2453 Haug, J.S., Goldner, C.M., Yazlovitskaya, E.M., Voziyan, P.A. and Melnykovych, G.: Directed cell killing (apoptosis) in human lymphoblastoid cells incubated in the presence of farnesol: effect of phosphatidylcholine. *Biochim. Biophys. Acta*, 1223 (1994) 133-140.

- 2454 Hirawake, H., Wang, H., Kuramochi, T., Kojima, S. and Kita, K.: Human complex II (succinate-ubiquinone oxidoreductase): cDNA cloning of the flavoprotein (Fp) subunit of liver mitochondria. J. Biochem. (Tokyo), 116 (1994) 221-227.
- 2455 Isemura, S. and Saitoh, E.: Molecular cloning and sequence analysis of cDNA coding for the precursor of the human salivary proline-rich peptide P-B. J. Biochem. (Tokyo), 115 (1994) 1101-1106.
- 2456 Johnson, P.G. and Beerman, T.A.: Damage induced in episomal EBV DNA in Raji cells by antitumor drugs as measured by pulsed field gel electrophoresis. Anal. Biochem., 220 (1994) 103-114.
- 2457 Johnston, R.G., Grace, W.K., Lemanski, C.L. and Mallawaaratchy, A.R.: Real-time detection of DNA during gel electrophoresis using a Zeeman refractive index detector. J. Biochem. Biophys. Methods, 28 (1994) 225-237; C.A., 121 (1994) 4482y.
- 2458 Kim, Y. and Morris, M.D.: Separation of nucleic acids by capillary electrophoresis in cellulose solutions with mono- and bis-intercalating dyes. *Anal. Chem.*, 66 (1994) 1168-1174.
- 2459 Kohno, K., Yasuzawa, K., Hirose, M., Kano, Y., Goshima, N., Tanaka, H. and Imamoto, F.: Autoregulation of transcription of the hupA gene in *Escherichia coli*: evidence for steric hindrance of the functional promoter domains induced by HU. *J. Bio-chem. (Tokyo)*, 115 (1994) 1113-1118.
- 2460 Kripalani-Joshi, S. and Law, H.Y.: Identification of integrated Epstein-Barr virus in nasopharyngeal carcinoma using pulse field gel electrophoresis. *Int. J. Cancer*, 56 (1994) 187-192; C.A., 120 (1994) 318640v.
- 2461 Lohia, A. and Samuelson, J.: Molecular cloning of an Enta-moeba histolytica gene encoding a putative mos family serine/threonine-kinase. Biochim. Biophys. Acta, 1222 (1994) 122-124.
- 2462 Maleszka, R.: Single-stranded regions in yeast mitochondrial DNA revealed by pulsed-field gel electrophoresis. *Appl. Theor. Electrophor.*, 3 (1993) 259-263; C.A., 120 (1994) 316843q.
- 2463 McGregor, D.A.: Optimization of separation and detection schemes for DNA with pulsed-field slab gel and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9335000, 1993, 143 pp.; C.A., 120 (1994) 316867a.
- 2464 Navin, M.J., Rapp, T.L. and Morris, M.D.: Variable frequency modulation in DNA separations using field inversion capillary gel electrophoresis. *Anal. Chem.*, 66 (1994) 1179-1182.
- 2465 Niederweis, M., Lederer, T. and Hillen, W.: Matrix effects suggest an important influence of DNA-polyacrylamide interactions on the electrophoretic mobility of DNA. J. Biol. Chem., 269 (1994) 10156-10162.
- 2466 Permana, P.A., Ho, D.K., Cassady, J.M. and Snapka, R.M.: Mechanism of action of the antileukemic xanthone psorospermin: DNA strand breaks, abasic sites, and protein-DNA cross-links. Cancer Res., 54 (1994) 3191-3195.
- 2467 Pramatarova, A. and Hamelin, C.: Electrophoresis of small DNA molecules in agaroses with different electroendosmotic properties. *Appl. Theor. Electrophor.*, 3 (1993) 277-281; C.A., 121 (1994) 4346g.
- 2468 Rodriguez-Frias, F., Arranz, J.A., Buti, M., Esteban, R. and Jardi, R.: Synthesis of a non-radioactive hepatitis B virus DNA probe from human serum by the polymerase chain reaction. Eur. J. Clin. Chem. Clin. Biochem., 32 (1994) 355-359.

2469 Schoenfeld, A., Luqmani, Y., Smith, D., O'Reilly, S., Shousha, S., Sinnett, H.D. and Coombes, R.C.: Detection of breast cancer micrometastases in axillary lymph nodes by using polymerase chain reaction. *Cancer Res.*, 54 (1994) 2986-2990.

- 2470 Tomura, D., Obika, K., Fukamizu, A. and Shoun, H.: Nitric oxide reductase cytochrome P-450 gene, CYP 55, of the fungus Fusarium oxysporum containing a potential binding-site for FNR, the transcription factor involved in the regulation of anaerobic growth of Escherichia coli. J. Biochem. (Tokyo), 116 (1994) 88-94.
- 2471 Van Winkle, L.J., Patel, M., Wasserlauf, H.G., Dickinson, H.R. and Campione, A.L.: Osmotic regulation of taurine transport via system β and novel processes in mouse preimplantation conceptuses. Biochim. Biophys. Acta, 1191 (1994) 244-255.
- See also 2006, 2027, 2219, 2411, 2429, 2431, 2476.
- 21d. Structural studies on RNA and RNA mapping
- See 2368.
- 21e. Structural studies on DNA and DNA mapping
- 2472 Aoki, Y., Lee, J.C., Pillai, S., Isselbacher, K.J. and Rustgi, A.K.: Radiolabeled polymerase chain reaction assay for detection of ras oncogene point mutations in tumors. *Clin. Chem. (Washington)*, 40 (1994) 705-709.
- 2473 Awata, H., Endo, F., Tanoue, A., Kitano, A., Nakano, Y. and Matsuda, I.: Structural organization and analysis of the human fumarylacetoacetate hydrolase gene in tyrosinemia type I. *Bio-chim. Biophys. Acta*, 1226 (1994) 168-172.
- 2474 Bartram, C., Edwards, R.H.T., Clague, J. and Beynon, R.J.: McArdle's disease: a rare frameshift mutation in exon 1 of the muscle glycogen phosphorylase gene. *Biochim. Biophys. Acta*, 1226 (1994) 341-343.
- 2475 Ben-Yoseph, Y. and Mitchell, D.A.: Rapid detection of common metachromatic leukodystrophy mutations by restriction analysis of arylsulfatase A gene amplimers. Clin. Chim. Acta, 226 (1994) 77-82.
- 2476 Branchini, M.L.M., Morthland, V.H., Tresoldi, A.T., Nowakonsky, A.V., Dias, M.B.S and Pfaller, M.A.: Application of genomic DNA subtyping by pulsed field gel electrophoresis and restriction enzyme analysis of plasmid DNA to characterize methicillin-resistant Staphylococcus aureus from two nosocomial outbreaks. Diagn. Microbiol. Infect. Dis., 17 (1993) 275-281; C.A., 120 (1994) 316840m.
- 2477 Cedervall, B. and Kaellman, P.: Randomly distributed DNA double-strand breaks as measured by pulsed field gel electrophoresis: a series of explanatory calculations. *Radiat. Environ. Biophys.*, 33 (1994) 9-21; C.A., 121 (1994) 4353g.
- 2478 Chen, D.D.Y.: Counting fluorescent molecules and high speed DNA sequencing in capillary electrophoresis. Avail. NLC Order No. DANN81973, 1993, 175 pp.; C.A., 120 (1994) 316870w.
- 2479 Harvey, J. and Gilmour, A.: Application of multilocus enzyme electrophoresis and restriction fragment length polymorphism analysis to the typing of *Listeria* monocytogenes strains isolated from raw milk, nondairy foods, and clinical and veterinary sources. *Appl. Environ. Microbiol.*, 60 (1994) 1547-1553; C.A., 121 (1994) 2091w.

B458 BIBLIOGRAPHY SECTION

- 2480 Higginson, D., Perez, G., Lopez-Canovas, L. and Riveron, A.M.: Non-enzymatic deproteinization of immobilized DNA suitable for pulsed field gel electrophoresis. *Anal. Lett.*, 27 (1994) 1255-1264.
- 2481 Imai, T.: (Analysis of large DNA fragments using pulsed-field gel electrophoresis). *Jikken Igaku*, 12 (1994) 597-603; C.A., 121 (1994) 4189h a review with 10 refs.
- 2482 Ishizaka, N., Okazaki, H., Kurokawa, K., Kumada, M. and Takuwa, Y.: Molecular cloning of a novel putative G proteincoupled receptor from rat aortic smooth muscle. Downregulation of the mRNA level by the cyclic AMP messenger pathway. *Biochim. Biophys. Acta*, 1218 (1994) 173-180.
- 2483 Kudo, S., Onda, M. and Fukuda, M.: Characterization of glycophorin A transcripts: control by the common erythroid-specific promoter and alternative usage of different polyadenylation signals. J. Biochem. (Tokyo), 116 (1994) 183-192.
- 2484 Loebrich, M., Ikpeme, S. and Kiefer, J.: Measurement of DNA double-strand breaks in mammalian cells by pulsed-field gel electrophoresis: a new approach using rarely cutting restriction enzymes. *Radiat. Res.*, 138 (1994) 186-192; C.A., 121 (1994) 3992c.
- 2485 Luckey, J.A.: High-speed DNA sequencing by capillary gel electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9320867, 1993, 147 pp.: C.A., 120 (1994) 316863w.
- 2486 Maekawa, M., Sudo, K., Kobayashi, A., Sugiyama, E., Li, S.S.-L. and Kanno, T.: Fast-type electrophoretic variant of lactate dehydrogenase M(A) and comparison with other missense mutations in lactate dehydrogenase. M(A) and H(B) genes. Clin. Chem. (Washington), 40 (1994) 665-668.
- 2487 Marino, M.A., Turni, L.A., del Rio, S.A. and Williams, P.E.: Molecular size determinations of DNA restriction fragments and polymerase chain reaction products using capillary gel electrophoresis. J. Chromatogr. A, 676 (1994) 185-189.
- 2488 Martínez-Férez, I., Fernández-González, B., Sandmann, G. and Vioque, A.: Cloning and expression in *Escherichia coli* of the gene coding for phytoene synthase from the cyanobacterium *Synechocystis* sp. PCC6803. *Biochim. Biophys. Acta*, 1218 (1994) 145-152.
- 2489 Mayer, P., Slater, G.W. and Drouin, G.: Theory of DNA sequencing using free-solution electrophoresis of protein-DNA complexes. *Anal. Chem.*, 66 (1994) 1777-1780.
- 2490 Oefner, P.J. and Bonn, G.K.: High-resolution liquid chromatography of nucleic acids. Int. Lab., 24, No. 8 (1994) 14-23.
- 2491 Pramatarova, A., Yelle, J., D'Amours, B. and Hamelin, C.: Efficient recovery of cloned human cytomegalovirus DNA fragments from agarose gels. J. Virol. Methods, 46 (1994) 1-10; C.A., 120 (1994) 318651z.
- 2492 Rabek, J.P., Zhang, D.-E., Torres-Ramos, C.A. and Papaconstantinou, J.: Analysis of the mechanism of glucocorticoid-mediated down regulation of the mouse α-fetoprotein gene. *Biochim. Biophys. Acta*, 1218 (1994) 136-144.
- 2493 Raitio, M. and Wikström, M.: An alternative cytochrome oxidase of *Paracoccus denitrificans* functions as a proton pump. *Biochim. Biophys. Acta*, 1186 (1994) 100-106.
- 2494 Sestini, R., Orlando, C., Zentilin, L., Gelmini, S., Pinzani, P., Bianchi, S., Selli, C., Giacca, M. and Pazzagli, M.: Measuring c-erbB-2 oncogene amplification in fresh and paraffin-embedded tumors by competitive polymerase chain reaction. *Clin. Chem. (Washington)*, 40 (1994) 630-636.

- 2495 Takayama, K., Morohashi, K.-i., Honda, S.-i., Hara, N. and Omura, T.: Contribution of Ad4BP, a steroidogenic cell-specific transcription factor, to regulation of the human CYP11A and bovine CYP11B genes through their distal promoters. *J. Bio-chem. (Tokyo)*, 116 (1994) 193-203.
- 2496 Ueno, K. and Yeung, E.S.: Simultaneous monitoring of DNA fragments separated by electrophoresis in a multiplexed array of 100 capillaries. *Anal. Chem.*, 66 (1994) 1424-1431.

See also 2159, 2333, 2455, 2470.

22. ALKALOIDS

- 2497 Caslavska, J., Hufschmid, E., Theurillat, R., Desiderio, C., Wolfisberg, H. and Thormann, W.: Screening for hydroxylation and acetylation polymorphisms in man via simultaneous analysis of urinary metabolites of mephenytoin, dextromethorphan and caffeine by capillary electrophoretic procedures. J. Chromatogr. B, 656 (1994) 219-231.
- 2498 Henion, J.D., Mordehai, A.V. and Cai, J.: Quantitative capillary electrophoresis-ion spray mass spectrometry on a benchtop ion trap for the determination of isoquinoline alkaloids. *Anal. Chem.*, 66 (1994) 2103-2109.
- 2499 Kvasnicka, F., Price, K.R., Ng, K. and Fenwick, G.R.: Determination of potato glycoalkaloids using isotachophoresis and comparison with a HPLC method. J. Liq. Chromatogr., 17 (1994) 1941-1951.
- 2500 Tagliaro, F., Antonioli, C., Moretto, S., Archetti, S., Ghielmi, S. and Marigo, M.: High-sensitivity low-cost methods for determination of cocaine in hair: high-performance liquid chromatography and capillary electrophoresis. Forensic Sci. Int., 63 (1993) 227-238; C.A., 120 (1994) 291577r.
- 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN
- 23a. Porphyrins and other pyrroles
- 2501 Hungerford, J.M.: Seafood toxins. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 145-150 a review.
- 2502 Wu, N., Li, B. and Sweedler, J.V.: Recent developments in porphyrin separations using capillary electrophoresis with native fluorescence detection. *J. Liq. Chromatogr.*, 17 (1994) 1917-1927.
- 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)
- 2503 Wronski, M.: Determination of thiols as sulphonic acids by capillary isotachophoresis. J. Chromatogr. A, 672 (1994) 273-277.

See also 1987.

- 25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOS-PHATES)
- See 2048, 2145, 2188, 2236, 2247.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. Organometallic compounds

See 2542.

26c. Coordination compounds

2504 Timerbaev, A.R., Semenova, O.P., Jandik, P. and Bonn, G.K.: Metal ion capillary electrophoresis with direct UV detection. Effect of a charged surfactant on the migration behaviour of metal chelates. J. Chromatogr. A, 671 (1994) 419-427.

28. ANTIBIOTICS

- 2505 Croubels, S., Baeyens, W., Dewaele, C., van Peteghem, C.: Capillary electrophoresis of some tetracycline antibiotics. J. Chromatogr. A, 673 (1994) 267-274.
- 2506 Liu, J., Volk, K.J., Lee, M.S., Pucci, M. and Handwerger, S.: Binding studies of vancomycin to the cytoplasmic peptidoglycan precursors by affinity capillary electrophoresis. *Anal. Chem.*, 66 (1994) 2412-2416.
- 2507 Sciacchitano, C.J., Mopper, B. and Specchio, J.J.: Identification and separation of five cephalosporins by micellar electrokinetic capillary chromatography. J. Chromatogr. B, 657 (1994) 395-399

See also 2527.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29e. Herbicides

- 2508 Carneiro, M.C., Puignou, L. and Galceran, M.T.: Comparison of capillary electrophoresis and reversed-phase ion-pair high-performance liquid chromatography for the determination of paraquat, diquat and difenzoquat. *J. Chromatogr. A*, 669 (1994) 217-224.
- 2509 Dinelli, G., Bonetti, A., Catizone, P. and Galletti, G.C.: Separation and detection of herbicides in water by micellar electrokinetic capillary chromatography. J. Chromatogr. B, 656 (1994) 275-280.
- 2510 Kaniansky, D., Iványi, F. and Onuska, F.I.: On-line isotachophoretic sample pretreatment in ultratrace determination of paraquat and diquat in water by capillary zone electrophoresis. *Anal. Chem.*, 66 (1994) 1817-1824.
- 2511 Yang, J., Wang, X.-Z., Hage, D.S., Herman, P.L. and Weeks, D.P.: Analysis of dicamba degradation by *Pseudomonas maltophilia* using high-performance capillary electrophoresis. *Anal. Bio-chem.*, 219 (1994) 37-42.

See also 2050.

- 29f. Fungicides
- 2512 Furuta, R. and Doi, T.: Enantiomeric separation of diniconazole and uniconazole by cyclodextrin-modified micellar electrokinetic chromatography. J. Chromatogr. A, 676 (1994) 431-436.
- 30. SYNTHETIC AND NATURAL DYES
- 30a. Synthetic dyes
- 2513 Burkinshaw, S.M., Hinks, D. and Lewis, D.M.: The use of capillary electrophoresis for the analysis of several dye classes. Spec. Publ.-R. Soc. Chem., 122 (1993) 93-100; C.A., 121 (1994) 11705b.

See also 2016.

- 30b. Chloroplast and other natural pigments
- 2514 Sulten, E., Mayaudon, J., Moureau, Z., Dumont, P. and Dejonghe, L.: (Electrophoresis of humic acid solutions from auriferous and non-auriferous soils). *Pedologie*, 43 (1993) 253-267; C.A., 120 (1994) 222779w.
- 31. PLASTICS AND THEIR INTERMEDIATES
- 2515 Rudzinski, W.E., Pin, L., Sutcliffe, R., Richardson, A. and Thomas, T.: Determination of hexamethylene diisocyanate in spray-painting operations using capillary zone electrophoresis. *Anal. Chem.*, 66 (1994) 1664-1666.

See also 2053.

- 32. DRUG ANALYSIS
- 32a. Drug analysis, general techniques
- 2516 Deyl, Z., Tagliaro, F. and Mikšík, I.: Biomedical applications of capillary electrophoresis. J. Chromatogr. B, 656 (1994) 3-27 a review with 48 refs.
- 2517 Fett, J.J.: Micellar liquid chromatography: I. Investigations with the novel Pinkerton internal surface reversed-phase column. II. Optimization of and application to the determination of drugs in urine by direct injection. III. Comparisons to the stationary phase approaches for the determination of drugs in biological fluids by direct injection. Avail. *Univ. Microfilms Int.*, Order No. DA9215386, 1991, 245 pp.; C.A., 120 (1994) 315061w.
- 2518 Tanaka, Y. and Terabe, S.: (Optical resolution by electrokinetic chromatography using ovomucoid and avidin). Kuromatogurafi, 14 (1993) 104-105; C.A., 121 (1994) 18159k.
- 2519 Tomlinson, A.J., Benson, L.M., Gorrod, J.W. and Naylor, S.: Investigation of the *in vitro* metabolism of the H₂-antagonist mifentidine by on-line capillary electrophoresis-mass spectrometry using non-aqueous separation conditions. *J. Chromatogr. B*, 657 (1994) 373-381.

B460 BIBLIOGRAPHY SECTION

- See also 2064.
- 32b. Antirheumatics and antiinflammatory drugs
- 2520 Maboundou, C.W., Paintaud, G., Bérard, M. and Bechtel, P.R.: Separation of fifteen non-steroidal anti-inflammatory drugs using micellar electrokinetic capillary chromatography. *J. Chro*matogr. B, 657 (1994) 173-183.
- 32c. Autonomic and cardiovascular drugs
- 2521 Jumppanen, J.H., Siren, H., Riekkola, M.L. and Soederman, O.: Correlation of resolution with fractional coefficients and pK_a values of capillary electrophoresis of four diuretics: determination of electric field strength and electroosmotic velocity. J. Microcolumn Sep., 5 (1993) 451-457; C.A., 120 (1994) 227100c.

See also 2529.

32d. Central nervous system drugs

See 2046.

- 32e. Chemotherapeutics (exc. cytostatics and antibiotics)
- 2522 Levêque, D., Gallion, C., Tarral, E., Monteil, H. and Jehl, F.: Determination of fosfomycin in biological fluids by capillary electrophoresis. J. Chromatogr. B, 655 (1994) 320-324.

See also 2036, 2059.

- 32g. Other drug categories
- 2523 Chadwick, R.R., Hsieh, J.C., Resham, K.S. and Nelson, R.B.: Applications of capillary electrophoresis in the eye-care pharmaceutical industry. *J. Chromatogr. A*, 671 (1994) 403-410.
- 2524 Korman, M., Vindevogel, J. and Sandra, P.: Application of capillary electrophoresis to the quality control of pharmaceutical formulations: effect area correction on quantitation of antitussives. J. Microcolumn Sep., 5 (1993) 525-530; C.A., 120 (1994) 331267y.
- 2525 Thomas, B.R., Fang, X.G., Chen, X., Tyrrell, R.J. and Ghodbane, S.: Validated micellar electrokinetic capillary chromatography method for quality control of the drug substances hydrochlorothiazide and chlorothiazide. J. Chromatogr. B, 657 (1994) 383-394.
- 2526 Yin, S. and Chen, Y.: (Compositions of induced musk; analysis of water soluble compositions of induced musk). Chengdu Keji Daxue Xuebao, (1993) 17-30; C.A., 120 (1994) 253464n.

See also 2140, 2149, 2239, 2519.

- 32h. Toxicological and forensic applications
- 2527 Flurer, C.L. and Wolnik, K.A.: Chemical profiling of pharmaceuticals by capillary electrophoresis in the determination of drug origin. *J. Chromatogr. A*, 674 (1994) 153-163.
- 2528 Krogh, M., Brekke, S., Tonnesen, F. and Rasmussen, K.E.: Analysis of drug seizures of heroin and amphetamine by capillary electrophoresis. J. Chromatogr. A, 674 (1994) 235-240.

2529 Lukkari, P., Nyman, T. and Riekkola, M.-L.: Determination of nine β-blockers in serum by micellar electrokinetic capillary chromatography. J. Chromatogr. A, 674 (1994) 241-246.

See also 2497, 2500.

- 32i. Plant extracts
- 2530 Carlsson, L., Ronquist, G. and Rosling, H.: Analysis of the cyanogenic glycoside linamarin in urine by isotachophoresis. J. Anal. Toxicol., 18 (1994) 91-94.
- 2531 Liu, Y.M. and Sheu, S.J.: (The application of capillary electrophoresis in analysis of Chinese-herb drugs). Yaowu Shipin Fenxi, 1 (1993) 327-333; C.A., 121 (1994) 18163g.

See also 2127.

- 33. CLINICO-CHEMICAL APPLICATIONS
- 33a. General papers and reviews
- See 2516, 2543.
- Complex mixtures and profiling (single compounds by cross-reference only)
- See 2083, 2104, 2111, 2112, 2114, 2115, 2116, 2118, 2120, 2121, 2131, 2144, 2243, 2251, 2260, 2282, 2291, 2318, 2332, 2333, 2365, 2370, 2373, 2472, 2475, 2486, 2494.
- 34. FOOD ANALYSIS
- 34b. Complex mixtures (single compounds by cross-reference only)
- See 2079, 2140, 2479.
- 35. ENVIRONMENTAL ANALYSIS
- 35a. General papers and reviews
- 2532 Nielen, M.W.F.: The potential of capillary electrophoresis in environmental analysis. *Tech. Instrum. Anal. Chem.*, 13 (1993) 607-633; C.A., 120 (1994) 330430j a review with 51 refs.
- Air pollution (complex mixtures; single compounds by cross-reference only)
- See 2515.
- Water pollution (complex mixtures; single compounds by crossreference only)
- See 1978, 2130, 2510, 2553.

ELECTROPHORESIS B461

- 35d. Soil pollution (complex mixtures; single compounds by crossreference only)
- See 2130.
- 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36a. Surfactants
- See 2554.
- 36c. Complex mixtures, technical products and unidentified compounds
- 2533 Campanella, L., Cardarelli, E., Ferri, T., Petronio, B.M. and Pupella, A.: A new experimental approach for determination tests in carrot sludge. *Environ. Prot. Eng.*, 16 (1992) 99-104; C.A., 120 (1994) 252330k.
- 2534 Geoghegan, W.D.: Production of electrophoretically-homogeneous protein-colloidal gold complexes. U.S. US 5,298,135 (Cl. 204-182.8; C25B7/00), 29 Mar. 1994, Appl. 909,409, 07 Jul. 1992; 19 pp.; C.A., 120 (1994) 293586s.

See also 2078.

- 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUC-TURES
- 2535 Ben-Taleb, A., Vera, P., Delgado, A.V. and Gallardo, V.: Electrokinetic studies of monodisperse hematite particles: effect of inorganic electrolytes and amino acids. *Mater. Chem. Phys.*, 37 (1994) 68-75; C.A., 120 (1994) 228165q.
- 2536 Boxall, C.: The electrophoresis of semiconductor particles. Chem. Soc. Rev., 23 (1994) 137-145; C.A., 121 (1994) 23510x - a review with 30 refs.
- 2537 Dunstan, D.E.: Electrophoretic mobility and dielectric response measurements of colloidal hematite. *J. Colloid Interface Sci.*, 163 (1994) 255-258; C.A., 120 (1994) 228191v.
- 2538 Gribbon, P.M., O'Hare, D., Parker, K.H. and Winlove, C.P.: Investigation of the endothelial cell glycocalyx using electrophoresis. *Electro-Magnetobiol.*, 13 (1994) 137-146; C.A., 120 (1994) 293371t.
- 2539 Kato, Y., Satoh, T., Kaneuchi, C., Itoh, T. and Matsuda, M.: Differentiation of thermophilic species of Campylobacter, in particular C. coli and C. jejuni, with atypical characteristics, by analysis of protein-banding profiles on non-denaturing polyacrylamide gels. Microbios., 76 (1993) 153-160; C.A., 121 (1994) 4980i.
- 2540 Nakano, Y., Makino, K., Ohshima, H. and Kondo, T.: Analysis of electrophoretic mobility data for human erythrocytes according to sublayer models. *Biophys. Chem.*, 50 (1994) 249-254; C.A., 121 (1994) 4366p.
- 2541 Ohshima, H.: Electrophoretic mobility of soft particles. *J. Colloid Interface Sci.*, 163 (1994) 474-483; C.A., 120 (1994) 281222q.

See also 2501.

- 38. INORGANIC COMPOUNDS
- 38a Cations
- 2542 Albert, M., Demesmay, C. and Rocca, J.L.: (Separation of organic and inorganic selenious compounds by capillary electrophoresis). *Analusis*, 21 (1993) 403-407; C.A., 120 (1994) 234015a.
- 2543 Buchberger, W., Winna, K. and Turner, M.: Applications of capillary zone electrophoresis in clinical chemistry. Determination of low-molecular-mass ions in body fluids. *J. Chromatogr.* A, 671 (1994) 375-382.
- 2544 Lee, Y.-H. and Lin, T.-I.: Determination of metal cations by capillary electrophoresis. Effect of background carrier and complexing agents. J. Chromatogr. A, 675 (1994) 227-236.
- 2545 Martínez, M. and Aguilar, M.: Determination of chromate ion in chromium plating baths using capillary zone electrophoresis with micellar solution. J. Chromatogr. A, 676 (1994) 443-450.
- 2546 Regan, F.B., Meaney, M.P. and Lunte, S.M.: Determination of metal ions by capillary electrophoresis using on-column complexation with 4-(2-pyridylazo)resorcinol following trace enrichment by peak stacking. J. Chromatogr. B, 657 (1994) 409-417.
- 2547 Shi, Y. and Fritz, J.S.: New electrolyte systems for the determination of metal cations by capillary zone electrophoresis. J. Chromatogr. A, 671 (1994) 429-435.
- 2548 Weston, A.: The analysis of inorganic metal cations by capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9239599, 1992, 405 p.; C.A., 120 (1994) 235042a.
- 2549 Yang, Q., Jimidar, M., Hamoir, T.P., Smeyers-Verbeke, J. and Massart, D.L.: Determination of alkali and alkaline earth metals in real samples by capillary ion analysis. *J. Chromatogr. A*, 673 (1994) 275-285.

See also 2504, 2523, 2559.

38b. Anions

- 2550 Benz, N.J. and Fritz, J.S.: Studies on the determination of inorganic anions by capillary electrophoresis. J. Chromatogr. A, 671 (1994) 437-443.
- 2551 Cousins, S.M., Haddad, P.R. and Buchberger, W.: Evaluation of carrier electrolytes for capillary zone electrophoresis of lowmolecular-mass anions with indirect UV detection. *J. Chroma*togr. A, 671 (1994) 397-402.
- 2552 Dabek-Zlotorzynska, E. and Dlouhy, J.F.: Application of capillary electrophoresis in atmospheric aerosols analysis: determination of inorganic and organic anions. *J. Chromatogr. A*, 671 (1994) 389-395.
- 2553 Janini, G.M., Chan, K.C., Muschik, G.M. and Issaq, H.J.: Analysis of nitrate and nitrite in water and urine by capillary zone electrophoresis. *J. Chromatogr. B*, 657 (1994) 419-423.
- 2554 Jordan, J.M., Moese, R.L., Johnson-Watts, R. and Burton, D.E.: Determination of inorganic sulfate in detergent products by capillary electrophoresis. *J. Chromatogr. A*, 671 (1994) 445-451.
- 2555 Matejovič, I. and Bieliková, M.: Evaluation of the isotachophoretic determination of nitrates and sulfates in plant material. Fresenius J. Anal. Chem., 349 (1994) 559-562.

B462 BIBLIOGRAPHY SECTION

2556 Nann, A. and Pretsch, E.: Potentiometric detection of anions separated by capillary electrophoresis using an ion-selective microelectrode. J. Chromatogr. A, 676 (1994) 437-442.

- 2557 Oehrle, S.A.: Versatility of capillary electrophoresis of anions with a high-mobility chromate electrolyte. *J. Chromatogr. A*, 671 (1994) 383-387.
- 2558 Stathakis, C. and Cassidy, R.M.: Cationic polymers for selectivity control in the capillary electrophoretic separation of inorganic anions. *Anal. Chem.*, 66 (1994) 2110-2115.
- 2559 Wojtusik, M.J. and Harrold, M.P.: Factors influencing trace ion analysis with preconcentration by electrostacking. J. Chromatogr. A, 671 (1994) 411-417.

BIBLIOGRAPHY SECTION

SUPPLEMENT TO THE
JOURNAL OF CHROMATOGRAPHY A
1994

INDEXES

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INTRODUCTION

Presenting the Subject Index for all the four different parts of the Bibliography Section as well as presenting the Index of Types of Compounds Chromatographed has become a tradition in the Journal. The following indexes refer to both volumes of Bibliography published this year (681 and 682). Because the methodological part differs substantially in different techniques, we have retained the subdivision system, using the following abbreviations: C = Liquid column chromatography, E = Electrophoresis, G = Gas chromatography, P = Planar chromatography. In the Index of Types of Compounds Chromatographed all types of methods are indicated in the individual entries by appropriate abbreviations. Entries relevant to supercritical fluid chromatography are to be looked for in the section on Gas Chromatography. Micellar electrokinetic chromatography is to be looked for in the section on Electrophoresis. In entries that are heavily populated by chromatographic papers we made a further subdivision into Techniques and Applications. In the Subject Index a selection was made in such entries and an appropriate note was attached. Commonly used sorbents and procedures were not included into the Index. Reviews are clearly indicated.

Prague (Czech Republic) Brno (Czech Republic) Z. Deyl and V. Schwarz J. Janák

Subject Index

Please, note that this Index refers to the entry numbers in the Bibliography Section (Vols. 681 and 682). Individual parts of the Bibliography Section (Liquid Column Chromatography, Gas Chromatography, Planar Chromatography and Electrophoresis) are numbered separately.

Liquid Column Chromatography

Adsorption 1564, 1631, 2866, 4163, 4164, 4168

- isotherm 40, 52, 61

```
— kinetics 4172
    see also Sorption dynamics
— , modelling 597, 1617
--- , nonequilibrium 1515, 1516
- nonlinear 1504
  -, reversible 39
Affi gel 624, 708, 753, 846, 869, 1303, 2224, 2249, 3118, 3549,
    3590, 3669, 4612
Affinity chromatography, applications to various fields of science and
    technology 123, 172, 176, 267, 303, 304, 316, 400, 401, 537,
    587, 598, 599, 620, 626, 632, 703, 733, 752, 766, 795, 803, 817,
    821, 902, 1650, 1652-1654, 1726, 1885, 2114, 2179, 2220,
    2225, 2227, 2251, 2256, 2258, 2264, 2362, 2387, 2951, 2960,
    3109, 3119, 3120, 3123, 3277, 3304, 3313, 3326, 3340, 3359,
    3388, 3410, 3430, 3431, 3434, 3445, 3462, 3467, 3503, 3506,
    3520, 3529, 3538, 3541, 3548, 3586, 3592, 3625, 3630, 3632,
    3658, 4270, 4273-4275, 4365, 4391, 4437, 4449, 4612, 4633,
    4640, 4645, 4646, 4649, 4651-4653, 4668, 4693, 4698, 4722,
    4723, 4744, 4746
    see also Membrane chromatography; Immobilized metal affinity
    chromatography; Immunoaffinity chromatography

    — , coupled with RP HPLC 4723

__ _ , enatioselective 2998(review)
— — , magnetic, high gradient 4079
— —, membrane 2110, 2119, 2891
— — , models 2949, 2954
— — , new sorbents see Dyes as ligands in affinity chromatography;
    Stationary phase(s) for affinity chromatography; various kinds of
    sorbents
     – , reviews and books 174, 606, 1655, 2066, 2840, 2950, 2955-
    2958, 3384, 3385, 3387, 3393, 3509, 3521, 4142, 4271

    — , theory 1655(review), 2959

Agglutinin-agarose 2299
Air problems 1495
Alumina based sorbents 1577, 2714, 4203, 4483, 4881, 4913
Amino bonded stationary phases 214, 285, 762, 887, 1097, 1860,
    1898, 2867, 2917, 3078, 3114, 4205, 4841
Aminohexyl-agarose 2723
Amperometric detection see Detection, amperometric
Annular chromatography 3083
- - , rotating 67, 1538, 4107
```

Argentation chromatography see Stationary phase, impregnated with

```
silver nitrate; Stationary phase, silver resin
Atomic adsorption spectrometry application in LCC see LC/AAS cou-
    pling
Automated procedures 137, 138, 141, 263, 463, 466, 470, 951,
    1055, 1092, 1176, 1230, 1383, 1616, 1619, 1680, 1690, 1722,
    1726, 1966, 1968, 1984, 2022, 2128, 2400, 2494, 2578, 2610,
    2645, 2669, 2913, 3273, 3286, 3474, 3797, 3801, 3862, 3921,
    4015, 4256, 4276, 4310, 4497, 4542, 4652, 4868, 4950, 4999,
    5051, 5088(review), 5133
    see also Sample preparation, automated
Band broadening 39, 58, 579, 4161
- mobility 2816
- profiles 1615
— sharpening 1609
Benzamidine-agarose 840, 850, 2292
Bioaffinity chromatography see Affinity chromatography, applica-
    tions to various fields of science and technology
Bioreactors, chromatographic 2810
Books (and symposia proceedings) 1363, 1451, 1452, 1473, 1720,
    2780, 2781, 4046, 4142
Boronate ligands for affinity chromatography 3658, 3668, 4667,
    4959
α-Bungarotoxin - agarose 719
Butane-agarose 3583, 4715, 4727
Butyl-agar 3424
Butyl-Toyopearl 2243, 3516, 3546, 3591, 4767
Calibration in chromatography, general 127, 4243
    see also Data processing
   - gel permeation chromatography see Gel permeation chroma-
    tography, calibration
Calibration in steric exclusion liquid chromatography see Gel per-
    meation chromatography, calibration
   of instruments 25
Calmodulin-agarose 2256, 3483, 3560, 4649
Calpastatin-agarose 832
Capacity factor 325, 2032, 3684, 4885, 4975, 4976
Capillary chromatographic techniques 468, 573(review), 1026,
    1451(book), 1549, 1567, 1675(review), 2047, 2076, 3003, 3302,
    4056, 4266, 5076(review), 5077(review)
— — , detector 2844, 2852

    columns see Column(s), microbore and capillary

    hydrodynamic chromatography 3003

Carbon as sorbent 250, 474, 1103, 1206, 1274, 1470(review), 1523,
```

1562, 1687, 2865, 2879, 2895, 3019, 3245, 4057, 4309, 4310,

B468 BIBLIOGRAPHY SECTION

4389, 4823

Carbon activated with silica-gel 4298

CarboPac 291, 293, 309, 764, 1747, 1749, 3091, 3114, 3437, 3613, 4395, 4504, 4823

Casein-agarose 2237, 4734

Cellulose based sorbents 102, 246, 730, 1660, 2612, 2661, 2668, 2894, 3629, 3706, 3860, 3929, 4948, 4986, 5010

Centrifugal countercurrent chromatography see Countercurrent chromatography

- partition chromatography 220, 1112, 1398, 3000, 3002, 3217, 3679, 3810, 5108
 - see also Partition chromatography
- size exclusion chromatography see Gel permeation chromatography, centrifugal

Ceramic based stationary phase 124, 2878

Charge transfer chromatography 1678

Chelation chromatography 4097(review), 5135

see also Copper chelate chromatography; Metal chelate chromatography

Chemiluminiscence see Detection and detectors chemiluminiscence Chemometrics 24, 143, 1494, 1542, 3801, 4159, 4251

Chiral derivatization 1262, 1311, 1808, 1984, 2532, 2553, 2559, 2598, 3990, 4323, 4415, 4529, 4541, 4548

- HPLC see Enantiomers (and diastereomers), separation
- mobile phases 446, 1662, 1956, 1969, 2526, 2570, 2649, 2971, 2978, 2980
- sorbents and stationary phases 87, 121, 182, 183, 185, 188-191, 246, 481, 496, 497, 500, 1147, 1163(review), 1181, 1225, 1230, 1254, 1266, 1324, 1336, 1563, 1585, 1658, 1660, 1663, 1664, 1667, 1864, 1879, 1900, 1935, 2509, 2523, 2528, 2533, 2538, 2563, 2570, 2571, 2576, 2594, 2612, 2649, 2661, 2668, 2858(review), 2860, 2870, 2873, 2902, 2904, 2968, 2978, 2980, 2982, 2984, 2985, 2987, 2994, 2995(review), 2997, 2999(review), 3099, 3163, 3226, 3236, 3272, 3685, 3706, 3738, 3758, 3845, 3853, 3866, 3889, 3893, 3901, 3908, 3929, 4010, 4223, 4282, 4287, 4288, 4289, 4453, 4538, 4543, 4547, 4811, 4814, 4817, 4922, 4933, 4939, 4941, 4948, 4957, 4972, 4986, 4993, 5010 see also Cyclodextrin, stationary phase

Chromatofocusing 1998, 2207, 2208, 2261, 3550, 4720

Clean up procedures 2(review), 214, 235, 263, 959, 970, 1278, 1284, 1341, 1344, 1531, 1721, 1725, 1963, 2408, 2436, 2437, 2447, 2455, 2669, 2712, 3020, 3049, 3696, 3902, 3959, 4300, 4339, 4341, 4790, 4868, 4884, 4896, 4940, 5024

CN-bonded phases 1069, 1097, 1227, 1327, 1898, 1901, 2338, 2345, 2513, 2514, 2543, 2561, 2568, 2605, 2655, 2864, 2874, 3807, 3905, 3919, 4005, 4956, 4969, 4970, 5035, 5056

Column(s), chiral see Chiral sorbents and stationary phases

- -, axial compressed 1593
- conditionings 4208
- coupling 1089, 1091, 1690, 2629, 2745, 4894
- heterogeneity 4173
- length, zero 4255
- dynamics 2815
- —, microbore and capillary 136, 330, 872, 1560, 1561, 1565, 1567, 1573, 1589, 1590, 1679, 1945, 1958, 2422, 2854, 2869, 2877, 2878, 3010, 3241, 3380, 3648, 3766, 3780, 3889, 3998, 4008, 4066, 4216, 4227, 4292, 4308, 4566, 4902, 5002
- see also Microcolumn
- --- , new types 92, 105, 2883, 4355
- packing 68, 2875

Column(s), performance 1634

- , Pirkle 461, 1321, 2526, 2538, 2860, 4538
- protection 1534
- , review 19
- selectivity see Selectivity
- switching 259, 409, 528, 1055, 1091, 1149, 1228, 1230, 1247, 1282, 1343, 1849, 1968, 1985, 2022, 2343, 2494, 2513, 2540, 2576, 2652, 3058, 3135, 3211, 3250, 3251, 3794, 3868, 3909, 3921, 3942, 3957, 3979, 3986, 3998, 4008, 4279, 4506, 4875, 4891, 4979, 4986, 4993, 5028, 5066, 5149, 5159

Comparison of sorbents 95, 999, 1580, 2126, 2474, 2501

Computerization 49, 56, 127, 139, 142-154, 1091, 1512, 1513, 1524, 1600, 1615, 1616, 1621, 1623, 1624, 1628-1630, 1632, 1636, 1637, 2026, 2801, 2802, 2914, 2916-2934, 2942, 2988, 4150, 4247-4258, 5150

--- , review 17, 142, 4055

see also Data processing; Models in chromatography; Retention model

Concanavalin A-agarose 267, 313, 658, 714, 756, 816, 849, 870, 1782, 2014, 2183, 2216, 2222, 2284, 2291, 3111, 3567, 3588, 3617, 4359, 4388, 4396, 4692, 4748

Conductivity detector (and detection) see Detection and detectors conductivity

Continuous buffer exchange 31

chromatography 823, 3077, 4296
 see also Preparative chromatography

-- gel 586

Copper chelate (affinity) chromatography 2063, 3538, 4760 see also Chelation chromatography; Metal chelate chromatography

Countercurrent chromatography 1042, 2749, 3258, 4072, 4073

- , cross-axis coil planet centrifuge 194, 195, 197, 1603(review)
- — , high-speed 1404, 4337
- --- , moving bed 1622
- — , pH-zone-refining 4294
- — , preparative 1674(review), 2910
- — , solvents 1489
- , theory 1489

Counterflow separation 1492

Coupled column chromatography see Columns(s), coupling

Cross-current, continuous 4(review)

Cyclodextrin, mobile phase 446, 936, 1262, 1913, 1990, 2001, 3723, 3977, 4553, 4850, 4941

—, stationary phase 91, 191, 202, 272, 481, 936, 958, 1203, 1257, 1266, 1336, 1555, 2001, 2497, 2581, 2854, 2973(review), 2983, 3078, 3214, 3297, 3690, 3738, 3845, 3893, 4174, 4210, 4245, 4281, 4283, 4290, 4785, 4817, 4972, 4973

Data analysis 54

- management 2914
- processing 154, 1630, 1636, 2925, 2930, 2942
 see also Calibration in chromatography, general

Data system 2918, 2927, 2931

see also Computerization

Dead time 1526

- volume 42, 46, 1526, 4297

Deconvolution in chromatography 49, 147, 2843

Derivatization 83

see also Post column derivatization; Precolumn derivatization

- , chiral see Chiral derivatization

SUBJECT INDEX LCC B469

```
1546, 1551, 1553, 1672, 1700, 1721, 1722, 1724, 1726, 1732,
Derivatization, comparison methods 506
                                                                           1735, 1748, 1751, 1791, 1808, 1819, 1912, 1913, 1922, 1925,
-- , fluorescence 72, 235, 242, 244, 326, 336, 346, 348, 354, 425,
                                                                           1942, 1948-1950, 1953, 1960, 1962, 1967, 2011, 2021, 2031,
    426, 457, 487, 528, 534, 890, 933, 1088, 1099, 1174, 1541,
                                                                           2090, 2105, 2270, 2288, 2316, 2341, 2352, 2369, 2373, 2388,
    1808, 1913, 1942, 1948-1950, 2105, 2316, 2399, 2553, 2598,
                                                                           2390, 2394, 2399, 2408, 2414, 2470, 2515, 2533, 2553, 2557,
    3062, 3138, 3141, 3155, 3173, 3200, 3224, 3247, 3250, 3286,
                                                                           2564, 2592, 2593, 2598, 2607, 2622, 2631, 2639, 2643, 2662.
    3297, 3651, 3655, 3657, 3660, 3661, 3763, 3773, 3818, 3885,
                                                                           2664, 2665, 2670, 2712, 2854, 3008, 3013, 3028, 3032, 3035,
    4188, 4323, 4350, 4351, 4354, 4415, 4428, 4499, 4538-4542,
                                                                           3052, 3062, 3064, 3138, 3141, 3155, 3156, 3207, 3209, 3221,
    4544, 4850, 4984, 5049, 5071, 5073
                                                                           3224, 3230(review), 3247, 3248, 3250, 3261, 3271, 3275, 3283,
    see also Post column derivatization; Precolumn derivatization
                                                                           3286, 3297, 3648, 3651, 3655, 3657, 3660, 3661, 3688, 3729,
- , on-column 1942, 2367, 2757, 3250, 3251
                                                                           3737, 3739, 3749, 3759, 3763, 3773, 3809, 3811, 3818, 3849(re-
 _ , review 226
                                                                           view), 3865, 3868, 3885, 3904, 3924, 3950, 3981, 3991, 4007,
    see also Post column derivatization; Precolumn derivatization
                                                                           4012, 4188, 4190, 4192, 4219, 4299-4301, 4304, 4305, 4308,
___, solid phase 72, 1541
                                                                           4322, 4323, 4329, 4340-4342, 4345, 4350, 4351, 4354, 4358,
Detection (and detectors), amperometric 248, 252, 261, 293, 663,
                                                                           4415, 4428, 4432, 4499, 4522, 4524, 4529, 4531, 4533-4535,
    674, 1281, 1433, 1439, 1742, 1747, 1756, 1768, 1769, 2356,
                                                                           4538-4542, 4544, 4553, 4558, 4560, 4775, 4837, 4850, 4889,
    2375, 2451, 2461, 2851, 3029, 3070, 3128, 3259, 3613, 3870,
                                                                           4959, 4965, 4980, 4983, 4984, 4988, 4989, 5012, 5024, 5027,
    4033, 4051, 4058, 4193, 4357, 4360, 4364, 4377, 4513, 4593,
                                                                           5035, 5041, 5049, 5050, 5070, 5071, 5073, 5079, 5080, 5100,
    4823, 4865, 4870, 4893, 5146
                                                                           5111
    see also Detection (and detectors), electrochemical
                                                                       Detection (and detectors), indirect 82, 274, 446, 1391, 1415, 1893,
__ _ _ , atomic absorption see LC/AAS coupling
                                                                           1965, 2763, 2764, 3100, 4190, 4196, 5121, 5148
__ _ _ , chemiluminiscence 83, 376, 380, 1062, 1098, 1858, 1980,

    — — , infrared see LC/FTIR coupling

    2847(review), 2848, 3009, 3141, 3152, 3162, 3849(review),
                                                                       __ _ _ , ion mobility 75
    3906, 4187, 4200(review), 4567, 5164
                                                                       __ _ _ , laser based 81, 1547, 2031, 2825, 2850, 2852, 3688,
    see also Detection (and detectors), fluorescence
                                                                           4322
    — — , circular dichroism 2850, 2972, 4429
                                                                       __ __ , light scattering 73, 74, 77, 139, 287, 290, 362, 365,
__ __ , comparison of various types 373, 426, 4195
                                                                           372-374, 395, 426, 614, 649, 1123, 1866, 1869, 1870, 1873,
__ _ _ , conductivity 82, 274, 1326, 1391, 1434, 1435, 1503,
                                                                           2355, 2363, 2433, 2449, 2480, 2483, 2485(review), 2488, 2492,
    2674, 2693, 2761, 2762, 2771, 3067, 3259, 3708, 4199, 4362,
                                                                           2825, 2855, 2924, 3136, 3149, 3149, 3184, 3186, 3213, 3235,
     4368, 4413, 4418-4420, 5126, 5130, 5132, 5138, 5141, 5145,
                                                                           3382, 3717, 3832, 3838, 4189, 4376, 4410, 4433, 4441, 4447,
     5152, 5157, 5163, 5167, 5170, 5173
                                                                           4457, 4917
— — , coulometric 463, 464, 1015, 1933, 2558, 3238, 3246,
                                                                        — — , NMR see LC/NMR coupling
    4510, 4970
                                                                       — — , optimization 212
 — — , density 2489, 3030
                                                                       ______, photodiode array 49, 50, 57, 69, 209, 211, 349, 403, 448,
— — , dielectric constant 1678
                                                                           949, 1018, 1038, 1094, 1118, 1256, 1259, 1261, 1268, 1271,
__ __ , electrochemical 70, 84, 229, 270, 452, 464, 467, 468,
                                                                           1325, 1530, 1699, 2313, 2352, 2359, 2465, 2493, 2589, 2671,
     470, 475, 524, 707, 776, 959, 971, 997, 1000, 1018, 1050, 1092,
     1204, 1227, 1347, 1424(review), 1426, 1433, 1437, 1548, 1549,
                                                                           2685, 2707, 2710, 2842(review), 2938, 3042, 3047, 3055, 3070,
     1696, 1705, 1708, 1752, 1753, 1858, 1899, 1933, 1940, 1941,
                                                                           3154, 3182, 3673, 3786, 3807, 3811, 3816, 3938, 4004, 4016,
                                                                           4039, 4150, 4299, 4476, 4503, 4729, 4788, 4874, 4884, 4902,
     1944-1947, 1951, 1954, 1983, 1986, 2330, 2349, 2376, 2377,
                                                                           4903, 4908, 4916, 4930, 5072, 5074
     2381, 2541, 2630, 2719, 2837(review), 2841, 3148, 3228,
                                                                       — — — , photometric 2763, 2764
     3230(review), 3238, 3241, 3300, 3320, 3671, 3877, 3879(re-
                                                                       __ _ _ , __ , indirect 1391, 3100
     view), 3887, 3931, 3931, 3949, 3990, 3997, 4035, 4185(review),
                                                                       — — , polarimetric 2997, 3096, 3168, 4886
     4194, 4197, 4198(review), 4330, 4427, 4507, 4509, 4511, 4519,
                                                                       __ _ _ , post column reaction see Post column derivatization
     4521, 4588, 4834, 4840, 4849, 4952, 4969, 4970, 5075, 5125,
                                                                       — — , potentiometric 70, 4401, 5121
                                                                                -, radioactivity 80, 324, 327, 358, 442, 489, 669, 1803,
     see also Detection (and detectors), amperometric
                                                                            1817, 1836, 1844, 1909, 2339, 2449, 3143, 3938, 4134, 4404,
 __ __ , __ , scanning 1552
                                                                           4405, 4416, 4456, 4459, 4482, 4708, 4843, 4949
__ _ _ , electrodes 70, 71, 1544, 1545
                                                                         _ _ _ , reaction see Post column reaction detection
 ___ __ , electrode array 2444
                                                                        _ _ _ , refractometric 199, 287, 360, 367, 369, 373, 387, 426,
 — — , electron capture 76
                                                                           1140, 1697, 1853, 1856, 1872, 1880, 1901, 1909, 1976, 2477(re-
 — — , enzyme 1544, 1545
                                                                           view), 2489, 2825, 2846, 3030, 3067, 3070, 3176, 4319-4321,
 — — , flame ionization 1680, 2839
                                                                           4363, 4367, 4380, 4412, 4423, 4442, 4443, 4452, 4481, 4886
 __ _ _ , __ photometric 76, 2853, 3715, 3716, 4262, 4808
 oxdots — oxdots , flow scintillation see Detection and detectors radioactivity
                                                                       __ _ _ , review, general 3, 76, 491, 593, 2477, 2485, 2837, 2840,
                                                                           2842, 2847, 2852, 3849, 4185, 4198, 4200
 — — — , fluorescence (luminiscence, phosphorescence) 43, 72, 83,
                                                                        – – , spectra UV, derivative 2843
     203, 212, 227, 233, 235, 242, 244, 247, 278, 286, 326, 336, 344,
                                                                        — — , spectrophotometric see Detection (and detectors),
     346, 348, 353, 354, 405, 425, 426, 432, 457, 465, 486, 487,
                                                                           photometric
     491(review), 512, 518, 528, 534, 890, 914, 915, 933, 934, 944,
                                                                       — — , surface plasma resonance 2840
     945, 951, 964, 1048, 1088, 1096, 1099, 1160(review), 1174,
     1184, 1191, 1207, 1208, 1223, 1278, 1324, 1330, 1439, 1541,
                                                                       __ _ _ , thermal lens, laser 1547
```

```
Detection (and detectors), thermionic 76, 4066
                                                                       Enantiomers (and diastereomers), separation, reviews 9, 1163, 1468,
-- -- , thermo-optical 2852(review)
                                                                           1668, 1835, 2973, 2975, 2979, 2990, 2995, 2998, 3879, 4284,
 — — — , troubleshooting 79
                                                                           4291, 4525, 4953
-- - , viscosity 60, 139, 287, 1124, 1767, 2477(review), 2492,
                                                                       Enzyme reactor 342, 456, 1553, 1912
    2845, 2846, 3838
                                                                       Equations see various kinds of equations
--- -- , voltametric 84, 1548
                                                                       Error analysis 3842(review)
Detector(s) cell 3010
                                                                       Ether-Toyopearl 3546
- , new designs 76, 3029, 4195, 4197
                                                                       Expert system(s) 26, 33, 1481
Developments, past 2793
                                                                       Extraction chromatography 144, 2752, 4089, 4098, 5112, 5116,
Diastereoisomers, separation see Enantiomers (and diastereomers),
    separation
                                                                       Fast (protein) chromatography (FPLC) 666, 674, 767, 1602, 1657,
Diffusion effect 3381
                                                                           1758, 1764, 2074, 2098, 2188, 2289, 2891, 3199, 3457, 3481,
Diode array detection see Detection (and detectors), photodiode ar-
                                                                           3637, 4076, 4102, 4462, 4625, 4703, 4786

    Fourier transformation see LC/FTIR coupling

Displacement chromatography 91, 190, 1957, 3382, 3529
                                                                       Field-flow fractionation 39, 196(review), 1397, 1583, 4070, 4229,
--- , preparative 2006
                                                                           4293, 4295, 4348, 5106
- model 1454(review), 1617
                                                                       Fingerprinting see under structural studies in individual entries in the
  -, theory 588, 1518
                                                                           List of Types of Compounds Chromatographed
DNA-agarose 3587
                                                                       Flame ionization detector see Detection (and detectors), flame ioniza-
DNA-cellulose 2182, 2186, 3389, 3502
Droplet countercurrent chromatography see Countercurrent chroma-
                                                                       Flash chromatography 198(review), 975, 1067, 3166, 3703, 4278
    tography
                                                                       Florisil 1093
Dye ligand membranes
                                                                       Flow fluctuations 2845
Dyes as ligands in affinity chromatography 598, 1651, 2051(review),
                                                                       - limits 102
    2130, 2200, 3431, 3606
                                                                       - optimization 2068
    see also Stationary phase(s) for affinity chromatography
                                                                       - programming 136
Electrochemical detection see Detection (and detectors), electro-
                                                                       Fluorescence detection see Detection (and detectors), fluorescence

    detector see Detection (and detectors), fluorescence

   detector see Detection (and detectors), electrochemical

    labelling see Derivatization, fluorescence

Electrochemically modified liquid chromatography 2911
                                                                       Fluoroapatite 2111
Electrochromatography 255, 2878
                                                                       Frontal analysis 61, 2915, 3845, 3940
Electrokinetic chromatography see entries under Capillary zone elec-
                                                                       Fullerene, as sorbent 116, 1571, 4218
    trophoresis within the section on electrophoresis
                                                                       Gel permeation chromatography, calibration 62, 649, 1139, 2067
Electrostatic interaction chromatography 30, 5084
                                                                      -- - , comparison with field-flow fractionation 4170
Elemental analysis, reviews 2782, 2790
                                                                      Enantiomers (and diastereomers), separation 87, 91, 93, 107, 121,
                                                                      ____ MS 1693
    153, 182, 184, 186-191, 210, 237, 246, 328, 336, 349, 446, 453,
                                                                      — — , computerization 2920
    461, 481, 486, 496, 497, 500, 502, 516, 875, 930, 936, 958,
                                                                      - - , high temperature 2478, 2846
    1022, 1041, 1073, 1147, 1155, 1174, 1176, 1177, 1181, 1182,
                                                                      — — , mechanism 34
    1201, 1203, 1206, 1208, 1218, 1219, 1223, 1225, 1230, 1236,
                                                                      — — , micellar 2811
    1242, 1254, 1262, 1266, 1274, 1311, 1324, 1333-1336, 1659-
                                                                      — — , molecular mass estimation 60, 94, 451, 1124, 1131,
    1667, 1795, 1808, 1826, 1832, 1841, 1850, 1864, 1879, 1900,
                                                                          1134, 1140, 1142, 1145, 2480, 2845, 2846, 3018, 3094, 3830,
    1927, 1930, 1935, 1956, 1969, 1970, 1977, 1984, 1990, 1991,
                                                                          3838, 4917
    2019, 2334, 2348, 2410, 2509, 2523, 2526, 2527, 2529, 2532-
                                                                      — — , mobile phase 29, 1131, 1483, 2478, 5105
    2535, 2538, 2547, 2553, 2559, 2563, 2570, 2571, 2576, 2594,
                                                                      — — , review 20, 279, 2477, 2728, 4135, 4140, 4141
    2612, 2649, 2661, 2668, 2831, 2887, 2968-2972, 2974, 2977,
                                                                      -- -- , simulation 48, 139
    2980-2982, 2984-2986, 2989, 2992-2994, 2996, 2997, 3054,
                                                                      -- -- , stationary phase(s) 581, 1587, 2898, 5105
    3099, 3137, 3163, 3167, 3168, 3214, 3226, 3233, 3234, 3236,
                                                                      — — — , theory 48, 2811
    3256, 3257, 3263, 3268, 3272, 3283, 3297, 3334, 3415, 3685,
                                                                      Gelatin-agarose 838, 2277
    3700, 3703, 3706, 3723, 3738, 3758, 3812, 3845, 3850, 3851,
                                                                      Glass, porous 90, 3516
    3853, 3860, 3867, 3874, 3875, 3880, 3883, 3889, 3893, 3897,
                                                                      Glucosidase immobilization 4217
    3901, 3908, 3917, 3919, 3923, 3929, 3961, 3963, 3967, 3969,
                                                                      Glutathione-agarose 908, 4691
    3977, 3990, 4010, 4066, 4282, 4283, 4285-4290, 4323, 4415,
                                                                      Gradient(s), mixer optimization 2912
    4424, 4425, 4430, 4453, 4473, 4529, 4536, 4538, 4539, 4541,
                                                                      --- , problems in detection 1611
    4543, 4547-4549, 4713, 4791, 4809, 4811, 4814, 4817, 4829,
                                                                      -, temperature 136
    4834, 4886, 4922, 4929, 4933, 4939, 4941, 4948, 4957, 4963,
                                                                      Heat effects 1517
                                                                      Heating, fan-induced 1488
    4972, 4973, 4980, 4984, 4986, 4993, 5010, 5027, 5036
- , - , affinity chromatography 2998(review)
                                                                      Heparin-agarose 401, 613, 697, 751, 765, 770, 803, 815, 821, 838,
                                                                          1891, 2034, 2108, 2168, 2206, 2214, 2223, 2245, 2248, 2254,
 – , –– , database 2923, 2988
                                                                          2255, 2258, 2259, 2284, 2723, 3126, 3313, 3389, 3446, 3460,
---, ---, preparative 1604, 2976, 2979(review), 2983, 3812, 4245
```

3499, 3553, 3560, 3566, 3568, 3574, 3575, 3579, 3583, 3587, 2832(review), 2833-2835, 2836(review), 2844, 2883, 3022, 4136(review), 4179-4184 3588, 3629, 3630, 3670, 4398, 4466, 4644, 4699, 4736(review), Integration errors 2806 4737, 4742 — methods 147 Heparin-polyacrylamide 4275 Interaction chromatography see Ion interaction chromatography Heparin-Toyopearl 4698 Interference theory 1517 Heptylamine-agarose 2175, 4679 Ion and ion pair chromatography 71, 126, 179, 261, 266, 323, 464, Hexyl-agarose 845 466, 480, 489, 924, 931, 939, 972, 987, 997, 998, 1083, 1204, High speed chromatography 2055 1213, 1243, 1281, 1328, 1337, 1344, 1378, 1379, 1403, 1405, Histamine immobilized 733 1406, 1409, 1411, 1412, 1416, 1420, 1423, 1425, 1427, 1430, Histidine-ligand affinity chromatography 587, 733 1432, 1434, 1435, 1507, 1520, 1806, 1830, 1937, 1965, 2308, History of chromatography 38, 1480, 1493(review), 2794 2311, 2327, 2330, 2359, 2360, 2365, 2387, 2403, 2458, 2515, see also Developments, past, reviews 2543, 2560, 2562, 2564, 2592, 2625, 2669, 2674, 2699-2701, Hydrogen bond activity, measurement by LC 2829 2706, 2711, 2722, 2730, 2751, 2758-2765, 2767-2769, 2771-Hydrodynamic chromatography 2488, 4170 2773, 2851, 3151, 3165, 3234, 3299, 3701, 3709, 3722, 3724, 3899, 3905, 3989, 4033, 4058, 4085, 4087, 4092, 4093, 4096, — _ , — — size exclusion chromatography 4170 4100, 4108, 4114, 4117-4119, 4121-4124, 4126-4128. 4131. Hydrophilic interaction chromatography 2058 4158, 4159, 4206, 4418, 4523, 4550, 4552, 4772, 4812, 4813, Hydrophobic interaction chromatography 581, 605, 1788, 2053, 4816, 4819, 4830, 4847, 4848, 4882, 4890, 4896, 4900, 4926, 2054, 2056(review), 2106, 2107, 2115, 2178, 2193, 2241, 2785(review), 2894, 3386, 3413, 3424, 3516, 3597, 4235, 4355, 4934, 4943, 4958, 5019, 5034, 5041, 5059, 5075, 5091, 5094, 5100, 5122-5124, 5132, 5133, 5135, 5136, 5139, 5145, 5146, 4621, 4624, 4698, 4733, 4744, 4751, 4763, 4767 5148, 5149, 5151-5154, 5156, 5158, 5161-5163, 5167, 5169, __ _ _ , stationary phases 90, 3386, 3516 5170, 5174 __ _ _ , theory 2785(review) __ _ _ _ , comparison with capillary ion electrophoresis 4116 --- parameters 1522 __ _ _ _ _ _ , coupling with AAS 4105 Hydrophobicity 1444(review) __ _ _ MS 1646, 4105, 5122 Hydroxyapatite 609, 613, 651, 673, 683, 697, 730, 731, 734, 735, 743, 744, 748, 750, 781, 783, 791, 806, 824, 833, 853, 869, 885, __ _ _ _ , dual-column 4111 __ _ _ _ _ _ , electrostatic 5084 901, 1250, 2111, 2147, 2166, 2206, 2208, 2220, 2224, 2232, 2245, 2292, 3089, 3126, 3196, 3389, 3489, 3495, 3502, 3506, __ _ _ _ _ , enantiomers separation 210, 2992, 3234 3546, 3549, 3555, 3577, 3591, 3603, 3627, 3633, 3634, 3678, __ _ _ _ _ _ , model 4146 — — — — , optimization 931, 972, 3299 4233, 4382, 4686, 4688, 4707, 4715, 4718, 4720, 4725, 4741, __ _ _ _ _ _ , quantification 924, 1423, 4418, 4552, 4772, 4882, 4742, 4767, 4768 5094, 5154 Hydroxyapatite-agarose 2018 — — — , reviews 894, 1440, 1457, 2678, 2703, 4068, 4112, Hyphenation techniques 1487 4130, 4148, 4157, 4370, 5131 see also individual types of hyphenated techniques __ _ _ _ _ , theory 28, 52, 53, 2819, 3709 IgG-agarose 537, 903, 2216, 3110, 4396, 4647, 4695 exchange chromatography, reviews 4656 IgM-agarose 3110 --- -- , developments 193 Immobilized enzymes 175 __ _ _ , chiral 1665 ligand affinity chromatography 3393(review) — — , mobile phase, modifiers 4381 see also individual types of affinity sorbents __ __ , model 2820 membrane support 85, 86, 1553, 2891 --- -- , theory 4166 metal affinity chromatography 526, 608, 666, 745, 2003, 2063, exchangers, new types 103, 115, 960, 1554, 2055, 2059, 2068, 2089, 2160, 2948, 2952, 3325, 4694, 4727, 4750 protein stationary phase 117, 178, 848, 1254 2122, 2793, 2867, 2893, 3376, 3704, 4207, 4209, 4621, 5166 see also individual types of affinity sorbents — — , membrane 2068, 2139 Ion exclusion chromatography 3027, 3140, 4125, 4153, 4892, 5089, Immunoaffinity chromatography 138, 173, 396, 591, 668, 706, 709, 5138 863, 1341, 1648, 1887, 2104, 2108, 2118, 2123, 2131, 2231, interaction chromatography 1408, 2242, 4196, 4895 2284, 2441, 3049, 3172, 3403, 3494, 3510, 4074, 4269, 4460, lon pairing modifiers 513, 987, 1412, 1520, 1965, 2543, 4206, 5019, 4467, 4627, 4746 5041, 5059, 5148 — — , reviews 5, 1649 see also Mobile phase modifiers — clean up 1722, 1725, 4339, 4341, 4940 Isotherm 40, 52, 61, 153, 1459(review), 1501 Inclusion chromatography 1913 Industrial applications, review 2789 α-Lactalbumin-agarose 760 Langmuir coefficients 1525 Information theory 32, 497, 3808, 4167 isotherm see Adsorption; Isotherm Infrared detector (and detection) see LC/FTIR coupling Laser based detection and detectors see Detection and detectors, Injection loop 2499 Instrumental broadening 58 laser based Instrumentation for liquid column chromatography 1(review), 4(re-LC/AAS (atomic absorption spectrometry) coupling 1399, 1540, 2075, 2364, 2677, 2750, 2942, 3280, 3722, 4102, 4260, 5113 view), 15(review), 16(review), 23(review), 25, 31, 64-67, 166,

169, 170, 192, 194, 197, 1042, 1527-1538, 1597(review),

LC/AES (atomic emission spectrometry) coupling 78, 653, 984, 2744, Ligand affinity chromatography 714 2749, 4105, 5154 see also Affinity chromatography LC/capillary electrophoresis coupling 594 Light scattering detection and detectors see Detection (and detec-LC, combination with electrophoresis 2184, 3362 tors), light scattering — , — GC 157, 166, 1002, 1366, 1535, 1881, 2591, 2783(re-Liquefied gases as mobile phase see respective entries under Superview), 3889, 4145(review), 4497 critical fluid chromatography in the section on Gas chromato-— , — — helium microwave-induced plasmas 2943(review) -, -- immunoanalytic procedures 3438 Liquid-liquid extraction 1228, 1278, 1947, 2021, 3404, 4133, 4458, —, — — microbial sensor 1543 5118, 5119 --- , --- radioluminography 1539 — comparison with solid-phase extraction 1947 -, - Raman spectrometry 2838, 2944 - chromatography 1494 -, -- SEC 1697, 3362 - partition chromatography 2830, 3429, 4895, 5024 -, - TLC 41, 155, 168, 2340 Liquid scintillation counting see Detection (and detectors), radioactiv-, comparison of LC methods 1043, 1044, 4029, 4170, 4887 ---, --- with AES 4093 Liquid-solid extraction 181 -- , -- capillary electrophoresis 531, 539, 650, 671, 2328, Lysozyme, immobilized 117 2961(review), 4006, 4116, 4529, 4589, 4615, 4789, 4890 Mannose-agarose 320, 3132 __, __ colorimetric methods 888, 2374 Mannosyl-agarose 3445 - , - electrophoresis 4668 Membrane chromatography 579, 634, 2178 - , - - field-flow fractionation 4170 - - , affinity 2110, 2119, 2891 -, - GC 925, 1821, 4403, 4960 -- - , ion-exchange 2068, 2139 --- , --- isotachophoresis 4797 - convective liquid chromatography 2804 , — — magnetic resonance spectroscopy 451 — , immobilized artificial 85, 86, 1553, 2891 --- , --- other analytical methods 644, 932, 1821, 4947, 4998 Metal affinity membrane, immobilized 2891 – , — — chromatographic methods 2689, 4668 chelate chromatography 3436, 3618, 4267, 4268, 4653, 4698 see also Chelation chromatography; Copper chelate chroma-—, — — RIA 1821, 1978 ---, --- supercritical fluid chromatography 1686 tography - , - TLC 4495, 4792, 4829, 4881 Method development 55, 1481, 2797, 4257 ---, --- UV/VIS spectroscopy 1164 Micellar chromatography 206, 405, 524, 1170, 1190, 1507, 2333, - coupling, general, review 2946, 4259, 4265 2704, 2805(review), 2905, 3252, 3741, 3874, 3985, 4303 - electrodialysis coupling 1409 see also Capillary chromatography, micellar in the Electrophoresis LC/ELISA coupling 357 section Microbore columns see Columns, microbore and capillary LC/FTIR coupling 2487, 2491, 2936(review), 4308 LC/MS coupling 138, 158-165, 169, 171, 201, 230, 255, 268, 275, - liquid chromatography 563, 872 282, 323, 352, 393, 404, 424, 427, 434, 449, 513, 522, 548, 563, Microcolumn 163, 185, 951, 1435, 1547, 1592, 1613, 1614, 1673, 566, 567, 755, 855, 858, 880, 881, 937, 966, 983, 985, 1026, 1946, 1990, 2065, 2521, 2869, 2877, 2952, 3356, 3715, 3716, 1035, 1075, 1082, 1085, 1086, 1090, 1100, 1107, 1120, 1126, 3723, 4082, 4091 1167, 1200, 1220, 1229, 1261, 1271, 1283, 1298, 1308, 1311, see also Columns, microbore and capillary 1346, 1355, 1358, 1550, 1573, 1614, 1624, 1628, 1640, 1641, Microdialysis 1233, 3238, 4510 1643-1646, 1681, 1715, 1783, 1798, 1809, 1810, 1812, 1839, Micropurification 1657 1852, 1979, 1994, 1999, 2061, 2073, 2093, 2103, 2162, 2184, Miniaturization of chromatography 32, 446, 1485, 1675(review), 2320, 2329, 2350, 2353, 2391, 2416, 2425, 2434, 2441, 2443, 2239, 3766, 3780 2448, 2459, 2469, 2555, 2613, 2660, 2663, 2724, 2737, 2739, Mobile phase(s), buffer see pH effect 2740, 2742, 2775, 2941, 3070, 3072, 3073, 3150, 3222, 3262, --- , chiral see Chiral mobile phase 3302, 3308, 3325, 3336, 3346, 3380, 3383, 3401, 3656, 3659, --- , continuous exchange 31 3675, 3780, 3811, 3834, 3895, 3915, 3933, 3936, 3938, 3939, — effects 29, 115, 454, 496, 958, 1131, 1170, 1279, 1415, 3951, 4011, 4022, 4060, 4062, 4067, 4084, 4085, 4095, 4105, 1469(review), 1470(review), 1474(review), 1483, 1507, 1567, 4261, 4263, 4266, 4306, 4314, 4346, 4386, 4421, 4422, 4447, 1662, 1665, 1934, 2386, 2896, 2994, 3081, 3272, 3709, 3873, 4551, 4566, 4574, 4580, 4582, 4593, 4824-4826, 4854, 4880, 4152, 4251, 4562, 4859 4927, 4977, 4992, 4993, 5001, 5004, 5047, 5068, 5099, 5122, — modifiers 29, 228, 513, 1257, 1627, 1662, 1956, 2360, 2365, - , reviews 156, 1151, 1442, 1642, 2346, 2676, 2756, 2935, 2939, 2483, 2501, 2524, 2570, 2768, 2805(review), 2978, 3081, 3279, 2945, 4883, 5077 3873, 3874, 4096, 4149, 4159, 4381, 4419, 5032, 5097, 5115, LC/NMR coupling 1180, 2940(review), 2947, 4264 5118, 5119, 5121, 5136, 5138, 5148, 5153 LC/RIA coupling 1916 see also Ion pairing modifiers — optimization 143, 403, 511, 531, 605, 665, 931, 972, 1015, LC/SFC (supercritical fluid chromatography) coupling 1527, 1686, 1147, 1214, 1257, 1618, 1619, 1804, 1893, 1969, 2040, 2349, 2937 LC/TLC see LC, combination with TLC 2365, 2368, 2370, 2528, 2529, 2570, 2584, 2626, 2649, 2735, Lectins, immobilized 315, 807, 1761, 3123, 3131, 3503, 4359, 4365 2796, 2812, 2933, 3014, 3299, 3657, 3985, 4152, 4248, 4249,

4355, 4548, 4562, 4583, 5032, 5097, 5105, 5136, 5142

Mobile phase(s), recycling 2808

```
— — , selectivity 1738
— — strength 1499, 2812, 5097
Models in chromatography 39, 50, 134, 140, 146, 151, 153, 187,
    597, 680, 988, 1091, 1128, 1490, 1498, 1500, 1502, 1505, 1507,
    1608, 1617-1619, 1625, 1634, 2154, 2820, 2917, 2949, 2954,
    2978, 2981, 3372, 4146, 4162, 4173, 4247, 4250, 4251, 4253,
    4303, 4871, 4972
__ _ _ , review 1440, 1447-1449, 1454, 1456, 1462, 1472, 1599,
    2909
    see also Computerization; Retention model
Molecular mass estimation 48, 60, 94, 223, 287, 290, 1124, 1131,
    1134, 1140, 1142, 1145, 2480, 2492, 2825, 2845, 2846, 3018,
    3094, 3830, 3838, 4917
    see also Gel permeation chromatography, molecular mass esti-
Monitoring of chromatographic procedures see Detection (and detec-
Moving-bed chromatography, simulated 186, 1596(review), 1669
Moving-column, continuous 1(review)
Mucin-agarose 3105
Multi-column chromatography see Column coupling
Multidimensional chromatography 594, 877, 1697, 3221, 4008,
    4352, 4652, 4723, 4910, 5141
    see also Column(s) switching
NAD-agarose 2205
New developments in chromatography see Developments, past, re-
    views
Nomenclature for chromatography 2800
Non-equilibrium frontal chromatography 4165
Nonlinear chromatography 44, 1625, 2909(review), 4162
Octyl-agarose 300, 309, 392, 621, 736, 800, 1973, 2248, 3131, 3519,
    3575, 3585, 4379, 4720, 4766
Octylamine-agarose 2205, 4707
Oligosaccharide mapping see under structural studies in individual
    entries in the List of Types of Compounds Chromatographed
On-column derivatization 1942, 2367, 2757

    focusing 1673

On-line-processes see individual LC coupling techniques
Open tubular liquid chromatography 35, 1510, 1561, 1565, 1570,
    1590, 1672, 2896, 3010, 3728, 3730, 3827, 4169, 4839
Optimization 43, 143, 206, 212, 403, 511, 531, 596, 605, 665, 883,
    931, 972, 1015, 1141, 1147, 1153, 1214, 1257, 1600, 1618-
    1620, 1622, 1679, 1686, 1777, 1804, 1893, 1969, 2040, 2059,
    2068, 2349, 2365, 2368, 2370, 2384, 2404, 2528, 2529, 2570,
    2584, 2626, 2649, 2707, 2735, 2764, 2796, 2797, 2802, 2812,
    2821, 2912, 2926, 2933, 3175, 3217, 3299, 3657, 3764, 3807,
    3808, 3904, 3985, 4061, 4081, 4152, 4159, 4167, 4244, 4248,
    4249, 4251, 4334, 4355, 4532, 4548, 4562, 4583, 4972, 5031,
    5032, 5097, 5105, 5127, 5136, 5142
--- , review 11, 13, 1462
    see also various types of chromatography, optimization
Organic modifiers see Mobile phase modifiers
Overloaded elution 2989
    see also Preparative (and semipreparative) chromatography
Ovomucoid column 1211, 1658, 2987
CM-papain agarose 3129
Partition chromatography 1521
    see also Centrifugal partition chromatography
— coefficient 1287, 2507, 2823, 2824, 2826, 3378, 4911
```

```
Partition model 1454(review), 3372
Partitioning 3198, 4071, 4078
- , hydrophobic affinity 3441
- , phase, temperature-induced 2228, 2799
Peak(s) assymetry 39
- broadening see Band broadening
--- , extra 2795
- , overlapping 49, 147, 2843, 4106
- performance 28
- purity 69, 1486, 1530, 1638, 2938, 4150
- shape 2993, 3279
-, small 2806
- suppression 2792
- tailing 3873
tracking 1618, 1619, 2026
Peptide mapping see under structural studies in individual entries in
    the List of Types of Compounds Chromatographed
Perfusion chromatography 140, 1573, 1634, 4574
pH effect 491, 511, 583, 665, 873, 984, 1083, 1214, 1257, 1279,
    1314, 1326, 1415, 1507, 1804, 1897, 1965, 2349, 2365, 2529,
    2584, 2735, 2812, 3217, 3371, 3690, 4118, 4547, 4548, 4583,
    5019, 5032, 5142
    see also Mobile phase
Phenyl-agarose 658, 683, 694, 697, 711, 729, 747, 761, 773, 789,
    800, 802, 806, 820, 826, 831, 853, 861, 865, 867, 2034, 2097,
    2107, 2115, 2207, 2214, 2217, 2220, 2226, 2232, 2233, 2235,
    2257, 3107, 3315, 3420, 3450, 3492, 3538, 3539, 3544, 3547,
    3555, 3570, 3574, 3577, 3603, 3626, 3628, 4466, 4632, 4654,
    4669, 4685, 4686, 4702, 4709, 4747, 4786
Phenyl-Toyopearl 3450, 3508, 4689
Phosphorescence detection see Detection (and detectors), fluores-
Photochemical reactions 524, 961, 2662
Photoconductivity detection (and detectors) see Detection (and de-
    tectors), conductivity
Photodiode array detector see Detection (and detectors), photodiode
Pirkle column 461, 1321, 2526, 2538, 2860, 4538
Planet-centrifuge chromatography 65
Polarimetric detection see Detection (and detectors), polarimetric
Poly(dG-dC)-agarose 689
Poly(G)-agarose 2259
Polyamide/silica gel 88
Polybrene-agarose 1766
Polylysine-agarose 797, 2232, 2238, 2723, 3555, 4734
Polymers immobilized 1584, 3587
    see also various kinds of immobilized ligands
Porous glass see Sorbents, glass
Post column derivatization 83, 235, 244, 398, 466, 480, 486, 528,
    944, 963, 978, 1001, 1006, 1062, 1088, 1099, 1721, 1722, 1726,
    1925, 1937, 2514, 2599, 2624, 2751, 3064, 3277, 3660, 3766,
    3809, 3818, 3885, 3971, 4360, 4432, 4550, 4889, 5033, 5111,
    5123, 5129, 5141, 5142

    — complex 1710

--- photolysis 2662
- reaction detection 1980, 2090, 2384, 3032, 3044, 4100,
    4182, 4560, 4900, 5040, 5127
```

— reactors 252, 342, 456, 465, 1420, 1540, 1753, 1912, 2745,

3766, 4192, 4427, 4499, 4519, 5164

B474

Potentiometric detection (and detectors) see Detection (and detectors), potentiometric Precolumn derivatization 72, 83, 189, 242, 243, 245, 247, 257, 326, 346, 348, 351, 354, 425, 457, 485, 487, 491(review), 506, 512, 534, 575, 600, 801, 890, 933, 952, 958, 962, 964, 065, 1055, 1174, 1176, 1208, 1222, 1276, 1345, 1412, 1438, 1541, 1546, 1734, 1794, 1798, 1808, 1814, 1819, 1825, 1871, 1879, 1913, 1922, 1948-1950, 1953, 1958, 1962, 1968, 1972, 1974, 1982(review), 1983, 1984, 1986, 1988, 1989, 2073, 2105, 2316, 2342, 2367, 2385, 2389, 2399, 2532, 2553, 2559, 2598, 2622, 2664, 2766, 3049, 3057-3060, 3062, 3074, 3138, 3141, 3155, 3156, 3162, 3183, 3200, 3216, 3224, 3229, 3247, 3263, 3266, 3270, 3275, 3284, 3285, 3286, 3288, 3297, 3651, 3655, 3657, 3661, 3714, 3736, 3763, 3773, 3777, 3844, 3950, 4010, 4188, 4323, 4350, 4351, 4353, 4354, 4411, 4415, 4428, 4453, 4516, 4527, 4532, 4534, 4538-4542, 4544, 4545, 4554-4556, 4813, 4850, 4863, 4920, 4984, 4989, 5049, 5071, 5073, 5129, 5137(review) see also Chiral derivatization; Derivatization, fluorescence Preconcentration 179, 2913, 2963, 2966, 3008 Prediction see Retention prediction Preparative (and semipreparative) chromatography 47, 131, 132, 134, 135, 190, 207-209, 375, 546, 1367, 1482, 1503, 1597, 1598, 1600, 1602, 1604, 1608, 1609, 1743, 1823, 1832, 1926, 2006, 2044, 2052, 2062, 2064, 2115, 2120, 2121, 2129, 2130, 2134, 2137, 2140, 2141, 2244, 2325, 2389, 2431, 2462, 2472, 2504, 2710, 2907, 2910, 2983, 3171, 3217, 3226, 3261, 3267, 3322, 3395, 3396, 3405, 3459, 3485, 3530, 3535, 3625, 3703, 3812, 4027, 4244-4246, 4523, 4585, 4967

```
— —, counter-current 1674(review)
```

- — , FPLC 1602

see also various kinds of chromatography

- , optimization 1600, 2933
- , reviews 10, 133, 589, 1556, 1596, 1599, 1601, 1606, 1610, 1674, 2066, 2908, 2909, 2979
- — , stationary phase(s) 1556(review), 2863, 2894, 4202
- — , theory 47, 1607

Present state of analytical methods 16, 37

Pressure influence 1612, 2828

Problems in liquid chromatography 1495

Programs for chromatography see Computerization

Protein A – agarose 303, 685, 693, 743, 903, 1851, 2191, 2197, 3293, 3556, 3572, 4652

Protein G - agarose 685, 736, 2197, 4647

Protein-Pak 761, 2191, 2290, 3540, 3610

Quantitation 32, 49, 59, 127-130, 147, 227, 243, 245, 276(review), 278, 286, 330, 343, 344, 350, 393, 403, 410, 411, 430, 465, 471, 479, 485, 504, 506, 509, 512, 554, 631, 661, 916, 924, 926, 934, 962, 963, 970, 1018, 1043, 1044, 1048, 1066, 1079, 1088, 1089, 1094, 1104, 1155, 1169, 1174, 1178, 1184, 1186, 189, 1204, 1205, 1207-1210, 1212, 1228, 1248, 1261, 1267, 1274-1276, 1278, 1281, 1284, 1292, 1295, 1309, 1319, 1322, 1337, 1342, 1345, 1351, 1410, 1421-1423, 1704, 1729, 1734, 1735, 1737, 1756, 1776, 1794, 1804, 1806, 1819, 1837, 1844, 1849, 1852, 1875, 1896, 1912, 1923, 1925, 1929, 1932, 1933, 1943-1946, 1948, 1951, 1953, 1954, 1958, 1960, 1962, 1963, 1971, 1972, 1978, 1979, 1988, 1989, 2021, 2079, 2095, 2116, 2159, 2304, 2313, 2323, 2335, 2336, 2338, 2342-2344, 2349, 2355, 2357, 2359, 2384, 2399, 2400, 2402, 2403, 2408, 2410, 2412, 2414, 2434, 2435, 2453, 2455, 2461, 2467, 2477(review), 2487, 2494,

2495, 2500, 2512, 2520, 2528, 2529, 2533-2535, 2537, 2543. 2552, 2559, 2564, 2565, 2568, 2569, 2572, 2574, 2578, 2582, 2583, 2592, 2593, 2598, 2603, 2607, 2610, 2615, 2623-2625, 2630-2632, 2639, 2645, 2646, 2648, 2657, 2661, 2663-2665, 2669-2671, 2681, 2684, 2686-2688, 2706, 2711, 2712, 2719, 2733, 2755, 2757, 2760, 2761, 2763, 2764, 2773, 2848, 2906. 2942, 2993, 3009, 3032, 3042, 3053, 3055, 3060, 3070, 3072-3074, 3087, 3096, 3138, 3155, 3162, 3200, 3212, 3224, 3241, 3250, 3254, 3256, 3262, 3270, 3275, 3288, 3300, 3310, 3317, 3318, 3438, 3651, 3657, 3660, 3676, 3678, 3691, 3693, 3695, 3733, 3736, 3737, 3744, 3759, 3767, 3769, 3773, 3776, 3777. 3779, 3796, 3806, 3807, 3809, 3811, 3839, 3850, 3851, 3857-3859, 3862, 3871, 3877, 3881, 3886, 3898, 3904, 3911, 3913, 3921, 3924, 3930, 3931, 3934, 3942, 3949, 3955, 3956, 3963, 3964, 3969, 3979-3981, 3983, 3985-3991, 3993, 3997, 3999, 4001, 4004, 4005, 4007, 4010, 4025, 4030, 4040, 4085, 4093. 4095, 4106, 4243, 4299-4301, 4308, 4319, 4321, 4322, 4329, 4336, 4338, 4341, 4351, 4353, 4362, 4364, 4400, 4413, 4418, 4420, 4428, 4429, 4436, 4471, 4472, 4474, 4476, 4484, 4495, 4496, 4503, 4509, 4511, 4513, 4514, 4519, 4521, 4522, 4524, 4529, 4531, 4535, 4536, 4539, 4544, 4545, 4552, 4554-4556. 4560, 4565, 4588, 4655, 4772, 4774, 4776, 4788, 4794, 4798, 4803, 4813, 4815, 4830, 4833, 4834, 4838, 4840, 4851, 4857, 4867, 4869, 4870, 4872, 4874, 4875, 4881, 4882, 4884, 4889, 4890, 4893, 4907, 4926, 4930, 4931, 4939, 4942, 4945, 4950, 4957, 4959, 4960, 4963, 4965, 4966, 4969, 4970, 4973, 4979-4984, 4988, 4989, 4994, 4995, 5002, 5005, 5007, 5008, 5017, 5021, 5024, 5027, 5029, 5032, 5034, 5035, 5041, 5047, 5049-5052, 5056, 5057, 5059, 5062, 5065, 5067, 5069-5071, 5075, 5079, 5080, 5090, 5091, 5094, 5100, 5111, 5114, 5122-5124, 5127, 5129, 5132, 5133, 5145, 5149, 5151, 5154-5158, 5164, 5168, 5173, 5174

Radial dispersion 1510

- flow chromatography 1626, 1647

see also Preparative (and semipreparative) chromatography

Radioactivity detection (and detectors) see Detection (and detectors), radioactivity

Radiochromatography see Detection (and detectors), radioactivity Reactors 2831, 2836(review), 4258

- , co-immobilized enzyme see Post column reactor
- , rate constants 1511

see also Post column reactors

Recirculation chromatography 1670(review), 2976

Refractometric detector see Detection (and detectors), refractometric Relationship between retention and structure see Structure–retention relationships

Resolution 50, 113, 1576, 4151, 4154, 4155, 4169

Retention 51, 1505, 1934, 2498, 4151, 4153

- equation 1497, 1506
- mechanism 115, 1519, 2791, 2814, 2829, 2917, 4171, 4254
- model 1490, 1507, 4146, 4871, 4972
 - see also Computerization; Models in chromatography
- prediction 41, 55, 1458(review), 1490, 2404, 2917, 4081, 4159
- --- , review 21, 1440, 1458, 1464-1466, 1474, 1475

Reversed phases characterization see Sorbents new types (incl. bonded phases)

Review(s), affinity chromatography (and books) 174, 606, 1655, 2066, 2840, 2950, 2955, 2998, 3384, 3385, 3387, 3393, 3509, 3521, 4142, 4271

B475 SUBJECT INDEX LCC

Review(s), application of high performance chromatography to various fields of science of technology 7, 18, 234, 236, 256, 273, 297, 363, 364, 377, 422, 510, 573, 578, 602, 607, 876, 894, 904, 907, 910, 911, 955, 1003, 1037, 1081, 1082, 1087, 1105, 1110, 1111, 1159, 1165, 1293, 1359-1365, 1368, 1369, 1373, 1374, 1393, 1418, 1445, 1656, 1691, 1780, 1835, 1918, 1920, 1959, 1964, 1982, 2060, 2077, 2117, 2346, 2427, 2485, 2505, 2694, 2731, 2784, 2786-2790, 2956-2958, 3004, 3012, 3021, 3153, 3181, 3230, 3239, 3242, 3243, 3303, 3306, 3379, 3423, 3666, 3710, 3740, 3802, 3803, 3842, 3847-3849, 3869, 3879, 3894, 4043, 4045-4047, 4054, 4055, 4069, 4077, 4086, 4137, 4139, 4141, 4144, 4316, 4344, 4438, 4701, 4705, 4804, 4901, 4924, 5081, 5088, 5095, 5137 see also review articles within individual entries of this section and reviews in the List of Types of Compounds Chromatographed

- —, automated procedures 5088
- , capillary chromatographic techniques 573, 1675, 2852, 5076,
- -, chelation chromatography 4097
- , chiral HPLC see Enantiomers (and diastereomers) separation,
- -, sorbents and stationary phases 1163, 2858, 2995, 2999 see also Enantiomers (and diastereomers), separation, review
- -, clean up 2
- , columns 19
- -, comparison with capillary electrophoresis 2961
- --- , computerization 17, 142, 4055
- , countercurrent chromatography 22, 251, 1603, 1674
- , cross-current, continuous 4
- --- , cyclodextrin in stationary phases 2973
- see also Enantiomers (and diastereomers), separation, review -, derivatization 226
- see also Enantiomers (and diastereomers), separation, reviews; Post column derivatization; Precolumn derivatization
- , detection (and detectors), general 3, 76, 593, 2837, 2840, 2842, 2852, 3849
 - see also review articles under individual entries of Detection (and detectors)
- , , chemiluminiscence 2847, 3849, 4200
- , , electrochemical 1424, 2837, 3230, 3879, 4185, 4198
- , , fluorescence 491, 1160, 3230, 3849
- ____, ___, light-scattering 2485
- —, —, photodiode array 2842
- -, -, refractometric 2477
- , , surface plasma resonance 2840
- --- , --- , thermo-optical 2852
- __ , __ , viscometry 2477
- , detectors, new design 76
- , dye-ligand affinity chromatography 2051
- , elemental analysis 2782, 2790
- —, enantiomers separation 9, 1163, 1468, 1668, 1835, 2973, 2975, 2979, 2990, 2995, 2998, 3879, 4284, 4291, 4525, 4953
- , error analysis 3842
- , field-flow fractionation 196
- , flash chromatography 198
- , gel permeation chromatography 20, 279, 2477, 2728, 4135, 4140, 4141
- , general 12, 23, 1445
- , heparin-agarose 4736
- , history of chromatography 1493

Review(s), hydrophobic interaction chromatography 2056, 2785

- -, hydrophobicity 1444
- , immunoaffinity chromatography 5, 1649 see also reviews under Affinity chromatography
- , industrial applications 2789
- ___, instrumentation 1, 4, 15, 16, 23, 1597, 2832, 2836, 4136
- , ion and ion-pair chromatography 894, 1440, 1457, 2678, 2703, 4068, 4112, 4130, 4148, 4157, 4370, 5131
- , exchange chromatography 4656
- -, isotherm 1459
- , LC combined with GC 2783, 4145
- __ , __ _ helium microwave-induced plasmas 2943
- LC coupling, general 2946, 4259, 4265
- —, LC/FTIR coupling 2936
- __ , LC/MS coupling 156, 1151, 1442, 1642, 2346, 2676, 2756, 2935, 2939, 2945, 4883, 5077
- , LC/NMR coupling 2940
- , micellar chromatography 2805
- , miniaturization of chromatography 1675
- , mobile phases effects 1469, 1470, 1474, 2805
- --- , models in chromatography 1440, 1447-1449, 1454, 2456, 1462, 1472, 1599, 2909
- , moving-bed chromatography 1586
- , moving-column, continuous 1
- -, nonlinear chromatography 2909
- optimization 11, 13, 1462
- , physicochemical basis 1493
- -, precolumn derivatization 491, 1982, 5137
- ___, preparative chromatography 10, 133, 589, 1556, 1596, 1599, 1601, 1606, 1610, 1674, 2066, 2908, 2909, 2979
- , present state 16
- , quantitation 276, 2477
- , reactors 2836
- , recirculation chromatography 1670
- , retention 21, 1440, 1458, 1464-1466, 1474, 1475
- , sample injection 2807
- ___ , ___ preparation 2, 2962
- ___ , shape selectivity 1461
- --- , size exclusion chromatography see Review(s), gel permeation chromatography
- , simulated operations 142
 - see also Review(s), computerization
- , solid-phase extraction 4143
- , solvent extraction 2775
- , selectivity triangle 1467
- ___, stationary phases (and sorbents) 14, 1154, 1441, 1446, 1450, 1460, 1463, 1470, 1475, 1556, 1566, 1582, 1584, 2862, 2956,
- , structure-retention relationship 1453, 1455
- , theory of chromatography 6, 1443, 1471, 1655, 1670, 2785, 2817, 4138
- , thermodynamics of chromatography 8, 1469, 1508
- validation 1152
- tRNA-agarose 798

Robotics see Automated procedures; Computerization

Rotation locular countercurrent chromatography see Countercurrent chromatography

Sample clean up see Clean up procedures

- injection and injectors 132, 166, 1528, 1532, 1535, 2807(review), 3687, 4292

Sample preconcentration 179, 2913, 2963, 2966, 3008, 3058, 3205, Stationary phase(s), carbon content 126 3220, 3909, 4276-4281, 4327, 4862, 5140 --- , cellulose based see Cellulose based sorbents preparation 2(review), 603, 2962(review), 2965, 2967, 3229, — , cellulosic continuous 1594 3678, 4280, 4512, 5025, 5031, 5118, 5119 — , ceramic based 124, 2878, 4233 see also Solid phase extraction — , characterization 103, 110, 1562, 1564, 166(review), 1572, — , automated 1383, 2913 1577, 1592, 2813, 2856, 2879, 2884, 2886, 2888, 4177, 4207, see also Automated procedures 4241 — — . solvent effects 132 — , charcoal/Celite 1758 pretreatment 471, 1282, 1438, 4554 - - , chiral see Chiral sorbents and stationary phases Selection of methods see Method development — —, comparison 95, 999, 1580, 2126, 2474, 2501, 2830, 2864. Selectivity 1679, 1738, 2987 2879, 4206, 4518 — , shape 1461(review) — —, continuous gel 586 Semipreparative chromatography see Preparative (and semiprepara-- - , copper-phthalocyamine 2877 tive) chromatography Sequential chromatogram ratio 2791 - - , cyano see CN-bonded phases Shock layers in LC 1518, 4168 --- , cyclodextrins see Cyclodextrin, stationary phase Silver resin chromatography see Stationary phases, impregnated with — — , dextran-grafted 2889 silver nitrate; Stationary phases, silver resin - - , diol-modified silica 112 Simulated operations 48, 139, 140, 142(review), 144, 1091, 1615, - - , dimethoxyphenylpropyl bonded silica 100 1623, 1627, 1629, 1635, 2919, 2954, 4911 - - , N,N-dimethylaminopropylacrylamide 4213 see also Computerization — , divinylbenzene-polystyrene 783 Size-exclusion chromatography see Gel permeation chromatography Small bore columns see Columns, microbore and capillary — — , epoxy modified silica 112 Software see Computerization — , epoxy-activated 1578, 2902 Solid phase extraction 106, 168, 180, 205, 470, 541, 956, 1004, - - , fine bonded layer structure 108 1101, 1191, 1228, 1239, 1245, 1253, 1276, 1282, 1348, 1351, - - , fluorinated 2905 1427, 1491, 1580, 1702, 1737, 1824, 1843, 1914, 1919, 1943, - - , fluorocarbon bonded 2319 1947, 1963, 2022, 2099, 2335, 2343, 2400, 2421, 2435, 2523, — for affinity chromatography 123, 175, 177, 178, 599, 1581, 2542, 2545, 2548, 2554, 2566, 2578, 2597, 2600, 2605, 2610, 1648, 1650, 1652, 1654, 2951, 2953, 2956(review), 2960, 3119. 2625, 2661, 2692, 2705, 2707, 2715, 2719, 2964, 3036, 3220, 3120, 3376, 3388, 3431, 3434, 3462, 3467, 3506, 3586, 3646. 3223, 3229, 3748, 3769, 3798, 3799, 3801, 3806, 3816, 3843, 4234, 4267-4270, 4272, 4274, 4275, 4651 3859, 3862, 3865, 3896, 3934, 3955, 3981, 3983, 3990, 3991, see also various kinds of stationary phases(s) 4044, 4052, 4143(review), 4231, 4277, 4321, 4336, 4364, 4400. - - gel permeation chromatography see Gel permeation chro-4484, 4774, 4776, 4788, 4794, 4840, 4845, 4857, 4867, 4874, matography 4878, 4898, 4940, 4950, 4958, 4959, 4961, 4981, 4982, 5065, — — human serum albumin 1252 5069, 5098, 5163 — — hydrophobic interaction chromatography 90, 3516 -- - , comparison with liquid-liquid extraction 1947 — — ion-exchange chromatography see Ion exchangers, new --- --- , sorbents 1255, 2580, 2856, 2884, 4281, 4840 — reaction 192 — — liquid-liquid partition chromatography 2830 reactor 3317 — — preparative chromatography 1556(review), 2863, 2894, reagents 72, 1541 4202 — — , fullerene bonded 116, 1571, 4218 Solute(s) size, influence 46 Solvent(s) see Mobile phase ---- , glass, pore 90, 3516 extraction 2777(review) — — , glucose-silica 104 selectivity triangle 1467(review) — , glutaraldehyde activated 2136 Solvent-stationary phase interaction 4215 - - , hydroxyapatite see Hydroxyapatite Sorption dynamics see Adsorption — , hydroxyethyl methacrylate based 1559 isotherms see Adsorption — —, iminodiacetic acid bonded 5115 Standard selection see various types of chromatography - - , immobilized artificial membrane 85, 86, 1553, 2891 Stationary phase(s), alginate 3376 --- , -- ligand affinity chromatography 3390 — — , alkylamide 1574, 4204, 4205 — , — polymethyloctadecylsiloxane 1565 — , alumina based 1577, 2714, 2879, 4203 -- - , impregnated with silver ion (nitrate) 362, 1865, 1866, 1869, — , aminopropylsilane modified 2857 1870, 4411, 4433, 4434 --- , binary-layered phase 111 see also Stationary phases, silver resin — , bonded phases see various kinds of bonded phases and - - , intraparticle convection 113 Stationary phase(s), new types — , investigation 1460(review) — — , calcium modified 4228 - - , liquid crystal bonded 2892 — , carbon 250, 474, 1103, 1206, 1274, 1470(review), 1523,

— — , macroporous polymeric 122, 1568, 1822, 2866, 2881,

4211(review), 4594

1562, 1687, 2865, 2879, 2895, 3019, 3245, 4057, 4309, 4310,

4389, 4923

1475, 1556, 1566, 1582, 1584, 2862, 2956, 4211

Stationary phase(s), magnesia-silica 4220	Stationary phase(s), silica-based 100, 103, 104, 112, 1575-1577,
— — , methacrylate copolymer 4235	1579, 1583, 1584(review), 1595, 1684, 2059, 2319, 2426, 2713,
— — , methoxyphenylpropyl bonded 4307	2857, 2859, 2868, 2880, 2886, 2888, 2899, 2902, 2994, 3326,
— — , microspherical 125	3646, 4122, 4207, 4212, 4217, 4219-4222, 4228, 4229, 4236,
	4239, 4358, 4925, 5105, 5115
— — , mixed bed 88, 101, 4205, 4511	— — , silver resin 5173
— , monodisperse particles 1576	see also Stationary phases, impregnated with silver nitrate
— — , monolayers 4238	
— — , montmorillonite, potassium halide treated 2901	, solvation 1463(review), 2871
— , new types 217, 395, 296, 586, 1198, 1312, 1576, 1684,	, stability 96, 104, 2874
2055, 2857, 2859, 2870, 2883, 2889, 2892, 2897, 2898, 3011,	— — , surface area 119
3370, 3377, 4220, 4225, 4232, 4236, 4307	— — , tetraphenylporphyrin-silica 103, 1684
see also variuous kinds of stationary phases(s)	— — , titania 2899, 4221
— — , nitrile bonded 4455	— , — -silica 4220
— — , p-nitrophenyl bonded 2713	— — , titanium oxide 3377
— — , nonporous 14(review), 1569, 2055, 2059, 2328	, wetting 2885
— — , octysilyl silica gel 2426	— — , zirconia 123, 125, 1577, 1582, 2072
— — , permeable 1479, 1558	, zirconia silica 4220
, particle size 2882	— — , zirconium oxide 1557, 4224
— — , perspectives 4226	— — , zwitterionic charged 30, 4094, 5084
— — , phenol-formaldehyde resins 4240	Steric exclusion liquid chromatography see Gel permeation chroma-
— — , phenylmethylsilicone 1865	tography
— , phenylpropanolamine bonded 4239	Streptavidin-agarose 3388
— — , phthalocyanine-modified 1579	Structure-retention relationships 54-59, 126, 454, 1453(review),
— — , polyamide and polyamine 1748	1455(review), 1521, 1522, 1526, 1580, 1934, 1938, 1977, 2020,
	2033, 2347, 2370, 2539, 2614, 2824, 3700, 3873, 4210, 4311,
— —, polybutadiene coated 2072	4956, 4976
— , — maleic acid coated 2129	·
— , poly(butadiene-acrylic acid(g)acrylonitrile(g)acrylic acid) 1586	Support(s) organic see Stationary phase(s)
— , polyethylene 454, 1934, 4925	Synergistic-radiation grafting 109
— — , polyhydroxyethyl methacrylate 598	System peak 1506, 4162
— , polymer coating 1450(review), 1575, 1577, 1584(review),	Temperature effects 511, 983, 1017, 1214, 1576, 1679, 2053, 2172,
2869, 4203, 4928	2336, 2386, 2796, 2799, 2828, 2987, 3081, 3272, 4166, 4251,
— , — immobilized 4212	4297, 4473, 4547, 4562, 4623, 4672, 4855, 5019, 5032
— — , polymeric 95-98, 107, 110, 122, 125, 209, 454, 999, 1034,	— gradient 136
1069, 1470(review), 1498, 1934, 1954, 2055, 2872, 2873, 2890,	— , high 2478, 3292
2897, 2898, 4184, 4211(review), 4214, 5105	Terminology 1477, 1484
— — , polymethacrylate 1034, 2873	Theory of chromatography 28, 41, 48, 60, 588, 1489, 1501, 1512-
— — , polymethyloctylsiloxane 2859	1516, 1518, 1676, 2811, 2816, 2818-2820, 2822, 2827, 2959,
— — , poly(3-octadecyl pyrrole) modified 2868	3000, 3709, 4163, 4164, 4166, 4167
— — , polypyrrole coated 89	— — , reviews 6, 1443, 1471, 1655, 1670, 2785, 2817, 4138
— — , polystyrene 2327, 2716	Thermodynamics of chromatography 8(review), 29-42, 44-53,
— , polystyrene-divinylbenzene 116, 452, 1034, 1043, 1044,	1469(review), 1508(review), 1509, 4161
1066, 1106, 1569, 2079, 2404, 3407, 3704, 3806, 4242, 4423,	Thiophilic gel (T-gel) 4675
4594, 5097	Thiophilic-interaction chromatography 3597
— — , polytrifluorostyrene coated 1575	Thiopropyl-agarose 752
— — , poly(vinyl alcohol) 2755, 2861	Threshold criterion 2803
— — , poly(vinyl p-tertbutylbenzoate) 1568	Thrombin-agarose 2284
— — , poly(vinylimidazole) coated 2063	Thymidine-agarose 795
	Torroidal coil centrifugal partition chromatography see Centrifugal
— , polyvinylphenol 2898	3 1
— , polyvinylphenol-ethylstyrene-divinylbenzene 2829	partition chromatography; Partition chromatography Trace enrichment see Sample preconcentration; Sample pretreatment
— , polyvinylpyrrolidone coated 2880	
— — , pore size 98, 120, 3835, 4235	Triazine dye affinity chromatography see Dyes as ligands in affinity
— — , porous hydrophilic polymer 2872	chromatography
— , — hydrophobic membrane 4246	Troubleshooting 27, 79
— — , preparation 109, 118, 2876, 2882, 2890, 2899, 2900, 2904,	Two-dimensional chromatography see Multidimensional chromato-
4201	graphy
— , properties 96, 102, 126, 1566(review), 1568, 2964, 2885,	UDP-glucuronate-agarose 770
3835	UDP-hexanolamine-agarose 760
— — , pyrophosphates 99	Validation 932, 1152(review), 1236, 1498, 3373, 3971, 3999, 4498,
— , reviews 14, 1154, 1441, 1446, 1450, 1460, 1463, 1470,	5009, 5029, 5053
147E 1EEE 1EEE 1EOO 1EOA 2062 20EE 4211	WGA-agarose 366 708 714 765 2238 4359

WGA-agarose 366, 708, 714, 765, 2238, 4359

B478 BIBLIOGRAPHY SECTION

Gas Chromatography

```
Activity coefficients, measurements 581, 587, 1265, 1278, 1996,
                                                                           1774, 1784, 1785, 1792, 1806, 1813, 1822, 1836, 1860, 1866,
    2004
                                                                           1867, 1883, 1884, 1886, 1901, 1923, 1944, 2046, 2122, 2127,
Adsorbent(s) see Sorbent(s) and bed(s)
                                                                           2129, 2136, 2144, 2153, 2161, 2170, 2177, 2194, 2196, 2217,
Adsorption see Sorption
                                                                           2220, 2226, 2238, 2249, 2267, 2269, 2274-2276, 2280, 2285,
Apparatus 43, 51, 119, 517, 523, 598, 601, 605, 608, 655, 1073,
                                                                           2289, 2303, 2319, 2322, 2356, 2364, 2378, 2386, 2389, 2390,
    1290, 1374, 1443, 1964
                                                                           2393, 2399, 2411, 2431, 2433, 2444, 2457, 2460, 2475, 2478,
    see also individual types of devices and sections on instrumenta-
                                                                           2486, 2490, 2509, 2521, 2523, 2537
    tion in individual entries; Chromatograph(s), design
                                                                       Capillary GC, derivatization 2412
Automation 43, 49, 123, 149, 590, 596, 678, 753, 805, 848, 1071,

    — , detector(s) and detection 63, 66, 67, 69-71, 77, 79, 80, 82,

    1312, 1410, 1465, 1967, 2011, 2090, 2301, 2436, 2504
                                                                           84, 144, 565, 615, 973, 1339, 1350, 1370, 1399, 1405, 1568,
Bed(s) see Sorbent(s) and bed(s)
                                                                           1766, 2029, 2030
Bibliography 2176
                                                                       — — , instrumentation 59, 598, 1312, 1323, 1325
Books, applications 1145, 1163

    — , multidimensional see Multidimensional GC

- , chromatography general 1969

    — , optimization 59, 754

- , detector(s) and detection 565
                                                                        - - , physico-chemical measurements 1974, 2007
 – , techniques 4, 563, 564, 636, 1971

    — , pressure programmed see Pressure programmed GC

Calibration see Quantitation, calibration

    — , pyrolysis see Pyrolysis GC

Capacity factor(s) 10
                                                                       --- , retention data 3, 18, 644, 862, 1380, 1467, 1498, 2212
Capillary column(s) 143, 548, 1220, 2017, 2332

    — . CLOT (carbon layer open tubular) 632, 1936, 2136

---- , coated 93, 98, 651, 1199, 1357, 1518, 1676, 2048, 2050,
                                                                       — , sample introduction 609, 1365, 1416, 2095, 2383
    2238
                                                                       — — , selectivity 1380
— — , coupling 108, 170, 759
                                                                       — — , separation mechanism 116
                                                                       — — , stationary phase(s) 104, 201, 633, 652, 686, 690, 1357,
— — , efficiency 1175, 2051
                                                                           1358, 1362, 1379, 1429, 1434, 1438, 1490, 1678, 2044, 2046,
--- , fused silica 104, 651, 1379, 1669
— — , glass 2238
                                                                           2096, 2146
                                                                       — — , techniques 90, 144, 598, 1326, 1396, 1798, 1910, 2063,

    — , GLOT (graphite layer open tubular) 631, 2238

— — , megabore 2460
                                                                           2085, 2095, 2415
— — , metal 103, 107, 643, 2039

    temperature programmed see Temperature programmed GC

— —, modification 632, 641, 642, 649
                                                                       — — , theory 9, 116
                                                                       Capillary GC/MS see GC/MS, capillary

    — , narrow bore 1356

— , packed 90, 171
                                                                       Capillary GLC see Capillary GC
                                                                       Carrier gas 17, 91, 912
— — , PLOT (porous layer open tubular) 538, 647, 2047, 2057, 2116
— , preparation 111, 113, 171, 642, 650, 651, 1356, 2039, 2045,
                                                                       — , preparation 608
    2048, 2054, 2057
                                                                       — — , properties 121, 912
                                                                       Chromatogram(s), evaluation and reconstruction 114

 — , reviews and books 643

— —, SCOT (support layer open tubular) 113
                                                                       Chromatograph(s), design 37, 43, 46, 52, 58, 588, 589, 593, 597,
— — , selectivity 632
                                                                           607, 612, 613, 1312, 1317, 1320-1323, 1325, 1331, 1961, 1964,
                                                                           2009, 2016, 2017, 2020-2022, 2062, 2167, 2178, 2331
— — , thick film 1175
                                                                       -, performance 1392
— — , thin film 88, 649
 – – , wide bore 1114, 1355, 1516, 1760, 2276, 2390

    supercritical 1459

Capillary GC, applications 98, 108, 180, 193, 199, 205, 220, 249,
                                                                           see also SFC, instrumentation
    260, 269, 272, 283, 286, 287, 294, 302, 304, 307, 312, 320, 321,
                                                                       Column(s) 847
    332, 334, 346, 365, 368, 369, 371, 376, 381, 386, 394, 402, 419,
                                                                        - , micropacked 168, 2049
    453, 454, 466, 496, 531, 538, 548, 617, 624, 726, 730, 731, 744,
                                                                       --- , packed 1045, 1963, 2123, 2174, 2413
                                                                       — , — , efficiency 2051
    754, 756, 794, 800, 808, 815, 831, 832, 837, 838, 842, 851, 864,
                                                                       —, —, instrumentation 597
    878, 883, 884, 894, 896, 903, 915, 925, 933, 934, 945, 962, 963,
    965, 976, 978, 979, 993, 1014, 1018, 1039, 1061, 1084, 1087,
                                                                       — . — , micro 709
    1090, 1091, 1095, 1097, 1106, 1114, 1127, 1129, 1135, 1143,
                                                                       -, switching 36, 599, 2019
    1152, 1153, 1163, 1166, 1168, 1186, 1189, 1203, 1212, 1220,
                                                                           see also Capillary column(s)
                                                                       Computer(s), data acquisition 127, 660, 2033
    1240, 1350, 1427, 1461, 1473, 1491, 1493, 1507, 1508, 1514,
    1516, 1526, 1544, 1559, 1590, 1591, 1604, 1611, 1615, 1616,
                                                                       - , data analysis and processing 124-128, 314, 390, 501, 660, 662,
    1618, 1621, 1622, 1624, 1637, 1638, 164, 1651, 1655, 1662,
                                                                           1387, 1388, 1410, 1431, 2033, 2038, 2071, 2073, 2074, 2173
                                                                       --- , modelling 6, 14, 129, 985
    1684, 1686, 1704, 1707, 1741, 1742, 1745, 1749, 1760, 1766,
```

Computer(s), optimization 131, 661

- . reviews and books 1390
- -, separation processes control 130, 599, 1312, 2062
- , software 124, 126, 129, 131, 132, 390, 501, 660, 1388, 1431, 2038, 2073, 2074, 2173

Correlation GC 568, 1063, 1383

Counter current GC 646, 1683

Cryofocusing 1254

- , applications 503, 562, 702, 1139, 1463, 2365, 2493
- , instrumentation 1319, 1415
- , techniques 47, 92, 138, 503, 606 see also Preconcentration, cryotrapping

Cryotrapping see Preconcentration, cryotrapping

see also Cryofocusing

Data analysis and processing (without computers) 219, 473, 1383, 1387, 1724, 2500

Dead time and volume, calculation 1974

— — — , measurements 1974

Derivatization, acylation 162, 236, 330, 346, 456, 511, 766, 914, 937, 1094, 1529, 1579, 1581, 1595, 1783, 1818, 1846, 2209, 2265, 2318, 2319, 2323, 2465, 2541, 2542

- -- , alkylation 276, 326, 341, 364, 386, 410, 445, 790, 829, 1068, 1069, 1094, 1115, 1215, 1414, 1543, 1721-1723, 1939, 2360, 2363, 2382, 2539, 2543
- , esterification 271, 279, 337, 880, 916, 958, 1687, 2189, 2234-2236, 2250, 2326
- , other types 224, 339-341, 352, 427, 439, 810, 857, 921, 922, 959, 1120, 1244, 1411, 1525, 1558, 1566, 1576, 1630, 1683, 1689, 1693, 1726, 1729, 1730, 1775, 1817, 1821, 1925, 2218, 2232, 2241, 2245, 2250, 2258, 2331, 2419, 2429, 2461
- , oxidation 1525, 2324
- --- , reagents 914, 1414
- -- , reduction 328, 920, 1440, 2365, 2366
- , silylation 252, 282, 444, 782, 788, 945, 1155, 1532, 1679, 1684, 1702, 1838, 1865, 2184, 2220, 2247, 2265, 2328, 2418
- , techniques 1244, 1329, 2412

Detection, alkali flame ionization 1049, 1690, 1762, 1764, 2114, 2319

- , atomic emission 375, 617, 624, 656, 973, 1156, 1339, 1399, 1710, 2334, 2358, 2364, 2365, 2368
- , chemiluminescence 1167, 1334, 1347, 1453, 1707, 1713, 1714, 2035, 2308, 2309, 2349
- , chlorine selective see Detection, halogen selective
- , electroantennographie 230
- --- , electrochemical (electroconductivity; ion selective; polarographic)
 825, 1896
- --- , electron capture 83, 235, 241, 333, 341, 346, 426, 513, 766, 939, 972, 1013, 1018, 1056, 1095, 1100, 1102, 1106, 1200, 1337, 1351, 1491, 1506, 1525, 1544, 1551, 1726, 1749, 1781, 1846, 1983, 2026, 2056, 2131, 2201, 2311, 2386, 2388, 2389, 2406, 2435, 2458, 2475, 2539, 2552
- , flame ionization 281, 294, 626, 737, 828, 859, 1065, 1346, 1461, 1493, 1506, 1512, 1568, 1687, 1716, 1728, 1817, 2011, 2197
- , flame photometric 356, 372, 373, 916, 920, 921, 1348, 1681, 1709, 1711, 1716, 1763, 1983, 2326, 2351, 2354, 2369
- , halogen selective 80, 526, 1010
- , helium ionization see Detection, inert gas ionization
- , inert gas ionization 623, 1349
- —, ion mobility 462

- Detection, ion trap 166, 249, 1204, 1595, 1874, 2404, 2405, 2478, 2492
- , ionization see Detection, alkali flame ionization
- , mass selective 375, 1461, 1536, 1827, 1842, 1847, 2251, 2407, 2430, 2433
- , microwave induced plasma 133, 365, 614, 722, 1527
- , Na ionization see Detection, alkali flame ionization
- , nitrogen selective 466, 812, 1084, 1104, 1167, 1334
- , nitrogen-phosphorus selective 410, 435, 454, 520, 1023, 1100, 1114, 1132, 1558, 1590, 1761, 1765, 1983, 2035, 2344, 2403, 2444, 2447, 2481
- , optimization 2026, 2056
- , phosphorus selective 1010
- , photoacoustic 627
- --- , photoionization 623, 737, 1203, 2016, 2131
- , plasma emission 80, 526
- , radioactivity 1450
- -, response 1348, 1568, 1983, 2033
- , reviews and books 2032
- -, selectivity 2032
- --- , sulphur selective 526, 951, 1210
- --- , surface ionization 1101, 1111, 1126, 2454, 2470
- -, techniques 1352
- -, theory 1337
- --- , thermal conductivity 1335
- , thermal energy analysis 1766, 2309
- , thermionic see Detection, alkali flame ionization
- —, ultraviolet absorption 140

Detector(s) 2028

- -, alkali flame ionization (AFID) 64, 81
- , argon ionization see Detector(s), inert gas ionization
- , chemiluminescent 615
- , electrochemical 620
- , electrolytic conductivity 65, 70
- --- , electron capture (ECD) 69, 78, 1337, 1351
- , flame ionization (FID) 61, 77, 626, 1341-1346, 1350, 2029, 2034, 2037
- , flame photometric (FPD) 618, 625, 2033
- , halogen selective 68
- -, helium ionization see Detector(s), inert gas ionization
- , inert gas ionization 82, 623, 1340, 1353
- , instrumentation and accessories 74, 1338, 2025
- , ion mobility 73
- -, ion selective 616
- , ionization see Detector(s), alkali flame ionization
- --- , light scattering (LSD) 1617, 2185
- , mass selective (MSD) 63
- -, mercuric oxide reduction 504
- , microwave induced plasma (MIP) 85, 614, 622, 1353, 1527, 2025
- , Na ionization see Detector(s), alkali flame ionization
- , nitrogen-phosphorus selective 72, 79
- --- , photoionization 60, 66, 76, 163, 1353
- --- , plasma emission 68, 84, 1332
- , plasma glow discharge 621, 2027, 2036
- , reviews and books 62, 63, 66, 67, 69-71, 75, 77, 79, 82, 84, 565
- -, sulphur selective 68, 71, 615
- , surface ionization 67, 72
- --- , thermal conductivity (TCD) 619, 2030, 2031
- -, ultraviolet (UV) 66
 - see also detector sections in individual entries

B480 BIBLIOGRAPHY SECTION

Diffusion coefficients 420 GC/GC see Multidimensional GC Diffusion, measurements 420, 1265, 1281, 1307, 1787 GC/GC/IR 1413, 1656 - , reviews and books 1281 GC/GC/MS 689, 723, 1396, 1413, 2483 --- , theory 1281, 1294 , applications 319, 389, 689, 1656, 1769, 2129, 2288, 2483 Distillation GC, simulation 1511 GC/ICPMS (inductively coupled plasma MS) 134, 1698 Elution see Retention GC/IMS (ion mobility spectrometry), instrumentation 1936 Enantiomers separation 100, 159-162, 179, 218, 272, 312, 317, 320, GC/ion trap MS 1393 334, 337, 350, 495, 687-690, 692, 693, 696, 697, 713, 731, 784, - , applications 746, 768, 2512 800, 802, 884, 891, 925, 956, 957, 993, 1000, 1090, 1108, 1112, -, optimization 768 1132, 1368, 1372, 1375, 1379, 1423-1425, 1427-1430, 1437-GC/IRMS (isotope ratio MS) 1409, 2088, 2100, 2229, 2279 1439, 1519, 1641, 1645, 1646, 1648, 1649, 1676, 1683, 1704, --- , applications 733, 876, 1572, 1593, 1954, 2087, 2279, 2490, 1749, 1812, 1825, 1829, 1840, 1845, 1897, 2064, 2096, 2109, 2522 2152, 2209, 2215, 2289, 2296, 2322, 2323, 2327, 2329, 2332, GC/microwave induced plasma AES 133 2337, 2342, 2385, 2429-2431, 2435, 2452, 2479 - -- -- , applications 962, 963, 2078 – , correlation with retention data 162 GC/microwave induced plasma MS 134, 669 — , data tabulated 693, 694, 800, 1424, 1426, 1429-1434, 1519, GC/MIR (matrix isolation MS) 169, 665, 841 1646, 1678, 2332 GC/MS, applications 146, 157, 158, 195, 197, 210, 215, 234-236, 239, 243, 252, 258, 261-263, 274, 276, 284, 290, 295, 296, - - , reviews and books 563, 713, 1433-1436, 1439 - — , techniques 691, 694, 784, 919, 1678, 2102, 2109 298-300, 305, 316, 318, 325, 327, 328, 331, 335, 336, 340, 343, ---- , theory 2007 345, 350, 352, 357, 359, 360, 362, 379, 384, 388, 398, 409, 411, Enrichment, see Preconcentration, enrichment 427, 429, 430, 439, 440, 444, 451, 455, 456, 458, 463, 464, 467, Equilibrium, phase, see Phase equilibria 509, 512, 515, 524, 535, 541, 550, 555, 559, 583, 676, 751, 758, 764, 765, 780, 788, 792, 793, 799, 805, 813, 818, 822-824, 828, Fast GC, see High speed GC Flow injection analysis in connection with GC 2176 835, 840, 858, 868-870, 875, 882, 887, 906, 908, 923, 927, 928, 932, 936, 937, 946, 948, 952, 954, 957, 961, 971, 974, 980, 986, Flow rate 1281 — — , instrumentation 51, 2018 988, 1021, 1033, 1034, 1037, 1046, 1050, 1052, 1056, 1092, — —, measurements 611, 2018 1094, 1098, 1099, 1103, 1105, 1109, 1119, 1124, 1128, 1133, 1137, 1142, 1144, 1148, 1149, 1154, 1183, 1189, 1193, 1195, - — , optimization 611 GC system(s) 1211, 1228 1200, 1201, 1204, 1209, 1218, 1221, 1222, 1233, 1239, 1269, 1279, 1301, 1394, 1407, 1417, 1418, 1468, 1478, 1479, 1481, see also Automation 1488, 1529, 1532, 1537, 1542, 1554, 1556, 1561, 1570, 1571, GC/AAS 141 1574-1576, 1578, 1580, 1582, 1584, 1592, 1606, 1608, 1609, —, applications 366, 367, 371, 2361, 2365-2367 - , detector(s) and detection 374, 2359 1612, 1613, 1619, 1626-1628, 1631, 1643, 1647, 1653, 1654, - , techniques 374, 1401, 2367 1659, 1665, 1675, 1679, 1680, 1682, 1687, 1689, 1692, 1702, GC/AES 141, 617, 973, 1030, 1700 1703, 1708, 1712, 1717, 1719, 1720, 1723, 1730, 1768, 1773, 1783, 1804, 1815, 1820, 1823, 1833, 1835, 1837-1839, 1843, -, applications 235, 375, 380, 386, 391, 624, 656, 962, 1030, 1156, 1852, 1854, 1855, 1858, 1864, 1865, 1868, 1872, 1875, 1881, 1699, 1710, 2086, 2358, 2361, 2364, 2368 1889, 1900, 1902, 1903, 1911, 1913, 1916, 1925, 1940, 1952, - , detector(s) and detection 1339, 1399 1997, 2124, 2128, 2132, 2137, 2139, 2160, 2164, 2166, 2168, -, techniques 1339 GC/AFS (atomic fluorescence spectrometry) 2363 2184, 2186, 2190, 2200, 2202, 2207, 2213, 2219, 2222, 2228, 2239, 2242, 2243, 2245, 2247, 2252, 2260, 2261, 2263, 2265, GC/chemical reaction interface MS 1404 GC/CIMS (chemical ionization MS) 1393 2272, 2282, 2284, 2288, 2298-2300, 2302, 2304, 2315, 2317, 2318, 2324, 2330, 2333, 2335, 2337, 2341, 2355, 2376, 2380, - , applications 330, 354, 358, 425, 432, 439, 445, 1113, 1671, 2384, 2401, 2402, 2417, 2419, 2428, 2432, 2434, 2440, 2443, 1819, 1920, 2183, 2436, 2453 2450, 2451, 2456, 2459, 2461, 2466-2469, 2476, 2480, 2482, - , detector(s) and detection 445 --- , techniques 330, 432, 1393 2501, 2507, 2520, 2538, 2548 -, automation 805, 1310, 2171 GC/combustion/isotope ratio MS 2087, 2279 -, capillary, applications 148, 193, 216, 282, 294, 321, 342, 354, GC/EIMS (electron impact MS) 341 425, 459, 778, 808, 831, 872, 903, 915, 933, 934, 977, 1005, - , applications 354, 433, 457, 831, 936, 994, 1005, 1561, 1598, 1824, 1826, 1920, 2090, 2438, 2442, 2448 1040, 1055, 1057, 1068, 1088, 1121, 1131, 1134, 1139, 1212, 1313, 1499, 1536, 1566, 1597, 1630, 1671, 1684, 1697, 1802, — , detector(s) and detection 1333 1842, 1863, 1878, 1909, 1918, 2127, 2129, 2149, 2154, 2183, GC/FTIR 136, 141 -, applications 189, 358, 808, 822, 841, 850, 934, 971, 1239, 1407, 2189, 2223, 2234, 2241, 2348, 2352, 2385, 2436, 2441, 2446, 2455, 2484, 2503 1538, 1665, 1722, 1861, 1920, 1953, 1997, 2085, 2142 — , — , data evaluation 1142 - , data analysis 1406 __ , __ , data tabulated 1566, 1630 - , detector(s) and detection 670 -, reviews and books 1395 -, -, detector(s) and detection 63, 1405 —, —, pyrolysis see Pyrolysis GC/MS - , techniques 136, 189, 670, 1398, 2085

-- , -- , techniques 1405

GC/FTIR/MS 138

- , applications 789, 1284, 2250

1806, 2172, 2269, 2275, 2523

GC/MS, data evaluation 390, 501, 664, 671, 849, 923, 1410, 1412, Hold-up time, calculation 1974 — — , measurements 1974 1531, 1859, 1895, 2171, 2173, 2362, 2427 HPLC/GC 604, 2430 , data tabulated 294, 358, 1021, 1046, 1056, 1529, 2189, 2234, -, applications 381, 392, 2301, 2534 2318, 2391 --- , reviews and books 1972, 2010, 2169 ___, derivatization 914, 1570, 1576, 1679, 1818, 1821, 2223, 2232, --- , techniques 604 2265, 2429, 2461 - , detector(s) and detection 137, 143, 341, 1349, 1405, 2124, HPLC/GC/GC 975 - , applications 975 2362, 2425 HPLC/GC/MS, applications 1115, 2391 - , head space see Headspace GC/MS — , techniques 2391 -, instrumentation 2076, 2083 HPLC/SFC 1803 -, optimization 137, 522, 2376 --- , reviews and books 263, 1222, 1570, 2077, 2315, 2469, 2480 - , instrumentation 1397 Injection, on column, instrumentation 44 __ , techniques 1144, 1393, 1404, 1405, 1542, 1730, 2080, 2083, __ , __ __ , techniques 44 2207, 2281, 2492 -, instrumentation 38, 39, 41, 44, 54, 594 GC/MS/FTIR 169, 1239 , on column, techniques 1059, 1365 GC/MS/MS 1393 -, applications 239, 324, 354, 856, 857, 885, 993, 994, 1717, 2393, , optimization 40, 400, 2015 —, programmed temperature vapourizer 42, 50, 55, 83, 603, 1311, 2477 1374, 1621, 1715, 2249, 2396, 2510 -, techniques 2281 - , reviews and books 564 GC/MS/SIM 1396 -, split 595, 1621 -, applications 192, 249, 262, 289, 345, 425, 433, 443, 465, 745, - , split-splitless, techniques 48 763, 772, 804, 870, 871, 936, 941, 948, 974, 989, 999, 1012, 1018, 1053, 1476, 1588, 1614, 1629, 1633, 1701, 1717, 1731, - , splitless 595, 1741 1733, 1761, 1767, 1827, 1829, 1896, 2149, 2230, 2258, 2259, -, -, instrumentation 1315 2286, 2319, 2407, 2429, 2441, 2442, 2446 ___ , ___ , techniques 1365 - , techniques 39, 41, 44, 53, 54, 56, 134, 606, 609, 702, 1352, - , optimization 2427 1446, 2000, 2383 _ , techniques 1409 -, thermal desorption 50, 57, 147, 154, 256, 361, 678, 948, 1110, GC/negative ion MS, applications 437, 445, 449, 748, 755, 857, 867, 915, 917, 992, 999, 1012, 1018, 1020, 1108, 1113, 1121, 1122, 1136, 1174, 1192, 1417, 1463, 1466, 1493, 1647, 1712, 1900, 1577, 1597, 1640, 1668, 1693, 1733, 1750, 1819, 1834, 1853, 1909, 1967, 2168, 2494, 2497, 2503 Instrumentation see Apparatus; or individual types of devices and 1871, 2262, 2278, 2391, 2445, 2453, 2455, 2465 sections on instrumentation in individual entries — — — , techniques 992, 2262 Inverse GC, applications 24, 26, 29, 30, 32, 420, 423, 528, 579, 586, GC/olfactometry 320, 489, 884, 1179, 1180, 1948, 2300, 2492, 2495 1070, 1075, 1264-1266, 1270-1272, 1277, 1280, 1282, 1283, - , reviews and books 1165 1293, 1295, 1296, 1298, 1302, 1305, 1307, 1786, 1787, 1789-GSC, applications 1669, 2067, 2121 1791, 1793, 1800, 1801, 1805, 1807, 1934, 1960, 1995, 2001, GSC, phase(s) 2116 2006, 2216, 2421, 2529 Headspace analysis, applications 25, 28, 196, 203, 204, 217, 231, 256, 353, 361, 460, 467, 471, 475, 494, 514, 536, 546, 548, 729, - , retention data 416 — — , reviews and books 1995 730, 744, 767, 773, 774, 848, 883, 895, 897, 899, 907, 948, 964, — — , thermodynamics 24, 26, 29, 30, 32, 34, 414, 416, 420, 423, 1035, 1054, 1072, 1138, 1139, 1141, 1164, 1168, 1170-1176, 528, 529, 577, 579, 586, 1070, 1264, 1265, 1270-1273, 1277, 1185, 1186, 1188, 1224, 1238, 1249, 1252, 1313, 1441, 1442, 1280, 1282, 1283, 1293, 1295, 1296, 1298, 1302, 1303, 1305, 1473, 1670, 1714, 1862, 1879, 1885, 1893, 1895, 1897, 1898, 1307, 1787, 1790, 1791, 1793, 1800, 1801, 1807, 1989, 1995, 2092, 2097, 2131, 2161, 2182, 2297, 2300, 2350, 2478, 2487, 2001, 2006, 2216 2488, 2493, 2497-2499, 2540 Kinetics, measurements 585, 1286, 1288, 1289, 1291, 1788 — — , data analysis 1892, 1898 see also Reaction GC — — , instrumentation 591, 1915 — , optimization 202, 698, 1063, 1186, 1442, 1474 Kovats' index(es) see Retention index(es) LC/GC, applications 766, 874, 1155, 2134 -, reviews and books 1972, 2169 LC/GC/MS 512 ---- , techniques 217, 256, 361, 591, 684, 685, 1139, 1174, 1188, Liquid crystals see Phase(s), stationary, liquid crystals 1238, 1416, 1474, 1915, 2092 - stationary phase(s) see Phase(s), stationary Headspace GC/MS 514, 744, 1164, 1170, 1879, 2239, 2437 Mass transfer, kinetics 1966 Henry's constants 31, 1262, 1268 Mc Reynolds' constants 645, 2002 High resolution GC see Capillary GC Microcomputer(s) see Computer(s) High speed GC 36, 143, 2009 Mixed phase(s) see Phase(s), mixed — — , applications 610, 2243, 2544 Mobile phase(s) see Phase(s), mobile — — , techniques 36, 143 Modelling 253, 414 High temperature GC 544, 1362, 1698, 2172 - of physico-chemical processes in GC 12, 1258, 1259 - — —, applications 291, 816, 817, 864, 1507, 1616, 1621, 1699,

- of retentions 114, 570, 1258, 2072

B482 BIBLIOGRAPHY SECTION

Modelling of separations processes 14, 114, 178, 568, 741 Phase(s), mobile, various (selected information only), new and rare see also modelling sections in individual entries types 102, 646, 1357, 1372, 1490, 1845, 1978, 2043, 2052, Molecular interactions, thermodynamics 414, 529, 586, 1271, 1470, 1790, 1791, 1800 — , — , — (— — —), OV (different types) 198, 649, 1379, 2045 — structure see Structure study —, —, — (— — —), PEG (different types) 1467 Multichromatography, applications 759 – , –– , –– (–– ––), polysaccharides 161 -, optimization 759 -, -, - (- -), polysiloxanes 20, 93, 94, 201, 633, 637, 652, Multidimensional GC 83, 120, 138 686, 691, 1336, 1380, 1385, 1426, 2041, 2050, 2064 — -- , applications 385, 389, 610, 696, 987, 1159, 1228, 1413, —, —, — (— — —), porous glassy carbon 714 1648, 1769, 1825, 2129, 2152, 2167, 2251 — , — , — (— —), porous polymers 647, 653, 1382, 2042 — —, automation 385, 2167 —, —, — (— — —), SE (different types) 198, 1263 - - , detector(s) and detection 385, 1413 — , — , — (— —), silica, modified 280 --- , instrumentation 46, 83, 1228 Precolumn(s) 590, 2063 — — , optimization 599 Preconcentration 386, 1581, 2505 --- , reviews and books 700, 987, 1413 --- , adsorption 187, 197, 361, 502, 512, 523, 672, 739, 752, 1063, — — , techniques 689, 1396, 1403, 1656, 2063, 2123 1110, 1136, 1157, 1199, 1417, 1420, 1422, 1967, 2090, 2093, Multiple column GC 1324, 1365, 1369 2095, 2138, 2163, 2497, 2503, 2505, 2510 — — , applications 1011 --- , chemisorption 1742 — — , techniques 1365 --- , cryotrapping 503, 562, 746, 1254, 1319, 1415, 2365, 2493 Nomenclature 7, 1256, 1456 see also Cryofocusing Packed column(s) see Column(s), packed -, distillation 673, 1418, 1487, 1895, 2386 Packing see Column(s), packed, packing -, enrichment 844, 933, 1015, 2396 Partition coefficients 1990, 1993 - , extraction 155, 156, 192, 212, 236, 244, 249, 258, 276, 330, - - , measurements 1993 368, 371, 413, 427, 483, 515, 516, 531, 673, 679, 788, 873, 936. Pattern recognition 447, 1142, 1160, 1177, 1217, 1391, 1531, 1906 948, 1015, 1102, 1216, 1377, 1502, 1545, 1814, 1895, 1919, Peak(s) calculation and theory 122, 662, 1383, 1401 2095, 2145, 2151, 2180, 2235, 2381, 2387, 2446, 2476 - modelling 1973 , instrumentation 2014, 2093 overlapping (resolution) 14, 1257, 1383, 1384, 1400, 1401, 2100, --- , membrane extraction 2380 2472 — , purge-and-trap (stripping) 146, 151, 152, 190, 207, 216, 224, -- shape 9, 11, 2075 232, 496, 517, 581, 726, 744, 773, 804, 1193, 1203, 1216, 1422, Phase(s), mobile, properties 121, 2043 1473, 1499, 1722, 1723, 1894, 1903, 2080, 2145, 2160, 2164, -, stationary 1362 2244, 2492, 2494 —, —, classification 111 --- , solid phase extraction 49, 50, 57, 148, 149, 157, 217, 323, 327, -, -, modification 97, 110 359, 388, 410, 431, 527, 677, 685, 750, 786, 960, 961, 986, --, --, preparation 94, 111, 630, 637, 686, 1357, 1359, 1363, 1371, 1007, 1023, 1032, 1039, 1091, 1093, 1100, 1109, 1150, 1188, 1202, 1419, 1421, 1479, 1492, 1529, 1530, 1533, 1544, 1609, 1372, 1678, 2041, 2064, 2065 —, —, properties 637, 645, 691, 1295, 1336, 1357, 1359, 1366, 1715, 1735-1737, 1739, 1740, 1757, 1761, 1763, 1814, 1819, 1426, 1678, 1980, 2050, 2052, 2064-2066 1839, 1855, 1856, 1865, 1925, 2136, 2157, 2191, 2192, 2240. —, —, reviews and books 636, 1362, 1381, 1436, 2044 2309, 2310, 2378, 2388, 2397, 2442, 2457, 2481, 2530 ---, ---, selection 131, 132, 539, 2062 -, spray and trap 153 - , - , selectivity 1367, 2042 --- , techniques 151, 786, 1440 --- , --- , various (selected information only), chelates 109 --- , trapping 147, 153-155, 256, 365, 386, 493, 682, 707, 765, 804, – , –– , –– (–– ––), chemically bonded 1448 1063, 1416, 1417, 1420, 2090, 2092, 2093 — , — , — (— — —), chiral (different types) 350, 686, 688, 693, Preparative GC 120, 1645 697, 784, 925, 1182, 1372, 1424, 1436, 1678, 1812, 2102, 2323 — —, applications 1245, 1683, 1840, 2215, 2452 — , — , — (— —), Chirasil-Dex 218, 713, 2152 --- , reviews and books 1245 – , — (— — —), Chirasil-Val 1358, 2007, 2327, 2342 — — , techniques 120, 1428 — , — , — (— —), crown ethers 20, 93, 95, 111, 637, 652, Process GC, applications 45, 659, 1227, 1318, 2023, 2524-2526 1364, 1381 — —, instrumentation 107, 612, 1318, 2023, 2062 — , — , — (— — —), cyano bonded 1448 — — , techniques 2023 — , — (— — —), cyclodextrins 88, 94, 100, 162, 179, 690, Pyrolysis GC 778 691, 694, 713, 800, 802, 891, 1000, 1112, 1182, 1361, 1368, — , applications 35, 242, 348, 417, 447, 450, 532, 534, 540, 699, 1375, 1379, 1385, 1425, 1426, 1428-1430, 1433, 1434, 1437, 776, 829, 865, 981, 982, 1061, 1064, 1069, 1078, 1082, 1210, 1438, 1518, 1519, 1646, 1648, 1676, 1749, 1825, 1840, 1897, 1214, 1217, 1226, 1230, 1234, 1237, 1240, 1795, 1797, 1808, 2041, 2046, 2064, 2065, 2096, 2116, 2209, 2215, 2287, 2289, 1809, 1926, 1932, 1933, 1938, 1943, 1945, 1949, 2089, 2321, 2296, 2322, 2332, 2431, 2452 2415, 2416, 2513, 2516, 2527 – , — , — (— —), liquid crystals 86, 95, 101, 104, 106, 113, — — , automation 1071 233, 630, 637, 639, 641, 652, 1276, 1366, 1367, 2041, 2050, - - , detector(s) and detection 2089 2055, 2058, 2061, 2066, 2146 — — , instrumentation 53, 596, 605, 1217, 2024

— —, optimization 1795, 2268, 2527

Pyrolysis GC, pyrogram evaluation 447, 1064, 1066, 1585, 1926 --- , reviews and books 699, 1082, 1234, 1943 Pyrolysis GC/FTIR 139 - - , applications 2422 Pyrolysis GC/MS 139 -- - , applications 245, 418, 421, 500, 533, 537, 549, 550, 552, 663, 701, 970, 1060-1062, 1067, 1068, 1074, 1076, 1215, 1225, 1231, 1234, 1327, 1408, 1543, 1607, 1685, 1798, 1810, 1935-1937, 1939, 1949, 1950, 2198, 2204, 2422, 2463, 2513, 2522, 2531, 2532, 2535 — —, data evaluation 701, 1076, 1231, 1232, 2535 - -, instrumentation 1073 - - , reviews and books 500 Quantitation 98, 185, 192, 194, 203, 232, 260, 276, 282, 284, 309, 324, 330, 342, 353, 394, 432, 462, 506, 509, 513, 520, 656, 709, 762, 792, 810, 824, 839, 848, 851, 854, 856, 864, 869, 883, 890, 899, 911, 933, 935, 955, 957, 963, 979, 982, 997, 999, 1001, 1008, 1017-1019, 1021, 1030, 1054, 1056, 1062, 1064, 1065, 1084, 1090, 1093, 1100, 1103, 1108, 1122, 1135, 1136, 1146, 1193, 1208, 1229, 1238, 1242, 1288, 1421, 1468, 1492, 1502, 1515, 1516, 1534, 1550, 1581, 1606, 1607, 1609, 1613, 1617, 1624, 1630, 1631, 1637, 1646, 1668, 1677, 1682, 1685, 1692, 1737, 1754, 1760, 1765, 1766, 1769, 1784, 1797, 1828, 1835, 1849, 1857, 1877, 1891, 2011, 2060, 2094, 2132, 2151, 2164, 2167, 2191, 2213, 2266, 2273, 2278, 2293, 2335, 2364, 2377, 2408, 2413, 2472, 2504 — , calculation and theory 1384, 2082 - , calibration 117, 654, 657, 676, 736, 747, 1238, 1249, 1384, 1568, 1955, 2060 --- , correlation analysis 468, 762, 833, 1515, 2151, 2293, 2377 2470 detection limit 668, 2425 -, optimization 48, 1384, 1401, 2069 -, reviews and books 2320 — , techniques 117, 118, 185, 2013, 2068, 2069 Radio GC, applications 270 Reaction GC, applications 2547 — — , techniques 2547 Reaction GC/MS, applications 876 Response factor(s) 1975 see also Detection, response Retention index(es) 8, 1396, 1910 — , calculation 122, 182, 184, 1262, 1308, 1386, 2126 -- , correlation with molecular structure 19, 191, 436, 482, 572, 575, 801, 1262, 1308, 1467, 1604, 1981, 1983 — —, correlation with physical parameters 18, 575, 886, 1358 --- , correlation with separation system 165, 539, 1089, 2120

— , correlation with thermodynamic data 182, 644, 1268

1498, 1867, 1978, 2042, 2189, 2234, 2318, 2478

— , theory 539, 1981, 1986, 2002, 2126

Retention Kovats' index(es) see Retention index(es)

Retention time(s) and volume(s), calculation 370, 2391

— , prediction 182, 200, 209, 575, 801, 862, 1262, 1980, 1984-

--- , tabulated 2, 3, 122, 180, 184, 191, 198, 209, 385, 436, 482,

539, 644, 736, 742, 799, 801, 886, 1262, 1358, 1388, 1467,

— , optimization 8

--- , reviews and books 2, 3

1986, 2072

Retention time(s) and volume(s), correlation with molecular structure 370, 1262, 1975, 2327 — — — , correlation with peak parameters 1975 — — — , correlation with physical parameters 22, 225, 267, 1358, 1998, 2148 — — — , correlation with separation system 545, 2075, 2108 — — — , correlation with thermodynamic data 16, 21, 27, 122 — — — , optimization 1389 — — — , prediction 21, 985, 1985, 2072 — — — , tabulated 21, 27, 88, 94, 109, 122, 259, 345, 370, 390, 848, 1205, 1358, 1566, 1591, 1621, 1638, 1737, 1760, 1975, 2148, 2191, 2287, 2364 -- -- theory 16, 1389 Retention, correlation with molecular structure 351, 363, 573, 714, 1263, 1380, 1448, 1477, 1519, 1987, 2200, 2212 , correlation with physical parameters 10, 574, 1258, 1260, 1267 , correlation with separation system 17, 170, 645, 703, 711, 2291 . correlation with thermodynamic data 20, 580, 1470, 1976, 2112 --- , data tabulated 111, 170, 694, 800, 1263, 1468 — , theory 10, 1976 see also Capacity factor(s); Retention index(es); Retention time(s) and volume(s) Reversed flow GC see Flow perturbation GC phase GC see Inverse GC Reviews, applications of GC to various fields of science and technology 172, 263, 383, 472, 500, 551, 593, 806, 881, 924, 930, 940-942, 944, 983, 984, 987, 1006, 1035, 1191, 1198, 1218, 1222, 1285, 1427, 1509, 1883, 1884, 1886, 1893, 1901, 1943, 1946, 1968, 2158, 2371, 2374, 2469, 2470, 2474, 2551 - , chromatography general 1, 5, 1970 , detector(s) and detection 62, 63, 66, 67, 69-71, 77, 79, 82, 84, -, instrumentation 592, 2008 -, optimization 566, 2158 - , phase(s) and separation conditions 106, 1381, 1382 --- , sorbent(s) and support(s) 1300, 1992 --- , techniques 1, 567, 710, 1165, 1972 - , thermodynamics 1281 Sample cleanup 197, 330, 760, 825, 990, 1017, 1036, 1478, 2159, 2436, 2453, 2519 — , solid phase extraction 152, 244, 1751, 1763, 2387 Sample collection 47, 221, 368, 460, 505, 511 - pretreatment 4, 152, 244, 406, 553, 743, 766, 769, 874, 1042, 1131, 1161, 1329, 1421, 1634, 1691, 1700, 2139 Sampling 698, 1110, 1136, 1254, 1485, 1545, 1967, 2155, 2246 -, automation 149, 1310 - , instrumentation 38, 695, 1330, 2163 -, quantitation 676 — , techniques 55, 255, 502, 504, 505, 672, 695, 752, 914, 1420, 1493, 1912, 2118, 2162, 2297 SEC/GC (size exclusion chromatography/GC) 2519 SFC (Supercritical fluid chromatography) 713, 1443, 1456 —, applications 172, 242, 264, 280, 292, 301, 527, 741, 777, 859, 860, 863, 1038, 1123, 1140, 1208, 1267, 1423, 1435, 1444,

1455, 1475, 1510, 1511, 1617, 1642, 1713, 1727, 1728, 1732,

1764, 1781, 1811, 1830, 1831, 1845, 1928, 1929, 1947, 2003,

2101, 2104, 2132, 2197, 2313, 2329, 2370, 2400, 2418, 2426

- , capillary 170, 415, 666, 707, 859, 863, 1140, 1400, 1455, 1457,

– , –– , applications 382, 393, 415, 1093, 1483, 1635

1928, 2114, 2329

SFC (Supercritical fluid chromatography), column(s), capillary 590, 1744, 1752, 1776, 1777, 1867, 1869, 1880, 1947, 2003, 2091, 1445, 2271 2133, 2147, 2191, 2298, 2302, 2303, 2313, 2345, 2388, 2409, -, --, packed 168, 171, 176, 177, 264, 280, 301, 704, 705, 709, 2497 834, 1038, 1402, 1423, 1445, 1449, 1450, 1453, 1472, 1617, SFE, instrumentation 164, 175, 1454 1764, 1830, 1831, 2084, 2107, 2108, 2114, 2115, 2291, 2400 - , modelling 253, 2094 - , detector(s) and detection 62, 140, 167, 281, 721, 1332, 1450, --- , modifiers 194, 1482, 1494, 2133 1453, 1713, 1764 --- , optimization 422, 674, 682, 683, 889, 1025, 1041, 1451, 1495, -, efficiency 704 1744, 2135 -, elution processes 168 preparative 492, 1454 --- , gradients 178, 704 - , reviews and books 4, 172, 175, 1510, 1947, 1971, 2003 -, high pressure 165 - , supercritical fluid(s) 680 - , high temperature 165 - , techniques 380, 674, 683, 2345 - , instrumentation 705, 708, 718, 721, 1444, 1457-1459, 2110 — , theory 2094 kinetics 2098 SFE/GC 48, 1311 - , mobile phase(s) 173, 174, 708, 712, 719, 720, 722, 1402, 1452, -, applications 175, 323, 526, 1311, 1662, 2310 2103, 2106 - instrumentation 175, 600 - , modifiers 708, 712, 719, 720, 1452, 2106, 2111, 2517 - , reviews and books 4, 175 -, optimization 178, 716, 834, 1447, 1449 -, techniques 2310, 2412 --- , preparative 181, 717, 1446, 2099 SFE/GC/FTIR 2081 - , pressure programming 708 SFE/HPLC, reviews and books 4 -, retention 1267, 1448, 2108, 2291 SFE/SFC, applications 175, 181, 715, 1880 -, - data 165, 170, 711, 1987, 2112 instrumentation 175 -, reviews and books 172, 710, 717, 1435, 1444, 1445, 1510, 1947, - , reviews and books 4, 175 1971, 2003, 2101, 2104, 2426 — , techniques 181, 707 - , sample introduction 415, 590, 702, 1446, 1457, 2114 Solubility, coefficients and parameters 32, 577, 2006, 2216 - , stationary phase(s) 179, 714, 1385, 1424, 1448, 2102, 2291 - , measurements 32, 577, 1491, 1787, 2006, 2216 — , techniques 140, 706, 709, 716, 741, 1444, 1617, 1732 Solvation, parameters 12, 27, 580, 1258, 1988 --- , theory 178, 703, 717, 1447, 2098, 2103, 2115 Solvent effect 186 , thermodynamics 1267, 2107, 2115 Sorbent(s) and bed(s), modification 1376, 1992, 2502 SFC/AES 141 -- -- , preparation 23, 96, 628, 635, 638, 648, 1363 ---, instrumentation 622 — — , properties 96, 576, 1300, 1420, 1992, 1999 SFC/FTIR 141, 2079 — — — , reviews and books 1300 --- , applications 2197, 2271 — — , various (selected information only), activated carbon 1363, 1546 - , detector(s) and detection 1400, 1402 - , instrumentation 135 — — — , — (— —), carbon black (different types) 1356, - , reviews and books 1395, 1971, 2113 1422, 2238 -, techniques 140, 1402 — — , — (— —), carbon fibres 96, 105 SFC/GC, applications 2305 — — — , — (— —), Chromosorb (different types) 23 - , reviews and books 1971 — — — , — (— — —), graphite 2238 -, techniques 140 — — , — (— — —), graphitized carbon 641 SFC/ICPMS 134, 1728 — — — , — (— — —), molecular sieves 629, 2123 — — , — (— — —), new and rare types 87, 99, 582, 634, - , applications 1728, 2370 SFC/microwave induced plasma AES 622 640, 681 — — — , — (— — —), porous polymers 653, 1382 -- --- MS 134 SFC/MS 141 – (— — —), silica gel 1999 - , applications 176, 242, 382, 393, 415, 543, 1093, 1483, 1705, Sorption 644 1799, 2084, 2338, 2370 effect in chromatography 602 --- , isotherms 1274, 1299 — , detector(s) and detection 667, 2370 --- , instrumentation 142, 667, 1397 -, kinetics 584, 1294 - , measurements 26, 423, 545, 582, 584, 634, 1274, 1282, 1287, - , reviews and books 1971 - , techniques 176, 666, 667, 1799, 2084 1290, 1294, 1297-1299, 1354, 1801, 1991, 1992 SFC/SFC 170, 711 -, modelling 570, 1268 -, theory 570, 1294 -, applications 834 - , reviews and books 1971 — , thermodynamics and equilibria 545, 584, 1287 -, techniques 834 Standard(s) 572 -, theory 170 -, preparation 115, 654, 675, 797, 1412, 2070 SFE (supercritical fluid extraction) 1456 — , properties 115, 736 Stationary phase(s) see Phase(s), stationary --- , applications 172, 194, 195, 235, 248, 323, 380, 527, 543, 680, 825, 889, 931, 960, 1004, 1025, 1030, 1036, 1041, 1123, 1157, Steam distillation GC, see Phase(s), mobile, water steam and other

1162, 1480, 1492, 1494, 1510, 1547, 1554, 1662, 1721, 1734,

SUBJECT INDEX GC 8485

Stopped flow GC see Flow perturbation GC Stripping see Preconcentration, purge-and-trap (stripping) Structure study 723, 851, 994, 1074, 1115, 1406, 1575, 1584, 1950, 2287, 2338 , correlation with retention data 1981 Subcritical fluid chromatography 741, 777, 1423, 1443, 1845, 2109, 2464 --- extraction 931 Supercritical fluid chromatography, see SFC Support(s), preparation 96, 1360, 2053 __ , properties 96, 576, 2055 — , various (selected information only), chalcedony 1373 Surface area measurements 1994 Switching, valve(s) 2012, 2019 Temperature programmed GC 601 __ _ _ , applications 1514, 2489 __ _ _ , detector(s) and detection 619, 2031 __ _ _ , retention data 8, 122, 1089, 1386, 2072, 2126 Theory of chromatography 6, 569, 1261 see also sections on theory in individual entries Thermodynamics 13, 1979 - , data correlation with retention data 580, 644, 1448

__, evaluation 580, 1977, 1978, 2332

Thermodynamics, measurements 13, 25, 31, 34, 420, 423, 528, 545, 579, 581, 587, 1265, 1273, 1276, 1978, 1996, 2004

- modelling 639, 1989, 2002
- -, theory 1977, 1978

see also Diffusion; Dilution; Equilibrium constants; Heat of physico-chemical processes; Henry's constants; Partition coefficients; Phase equilibria; see also sections on thermodynamics in Mass transfer; Molecular interactions; Solubility; Solution; Solvent effect; Sorption; and in individual techniques

Thermogravimetry/GC 1214, 1796

- —/GC/FTIR 139
- -- /GC/MS 139, 1788

Thin layer chromatography/GC, applications 455

Trace analysis, applications 241, 371, 558, 1250, 1729, 2011, 2090, 2308, 2368

- - , instrumentation 37
- _____, techniques 37, 156, 186, 774, 1377

Trapping see Preconcentration, trapping

Valve(s) 2012, 2019

Valve(s), design 607, 1324

see also Switching, valve(s)

Vapour GC (SSC) see Phase(s), mobile, water steam and other va-

Planar Chromatography

```
Adsorption 5, 31, 617
                                                                            549, 551, 553, 654, 664, 671, 672, 753, 764
 Advances in TLC 234(review), 353, 452(review)
                                                                            see also Detection and detectors, reagents
 Affinity TLC 789
                                                                        Development, gradient 21, 211, 238(review), 465, 525, 768
Alumina (selected references only) 124, 739
                                                                        -, instrument see Instrumentation for TLC
Aluminosilicate as sorbent 13
                                                                          – , multiple 21, 211, 238(review), 465, 776
Amino bonded silica gel 114, 368, 640, 687
                                                                        --, --, automated 21, 221, 640, 671
Argentation TLC see Impregnation with silver salts
                                                                        -, radial 159
Automation 21, 22, 221, 248, 640, 671
                                                                        --- , reviews 238, 613
Blotting 615(review)
                                                                        , stepwise 525, 768
Capillary flow TLC 613(review)
                                                                        --- , two-dimensional 492, 653
Cellulose as sorbent 12, 48, 122, 256, 259, 608, 707, 740
                                                                            see also Multidimensional TLC
-, PEI 354
                                                                        Diastereoisomeric separation see Enantiomers and diastereomers,
Centrifugal TLC 159
                                                                            separation
Chamber(s) for TLC 460, 613(review)
                                                                        Diphenyl bonded silica 702
-, horizontal 31, 48, 211, 426, 774
                                                                        Displacement TLC 333
- , miniaturization 419
                                                                        Documentation of TLC 8, 9, 613(review)
  – , sandwich 5, 109, 211, 419
                                                                        Enantiomers and diastereomers, separation 28, 110, 120, 256, 370,
Charge transfer chromatography 437
                                                                            477 702
Chiral derivatization 110
                                                                        Fingerprinting see structural studies in individual entries in the List of
- sorbents 28, 370, 626
                                                                            Types of Compounds Chromatographed
Clay, as sorbent 464
                                                                        Fluorescence labelling 574, 731
Computerization 17, 23, 465, 466, 560, 609, 465
                                                                            see also Detection and detectors, fluorescence
Cyclodextrin as eluents 256
                                                                        Gel permeation chromatography, TLC 710
Derivatization 49, 110, 112, 120, 518, 731
                                                                        Gradient elution see Development, gradient
    see also Fluorescence labelling
                                                                        High performance TLC, instrumentation see individual types of equip-
Detection and detectors, autoradiography 231, 257, 326, 367, 382,
                                                                            ments
                                                                        — — , quantitation see Quantitation
— — , colour reactions see Detection and detectors, reagents;
                                                                        — — , sorbents see individual sorbent types
    Detection and detectors, visualization
                                                                        History of chromatography 456
 — — , densitometric 80, 179, 188, 190, 201, 204, 217, 266, 277,
                                                                        Humidity, high 581
    335, 357, 358, 367, 410, 411, 425, 428, 430, 432, 472, 525, 540.
                                                                        Image processing 8, 248, 397
    595, 636, 664, 676, 693, 704, 743, 750, 765
                                                                        Immunoaffinity TLC
— — , FID (flame ionization) 57, 148, 283, 296, 305-307, 315,
                                                                        Immunostaining see Detection and detectors, immunostaining
    467, 516, 558, 604, 631, 648, 659, 773, 782
                                                                        Impregnation with AgNO see Impregnation with silver salts
— — , fluorescence 11, 112, 197, 369, 574, 587, 740
— — , — , densitometry 190, 201, 715

    borate and boric acid 58, 65, 66, 249, 297, 511, 655

— — , fluorography 321, 670
                                                                        - - EDTA 249
— — , FTIR 393, 559, 630
                                                                       - - iron(III) 645
— — , immunostaining 61, 85, 300, 310, 487, 500, 679, 683
                                                                       -- - mono(2-ethylhexyl)acid phosphate 785
— — , IR 254
                                                                       - - n-octanol 249
— — , liquid crystal 247
                                                                       - - oxalate 62, 504, 517
— — — , photometric see Detection and detectors, densitometric
                                                                       - - paraffin oil 249, 437, 624
— — , radioactivity 231, 752
                                                                       - - phosphate buffer 640
— — , radiography scanning 50, 683
                                                                       — — silver salts 309, 472, 483, 484, 508, 647, 649, 669, 681, 682
— — , reagents 10, 11, 246, 334(review), 341, 401, 442, 553,
                                                                       - TCMA (tricaprylmethylammonium chloride) 249, 399
    621, 622, 705, 706
                                                                       Instrumentation for TLC 6, 237(review), 460, 619, 620
    see also Detection and detectors, visualization
                                                                           see also Detection and detectors; Chamber(s)

    — , reviews, general 232, 334

                                                                       Ion-exchange lavers 627
— — , scanning 80, 136, 336, 357, 358, 366, 367, 393, 410,
                                                                       Ion and ion-pair chromatography 186
    411, 418, 422, 425, 434, 595, 636, 651, 661, 664, 676, 694, 714,
                                                                       Laser induced fluorescence see Detection and detectors, fluorescence
    722, 738, 743, 765, 775
                                                                       Magnesium oxide layers 187
— — , UV spectra in situ 559, 560
                                                                       Marble powder, as sorbent 464
— — , visualization 10, 32, 53, 77, 80, 122, 151, 263, 268, 276,
                                                                       Micellar TLC 743
    311, 316, 325, 326, 334(review), 419, 461, 507, 518, 532, 546,
                                                                       Microchannel TLC 630
```

Review(s), detection and detectors 232, 334 Miniaturization of TLC 419, 556 — , development 3, 238, 613 Mobile phase, chiral 120, 702 — , documentation 613 — — , modifier 548, 606, 616 - , instrumentation 237 — — , salts in 727 - , new developments 3, 613 — — , selection and optimization 17, 23, 253, 445, 480, 606, 616, -, optimization 238, 629 749 - , overpressure layer chromatography 629 - - , theory 242 - , quantitation 2, 453 Modelling 242, 465, 617 Multidimensional TLC (two-dimensional) 48, 286, 295, 333, 352, 383, — , radiochromatography 613 —, reversed phase(s) 334 492, 579, 596, 771 -, TLC coupling 1 see also Development, two-dimensional — , TLC/MS combination 613 New developments, review 3, 238, 613 Salting-out chromatography 606-608 Nomenclature for chromatography 457 Sample enrichment 255, 745 Optimization 17, 23, 189, 238(review), 253, 445, 466, 480, 606, 616, Scanners see Detection and detectors, scanning 629(review), 749, 774 Separation degree, measurement 4 Overpressured layer chromatography (OPLC) 6, 14, 16, 18, 67, 333, Silica gel, alkylamino modified 129 399, 629(review) __ __ , mixed with GDX-102 462 Paper chromatography, applications 139, 225, 226, 371, 442, 472, — — , modification with Alizarin Red S 228 478, 541, 612 Size-exclusion chromatography 710 Peptide mapping see structural studies in individual entries in the List Snyder-Soczewinski equation 465 of Types of Compounds Chromatographed Sorbents, activation see individual types of sorbents Preparative TLC 137, 151, 195, 241, 252, 383, 400, 423, 491, 627, – , AlO see Alumina 664, 779 - , bonded phases see Silica gel sorbents; Reversed phase(s) paper chromatography 371 Quantitation 2(review), 18-20, 117, 119, 129, 136, 141, 174, 188, — , clay 464 - . comparison 16, 529 200, 208, 209, 247, 290, 296, 327, 335, 336, 367-369, 397, 411, - , dispersive composition 250 426, 448, 453(review), 518, 539, 552, 558, 594, 596, 599, 636, - , general aspects see individual types of sorbents 714, 731, 739, 740, 742, 744, 751, 754, 767, 769, 773, 788 --- , densitometry 188, 217, 266, 357, 358, 367, 411, 425, 428, 595 --- , marble powder 464 __ , new types 627, 740 , fluorimetry in situ 369 Quantitative structure-activity relationships (QSAR) 245, 573, 748, - , particle size 14, 16 - , porosity 16 749 silica gel, modified see individual types of modification — – retention relationships 458 Staining procedures see Detection and detectors, visualization Radioactive labelled compounds, techniques for ¹⁴C 194, 195, 395, Sulfosalicylate, stannic, as sorbent 627 396, 566-568 ___,___ ³⁵S 759 Temperature, high 581 Thermodynamic of chromatography 5, 617 Radiochromatography 613 see also Detection and detectors, radioactivity Titania TLC 625 TLC, combination, review 1 Reagents for detection see Detection and detectors, reagents ___, __ with AAS (atomic adsorption spectroscopy) 781 Relation between mobility (R_F , R_M) and mobile phase composition 31, ____ FTIR see Detection and detectors, FTIR 48, 137, 244, 437, 784 __, __ electrophoresis 346, 530, 531, 534, 708, 709 ___ _ _ and structure in TLC 21, 28, 243-245, 370, 459, 618, __, __ LCC 5, 24, 364 624, 719 __, __ mass spectrometry 96, 353, 613(review), 644, 667, 736, Reproducibility 463 744, 745 Retention mechanism 31, 617, 623 __, __ photothermal deflection spectroscopy 27 prediction 5, 253, 465, 617, 618 __, __ Raman spectroscopy 393 Reversed phase(s) 120, 153, 186, 227, 243, 334(review), 335, 367, __ , __ _ SIMS 254 387, 390, 438, 548, 557, 616, 624, 700, 725, 748, 749, 785 __ , __ _ spectrophotometric method 25, 363 Review(s), advances in TLC 234, 452 - , comparison with LCC 143, 467, 529, 715, 739 -, application to various fields of science and technology 172, 177, instrumentation see Instrumentation for TLC 233, 235, 236, 239, 240, 280, 443, 454, 455, 605, 614, 632, 660, - , plates, pretreatment of 15 707 Two-dimensional HPTLC see Multidimensional TLC (two-dimensional) -, blotting 615 Validation 18, 19, 565 -, capillary flow 613 Zeolite 251 - , cellulose as sorbent 707

— , chambers 613

Electrophoresis

```
Acid violet staining 369
                                                                       Capillary coupled 188
Affinity electrophoresis 47, 1166, 1183, 1457, 1754
                                                                       - , cyclodextrin immobilized 2061, 2064
 — — , capillary 46, 687, 688, 1459, 1987, 2168, 2506
                                                                       -, deactivation 1408
— — , — , gel 549, 550, 1172
                                                                       --- , derivatization 1406
 — — , — , enantiomer separation 46, 77
                                                                       - , dynamically modified 176

    — , two dimensional 923, 930

                                                                       , hydrophilic 1371, 2153
    see also Immunoaffinity electrophoresis
                                                                       -- chromatography, micellar 55, 67, 100, 128, 132, 149, 153, 155,
Affinoblotting see Blotting techniques; Electroblotting; Immunoblot-
                                                                           157, 162, 165, 176, 449, 601, 604, 605, 608, 611, 612, 627, 629,
                                                                           630, 633, 634, 636, 772, 806, 1262, 1266, 1391, 1403, 1405,
Agar 1346
                                                                           1415, 1654, 1792, 1793, 1917, 1919, 1921, 1942, 1949, 2018,
Agarose-formaldehyde see Formaldehyde-agarose gel
                                                                           2024, 2075, 2076, 2078, 2079, 2127, 2130, 2136, 2402, 2502,
- gel, electric birefrience 1345
                                                                           2504, 2505, 2507, 2509, 2518, 2520, 2525, 2527-2529
--- , structure 1339
                                                                       — — , — , automated 630
Agarose-polyacrylamide gel 762
                                                                        – – , – , capillary, coated 2028
Amido black staining 742
                                                                       ---- , --- , comparison with CZE 815, 1264, 2497
Ammonia-silver staining method see Silver stain procedures
                                                                       --- , -- , -- liquid chromatography 629, 630, 1917
Asymmetric field inversion electrophoresis see Field inversion electro-
                                                                      -- -- , -- , coupling with MS 44
    phoresis and other types of field inversion
                                                                      — — , — , detection 601
Automation 3(review), 40, 514, 630, 653, 723, 786, 1093, 1321,
                                                                      — — , — , — , electrochemical 636
    1328, 2027, 2043, 2044, 2135
                                                                      — — , — , — , fluorescence 155, 157, 806, 1919, 2021, 2502
Axisymmetric electrophoresis 1280
                                                                      — — , — , — , laser based 806, 1919, 2021
Band broadening 722, 2042
                                                                       — — , — , — , refractometric 116
- spreading 701
                                                                       — — , — , electrokinetic flow 80
Blotting apparatus 663
                                                                      - - , - electroosmotic flow 2028
Blotting techniques 133, 139, 190, 192, 198, 200, 217, 228-230,
                                                                      — , — , enantiomer separation 807, 1260, 1363(review), 1404,
    232, 238, 243(review), 248, 254, 255, 259, 264, 269, 278, 296,
                                                                           1431, 1940, 1943, 2037(review), 2512
    300, 333, 345, 352, 356, 357, 359, 367, 368, 372-374, 389, 390.
                                                                           see also various modifiers
    397, 407, 410, 417, 422, 441, 454, 460, 461, 463, 468(review).
                                                                      — —, —, instrumentation 1349
    470, 475, 477-479, 494, 499, 504, 526, 528(review), 559, 578,
                                                                        – – , – , mobile phase 153, 176, 604, 605, 608, 627, 1262, 1405
    760, 778, 797, 826, 848, 868, 869, 872, 875, 879, 881, 882, 887,
                                                                      — , — , — — , additives 132, 1259, 1262, 1360, 1363(review),
    888, 897, 899, 901, 910, 913, 917, 947, 961, 977, 990, 1005,
                                                                           1391
    1007, 1009, 1012, 1019, 1023, 1024, 1030, 1046, 1050, 1052,
                                                                      — — , — , modeling 2041
    1053, 1059-1062, 1069, 1075, 1088, 1107, 1110, 1112, 1120,
                                                                      — — , — , molecular sieve 2055
    1135, 1136, 1140-1145, 1147, 1148, 1151, 1152, 1155-1157,
                                                                      — , — , optimization 13, 153, 154, 604, 605, 608, 708, 1246,
    1159, 1160, 1178, 1182, 1188, 1196, 1197, 1200, 1203, 1211,
                                                                          1262, 1349, 2039, 2041, 2078, 2504, 2505, 2512, 2520
    1212, 1224, 1489, 1524, 1541, 1548, 1559, 1561, 1564, 1572,
                                                                      — — , — , quantitation 128, 154, 1262, 1266, 1919, 2509, 2520,
    1596, 1605, 1610, 1628, 1646, 1669, 1677, 1698, 1704, 1713,
                                                                          2525, 2528, 2529, 2545
    1718, 1720, 1735, 1737, 1755, 1791, 1796, 1798, 1799, 1801,
                                                                      — — , — , reproducibility 1421, 2038
    1807, 1809, 1811, 1814, 1817, 1818, 1820, 1825, 1826, 1839,
                                                                      — — , — , retention index 1359, 1403
    1851, 1853, 1856, 1889, 1911, 2089, 2101, 2103, 2122, 2187,
                                                                      — — , — , reviews 101, 725, 1255, 1363, 1938, 2037, 2055, 2516
    2189, 2190, 2197, 2231, 2235, 2245, 2264, 2276, 2282, 2289,
                                                                      --- , --- , sample injection 2018
    2292, 2293, 2300, 2312, 2321, 2336, 2339, 2351, 2352, 2359,
                                                                      ---, --, -- on column concentration 2034
    2365, 2388, 2389, 2395, 2406-2408, 2410-2413, 2415, 2418,
                                                                      ---- , --- , solvent gradient 1349, 2039
    2419, 2422, 2428, 2429, 2432, 2435, 2439, 2440, 2443-2445,
                                                                      — — , — , theory 13, 725(review), 735
    2461, 2482, 2493
                                                                      — — , — , with bile salt 154, 807, 1246, 1260, 2502
    see also Electroblotting; Immunoblotting
                                                                        - - , - , - cyclodextrin 608, 751, 807, 1260, 1363(review), 1943,
Books (and symposia proceedings) on electrophoresis 1299, 1388
                                                                          2512, 2527
Buffer 4, 657
                                                                      — — , — , — cyclohexanol 1391
Capacity factor 810, 1403, 1917
                                                                      — — , — , — crown ethers 1363(review)
                                                                      — , — , — Brij 708
Capillary array electrophoresis 563, 1175, 2006, 2496
                                                                      — , — , — cetyltrimethylammonium bromide 112, 2529

    cartridge 1369

- characterization 69, 221
                                                                      --- , coating 59, 60, 76, 86, 197, 221, 516, 706, 1370, 1386, 1387,
                                                                      ---,--, -- digitoxin 162
    1397(review), 1401, 1538, 2022, 2028, 2056, 2061, 2064, 2262
                                                                      --- , --- , --- N-dodecanoyl-L-glutamate sodium 162
```

Capillary chromatography, micellar, with micelles charged in situ	Capillary, wall adsorption 86
2051	 zone electrophoresis (CZE) 32, 51, 64, 68, 70, 96, 102, 104-108,
	127, 128, 131, 134, 151, 152, 156, 164, 168, 169, 177, 183, 188,
— , — mixed micelles 2013	189, 197, 212, 213, 215, 220, 221, 223, 224, 236, 251, 279, 306,
, , organic modifiers 2076, 2528	319, 320, 324, 325, 411, 436, 486, 487, 514, 556, 564, 575, 602,
, , , ovomucoid 1431	603, 606, 607, 610, 611, 613-619, 621-623, 625, 626, 628, 631,
,, SDS-poly(ethylene oxide) 2165	632, 634, 635, 637, 639, 641-644, 646, 648, 649, 753, 755, 805,
,, surfactants, double chain 78	808-810, 813, 816, 822, 840, 845, 850, 854, 859, 962, 982,
,, comparison 2033, 2050	1037, 1111, 1233, 1244, 1245, 1249-1252, 1261, 1263, 1267,
, , , zwitterionic 176, 2013, 2150	1271, 1272, 1274, 1287-1291, 1293, 1294, 1296-1298, 1306,
— , — , — taurodeoxycholic 1246	1376, 1381, 1410, 1422, 1440, 1442, 1444, 1445, 1447, 1448,
— — , — , — TAB 154, 2545	1462, 1471, 1472, 1487, 1493, 1494, 1496, 1498, 1499, 1504-
— , — , — tetraalkylammonium salts 1793	1511, 1514, 1522, 1533, 1537-1539, 1575, 1612, 1657, 1660,
 electrophoresis see Capillary zone electrophoresis 	1511, 1514, 1522, 1533, 1537-1539, 1573, 1612, 1637, 1660,
 electrophoresis, affinity see Affinity electrophoresis, capillary 	1665, 1672, 1813, 1840, 1872, 1873, 1875, 1877, 1916, 1922,
, book 1299, 1388	1929, 1939, 1942, 1947, 1948, 1952-1955, 1957, 1958, 1960,
— — , cyclic, synchronized 1989	1966, 1967, 1972, 1974, 1975, 2023, 2026, 2035, 2059, 2081,
— — , free solution 166, 167, 668, 823, 1186, 1433, 1976, 2143,	2082, 2084, 2096-2098, 2128, 2131-2135, 2137, 2138, 2142,
2158, 2489	2146, 2148, 2152-2158, 2163, 2170, 2218, 2240, 2262, 2360,
 — , instrumentation see Capillary zone electrophoresis, instrumen- 	2369, 2381, 2463, 2478, 2490, 2500-2505, 2511, 2513, 2515,
tation	2519, 2521-2524, 2531, 2542-2548, 2550-2554
— , on chip 54, 694, 700, 1320, 1993-1995	see also Free flow electrophoresis
— , pulsed-field 757, 1450, 2053	— — , affinity see Affinity electrophoresis, capillary
— — , optimization 2053	— — , automation 514, 723, 2027, 2043, 2044
— — , reviews see Capillary zone electrophoresis, reviews	— — , band broadening 722
electrophoretic immunosubtraction 286	, spreading 701
	, baseline 50, 691
— electroseparation system 1396	, blotting 372
— gel electrophoresis 35, 186, 446, 450, 452, 492, 497, 501, 508,	, book 1388
512, 516, 527, 551, 565, 570-572, 576, 579, 584, 590, 731, 820,	, buffers 197, 639, 1981, 2052, 2522
843, 849, 1132, 1133, 1171(review), 1228, 1379(review), 1534,	, concentration 2157
1790, 1794, 1823(review), 1824, 1870, 1876, 1882, 1899, 1913,	, optimization 62, 104, 107, 151, 171, 279, 320, 451,
2006, 2040(review), 2240, 2403, 2447(review), 2458, 2478,	556, 614, 646, 844, 856, 940, 962, 1289, 1470, 1509, 1929,
2485, 2487	1981, 2080, 2096, 2157, 2262, 2404, 2505, 2559
— — , affinity 549, 550, 1172	1981, 2080, 2090, 2137, 2202, 2404, 2303, 2333
— — , columns 35, 669, 1366, 1407, 1531	, polymer solution 587
— — , comparison with agar gel electrophoresis 516	, polymeric additives 319
, CZE 1236	— — , capacity factor 810
— — , — — LC 1236	— — , capillaries 59, 60, 69, 215, 224, 1402, 1407, 1424, 1954,
— — , detection 25, 508, 551, 584, 590, 2403, 2458	2017
— — , factors affecting performance 658	, , coated 76, 86, 197, 221, 548, 706, 847, 853, 1316,
— — — , field inversion 2463	1370, 1386, 1387, 1397(review), 1401, 1538, 2022, 2056, 2061,
, media 497, 579, 584, 669, 702, 716, 843, 1366, 1375,	2064, 2262
2169, 2175, 2178, 2401	— — , — , coiling influence 731
— — , optimization 492, 570, 571, 576	— — , — , coupled 188
— — , polyethylene oxide gels 2169, 2178	, , cyclodextrin immobilized 2061, 2064
, polysaccharide gel 2175	— — , — , deactivation 1408
— — , quantitation 1207	— — , — , derivatization 1406
, quantitation 1257 , replaceable gels 579, 584, 702, 1375	— — — , — , from organic polymers 721
, temperature effects 576	, hydrophilic 1371, 2153
	, , packed 2128
— — , uncrosslinked gel 486	, , surface modified 739, 859, 1333, 2022
— — , voltage effects 2403	, cartridge 1369
— — , with surfactants 1375, 2169, 2178	see also Capillary
ion electrophoresis 647, 1288, 1291, 1293, 1297, 1298, 1302(re-	, chips 54, 694, 700, 1320, 1993-1995
view), 1415, 1416, 1973, 1977(review), 2542-2549, 2556, 2557	
— — , comparison with ion chromatography 1973	— — , column switching 694
— — , detection 2549, 2556, 2557	— — , combination with immunoassay 750
— — , quantitation 2549	, isoelectric focusing 2257
 isoelectric focusing see Isoelectric focusing, capillary 	— — , comparison with capillary chromatography, micellar 815,
 isotachophoresis see Isotachophoresis, capillary 	1264, 2497
— packed 2042	, gel electrophoresis 1236
see also Capillary gel electrophoresis	

Capillary zone electrophoresis (CZE), comparison with LC 171, 306,	Capillary zone electrophoresis (CZE), instrumentation 9, 17, 19, 52,
313, 320, 850, 1236, 1271, 1272, 1300(review), 1952, 2163,	54, 73, 79, 87, 690, 692, 729, 734, 1318, 1320, 1362, 1369,
2497, 2508	1373, 1378, 1382, 1392, 1393, 1398, 1425, 1426, 1997(review),
— — , — — gel electrophoresis 1875	2027, 2058, 2381
— — , computerization 49, 62, 699, 1372, 1392	— — , ion-pair interaction 2151
— — , constant denaturation 1885	
— — , coolant 1369	— — , isoelectric point 721
— — , coupling with AES (atomic emission spectrometry) 709	— — , isotachophoretic preconcentration 75, 202
	— — , miniaturization 1993-1995
— — , — — capillary isotachophoresis 75, 202, 2043, 2044,	see also Capillary zone electrophoresis, chips
2510	— — , modelling 48, 682, 719, 720
— — , — — flame photometric detection 2048	— — —, mobile phase see Capillary zone electrophoresis, buffers
— — , — — HPLC 213	— — , mobile phase, chiral see Capillary zone electrophoresis,
— — , — — MS 44, 81, 191, 224, 324, 622, 642, 685, 686,	enantiomer separations
835, 1356(review), 1358, 1377, 1411, 1413, 1414, 1417, 1939,	— — , — — , nonaqueous 1939, 2047
2156, 2498, 2519	— — — , — — , with albumin 1361
— — , cyclic 694	— — , — , — amines and amino sugars 844
— — , detection, amperometric 52, 664, 713, 717, 733	— — , — — , — butanol 2550
see also detection, electrochemical	— — , — , — calizarenes 1409
— — , — , chemiluminiscence 27, 697, 1324, 2170	— — , — — , — cellulose 306, 548, 1926, 2452, 2458
— — , — , cell 2002, 2004	— — , — , — cetyltrimethylammonium bromide 606
— — , — , conductivity 84, 2001	— — , — — , — — chloride 65
— — , — , electrochemical 111, 169, 666, 2369	— — , — — , — crionde 03 — — , — , — crown ether 1363(review), 1432, 2547
— — , — , enzyme assay 698	
— — , — , fluorescence 23, 43, 63, 71, 114, 157-159, 189, 575,	— — , — — , — chitosan 856
	,, cyclodextrin 45, 90, 91, 105, 134, 611, 621,
606, 623, 703, 724, 750, 774, 813, 1323, 1325, 1327, 1440,	671(review), 740, 1256, 1265, 1268, 1363(review), 1427,
1499, 1507, 1575, 1873, 1882, 1913, 1998, 2000, 2015, 2016,	1428(review), 1429, 1433, 1472, 1498, 1926, 1936, 1944, 1946,
2072, 2081, 2082, 2097, 2133, 2218, 2452	2046, 2063, 2098, 2135
— — , — , fluorometry, semiconductor laser 56, 57	— — — , — — , — hydroxyethyl cellulose 2490
— — , — , indirect 85, 635, 642, 646, 774, 1249, 1287, 1288,	— — , — — , — hydroxypropylmethyl cellulose 306, 2452
1291, 1294, 1296, 1440, 1972, 2129, 2544, 2551	— — , — , — ion-pairing reagents 65, 587, 606
— — , — , laser induced 23, 56, 57, 63, 71, 85, 114, 157-159,	— — — , — phytic acid 1364, 2151
189, 623, 707, 809, 1214, 1323, 1325, 1331(review), 1507,	— — — , — — , — polyacrylamide, non-crosslinked 2452
1575, 1913, 2016, 2072, 2077, 2081, 2082, 2097, 2133, 2218,	— — , — , — polymer content 587, 1368, 1876, 1882, 2558
2458	— — , — , — polymeric hollow fibers 1341
— — , — , microscope 1998	— — , — — , — presence of surfactants 2360
— — , — , off column 70	— — , — — , — propanol 1487
— — , — , optical cell 1329, 1334	— — , — — , — tetrabutylammonium 740
— — , — , photodiode-array 21, 707, 940, 1214	— — , — , — trimethylammonium propane sulfonate 2080
— — , — , photometric 84, 85, 1249, 2015, 2048, 2129, 2369	— — , — uncrosslinked polymer 486
— — , — , potentiometric 2556	
— — , — , radioactivity 30, 665, 2007	
	— — , — — , pH 62, 104, 105, 107, 313, 320, 451, 611, 635,
— — , — , refractometric 116, 707, 1439, 2015, 2077	705, 1256, 1291, 1313, 1399, 1470, 1509, 1511, 2052, 2080,
— — , — , reviews 22, 620, 727, 1331, 1367, 1423	2143, 2157, 2262
— — , — , scanning 1332	— — , modeling 2012
— — , — , thermo-optical 1331(review)	— — , molecular mass separation 1368, 1539, 2014
see also Detection and detectors	— — , optimization 62, 75, 98, 104, 107, 151, 171, 279, 313,
— — , electroosmotic flow 65, 73, 76, 82, 83, 734, 1314, 1419,	320, 451, 556, 614, 619, 646, 682, 705, 844, 856, 859, 1251,
2017, 2019, 2052, 2521, 2558	1256, 1289, 1291, 1313, 1470, 1509, 1511, 1929, 1974, 1981,
— — , — — , reversed 1470	2036, 2080, 2096, 2262, 2404, 2505, 2559
— — , electrophoretic flow 606	— — , organic solvent modifiers 625, 1251, 1487, 2547, 2550
— — , — mobility 65, 164, 639, 1291, 2142	— — , overlapping scheme 2036
— — , enantiomer separations 45, 90, 91, 175, 621, 671(review),	— — , peak correction 49
739, 740, 1256, 1265, 1268, 1361, 1363(review), 1404, 1427,	— — , pH gradient see Capillary zone electrophoresis, gradients
1428(review), 1429, 1432, 1433, 1434(review), 1498, 1920,	— — —, pK determination 14
1926, 1934, 1936, 1944, 1946, 1951, 2037(review), 2045(re-	— — , polymer solution 587, 1368, 1876, 1882
view), 2046, 2057, 2061-2064, 2098, 2129, 2132, 2135	— — , postcolumn derivatization 727(review)
— — , field strength, time-varying 1378	— — , — reaction detection 697
— — , flow control 66, 690	
	— — , precolumn derivatization 158, 159, 727(review), 1951,
— — , fraction collection 73, 1373, 1537	2135, 2138
— — , imaging 1439	— — , preparative 58, 677, 852, 1374, 1420(review), 2149

Capillary zone electrophoresis (CZE), pressure-assisted 1487 1704, 1720, 1744, 1745, 1757, 1780, 1795, 1802, 1808, 1884, 1897, 2185, 2197, 2199, 2209, 2236, 2247, 2254, 2267, 2277, — — , quantitation 128, 602, 603, 615, 619, 635, 675, 676, 723, 2285, 2292, 2303, 2304, 2366, 2377, 2415 753, 774, 815, 1245, 1261, 1288, 1296, 1384(review), 1916, Detection and detectors, chemiluminiscence 27, 697, 1324, 1804, 1925, 1929, 1933, 1944, 2030, 2096, 2138, 2152, 2262, 2498, 2170 2508, 2522, 2523, 2552, 2554, 2559 — — , conductivity 84, 2001, 2557 — — — , reproducibility 675 — — , densitometric 234, 238, 329, 368, 378, 496, 536, 542, — — , reversed polarity 44 __ _ _ , reviews and books 2, 22, 72, 74, 88, 109, 207, 226, 447, 560, 760, 906, 963, 990, 1016, 1096, 1147, 1199, 1330, 1454, 1545, 1548, 1582, 1637, 1679, 1701, 1704, 1711, 1804, 1825, 484, 609, 624, 671, 710-712, 725, 727, 728, 851, 1270, 1299, 1884, 2161, 2171, 2197, 2238, 2254, 2389 1300-1302, 1356, 1363, 1367, 1380, 1383, 1384, 1388-1390, — — , electrochemical 111, 169, 666, 1999(review), 2369 1397, 1400, 1412, 1418, 1420, 1423, 1428, 1434, 1468, 1513, see also Detection and detectors, amperometric 1608, 1823, 1871, 1935, 1938, 1941, 1956, 1979, 1997, 2031, --- -- , fluorescence 23, 43, 63, 71, 114, 155, 157-159, 189, 508, 2037, 2045, 2057, 2447, 2516, 2532 — — , sample enrichment 88(review), 1385, 2025, 2032 525, 551, 575, 584, 590, 606, 623, 703, 724, 750, 806, 813, __ _ _ , __ injection 675, 696, 700, 714, 1294, 2020, 2025, 2032, 1106, 1201, 1202, 1323, 1325, 1327, 1499, 1507, 1540, 1575, 1879, 1913, 1919, 1998, 2000, 2006, 2015, 2016, 2021, 2072, 2054 __ __ , __ matrix effects 7, 12 2081, 2082, 2097, 2133, 2218, 2452, 2502 __ _ _ , __ , indirect 774, 1440 — — , — stacking 695, 696, 2510, 2559 — — , fluorography 233, 342, 380, 431, 766, 775, 868, 907, — — , simulation 719, 720, 722, 1372 __ __ , temperature effects 8, 279, 812, 823, 962, 1394, 1395 972, 1014, 1632, 1887, 2380 — — , — inside capillaries 49, 1394 — — , fluorometry, semiconductor laser 56, 57 __ _ _ , theory 48, 53, 61, 675, 725(review), 812, 1365, 1395, — — — , infrared 18 __ _ _ , laser based 18, 23, 25, 56, 57, 63, 71, 114, 157-159, 189, 1398, 2059 508, 525, 551, 584, 590, 623, 656, 707, 732, 806, 809, 906, — — , two dimensional (HPLC/CE) 213 1106, 1214, 1323, 1325, 1331(review), 1507, 1575, 1913, 1919, — — , voltage programming 723 2006, 2016, 2021, 2072, 2077, 2081, 2082, 2097, 2133, 2171, — — , wall adsorption 86, 197, 722 2218, 2458, 2496 — — , zeta potential 689 – – , zone broadening 714 — — , light scattering 656 — — , luminiscence 960 Cellulose acetate 926, 1492, 1613, 1622, 1756, 1759 — — , microscope 1998 electrophoresis 760 -- -- off column 70 Centrifuge blotting 846 __ _ _ , photodiode array 21, 707, 940, 1214, 2009 Column switching 694 — — , photometric 84, 85, 1249, 2015, 2048, 2129, 2369 Comparative analysis 6 Computerization 6, 49, 62, 495(review), 542, 683, 699, 743, 745, — — , potentiometric 2556 — — , radioactivity 30, 665, 2007 747, 827, 1349-1355, 1372, 1392, 1435, 1627, 1902, 1903, — — , refractometric 116, 707, 2015, 2077, 2457 1988, 2041, 2069, 2171 — — , review 22, 26, 1331, 1367, 1423, 1999 see also Database; Modeling — — , scanning 18, 137, 350, 368, 378, 483, 525, 560, 747, Concanavalin A affinity immunoelectrophoresis 1475 760, 906, 963, 990, 1096, 1147, 1199, 1332, 1548, 1558, 1582, Continuous convective electrophoresis 1617 electrophoresis 1(review), 20, 214, 660, 679, 680, 746, 1278, 1639, 1679, 1701, 1704, 1711, 1884, 2161, 2197, 2206, 2235, 1305, 1350, 1970, 1985, 2214 2238, 2254, 2389 — — , sensitivity, enhancing 1367(review) --- ion focusing 1970 Counteracting flow electrophoresis 2072, 2074 - - , thermo-optical 1331(review) __ _ _ , zymography 430, 1102, 1760, 1765, 2349, 2380, 2388 Crossed immunoelectrophoresis see Immunochemical techniques in Detection, indirect 85, 635, 642, 646, 774, 1249, 1287, 1288, 1291, electrophoresis; Immunoaffinity electrophoresis 1294, 1296, 1440, 1972, 2129, 2544, 2549, 2551 Curdlan gel 1340 procedures 206, 2174, 2330, 2338 Data processing 683, 743 see also Capillary chromatography, micellar, detection; Capillary Database 92, 199, 233, 308, 745, 827, 1035 zone electrophoresis, detection; Isotachophoresis, detection see also Computerization Densitometry see Detection and detectors, densitometric Detector(s), new types 18, 715, 1998 N,N'-Diethyldithiocarbamate as stain 1721 Destaining 217 Disc gel electrophoresis 1756 Detection and detectors, amperometric 52, 664, 713, 717, 733 Discontinuous electrophoresis 1168 see also Detection and detectors, electrochemical DNA-fingerprinting see structural studies in individual entries in the — — automated 40 — — ___ , autoradiographic 28, 133, 142, 170, 227, 240, 242, 247, List of Types of Compounds Chromatographed 297, 308, 387, 397, 406, 459, 463, 483, 485, 504, 505, 536, 560, Drving of gels Electroblotting 178, 194, 200, 229, 305, 349, 802, 927, 1029, 1477, 569, 577, 580, 585, 803, 872, 874, 879, 892, 895, 899, 900, 904, 918, 979, 984, 999, 1018, 1061, 1064, 1103, 1154, 1180, 1209, 1534, 1536, 2091, 2160, 2264 see also Blotting techniques; Immunoblotting 1213, 1224, 1230, 1237, 1239, 1285, 1286, 1477, 1521, 1524, Electrochromatography 1343, 1937, 2035, 2042 1548, 1552, 1555, 1558, 1610, 1637, 1662, 1679, 1688, 1691,

B492 BIBLIOGRAPHY SECTION

Electroimmunoblotting 790 Gel(s), cutter 34 see also Blotting techniques; Immunoblotting — , preparing 37, 38, 670 Electrokinetic chromatography see Capillary chromatography, --- , relaxation 5, 1308, 1335 micellar , short 1337 flow 80 Gold (coloidal) staining 217, 1669 Electroosmosis 61, 82, 83 Gradient(s), gel(s) 140, 143, 150, 227, 243(review), 258, 348, 769, Electroosmotic flow 65, 73, 76, 82, 606, 734, 1314, 1419, 1937, 779, 788, 794, 797, 800, 804, 858, 882, 894, 897, 921, 948, 963, 1967, 2017, 2019, 2029, 2052, 2521, 2558 1206, 1473, 1483, 1486, 1489, 1524, 1558, 1656, 1709, 1713, 1731, 1764, 1782, 2099, 2102, 2104, 2106, 2111, 2114, 2115, Electrophoresis, combination with immunoassay 750 --, --- PC 811, 1501, 1502, 1686, 2145, 2182 2117, 2121, 2123, 2125, 2216, 2221, 2258, 2317 — , comparison with LC 171, 306, 313, 320, 629, 630, 850, 1236. —, —, denaturing 524, 1217, 1241, 1829, 2400(review) 1271, 1272, 1300(review), 1917, 1952, 1973, 2163, 2260, 2497, —, —, large pore 769 —, —, thin pore 2317 - , coupling with AES (atomic emission spectrometry) 709 --- , --- , transverse 2179 - , - - flame photometric detection 2048 —, pH, immobilized 196, 651(review), 741, 953, 1004 — , — — HPLC 213 ---, ---, optimization 1348 --, -- MS 44, 81, 179, 191, 224, 324, 622, 642, 684-686, 835, --- , --- , steady state moving 2060 836, 1356(review), 1357, 1358, 1377, 1411, 1413, 1414, 1417. -, temperature 489, 509, 585, 1238, 1847, 1900, 1914 1534, 1536, 1939, 2156, 2173, 2498, 2519 High-pressure electrophoresis 1118, 1437 see also Capillary zone electrophoresis; Isoelectric focusing High-voltage electrophoresis 1497 Electrophoretic mobility see Mobility, electrophoretic History of electrophoresis 655 - transfer, membranes 1579 Hydrophilic-hydrophobic polymer medium 1342 - - , semi dry see Electroblotting Image analysis 892, 1235, 1328, 2003, 2065(review) Elution from gels 835, 839 Immunoaffinity electrophoresis, capillary 688 Enantiomers, separation 45, 46, 77, 90, 91, 175, 621, 671(review), Immunoblotting 121, 135, 141, 145, 231, 239, 242, 244, 246, 250, 739, 740, 807, 1256, 1260, 1265, 1268, 1361, 1363(review), 255, 258, 260, 264, 299, 315, 339, 344, 348-350, 363, 389, 391, 1404, 1427, 1428(review), 1429-1433, 1434(review), 1498, 1920, 393, 397, 410, 424, 437, 442, 475, 585, 765, 771, 782, 784, 795, 1926, 1934, 1936, 1940, 1943, 1944, 1946, 1951, 2037(review), 877, 880, 892, 895, 898, 906, 916, 924, 948, 958, 980, 985, 990, 2045(review), 2046, 2057(review), 2061-2064, 2098, 2129, 2132, 1006, 1007, 1015, 1055, 1058, 1076, 1099, 1113, 1326, 1463. 2512 1478, 1480, 1481, 1564, 1623, 1629, 1646, 1703, 1715, 1731, Enhance with electricity, review 1983 1785, 2092, 2102, 2104, 2106, 2112, 2114, 2115, 2193, 2200, Ethidium-bromide as detection reagent 309, 478, 522, 591, 875, 2241, 2247, 2258, 2259, 2267, 2288, 2291, 2295, 2297, 2303, 1138, 1139, 1152, 1165, 1203, 1204, 1209, 1213, 1222, 1224, 2305, 2328, 2331, 2356, 2361, 2363, 2367, 2378, 2393, 2410, 1745, 1779, 1796, 1798, 1806, 1827, 1887, 2103, 2408, 2429, 2422, 2442, 2445 2451, 2471 see also Blotting techniques; Electroblotting; Electroimmunoblot-Extraction from gel 1852 Evans blue staining 2174 Immunochemical techniques in electrophoresis 292, 330, 419, 1054, Field-alternation gel electrophoresis, review 533 1611, 1783, 2335, 2370 Field-inversion electrophoresis (selected references only) 523 Immunoelectrophoresis, affinity 1457 see also various types of field-inversion electrophoresis see also Rocket immunoelectrophoresis — , capillary gel electrophoresis 2464 Immunofixation 287, 786, 2318, 2370 Fingerprinting see Peptide mapping and structural studies in Instrumentation for electrophoresis 9, 15-20, 33, 34, 36, 38, 52, 54, individual entries in the List of Types of Compounds Chroma-73, 79, 87, 94, 253, 542, 659-663, 684, 690, 692, 729, 734, tographed 1285, 1318-1322, 1338, 1347, 1349, 1362, 1373, 1378, 1382, Fluorescence labelling 1461, 2072, 2081, 2135 1392, 1393, 1398, 1425, 1426, 1627, 1838, 1879, 1893, 1988, Flurescent dye 1201 1990-1996, 1997(review), 2010, 2011, 2027, 2058, 2381 Fluorophore assisted carbohydrate electrophoresis (FACE) 1443 see also appropriate entries under Capillary zone electrophoresis; Footprinting see Nucleotide mapping and structural studies in Detectors, new types individual entries in the List of Types of Compounds Chroma-Isodalt technique, see Two dimensional electrophoresis Isoelectric focusing, applications 120, 139, 178, 282, 285, 287, 293, Formaldehyde - agarose gel 348, 373, 384, 407, 1050, 1052, 1075, 311, 318, 351, 371(review), 392, 413, 414, 416, 440, 651(re-2405, 2414, 2431 view), 786, 814, 959, 971, 1004, 1060, 1072, 1104, 1480, 1481, Fraction collection 73, 1373, 1537 1490, 1521, 1567, 1635, 1728, 1773, 2312, 2362, 2391 Free flow electrophoresis 42, 652(review), 678, 1284(review), 1438, see also Gradient(s), pH 1964, 2049, 2148 — — , buffer 4 — — — , preparative 1964 — , capillary 125, 225, 251, 317, 318, 732, 842, 1439, 2164, 2181 see also Capillary zone electrophoresis solution capillary electrophoresis 166, 167, 668, 823, 1186, 1433, — — , — , detection 317, 732, 1439, 2181

— , combination with capillary electrophoresis 2257

— — , pl markers 654

1976, 2143, 2158, 2489

see also Capillary zone electrophoresis

Isoelectric focusing, preparative 974, 1128, 1549, 1692 Pouring sequencing gels 667 Precolumn derivatization 125, 158, 159, 727(review), 1951, 2135, — — , ultrathin layer 121 Isotachophoresis, application(s) 97, 736, 752, 754, 1950, 1968, 2499, 2138 Preparative electrophoresis 58, 214, 253, 263, 652(review), 677, 678, 2530, 2555 737(review), 742, 852, 917, 939, 974, 1128, 1347, 1374, -, automated 2043, 2044 1420(review), 1549, 1634, 1692, 1964, 2149 - , background electrolytes 89 see also Capillary zone electrophoresis, preparative; Isoelectric fo-- , capillary 130, 1295, 1469, 2009, 2240, 2503 __ , __ , coupling with CZE 75, 202, 2043, 2044, 2510 cusing, preparative Pulsed field capillary electrophoresis 757, 1450, 2053 --- , --- , detection 2009 — electrophoresis, applications 394, 493, 500, 597, 1173, 1189, comparison with LC 2499 1191, 1192, 1194, 1195, 1202, 1223, 1225, 1229, 1234, 1581, - , preparative 737(review) 1838, 1842, 1848, 1854, 1855, 1862, 1883, 1901-1903, 2456, review 448, 737 2460, 2461, 2463, 2476, 2477, 2480, 2484 Labelling, fluorescence see Fluorescence labelling __ __ , gradient gel 1206 Liquid scintillation counting see Detection, radioactivity — — , instrumentation 1838 Mathematical methods 95 __ __ , reviews 503, 507, 541, 2481 Matrix, irregular 1309 __ __ , two-dimensional 502 Media for electrophoresis 31(review), 34, 669, 672, 673, 716 gel electrophoresis 94 see also Gel(s) Quantitation 128, 154, 201, 216, 238, 581(review), 602, 603, 615, Membrane electrophoresis 1492 619, 620(review), 635, 675, 676, 723, 753, 774, 815, 827, 913, Methylene blue 1166 1032, 1147, 1207, 1245, 1261, 1262, 1266, 1288, 1296, 1384(re-Miniaturization in electrophoresis 9, 17, 54, 660, 694, 700, 738(review), 1453, 1649, 1679, 1746, 1765, 1825, 1875, 1916, 1919, view), 1176(review), 1221, 1320, 1993-1995 1925, 1929, 1933, 1944, 2030, 2096, 2138, 2152, 2262, 2287, see also entries under Capillary zone electrophoresis 2498, 2508, 2509, 2520, 2522, 2523, 2525, 2528, 2529, 2545, Mobility, electrophoretic 65, 164, 490, 639, 656, 773, 776, 1193, 2549, 2552, 2554, 2559 1243, 1253, 1276, 1281, 1282, 1291, 1304, 1311, 1312, 1315, see also Capillary zone electrophoresis, quantitation 1351, 1833, 1841, 1928, 2142, 2465, 2537, 2540, 2541 Radioactive labelled compounds see Detection and detectors, ra-- , shift 1243, 1894 Modeling 39, 41, 48, 495(review), 681, 682, 719, 720, 1310, 1351, dioactivity Radiofluorography see Detection and detectors, radioactivity 1352, 2012, 2041 Radioimmunoblotting see Immunoblotting; Detection and detectors, see also Simulation; Computerization radioactivity Nitrocellulose transfer technique see Blotting techniques Review(s), applications to various fields of science and technology Nonlinearity 1311, 1312 Northern blotting see Blotting techniques; Immunoblotting 110, 456, 462, 471, 498, 535, 538, 543, 554, 558, 562, 588, 650, Nucleotide mapping see structural studies in individual entries in the 748, 876, 1038-1040, 1210, 1257, 1468, 1619, 1823, 1959, List of Types of Compounds Chromatographed 1978, 1980, 2105, 2166, 2501, 2536 Optimization 13, 62, 75, 98, 104, 107, 151, 153, 154, 279, 313, 320, automation 3 -, blotting techniques 243 468, 528 451, 492, 556, 570, 571, 576, 604, 605, 608, 614, 619, 646, 662, - , capillaries 1397 682, 705, 708, 844, 856, 859, 962, 1246, 1247, 1251, 1256, --- , capillary chromatography, micellar 101, 725, 1255, 1363, 1938, 1262, 1289, 1291, 1313, 1348, 1349, 1470, 1509, 1511, 1924, 1929, 1974, 1981, 2036, 2039, 2041, 2053, 2078, 2080, 2096, 2037, 2055, 2516 2157, 2262, 2504, 2505, 2512, 2520, 2559 — , — gel electrophoresis 1171, 1379, 1823, 2040, 2447 -, - ion electrophoresis 1302, 1977 Orthogonal field alternation gel electrophoresis see Field inversion __ , __ zone electrophoresis 2, 22, 72, 74, 88, 109, 207, 226, 447, electrophoresis and other types of field inversion 484, 609, 624, 671, 710-712, 725, 727, 728, 851, 1270, 1300-Paper electrophoresis 160, 1292, 1924, 1927 1302, 1356, 1363, 1367, 1380, 1383, 1384, 1389, 1390, 1397, Peak correction 49 1400, 1412, 1418, 1420, 1423, 1428, 1434, 1468, 1513, 1608, - sharpening 1307 1823, 1871, 1935, 1938, 1941, 1956, 1979, 1997, 2031, 2037, --- , spikes 1355 Peptide mapping see structural studies in individual entries in the List 2045, 2057, 2447, 2516, 2532 of Types of Compounds Chromatographed -, comparison with LC 1300 -, computerization 495 pH effects 11, 104, 1924, 2080, 2096, 2143, 2157, 2262, 2559 — , continuous electrophoresis 1 see also Capillary zone electrophoresis, mobile phase, pH - , coupling with MS 1356 PhastSystem 198, 786 -, detection 22, 26, 727, 1331, 1367, 1423, 1999 pH gradients, immobilized see Gradients, pH, immobilized — , enantiomer separation 671, 1363, 1428, 1434, 2037, 2045, 2057 Planar chip technology 54, 694, 700, 1320, 1993-1995 Polyacrylamide, rehydratable 1168 see also Capillary zone electrophoresis Polyacrylamide-glycerol gel 1085, 1729 - , field alternation gel electrophoresis 533 Polyacrylamide-urea gel 909, 1070, 1665, 1808, 2107, 2263, 2424 -, free flow electrophoresis 652, 1284

> — , gradient(s) gels 243 — , — — , denaturing 2400

> __ , __ , pH, immobilized 651

Polymer relaxation 1308, 1335

Polyvinylpyrrolidone-agarose 540

Postcolumn derivatization 727(review)

Review(s), image analysis 2065 Solid friction 1308, 1335 ---, instrumentation 1997 Southern blotting see Blotting techniques -, isolectric focusing 371, 651 Staining procedures see Detection procedures; Silver stain proce-- , isotachophoresis 448, 737 --- , media for electrophoresis 31 Temperature effects 8, 279, 576, 812, 823, 1394, 1395 - , miniaturization in electrophoresis 738, 1176 -, modelling 495 Temperature-gradient gel electrophoresis 489, 509, 585, 1238, 1847. --- , postcolumn derivatization 727 -, precolumn derivatization 727 Terbium chloride staining 2167 - , preparative electrophoresis 652, 737, 1420 Theory of electrophoresis 13, 48, 53, 61, 657, 674, 675, 725(review), - , pulsed field electrophoresis 503, 507, 541, 2481 -, quantitation 581, 620, 1384 - , sample enrichment 88 Titration curve 841(review) -- , -- pretreatment 3 Toluidine blue 1451 , sedimantation equilibrium-quantitative PAGE (SE-PAGE) 1039 Trajectories of spheres 1982 -, silver staining 2005 Transfer techniques see Blotting techniques; Electroblotting; Im--, simulation 495 -, theory of electrophoresis 725 Transport in gels 746, 749 - , titration curve 841 Tricine-SDS-PAGE 1532 — , two dimensional electrophoresis 3, 243, 2065 Two dimensional electrophoresis 40, 92, 93, 136, 137, 190, 196, 199. RNA mapping see structural studies in individual entries in the List of Types of Compounds Chromatographed Rocket immunoelectrophoresis 2243 Sample application 16, 2018, 2020, 2025, 2032, 2054 - enrichment 88(review), 362, 2025, 2032 matrix effects 7 on column concentration 2034 - pretreatment 3(review), 96, 2480 stacking 695, 696, 2510, 2559 Sedimentation equilibrium - quantitative PAGE (SE-PAGE) 1039(re-Semi-dry electrotransfer see Blotting techniques Silver stain procedures 93, 181, 204, 217, 233, 235, 245, 248, 283, 284, 292, 300, 315, 321, 340, 362, 366, 390, 405, 421, 440, 491,

742, 756, 760, 837, 857, 865, 899, 911, 925, 931, 932, 975,

1016, 1029, 1031, 1033, 1048, 1060, 1063, 1065, 1094, 1254,

1588, 1603, 1610, 1717, 1734, 1744, 1786, 1797, 1853, 1875,

2005(review), 2086, 2177, 2202, 2225, 2241, 2245, 2311, 2345,

2361, 2376, 2398

see also Modeling

Software see Computerization

Simulation 495(review), 719, 720, 722, 1372

907, 911, 913, 917, 932, 934, 938, 943, 944, 951, 974, 975, 979, 993, 998, 1001, 1029, 1032, 1035, 1081, 1114, 1116, 1120, 1169, 1254, 1286, 1435, 1436, 1528, 1530, 1532, 1543, 1548, 1587, 1588, 1590, 1591, 1595, 1603, 1611, 1618, 1635, 1638, 1643, 1647, 1664, 1669, 1710, 1733, 1760, 1778, 1859, 1861, 1961, 2003, 2066-2070, 2083, 2094, 2115, 2159, 2160, 2176, 2182, 2184, 2185, 2191, 2204, 2205, 2229, 2230, 2265, 2266, 2274, 2278, 2280, 2379, 2466 - - -, affinity 923, 930 — — , gradient grade electrophoresis 2115 — — , reviews 121, 1190, 2065 Ultrathin layer electrophoresis 1336 Urea-polyacrylamide gel see Polyacrylamide-urea gel Urea gel electrophoresis 252 gradient electrophoresis 1605 Voltage programming 723 Western blotting see Blotting techniques; Immunoblotting Zymography see Detection and detectors, zymography

dures and other staining procedures

1900, 1914

munoblotting

see also Capillary zone electrophoresis, temperature effects

735, 812, 1310, 1315, 1395, 1398, 1832, 1833, 2059, 2489

213, 233, 235, 263, 264, 283, 284, 292, 297, 300, 302, 307, 308,

321, 340, 351, 355, 366, 402, 406, 438, 442, 539, 567, 672,

741-747, 765, 818, 825, 827, 835, 838, 864, 971, 874, 901, 902,

see also Capillary zone electrophoresis, theory

Index of Types of Compounds Chromatographed

This Index follows generally identical rules as those published in previous years i.e. references of general interest and techniques are within a given entry listed first, followed by applications and finally by papers limited to certain area of applications only. This, however, is applicable to highly populated entries, where subdivision appeared necessary. As in the past years the individual parts of the Bibliography Section i.e. Liquid column chromatography (C), Gas chromatography (G), Planar chromatography (P) and Electrophoresis (E) were numbered separately. Therefore the respective shortening should direct the reader to one of the techniques first before looking for a particular number (identical numbers occur under different techniques). Please note that this Index refers to the entry numbers in the Bibliography Section, J. Chromatogr. Vols. 681 and 682.

Α

Acaricides

C: 43, 2457, 3798, 3818

C: 955(review), 1703

G: 1026, 1119

Aconitum alkaloids

- C: 937
- P: 135

Acridines

- G: 1684
- Acrylic resins (inclusive pyrolysis products)
 - C: 1135, 1137, 2471, 2472, 2479, 2482, 2486, 2772, 3832, 4163,
 - G: 417, 1064, 1069, 1072, 1077, 1435, 1789, 1803, 1809, 2042, 2089, 2417, 2424

Actinides and uranium

- C: 1407, 1411, 2738, 2752, 2776, 5123
- G: 1729
- P· 627

Adrenergic and adrenergic blocking agents

- C: 106, 473, 1183, 1184, 1195, 1196, 1199-1203, 1216, 1222-1224, 2523, 2524, 2526, 2528, 2529, 2534, 2535, 2539, 3843, 3861, 3867, 3873-3875, 3880, 3882-3884, 4953(review), 4954, 4956, 4958, 4965, 4985
- G: 429, 439, 456, 463, 976, 1086, 1087, 1089, 1091, 1092, 1094. 1095, 1132, 1673, 1821, 1823, 1827, 1871, 2430, 2435, 2438
- P: 191
- E: 627, 740, 1259, 1945, 1946, 1948, 2529

Aerosols

G: 2181

Aflatoxins

- C: 235, 236(review), 1721, 1722, 1725, 1726, 4339, 4341
- E: 101(review)

Agrochemicals (other than pesticides)

- C: 1109, 2453, 3818, 3819, 4900
- G: 1782, 2410
- P: 383, 700

Air pollution

C: 211, 245, 459, 955(review), 1347, 1375, 1376, 1438, 1546,

- 1688, 1704, 1806, 2766, 3057, 4301, 4332, 4916, 5088(review), 5089, 5174
- G: 215, 251, 255, 368, 470, 502, 504-509, 530, 558, 593, 653, 672, 681, 695, 746, 750, 752, 761, 763, 771, 772, 799, 988, 991, 1003, 1187, 1189-1191, 1251, 1350, 1376, 1388, 1420, 1461, 1463, 1465, 1500, 1501, 1508, 1549, 1555, 1562, 1586, 1603, 1643, 1715, 1756, 1814, 1857, 1906-1910, 1912, 1913, 1967, 2008, 2014, 2090, 2118, 2127, 2137, 2138, 2141, 2150, 2158, 2162, 2177, 2214, 2218, 2253, 2293, 2502-2506, 2548
- P: 109
- E: 2515

see also individual polluting compounds

Alcohols, aliphatic

- C: 18(review), 189, 222, 224, 249, 345, 1370, 1500, 1526, 1663, 1695-1698, 1754, 2693, 3025-3027, 3029-3031, 3176, 4166, 4322, 4323, 4357, 4821
- G: 55, 162, 226, 227, 229, 231, 232, 254, 460, 462, 474, 518, 528, 640, 690, 691, 693, 694, 724, 779-781, 783, 784, 839, 1065, 1155, 1230, 1241, 1289, 1357, 1379, 1514-1516, 1518, 1519, 1521, 1522, 1525-1528, 1564, 1676, 1720, 1941, 2060, 2067, 2096, 2177-2183, 2185, 2265, 2267, 2418
- P: 239(review), 257, 338, 486, 618, 633
- E: 709, 753

--- , cyclic

- C: 18(review), 182, 222, 1370, 1563, 2864, 3028, 3029, 3183, 3710(review), 3712, 3717, 3720, 4042, 4322, 4323, 4357,
- G: 460, 693, 1429, 1433, 1560, 1582, 2184
- P: 239(review)

Aldehydes, see Oxo compounds

Alkali metals

- C: 4092, 4093, 4096, 4178, 5129, 5132, 5138, 5169
- E: 646, 1287, 1972, 2543, 2549

Alkaline earths

- C: 1410, 2730, 2757, 4092, 4093, 4100, 4110, 4113, 5124, 5125, 5139, 5141, 5144
- G: 1819
- P: 225, 446
- E: 644, 646, 1287, 1290, 1972, 2543, 2549

P: 697

Alkaloids E: 45, 153, 2041 C: 917-937, 2329-2344, 3676-3685, 4788-4802 Amines, cyclic, applications G: 344-347, 930-938, 2336-2339 C: 477, 1241, 1935, 1937, 1939, 1940, 1943, 3258, 4176, 4210. P: 134-144, 358-366, 538, 539, 713-717 E: 601-603, 1244, 1245, 1915-1917, 2497-2500 G: 145, 324, 327-329, 332, 913, 1671, 1795, 2311-2313, 2316, -, reviews and books 2317 C: 5076 P: 37, 111, 113, 624 G: 930, 2474 E: 634, 2130 - , theory and general techniques polyamines and their derivatives C: 917, 2335, 3676, 3679, 3682, 3685, 4792, 4793, 4795, 4797, C: 455-457, 1942, 3224, 3225, 3227, 3228, 3231, 3235, 3237, 4798, 4800 G: 124 G: 248, 325, 915, 1152, 1672 P: 137, 139, 208, 361, 538, 715, 717 P: 112, 527 E: 1268, 2499 E: 152, 1495 a other Amino acids C: 918, 919, 928, 2329, 2335 C: 479-519, 1957-1991, 3260-3289, 4522-4558 G: 345-347, 931, 933, 936-938, 1109, 1133, 1696, 2337, 2338 G: 336-339, 919-925, 1677-1688, 2322-2332 P: 138, 140 P: 116-122, 344, 345, 529, 702-707 see also individual alkaloid species E: 155-163, 806-809, 1496-1498, 2132-2139 Allergens — , reviews and books C: 491, 510, 1959, 1964, 1982, 3289, 4525 C: 625 G: 449 G: 924, 1436 E: 640 P: 233 Aluminium, see Cations, inorganic, analytical group III -, techniques and theory Amides, imides and related compounds C: 30, 72, 83, 87, 93, 125, 189, 465, 480, 483, 486, 489, 490, C: 476, 1739, 3257, 4205, 4520, 4521, 5016 492, 494, 496, 497, 500, 506, 513, 516-519, 896, 952, 971, G: 331, 333, 362, 646, 1435, 1675 1414, 1507, 1538, 1541, 1586, 1660, 1666, 1794, 1949, 1957, P: 269, 700, 701, 756 1960, 1961, 1965-1967, 1969, 1971, 1972, 1974, 1977, 1984, E: 2131 1987-1989, 2030, 2069, 2071, 2352, 2674, 2904, 2905, 3074. Amines 3236, 3238, 3246, 3260, 3262-3264, 3267, 3272, 3273, 3276. C: 451-478, 1933-1956, 3223-3259, 5401-4521 3277, 3279, 3280, 3283, 3285, 3454, 3782, 4188, 4289, 4294, G: 324-335, 912-918, 1668-1676, 2311-2321 4523, 4524, 4526-4528, 4534, 4536, 4538, 4539, 4541-4544, P: 110-115, 242, 243, 527, 528, 697-701 4547-4552, 4556, 4557, 4654 E: 152-154, 805, 1795, 2129-2131 G: 160, 336, 339, 1435, 1678, 1682, 1683, 1687, 2007, 2322, --- , reviews and books 2327 C: 3230, 3239 P: 6, 11, 12, 28, 117, 122, 246, 251, 256, 344, 529, 702, 703, G: 2315, 2320 general techniques E: 9, 91, 156, 161, 634, 682, 727, 773, 806, 984, 1269, 1375, C: 72, 189, 450, 458, 459, 461, 1500, 1520, 1541, 1577, 1663, 1496-1498, 2043, 2133-2139 1933, 2898, 3226, 3229, 3232-3234, 3236, 3238, 3245, 4205, - , applications, non-biological 4322, 4323, 4503, 4506, 4542, 4544 C: 484, 488, 1973, 1981, 3249, 3432, 4533, 4526 G: 912, 2096, 2331 G: 690, 919, 925, 1679, 1684 P: 698 P: 116.533 E: 646 E: 2151 , aliphatic amino alcohols and quaternary bases , enzymatic reactions C: 458, 475, 1871, 1956, 2664, 2686-2688, 2997, 3245, 3256, C: 1991, 4530 3288, 4504, 4505 G: 337 – , — , food G: 1520, 2311, 2318 P: 110, 342, 408 C: 482, 3232, 3274, 3281, 4526 E: 2129 G: 920, 2328 - , alkyl see also Food analysis C: 1664, 1936, 1937, 1939, 3223, 3226, 4288 —, —, microorganisms and plants G: 326, 511, 690, 914, 916, 1078, 1150, 1668-1670, 1676, 2318, C: 309, 493, 501, 625, 3540, 4528 G: 338, 923 P: 110, 342, 698, 755 P: 118, 704 - , cyclic, techniques and theory --- , --- , blood C: 57, 188, 451-454, 460, 1147, 1241, 1664, 1934, 1938, 2349, C: 480, 481, 485, 486, 491(review), 504, 507, 508, 510(review), 512, 1963, 1968, 1975, 2674, 3269, 3275, 3284, 3286, 3290, 3226, 4192, 4228, 4899 3432, 4508, 4522, 4524, 4531, 4537, 4540 G: 2318

G: 924, 1688, 2324

G: 1967

see also Nitrogen compounds, inorganic

```
P: 703
                                                                        Amphetamines, see Psychostimulants
    E: 1269
                                                                        Anabolics
Amino acids, applications, urine
                                                                            C: 2937, 4191, 4346
    C: 481, 487, 504, 508, 509, 1968, 1975, 3265, 3270, 3278, 3282,
                                                                            G: 2280, 2281
       3287, 4551
                                                                            P: 763
    G: 1681, 1686
                                                                        Anaesthetics
    P: 121
                                                                            C: 1230, 1231, 1243, 1249, 1258, 1261, 1263, 1265, 1347, 2569,
    E: 163
                                                                               2581, 2551, 3839, 3902, 3921, 3922, 3936, 3937, 3942, 4512.
— , — , other biological material
                                                                               4788, 4801, 4975, 4976, 4982, 5003, 5080
    C: 484, 486, 498, 499, 505, 508, 656, 1975, 1983, 1986, 1987,
                                                                            G: 347, 443, 930, 932, 1110, 1112, 1114, 1130, 1136, 1437.
       1996, 5084
                                                                               1523, 1835, 1837, 1840, 1857, 1864, 2161, 2215, 2450-2452,
    G: 338, 921, 1684, 1685, 2330, 2331
                                                                               2457, 2467, 2471, 2475, 2480, 2481
    P: 116, 123, 126, 529, 531
                                                                            P: 261, 404, 405, 573, 576, 755
    E: 158, 159, 172, 1028, 1502, 1672
                                                                            E: 630, 2500
--- , derivatives, dansyl and dabsyl
                                                                        Analeptics
    C: 88, 125, 479, 1980, 1990, 2854, 3268, 3284, 4532, 4553,
                                                                            G: 1079, 1841
       4555
                                                                        Androstane derivatives, techniques and theory
    P: 117, 120, 711
                                                                            C: 3200, 4474
    E: 91, 807, 1375, 2136
                                                                            G: 2282
  -, -, DNP and TNP
                                                                            P: 687
    C: 1976, 4294
                                                                        - , applications, non-biological
--- , --- , NBD
                                                                            E: 374
    C: 222
                                                                         – , — , biological
 — , — , OPA
                                                                            C: 405, 2525, 3203
    C: 485, 508, 512, 2038, 3263, 3269, 3286, 4524, 4535, 4556
                                                                            G: 869, 870, 1628-1631, 2279
    G: 1683
                                                                            P: 520, 521, 763
    E: 2043
                                                                        Anions, inorganic
— , — , PTH, PTC
                                                                            C: 1420-1435, 2758-2773, 4114-4130, 5145-5174
    C: 309, 482, 495, 506, 514, 525, 592, 601, 685, 715, 840, 1276,
                                                                            G: 553, 1244, 2539-2543
       1793, 1958, 1966, 1967, 1972, 1982(review), 1988, 1989,
                                                                            P: 448, 449
       2069, 2156, 3540, 4539, 4545, 4546, 4554, 4584
                                                                            E: 647-649, 1294-1298, 1973-1977, 2550-2559
   E: 162, 708, 808, 809
                                                                        — , — , techniques
— , — , other
                                                                            C: 30, 115, 1405, 1423, 1427, 1429, 1430, 1462(review), 1620,
   C: 83, 190, 465, 506, 802, 1660, 1949, 1962, 1966, 1967, 1970,
                                                                               1801, 2699, 2701, 2759-2765, 2767, 2769, 2771, 4082, 4094,
       1984, 2674, 3266, 3270, 3283, 3285, 3288, 3454, 4188, 4534,
                                                                               4108, 4112(review), 4114, 4116, 4118, 4122, 4124, 4130(re-
       4539, 4542-4544, 4548-4550, 4552
                                                                               view), 4209, 4262, 4362, 4368, 4926, 5089, 5091, 5094,
    G: 337, 1680, 2323, 2328, 2329, 2332
                                                                               5131(review), 5132, 5133, 5136, 5138, 5145, 5148, 5150-
    P: 11, 345, 706
                                                                               5154, 5157, 5159, 5160, 5162, 5163, 5165-5167, 5169, 5170,
   E: 9, 155, 157-159, 400, 401, 607, 682, 806, 1269, 2072
                                                                               5174
-, -, with a modified sulphur function
                                                                            G: 2539
   G: 924, 2326
                                                                            E: 642, 648, 1294, 1297, 1298, 1966, 1967, 1973, 1976,
 , iodinated
                                                                               1977(review), 2551, 2552, 2556-2559
   C: 515
                                                                           see also Halides and other inorganic halogen containing com-
   P: 119
                                                                            pounds; Nitrogen compounds, inorganic; Phosphorus com-

    unusual

                                                                            pounds, inorganic; Sulphur compounds, inorganic
   C: 93, 481, 492, 502, 506, 507, 509, 511, 1276, 1960, 1970.
                                                                        Anorexic compounds, see Appetite depressants
       1977-1979, 1981, 1985, 2352, 3150, 3161, 3261, 3265, 3267,
                                                                        Ansamycins (Rifamycins, Halomycins, Streptovaricin)
       3270, 3275, 3278, 3280, 3284, 3454, 4522, 4529, 4535, 4536,
                                                                           C: 2416, 3769, 5011
       4547, 4551, 4558
                                                                        Anthelmintics
   G: 920, 922, 1677
                                                                           C: 1031, 1273, 1278, 1282, 1342, 1978, 2612, 2823, 3950, 3962,
   P: 256
                                                                               5004, 5021
   E: 160, 1496, 1951, 1953, 2132
                                                                           G: 1844, 1848
Amino-glycosidic antibiotics (gentamycin, kanamycin, lincomycin, neo-
                                                                           P: 156, 198
   mycin, streptomycin, paromomycin)
                                                                           E: 676
   C: 1032, 2414, 2432, 3781, 4862, 5075
                                                                        Anthocyanes
   P: 731
                                                                           C: 231, 3050, 4330, 4904
   E: 1925, 2506
                                                                           G: 2196
Ammonia
                                                                        Anthracycline antibiotics
```

C: 1037(review), 1041, 1045, 1051, 1072, 1084, 1306, 2627.

4871, 4876

B498

P: 160, 374, 737	see also Coumarins
Anthraquinones	Anticonvulsants
C: 1112	C: 143, 1225, 1243, 1245, 1246, 1248, 1250, 1252, 1267, 1272,
P: 426, 469, 768	2550, 2565, 2575, 2577, 2582, 2583, 2590, 3899, 3915, 3936,
Anti-AIDS drugs see Antiviral agents	4251, 4981, 4999, 5000, 5002
Antialergic agents	G: 434, 1102, 1817, 1822, 2441
G: 868, 1116, 1842	P: 121, 192, 400, 401, 403, 407, 570, 576
Antianginal drugs	E: 163
C: 4966	Antidepressants
Antiarrhytmics 2522 2522 2542 2546 2862 2862 2874 2876	C: 1209, 1234, 1239, 1256, 1257, 1259, 1353, 2558-2560, 2574,
C: 1194, 1265, 2522, 2527, 2542, 2546, 3862, 3863, 3874, 3876,	3874, 3903, 3926, 3927, 3932, 3934, 4977, 4988, 4998
3885, 4964	G: 438, 1099, 1831, 1839, 2482
G: 1097, 1817, 2436	P: 196, 399
P: 757	Antidiabetics, oral C: 1256, 2650, 2673, 4003, 5045, 5046
Antiarteriosclerotics	P: 196
C: 3881, 4004	Antiemetics
G: 1127	C: 1235, 1260, 1322, 1332, 2556, 2576, 2651, 2655, 2661, 3898,
Antiarthritics, see Antirheumatics Antiasthmatics	3905, 3992
C: 1232, 1236, 1237, 1251, 1254, 2579, 2580, 2680, 3890, 3904,	P: 194, 195
3908, 3916, 4951, 4985	Antiepileptics, see Anticonvulsants
G: 429	Antifertility agents, see Contraceptives
E: 2046	Antifungal antibiotics
see also Antihistamines; Purine alkaloids	C: 1028, 1042, 1085, 2405, 2430
Antibacterials (antiseptics, desinficiens, etc.)	G: 2408, 2460
C: 1200, 1277, 1279-1281, 1283, 1285, 1286, 1289, 1293(re-	P: 155, 212, 373, 378, 545
view), 1294, 1295, 1338, 1730; 2461, 2600, 2603, 2605,	Anti glaucoma drugs
2614, 2616-2619, 2621, 2622, 2683, 2690, 3689, 3953-3956,	C: 2663
3959, 3994, 4975, 4976, 5023, 5024	Antihistamines
G: 1118, 1134, 1219, 1780, 1847, 1848, 2312, 2458	C: 1209, 1228, 2536, 2544, 2587, 2581, 3987, 4995, 5063
P: 197, 408, 409, 577, 725, 760	G: 432, 438, 1079, 1107, 1113, 1116, 1842, 2447, 2453, 2482
E: 1361, 2522	P: 566, 567
see also Antibiotics; Chemotherapeutics; Sulphonamides	E: 1358, 2519
Antibiotics	Antihypertensives, see Hypotensives and antihypertensives
C: 1028-1085, 2395-2432, 3760-3796, 4855-4879	Antiimmunodeficiency drugs, see Antiviral agents
G: 383, 384, 981, 982, 2377	Antiinflammatory agents, see Antirheumatics
P: 155-171, 372-379, 545-547, 729-738	Antimalarial drugs
E: 615, 1925-1927, 2505-2507	C: 1274, 1291, 2598, 3943, 3947, 3949, 3963, 3965, 5027
— , reviews and books	G: 1845
C: 1037, 1081, 1082, 2427	P: 362, 366, 413, 575
G: 383	E: 682, 1264
P: 240	Antimycotics
, general techniques	C: 2609, 2611, 2621, 4478, 4923
C: 1069, 1079, 2413, 3796, 3891	G: 446
G: 981	P: 569, 725, 760
E: 2527	see also Antifungal antibiotics; Fungicides
see also individual antibiotics groups	Antioxidants and preservatives
— phosphorus containing	C: 408, 1387-1392, 2718-2721, 4042, 4064, 4065, 5101, 5102
C: 2415	P: 223, 439, 440, 597-599, 777, 778
— , other groups	Antiparasitic drugs
C: 1029, 1031, 1035, 1057, 1067, 1078, 1080, 2398, 2400, 2402,	C: 1077, 1288, 1296, 2607, 2613, 2620, 2623, 3961, 5013, 5021,
2411, 2418, 2424, 2428, 2645, 3771, 3772, 3780, 3783, 3784,	5025
3787, 3794, 4879	see also Anthelmintics; Antimalarial drugs
G: 384, 1732	Antiparkinsonics
P: 134, 156, 166, 170, 377, 547, 733	C: 1222, 1233, 1269, 2593, 4989
E: 615	G: 1843
Anticoagulants	Antiprotozoal agents, see Antiparasitic drugs
C: 1198, 1207, 1210, 1218, 1265, 1324, 1336, 2667, 3865, 4008	Antipsoriasis drugs
G: 1125, 1536	C: 3745, 4009
E: 1251, 1267, 1361	

Antipyretics, analgesics

Azo and related compounds

G: 332, 1703

C: 1170, 1171, 1243, 1253, 1261, 1264, 1265, 2338, 2510, 2512, 2513, 2547, 2551, 2562, 2577, 2590, 2592, 2937, 3844, 3855, Bacteria, see Cells, viruses and microorganisms 3856, 3907, 3912, 3919, 3931, 3935, 4167, 4937, 5000 - , metabolites and taxonomy, see Cells, viruses and microorgan-G: 1079, 1083, 1101, 1695, 1836, 2429 isms, metabolites and taxonomical studies P: 135, 261, 362, 366, 407, 563, 564, 572 Barbiturates, see Anticonvulsants, Anaesthetics, Hypnotics Antirheumatics (antiinflammatory, antiarthritics) Barium, see Alkaline earths C: 91, 1168, 1169, 1171-1182, 1222, 1265, 1837, 1898, 2509-Bee venom, see Venoms, other 2521, 2548, 2984, 2985, 3278, 3850-3859, 3967, 4264, 4336, Beryllium, see Cations, inorganic, analytical group III 4471, 4477, 4935-4949 Bile acids and alcohols G: 438, 2428, 2482 C: 424-426, 1909-1915, 3210, 3211, 4486-4488 P: 245, 392, 394, 432, 562-565, 750-753, 772 G: 880, 1638, 1640 E: 626, 1942, 1943, 2520 P: 95, 330-332, 691, 692 Antisclerotics E: 605, 1492 C: 1057, 3866, 3888 Bile piaments G: 466 C: 942, 943, 1015 P: 166, 568 E: 1919 Antiseptics, see Antibacterials Biopolymers and their constituents, techniques Antitumor antibiotics E: 94, 1368 C: 1041, 1045, 1072, 1074, 1076, 2302, 2395, 2396, 3762, 3973, see also DNA; Enzymes; Proteins; RNA 4855, 4877 Biotin, see Vitamins, biotin group G: 2461, 2465 Biphenyl and derivatives P: 157, 372 C: 116, 3019, 4309, 4310, 4885 E: 1927 G: 143, 205, 208, 213, 218, 219, 470, 505, 617, 715, 748, 751, Antitussives 753-755, 762, 768, 769, 1008, 1409, 1412, 1479, 1484, 1488-C: 2557, 3931, 4022, 4802, 4973 1492, 1494-1498, 1501, 1751, 1814, 2026, 2143, 2144, 2146, G: 451, 1085, 1124, 1126 2147, 2152, 2155-2157, 2165 E: 2524 Bismuth, see Cations, inorganic, analytical group I and Ila Antiulcer compounds Bitter substances C: 1179, 1226, 1319, 1339, 2615, 2649, 2654, 2659, 3909, 3920, C: 3217, 3218, 4498 3933, 3987, 4987 P: 435 E: 628 α-Blocking agents, see Adrenergic and adrenergic blocking agents see also Antihistamines β-Blocking agents, see Adrenergic and adrenergic blocking agents Antiviral agents Boranes and derivatives of boric acid C: 963, 1287, 1290, 1298, 1326, 1337, 2405, 2596, 2601, 2602, C: 3025 2604, 2608, 2669, 3787, 3945, 3946, 3948, 3958, 3964, 4776, G: 83 5005, 5010, 5017, 5020, 5022, 5028, 5049, 5051, 5065, 5071 F: 1923 G: 1846, 2109 Bronchodilators P: 373 C: 1200, 3890, 4951, 4992 E: 676, 1263 E: 2046 Appetite depressants see also Antiasthmatics C: 1256, 4010 P: 196 stimulants C G: 1854, 1867 Arsenic, see Cations, inorganic, analytical group IIb Cadmium, see Cations, inorganic, analytical group I and IIa -- , organo-compounds Caesium, see Alkali metals C: 984, 4826 Calciferols, see Vitamins, D group G: 1959 Calcium, see Alkaline earths Asphalts, see Coal, tar and bitumens, hydrocarbons in Calcium antagonists Aza heterocyclics C: 1187, 1206, 1214, 1219, 2530, 2538, 2541, 3871, 3879, 3884, G: 833 3889, 4950, 4957, 4960 **Azides** G: 428, 1084, 1829, 2433 C: 1425

В

F: 1944

Carbamates, see Pesticides, carbamates

Cannabis constituents, see Hallucinogens (inclusive cannabis constitu-

BIBLIOGRAPHY SECTION

Carbazoles

G: 1694 P: 540 Carbohydrates (including glycoproteins) C: 248-322, 1740-1794, 3063-3132, 4355-4398 G: 261-266, 812-818, 1566-1580, 2220-2224 P: 39-44, 270-275, 470-473, 638-643 E: 104-127, 755-771, 1442-1467, 2080-2095 reviews C: 1, 4, 142, 251, 256, 273, 276, 4370 G: 1570, 1886 E: 109 --- , general theory and techniques C: 117, 134, 151, 255, 259, 260, 262, 263, 265, 267, 269, 277, 278, 301, 1746, 1794, 2910, 3064-3066, 3068, 3074, 3075, 3077, 3079-3082, 4194, 4355, 4362, 4364, 4368, 4369, 4373, 4389 4513 G: 1383, 1577 P: 640, 687 E: 107, 108, 111, 114, 755, 1442-1447, 1459, 2015 -, applications, non-biological C: 249, 266, 980, 1745, 1757, 1761, 1764, 4194, 4358 G: 1572, 1578 P: 44 -, - , food products C: 253, 261, 265, 1368, 1741, 1742, 1750, 1752, 1755, 2693, G: 265, 267, 1567, 1573 E: 755 – , –– , microorganisms C: 271, 613, 776, 1744, 3066, 3070, 3084, 4357 G: 262, 813, 815, 1570, 1571 P: 39, 43 -- , ---- , plants C: 253, 264, 1703, 1747, 1750, 1762, 3063, 4363 G: 1575 P: 470, 585, 639 ...,, animal material C: 257, 258, 285, 313, 314, 642, 768, 816, 897, 974, 1749, 1751, 1756, 1759, 1761, 1763, 1785, 1787, 1855, 2308, 3069, 3073, 3088, 3091, 3095, 3131, 4194, 4356, 4359 G: 261, 266, 1569, 1574, 1576, 2222 P: 41, 42, 75, 150, 270, 274, 289, 471 E: 115 -, derivatives, acids and lactones C: 1768, 3078, 3154 E: 105 --- , ---- , alcohols C: 248, 285, 1754 G: 1143 , — , amino sugars C: 278, 285, 313, 816, 1751, 1759, 1761, 1763, 1769, 1771, 1785, 3069, 3088, 3091, 3095, 3131, 4532 P: 39, 42, 270, 274, 471

E: 115, 116, 125, 1443, 2082 see also Glycosaminoglycans

- , --- , deoxy

P: 471

C: 258, 3072, 3088

```
Carbohydrates, derivatives, methylated
    G: 1568, 2223
  -, —, phosphates, see Phosphorus compounds, organic
 – . — . other
    C: 291
    G: 264, 1928, 2221
Carbon
    G: 2529
— oxides
    G: 538, 555, 585, 629, 729, 1246, 1955, 1962, 2053, 2087
Carbonyls, see Oxo compounds
Carboxylic acids
    C: 323-356, 1795-1840, 3133-3169, 4399-4430
    G: 267-287, 819-854, 1581-1611, 2225-2257
    P: 45-50, 277-281, 474-484, 644-651
    E: 128-133, 772-774, 1468-1470, 2096-2098
 -, reviews and books
   C: 1835, 3153
   G: 1583
   P: 280
--- , general techniques and theory
   C: 222, 323, 324, 332, 336, 338, 339, 341, 342, 345, 517, 1612,
       1663, 1801, 1804, 1806, 1808-1810, 1822, 1824, 1831, 1832,
       2674, 2760, 2969, 3141, 3144, 3145, 3149, 3151, 3154, 3155,
       3157, 3162, 3163, 4127, 4166, 4368, 4400, 4401, 4403, 4406,
       4408, 4410, 4413, 4415, 4418-4420, 4425, 4426, 4429, 4892,
       5103, 5136, 5145, 5174
    G: 850, 1598, 2232, 2234, 2237
    P: 49, 337, 458, 476, 478, 479, 644, 645, 777
    E: 129-131, 133, 635, 772, 773, 1468, 2096, 2551, 2552
- , higher fatty acids
    C: 324, 327, 328, 331, 335, 340, 345, 346, 348, 349, 352, 354,
       358, 559, 692, 749, 754, 992, 1739, 1799, 1805, 1811, 1812,
       1814-1816, 1819, 1825, 1826, 1828, 1833, 1834, 1836, 1838-
       1840, 1853, 1859, 2433, 3135, 3142, 3143, 3152, 3156, 3159,
       3160, 3164, 3182, 4404, 4405, 4411, 4412, 4416, 4417, 4424,
       4430, 4434, 4470
    G: 278, 1581, 1916, 2240, 2249, 2252, 2273
   P: 10, 46, 49, 79, 83, 269, 278, 281, 288, 292, 294, 305, 475,
      481, 483, 497, 646, 647, 650, 651, 655
--- , --- , simple esters
   C: 222, 328, 347, 349, 351, 376, 1795, 1803, 1823, 3134, 3136,
       4399, 4423
    G: 18, 269-271, 274, 280, 281, 283, 287, 603, 651, 820, 822,
       825, 830, 835-838, 841, 845, 849-851, 854, 1149, 1158,
       1379, 1585, 1589, 1598, 1599, 1604, 1609, 1638, 1639, 2226,
       2241, 2250, 2255, 2269, 2273
    P: 64, 474, 484, 648
-, lower fatty acids
    C: 115, 342, 351, 2693, 3140, 3169
    G: 55, 100, 271, 761, 767, 827, 831, 839, 848, 1581, 1582, 1586,
```

2242, 2244

- , non-volatile, techniques

G: 282, 1058, 1594 P: 28, 482

E: 2097

C: 3155, 3166-3168, 4409, 4427

Carboxylic acids, non-volatile, applications C: 333, 334, 337, 339, 343, 350, 485, 1796, 1797, 1813, 1818, 1829, 2693, 3139, 3067, 3158, 3165, 3150, 4402, 4427, 4428

G: 148, 284, 335, 338, 465, 829, 843, 847, 1236, 1592, 1603, 1611, 1626, 1876, 2198, 2484

E: 131, 774, 1469

__ , __ , lactones

G: 1269, 1379, 1433, 2096

--- , oxo acids

C: 326, 1812, 3161

G: 464, 824, 840, 842, 846, 1587, 1588, 1593, 1605, 1606, 1684, 2239, 2272

- , cyclic acids, techniques and theory

C: 24, 59, 103, 330, 355, 1927, 3133, 3137, 3138, 3148, 3782, 4242, 4422, 4425

G: 272, 834, 1591

P: 47, 477, 623

E: 128, 132, 626, 1470, 2098

— , — , applications, non-biological

C: 325, 329, 356, 1320, 4402

G: 279, 535, 819, 1514, 1665, 2234, 2236, 2253, 2265, 2523

P: 29, 45, 50, 279

E: 128, 736

__ , __ , __ , microorganisms

C: 1807

G: 273, 464, 821, 823, 832, 844, 1571, 1601, 1609, 1626, 2228, 2229, 2239

E: 2511

__ , __ , __ , plants

C: 344, 1717, 1798, 1820, 1821, 1827, 1835(review), 3050, 3147, 4053

G: 460, 838, 1591, 1597, 1650, 2247, 2256

P: 48, 280(review), 480

---, ---, animal material

C: 353, 1800, 1830, 1837, 3241, 4414, 4421, 4833

G: 258, 1596, 1608, 1610, 1639, 2231, 2233, 2243, 2248

P: 114, 277

- , - , - , food products

C: 1706, 1802, 1820, 1824, 1827, 1831, 3138, 3146, 5087

G: 268, 278, 472, 486, 828, 851-853, 1584, 2225, 2227, 2230, 2235, 2238, 2251, 2254, 2257, 2411

see also Food analysis

Cardiac depressants

C: 3874, 4954

Cardiac glycosides, techniques

P: 243, 335

- - , applications, non-biological

C: 4490, 4491

P: 525

— , — , biological

C: 431, 1925, 4492

Cardiotonics (cardiostimulants)

C: 1206, 1221, 2542, 3877, 3878, 3887

G: 2434

P: 431

Catechins and tannins, see Tannins

Catecholamines, reviews

C: 3242

--- , techniques

C: 36, 70, 463-467, 472, 1947-1950, 2674, 3148, 3239, 3243,

3245, 3246, 3254, 4512-4514

P: 687

E: 2129

Catecholamines, applications

C: 462, 464, 467-471, 473, 1204, 1944-1946, 1950, 1951, 3238, 3240, 3241, 3244, 3247, 3249, 3252, 3253, 3255, 4507-4510,

P: 114, 422, 699

E: 740, 2138

- , metabolites

C: 470, 464, 1233, 1950, 3239, 3241, 3244, 3249, 3255, 4511

G: 330

P: 277, 343

Cations, inorganic

C: 1398-1419, 2730-2757, 4080-4113, 5108-5144

P: 224-229, 442-447, 605-609, 779-785

E: 641-646, 1287-1293, 1966-1972, 2542-2549

__ , __ , reviews and books

C: 156, 222, 1365, 1418, 2731, 2756, 4086, 4097, 4112, 5131, 5137

P: 443, 605

—, —, techniques

C: 71, 1404, 1405, 1409, 1413, 1412, 2699, 2701, 2732, 2734-2736, 2741, 2746, 2748, 2750, 2752, 2757, 2760, 2761, 2764, 2942, 3726, 4080-4082, 4090, 4094, 4098, 4103-4106, 4108, 4113, 4186, 4190, 4202, 4238, 4262, 5089, 5112, 5114, 5116, 5119, 5121, 5126, 5127, 5130, 5133, 5136, 5138, 5141, 5143, 5154, 5170, 5174

G: 2033

P: 227, 228, 445, 609, 610, 779, 781, 785

E: 641-643, 645, 646, 707, 1288, 1289, 1291, 1292, 1415, 1416, 1966-1968, 1970, 1973, 2504, 2544, 2546-2548, 2550, 2559

—, —, analytical group I and IIa (Ag, Bi, Cd, Cu, Hg, Pb, Pd, Tl)

C: 1399, 1412, 1419, 2733, 2740, 2751, 3722, 4085, 4088, 4101, 5115, 5120, 5126, 5129, 5135, 5141, 5142

G: 2358, 2359

P: 224, 229

E: 1293, 1971

---, ---, analytical group IIb (As, Mo, Sb, Se, Sn, Tc, Te, V, W)

C: 984, 1400-1402, 1406, 1412, 1430, 1540, 1550, 2737, 2739, 2742, 2744, 2747, 2753, 2754, 3725, 4084, 4086(review), 4087, 4095, 4107, 4109, 4111, 5110, 5113, 5117, 5122

G: 2461

P: 224, 442, 605(review)

E: 1971, 2542

..., ..., analytical group III (Al, Be, Co, Cr, Fe, Ga, Mn, Nb, Ni, Ta, Th, Ti, Zn, Zr)

C: 653, 1399, 1403, 1412, 1414, 1419, 2075, 2706, 2709, 2751, 2754, 2755, 4088, 4089, 4102, 4107, 5111, 5115, 5118, 5123, 5125, 5126, 5134, 5135, 5140-5142, 5170

G: 379, 972, 1301, 1728

P: 224, 226, 442, 447, 608, 727, 782, 783

E: 1287, 1293, 1924, 1969, 1971, 2545

see also Actinides and uranium; Alkali metals; Alkaline earths; Platinum metals and gold; Rare earths

Cells, viruses and microorganisms

C: 1397, 2727, 2728(review), 4070, 4072-4074, 4078, 5106

G: 823

E: 1281, 1285, 1965, 2538-2540

```
Cells, viruses and microorganisms, metabolites and taxonomical
                                                                                4469, 4508, 4518, 4519, 4537, 4540, 4643, 4668, 4671, 4673.
    studies
                                                                                4685, 4686, 4708, 4743, 4803, 4836, 4853, 5084, 5139
    G: 583, 813, 815, 1240
                                                                             G: 1466, 2351
Cellulose acetate see Polysaccharides and their constituents
                                                                             P: 40, 54, 82, 121, 145, 201, 277, 327, 343, 393, 406, 481, 539,
Cephalosporins
                                                                                576, 641, 668, 681
    C: 1030, 1044, 1061, 1064, 1065, 1073, 1498, 2401, 2407, 2412,
                                                                             E: 39, 117, 135, 139, 140, 145, 148, 163, 280, 285, 287, 288,
       2425, 3760, 3765, 3775, 3776, 3795, 4856, 4857, 4859, 4861,
                                                                                292, 312, 345, 362, 388, 399, 407, 416, 417, 426, 504, 509.
       4867
                                                                                552, 555, 573, 591, 592, 633, 779, 784, 786-788, 794, 795,
    P: 243, 729
                                                                                798, 802, 817, 916, 926, 931, 933, 1030, 1047, 1054, 1068,
    F: 2507
                                                                                1070, 1085, 1159, 1232, 1239, 1269, 1480, 1484-1486, 1490.
Ceramides, see Sphingolipids
                                                                                1625, 1629, 1729, 1737, 1745, 1761, 1826, 1880, 1898, 1904,
Cerebrosides, see Sphingolipids
                                                                                1905, 2083, 2104, 2111, 2112, 2114-2116, 2118, 2120, 2121,
Chalcones
                                                                                2131, 2144, 2243, 2251, 2260, 2282, 2291, 2318, 2332, 2333.
    C: 5113
                                                                                2365, 2370, 2472, 2475, 2486, 2494, 2543
Chelates, see Coordination compounds
                                                                             see also individual categories of endogenous compounds
Chemotherapeutics
                                                                         -, reviews and books
   C: 1276
                                                                             C: 491, 510, 4043
   G: 1414
                                                                             G: 2341
   see also Sulphonamides
                                                                             P: 454
Chloramphenicol and related compounds
                                                                             E: 72, 1380, 1956, 2516
    C: 1068, 3219, 3786, 3788
                                                                          -- , profiling body fluids
    G: 383, 1733, 2377
                                                                             C: 3074
   E: 1926
                                                                             G: 325, 441, 583, 780, 824, 826, 840, 911, 927, 946, 1144,
Chloroplast pigments
                                                                                1146-1149, 1152, 1154, 1223, 1292, 1328, 1558, 1569, 1588,
   C: 1114, 1115, 1118, 2463-2467, 2469, 2470, 3824, 3829, 4905
                                                                                1592, 1594, 1599, 1628, 1629, 1638, 1677, 1688, 1692, 1701,
                                                                                1712, 1837, 1858, 1871, 1872, 1874-1877, 2060, 2088, 2119.
Choline and derivatives
                                                                                2178, 2219, 2237, 2242, 2243, 2248, 2260, 2278, 2282, 2484,
   C: 478, 1852, 1941, 1954, 2350, 2363, 3245, 4519
                                                                                2485
                                                                         Coal analysis
Cholinergic and cholinergic blocking substances
                                                                             C: 1692, 1693, 4318
   C: 1271, 2561, 2564, 2568, 2672, 3860, 3901, 4967, 5062
                                                                             G: 537, 617, 1210, 1214, 1273, 1408, 1509, 1932, 1938, 1950,
   G: 970, 1134
                                                                                1994, 2531, 2533
   P: 398
                                                                         Coal tar and bitumens, hydrocarbons in
   see also Myorelaxants
                                                                             C: 199, 1677
Chromium, see Cations, inorganic, analytical group III
                                                                             G: 193, 532, 550, 738, 1486, 1703, 2130
Chromones
                                                                             P: 467, 745
   C: 239
                                                                         Cobalamins, see Vitamins, B<sub>12</sub> group
   P: 35
                                                                         Cobalt, see Cations, inorganic, analytical group III
Chromoproteins and metalloproteins
                                                                         Coccidiostatics
   C: 492, 644, 652-656, 658-670, 2108, 2149-2162, 2212, 3446,
                                                                             C: 2421, 3944
      3467-3469, 3471-3478, 3501, 4623, 4666-4674, 5114
                                                                         Colchicum alkaloids
   E: 310, 312, 313-318, 912, 958-968, 1566, 1654-1660, 2257-
                                                                             C: 920
      2263, 2327
                                                                         Contraceptives

    , structural studies

                                                                             C: 2653, 3989, 5056
   C: 562, 574, 657, 2037, 3470, 3475, 4598, 4669
                                                                             G: 871
   E: 310, 311, 836
                                                                            see also Steroids
Cinchona alkaloids
                                                                         Coordination compounds
   C: 1265, 2522, 3677
                                                                             C: 985-988, 2073, 2365-2370, 2706, 2735, 3724-3727, 4080,
Clinico-chemical applications (endogenous compounds in body fluids)
                                                                                4083, 4099, 4104, 4134, 4178, 4827, 4900, 5114, 5119, 5170
   C: 258, 286, 306, 318, 324, 342, 350, 351, 353, 382, 396, 398,
                                                                             G: 973, 1730
      409-411, 415, 425, 455, 464, 470, 480, 481, 485, 504, 507-
                                                                             P: 544, 727, 784
      509, 515, 517, 547, 631, 644, 664, 788, 821, 827, 838, 884,
                                                                             E: 610, 1924, 2504
      889, 892, 939, 943-945, 956, 979, 993, 1006, 1011, 1023,
                                                                            see also Amino acids, metal complexes
      1344, 1395, 1756, 1779, 1817, 1825, 1858, 1885, 1887, 1888,
                                                                          reviews
      1914, 1968, 1972, 1975, 1983, 2014, 2022, 2123, 2138, 2150,
                                                                            C: 2731
```

E: 609, 1959

Copper, see Cations, inorganic, analytical group Ila

Coronar vasodilatans, see Vasodilatans

2192, 2261, 2272, 2310, 2372, 2382, 2392, 2628, 2674,

2686-2688, 3071, 3072, 3142, 3164, 3165, 3184, 3196, 3197,

3210, 3211, 3228, 3244, 3255, 3265, 3278, 3282, 3284, 3286,

3430, 3437, 3449, 3474, 3498, 3550, 3564, 3615, 3689, 3690, 3747, 3753, 4044, 4360, 4421, 4427, 4460, 4463-4465, 4467,

Cosmetics C: 1014, 1320, 1388, 2658, 4532, 5069 G: 2183 E: 805 Coumarins C: 1210, 1252, 2682, 3051, 3865, 4347, 4800 G: 1536, 2195, 2198 P: 265, 279, 468, 637 Crude oil and petroleum analysis C: 199, 219, 221, 967, 1678, 1694, 3021(review), 4221, 4222, 4312-4314, 4316(review), 4317 G: 143, 775, 1230, 1503, 1507, 1510, 1511, 1713, 2174, 2189, 2234, 2318, 2353, 2534, 2537 P: 631, 632(review) see also Hydrocarbons, complex mixtures Cyanates, see Halides and other inorganic halogen compounds Cyanides, see Halides and other inorganic halogen compounds Cyanogenic glycosides C: 1955, 3063 P: 115, 470 Cytostatics C: 1032, 1037, 1275, 1299-1318, 1350, 1953, 2302, 2329, 2379, 2402, 2514, 2624-2648, 2655, 2684, 3300, 3762, 3957, 3966-3983, 4496, 4774, 4776, 4855, 5029-5044 G: 350, 957, 1120, 1122, 1849-1851 P: 18, 202, 203, 410 F: 1949 see also Antitumor antibiotics; Purines, analogues of purines, pyrimidines, nucleotides, nucleosides D Desinficiens, see Antibacterials Detergents, see Surfactants, emulsifiers and detergents Diagnostics C: 1323, 1985, 3901, 5059 G: 1148 E: 630 Diazines C: 952 G: 2343, 2344 Dioxans and dioxins C: 217 G: 56, 246, 249, 250, 797, 798, 801, 805, 1198, 1412, 1484, 1540-1542, 1544-1553, 1555, 1814, 2207, 2352 Disulphides P: 759 Disulphones and polysulphones C: 1138 Diuretics C: 1188, 1190, 1192, 1193, 1213, 1222, 1898, 2333, 2403, 2522, 2540, 2545, 2652, 2671, 2963, 3868, 3985, 3986, 3991, 4007, 4025, 4962, 5057, 5058 E: 631, 2521, 2525 DNA, reviews C 904 907 E: 456, 462, 468, 484, 495, 498, 503, 506, 507, 528, 533, 535, 538, 541, 543, 1171, 1176, 1823, 2447, 2481

```
DNA, techniques
   C: 593, 893, 902, 905, 2316, 2319, 2322-2325, 3667, 3668,
   P: 133, 712
   E: 221, 257, 309, 449, 452, 486, 487, 490, 492-494, 496, 497,
       501, 508, 510, 512, 513, 516-518, 520, 522, 523, 525, 527,
       530-532, 537, 540, 542, 857, 1165, 1166, 1169, 1170, 1172,
       1173, 1179, 1183, 1186, 1187, 1189, 1190, 1193-1195, 1198,
       1201, 1202, 1207, 1308, 1310, 1371, 1436, 1535, 1797, 1824,
       1827-1829, 1831-1834, 1837, 1838, 1840-1842, 1845-1847,
       1849, 1850, 1852, 1854, 1855, 1857, 1858, 1860-1862, 1866,
       1867, 1874, 1875, 1904, 1905, 2006, 2027, 2448-2452, 2457,
       2458, 2463-2465, 2467, 2476
—, applications, non-biological
   C: 689, 906, 2327, 3667, 3671
   E: 255, 463, 472, 488, 491, 499, 505, 514, 521, 536, 1142, 1145,
       1150, 1151, 1157, 1167, 1168, 1174, 1175, 1177, 1178,
       1180-1182, 1185, 1199, 1224, 1779, 1780, 1812, 1825, 1830,
       1839, 1843, 1844, 1851, 1889, 2219, 2429, 2431, 2453-2455,
       2459, 2461, 2469, 2466
--- , --- , microorganisms
   C: 906, 2326, 3669, 3670
   E: 499, 500, 502, 519, 1191, 1192, 1196, 1206, 1853, 1856,
       1864, 2460, 2462, 2468
— , — , plants
   E: 521, 526, 2470
— , — , animal material
   C: 689, 903, 908, 909
    E: 485, 489, 504, 509, 511, 515, 524, 529, 534, 536, 539, 555,
       591, 592, 875, 1141, 1182, 1184, 1188, 1197, 1200, 1203-
       1205, 1213, 1224, 1232, 1749, 1798, 1801, 1826, 1835, 1836,
       1848, 1859, 1863, 1865, 1880, 2411, 2448, 2456, 2471
- , structural studies
    C: 203, 910(review), 911(review), 912-916, 2328, 3673, 3674,
       4787
    G: 928
    E: 282, 448(review), 505, 516, 548-553, 554(review), 555-557,
       558(review), 559-561, 562(review), 563-580, 581(review), 582-
       587, 588(review), 589-599, 1159, 1184, 1197, 1205, 1209,
       1210(review), 1211-1242, 1490, 1574, 1825, 1826, 1837,
       1844, 1858, 1870, 1871(review), 1872-1913, 2159, 2333,
       2455, 2470, 2472-2480, 2481(review), 2482-2496
- , complex mixtures of DNA and RNA and DNA-RNA hydrids
    C: 3675, 4619
    E: 600, 1243, 1914
Drug monitoring and pharmacokinetics studies, reviews and books
    G: 322, 449, 1115, 1812, 2426, 2427
    see also individual categories of drugs
Drugs of abuse (general papers)
    C: 917, 4013, 4788, 4930
    G: 1131, 1135, 2425, 2442, 2462, 2463, 2472, 2473, 2476, 2479
    P: 538, 582, 713, 767
    see also individual categories of drugs
```

C: 617, 1321, 1326, 1327, 1332-1335, 1340, 1341, 1830, 2531,

4002, 5047, 5050, 5061, 5070

G: 1115, 1123, 1747, 1852, 1856, 2091, 2461

2656, 2657, 2660, 2663-2665, 2668, 2670, 3201, 3990, 3996,

, other

P: 206, 266, 412

E: 1950, 2239, 2523

Drugs, synthetic, see Pharmaceutical applications and individual types	Ephedra alkaloids
of drugs	C: 4935
Dyes, natural, see Pigments, natural	P: 358, 365
Dyes synthetic, reviews	E: 1244, 1915
C: 4705, 4901	Epoxides
— , theory and techniques	C: 222, 237, 3054
C: 3820, 4902, 4903	G: 693, 2210
P: 185, 602, 741, 745	P: 281
E: 616, 1252, 1343, 2513	Epoxy resins
, applications	G: 1075, 1790, 1793, 2415
C: 2462, 3821, 3822	Ergot alkaloids
G: 158 D: 193 195 394 395 743 743	C: 921
P: 183, 186, 384-386, 742, 743 E: 2016	E: 603
	Essential oils
see also Food dyes; Textile dyes (including bleaching agents)	C: 3216, 4497
	G: 88, 308, 310, 313-316, 318-321, 469, 470, 883, 895, 896
	898-904, 906-908, 1139, 1141, 1167, 1172, 1358, 1403
E	1425, 1439, 1454, 1647-1650, 1652-1656, 1658-1661, 1663
	1869, 1870, 2289, 2295, 2296, 2298-2305, 2483
Ecdysones and other insect hormones of steroid nature	P: 339, 526, 695
C: 427, 1916, 1917, 1918(review), 1919, 3212, 4489	Ethers, aliphatic ethers
G: 881	C: 222, 3161, 4913
P: 96, 333, 334(review)	G: 109, 627, 1205, 1235, 1561, 1563, 1565, 2215, 2216
E: 1493	P: 239(review)
Elemental analysis (including functional group analysis)	— , cyclic ethers
G: 1411	C: 222, 4178, 4352
Endorphins, enkephalins and their analogues	G: 1412, 1430, 2006, 2210, 2212, 2216
C: 535, 1995, 2007, 2015, 2028, 2032, 3310, 4565, 4570, 4574	P: 239(review), 747
E: 810, 1503, 1510, 2146	Expectorants
Environmental analysis (general papers)	C: 1185, 1205, 2562, 3897, 5052
C: 116, 212, 1430, 1531, 2699, 2937, 3006, 4885, 5024, 5085,	E: 1266
5132	Explosives
G: 501, 1905	C: 3220, 3222, 4500
P: 255, 419	G: 94, 323, 1405, 2308, 2310
— , — , reviews and books	P: 108, 519
C: 955, 1105, 1373, 1374, 2676, 4054, 4055, 4259, 4883, 5088	E: 1494
G: 1968	
E: 88, 2532	
Enzymes (including activity measurement)	F
C: 726-870, 2197-2300, 3521-3639, 4701-4771	•
P: 710, 711	Ferrocenes
E: 371-445, 1037-1129, 1714-1789, 2325-2399	C: 1552, 3723
, general techniques and reviews	G: 376
C: 603, 1503, 2242, 3380, 3521, 4701, 4736	Flame retardants
P: 454	G: 543
E: 198, 215, 222, 371, 372, 431, 1038-1040, 1714, 2325	Flavins, see Vitamins, B and other flavins
, activity measurement	Flavonoids and γ-pyrone derivatives
C: 736, 772, 788, 827, 2253, 2274-2276, 2298, 3564, 3635,	C: 182, 232, 1354, 1709-1719, 2682, 3037-3046, 4333-4338,
4701(review), 4717	4800, 5081
G: 2355	G: 792, 793, 1543, 2196, 2197, 2200
P: 683	P: 33, 260, 261, 363, 635, 636, 769
E: 381, 436, 900, 1037, 1095, 1111, 1780, 2105(review), 2338,	E: 100, 634, 1441, 2079
2381	Flavours, volatiles, odours, see Organoleptics
, complex mixtures and uncompletely defined enzymes	Fluorinated antibiotics
C: 870, 2299, 2300, 3636-3639, 4771	C: 2403, 2408
E: 445, 1127-1129, 1785-1789, 2394-2399	Folic acid and other pteridine derivatives
see also individual categories of enzymes	C: 995, 1009, 1018, 2379, 2387, 2628, 2665, 3731, 3738, 3967,
	4848, 4833
	P: 368

Food analysis

- C: 157, 168, 238, 255, 261, 265, 292, 332, 333, 338, 339, 365, 368, 372, 375, 390, 419, 420, 482, 674, 676, 923, 926, 954, 959, 989, 991, 993, 1002, 1007-1009, 1017, 1025, 1038, 1068, 1098, 1106, 1116, 1199, 1200, 1283, 1286, 1297, 1328, 1356, 1366-1368, 1370, 1371, 1421, 1422, 1429, 1432, 1433, 1608, 1701, 1712, 1722, 1728, 1736, 1741, 1742, 1745, 1750, 1752, 1755, 1776, 1777, 1797, 1801, 1802, 1804, 1813, 1818, 1824, 1831, 1881, 1894, 1899, 1905, 1906, 1933, 1936, 1937, 1997, 2016, 2099, 2342, 2374, 2381, 2385, 2387, 2390, 2408, 2421, 2422, 2439, 2447, 2450, 2457, 2460, 2597, 2599, 2617, 2689-2693, 2695, 2697, 2698, 2769, 2770, 2848, 3017, 3035. 3038, 3039, 3041, 3048, 3059, 3085, 3138, 3139, 3146, 3168, 3174, 3179, 3183, 3219, 3232, 3253, 3274, 3281, 3482, 3484, 3485, 3636, 3695, 3739, 3746, 3768, 3805, 3786, 3798, 3950-3953, 3960, 4021, 4039, 4048-4052, 4084, 4117, 4119, 4124, 4345, 4369, 4400, 4401, 4406, 4426, 4429, 4452, 4479, 4846, 4865, 4868, 4874, 5009, 5024, 5026, 5085, 5101, 5154, 5164, 5172
- G: 203, 205, 208, 211, 217, 240, 304, 372, 392, 395, 396, 407, 412, 413, 467, 468, 471, 472, 476, 477, 483, 485, 491-493, 496, 689, 744, 745, 758, 782, 807, 810, 822, 830, 841, 859-862, 873, 874, 878, 879, 888, 910, 963, 975, 989, 995, 996, 1002, 1008, 1010, 1011, 1020, 1025, 1028, 1049, 1050, 1151, 1155, 1157, 1158, 1160, 1163, 1164, 1166, 1168-1170, 1173, 1175, 1178, 1179, 1181, 1186, 1243, 1311, 1442, 1464, 1478, 1484, 1515, 1537, 1581, 1584, 1611, 1615, 1616, 1618, 1620, 1622, 1624, 1636, 1641, 1651, 1670, 1691, 1714, 1737, 1738, 1743, 1753, 1760, 1762, 1765-1767, 1769, 1778, 1785, 1800, 1873, 1878, 1880-1882, 1885, 1887-1892, 1898, 1902, 1962, 2003, 2144, 2147, 2157, 2165, 2208, 2213, 2220, 2224, 2227, 2257, 2266, 2267, 2276, 2285, 2344, 2347, 2366, 2369, 2379, 2386, 2390, 2399, 2409, 2413, 2486-2490, 2494-2496, 2498, 2499, 2540
- P: 34, 49, 115, 142, 154, 179, 197, 262, 263, 279, 329, 528, 555-557, 599, 674, 735, 736, 743-746, 763
- E: 130, 131, 257, 270, 301, 319, 613, 634, 635, 644, 647, 755, 772, 974, 1273, 1469, 1916, 1957, 1958, 2079, 2140, 2479

--- , reviews

C: 364, 377, 1105, 1360-1365, 1369, 1424, 2694, 4045-4047,

see also Antioxidants and preservatives; Medicated feeds; analysis of individual food constituents

Food dves

- C: 255, 1369(review), 2460, 4705(review)
- P: 184, 741, 743, 744
- E: 1928

Fullerenes

- C: 98, 100, 201, 202, 207-209, 213, 216, 1682-1685, 2980, 3004(review), 3005, 3011, 3015, 3016, 4298, 4302, 4307
- G: 181, 1354, 1480

Fumigants

G: 777, 1475

Fungicides

- C: 1094, 2451, 2452, 2461, 3798, 3818, 4898
- G: 412, 719, 756, 788, 1015, 1043, 1048-1050, 1156, 1779, 1781, 2516
- P: 179
- E: 2512

Furans

- C: 222, 238, 1728, 1729, 3219, 4348
- G: 244, 251, 730, 803
- E: 617

Furocoumarins

- C: 4349
- G: 247

G

Gallium, see Cations, inorganic, analytical group III Gangliosides, see Sphingolipids

Gases

- C: 1439, 4131
- G: 132, 475, 538, 554, 556, 557, 584, 588, 614, 629, 638, 647, 655, 729, 730, 1221, 1227, 1228, 1239, 1245, 1248, 1251, 1254, 1275, 1314, 1317, 1318, 1335, 1349, 1354, 1363, 1377, 1460, 1911, 1957, 1958, 1961, 1963, 1964, 2021, 2097, 2116, 2544, 2546

Gibberelins

- C: 2346(review)
- G: 349, 940
- see also Indoles

Glucosinolates

C: 960, 2682

Glycerides, simple

- C: 366, 387, 3175
- G: 277, 291, 292, 860, 863-865, 1243, 1602, 1621-1623, 2264-2266, 2269, 2271, 2273-2276
- P: 52, 56, 68, 83, 323, 517

see also Carboxylic acids; higher fatty acids, simple esters Glycolipids

C: 367, 370, 392, 3178, 3495

- P: 53, 59, 60, 75, 77, 80, 85, 295, 298, 316, 318, 485, 487, 490, 494, 498, 500, 501, 505, 662, 680, 683
- see also Phospholipids; Sphingolipids

Glycols and polyols

- C: 82, 1145, 2483, 3074, 4320, 4321
- G: 782, 1517, 1799
- E: 97, 752, 754, 2077

Glycoproteins and glycopeptides, techniques

- C: 250, 315, 1780(review), 1786-1788, 1794, 3128, 3322, 4386, 4503, 4593
- E: 109(review), 119, 121, 125, 127, 762, 770, 1452, 1455, 1457, 1458, 1461, 2091
- , applications, non-biological
 - C: 1782, 3106, 3123
 - E: 123, 764, 765, 767, 1463, 1464, 1694, 2086, 2092, 2094, 2095
- __, __, microorganisms
 - C: 309, 317, 4382, 4387, 4390, 4391, 4638
 - E: 126, 127, 881, 1466, 2088, 2089, 2093, 2155
- , , plants
 - C: 314
 - see also Lectins
- __ , ___ , animal material
 - C: 306, 308, 311-313, 316, 318, 322, 643, 1764, 1779, 1788, 1789, 1791-1793, 2118, 3104, 3107, 3110, 3111, 3114, 3115,

Н

```
3117, 3119, 3449, 3497, 3527, 4383, 4384, 4388, 4389, 4394,
                                                                          Herbicides, general techniques
        4395, 4397, 4398, 4692
                                                                              C: 1101, 1105(review), 1106, 2447, 3810, 3811, 3813, 3815,
    E: 117, 122, 124, 759, 763, 768, 771, 930, 931, 1456, 1462,
                                                                                 4892, 4894
        1467, 1573, 1625, 2115, 2282, 2293
                                                                              G: 1039, 1774, 1775
 Glycoproteins and glycopeptides, structure investigation
                                                                              P: 178
    C: 256(review), 276(review), 303, 305, 312, 1764, 1780(review),
                                                                              E: 685, 2050
        1783-1785, 1787, 3068, 3108, 3113, 3118, 3121, 3128, 3129,

    , carboxylic acid, anilides and related compounds

       3131, 3402, 3505, 3554, 4365, 4396, 4596
                                                                              C: 1102-1104, 3811, 3812, 3815, 4890, 4891
    P: 43
                                                                              G: 408, 409, 1044-1046, 1772, 2404, 2405, 2412
    E: 109(review), 113, 125, 759, 761, 1460, 1465, 2091
                                                                              P: 381
Glycosaminoglycans (including proteoglycans of connective tissue)
                                                                              E: 1250, 2508, 2510, 2511
    C: 281-286, 288-290, 296, 299, 300, 302, 313, 314, 319, 1771,

    , triazine derivatives

       1778, 1781, 1790, 1791, 2142, 3086, 3088-3092, 3095, 3101,
                                                                              C: 2443, 2444, 2450, 2964, 3815, 3816, 4893, 4895-4897
       3103, 3111, 3116, 3127, 3130, 3604, 4372, 4378, 4379, 4381,
                                                                              G: 398, 411, 512, 515, 519, 521, 1040, 1761, 1771, 1776, 1777.
                                                                                 2402, 2403, 2407
    G: 553
                                                                              P: 740
    P: 472, 491
                                                                              E: 2509
    E: 112, 116, 758, 760, 766, 769, 1147, 1448, 1449, 1451, 1453,

    urea derivatives

       1454, 2084, 2085, 2087
                                                                              C: 1100, 2445, 2446, 2448, 2449, 3814
    see also Glycoproteins and glycopeptides, applications, animal
                                                                              G: 375, 386, 410, 680, 1038, 1773
    material
                                                                              P: 382

    structural studies

                                                                          Heterocyclics, nitrogen (other)
    C: 257, 317, 1790
                                                                              C: 949, 951, 954, 1343, 2349, 2352, 4833
    P: 275
                                                                              G: 351, 693, 803, 944, 1121, 2217, 2311, 2341-2343
    E: 2083
                                                                              P: 720-722, 748
    see also Carbohydrates, derivatives, amino sugars
                                                                              see also individual groups of nitrogen containing heterocyclics
Growth factors
                                                                              and drugs
    C: 530, 544, 545, 2034, 2087, 2389, 3327, 3329, 3335, 4579,
                                                                          --- , oxygen (other)
       4583, 4595, 4655
                                                                              C: 237, 1727, 3052
    G: 361, 427, 939, 942, 975, 976, 1590, 1634
                                                                              G: 244, 245, 251, 693, 799, 800, 802-804, 1539, 1941
    P: 763
                                                                              P: 264
    E: 181, 688, 1500, 1667, 2141, 2150
                                                                             see also individual groups of oxygen containing heterocyclics
    see also Pituitary hormones and proteins; Gibberelins
                                                                          - , sulphur (other)
Gold, see Platinum metals and gold
                                                                              C: 2977, 4811
Guanidine and guanidine derivatives
                                                                              G: 693, 736, 947, 951, 1707, 1713, 2339, 2352
    C: 5147
                                                                              P: 399, 542
    G: 341
                                                                             see also Thiazoles and isothiazoles; Thiophenes
                                                                          Histamine and related substances
                                                                              C: 1933, 3248, 3250, 3251, 4516
                                                                             see also Imidazoles
                                                                          Hormones peptidic and proteinous (including synthetic analogues)
                                                                              C: 528, 541, 547, 556-558, 561, 2002, 2011, 2090, 3294, 3296,
Haemostatics
                                                                                 3311, 3338, 4559, 4562-4564, 4572, 4582, 4592
    P: 417
                                                                              E: 186, 2144, 2148, 2158
Halides and other inorganic halogen-containing compounds (includ-
                                                                             see also individual categories of peptidic hormones
   ing cyanides and cyanates)
                                                                         -, synthesis and structural studies
    C: 43, 962, 1420, 1431, 1433-1435, 2697, 2766, 2768, 2772,
                                                                             C: 525, 1994, 3339, 4592
       2773, 4115, 4119, 4120, 4127, 4129, 5084, 5146, 5155, 5156,
                                                                             E: 2143, 2148, 2158
       5158, 5161, 5173
                                                                          Humic acids
    G: 1244, 1249, 1997, 2319, 2540-2542, 2550
                                                                             C: 1110(review), 3825
   E: 1294
                                                                             G: 500, 829, 1234, 1685
Hallucinogens (including cannabis constituents)
                                                                             E: 1929, 1930, 2514
    C: 2675
                                                                          Hydrazines, hydrazides and hydrazones
    G: 149, 276, 461, 1080, 1865, 2094, 2466, 2469, 2477
                                                                             C: 5081(review)
Halogen derivatives of hydrocarbons, see Hydrocarbons, halogen de-
                                                                         Hydrides
   rivatives
                                                                             G: 560, 618, 1959
Halogens
                                                                         Hydrocarbons
   C: 4119, 4130(review), 5146, 5161
                                                                             C: 199-221, 1677-1694, 3004-3024, 4297-4319
```

G: 180-225, 723-778, 1460-1513, 2116-2175

P: 29, 467, 631, 632

E: 751, 2075, 2076

Hydrocarbons, reviews and books

- C 1450, 1461, 1466, 1469, 1470, 1582, 1691, 3012, 3021, 4316
- G: 1510
- P: 632
- , theory and techniques
 - G: 43, 152, 498, 587, 778, 1512
- , aliphatic
 - C: 46, 199, 200, 4297
 - G: 57, 115, 132, 180, 182-188, 206, 475, 504, 508, 538, 644, 723-729, 732-735, 778, 1262, 1274, 1276, 1287, 1448, 1460-1469, 1916, 1922, 1940, 2011, 2023, 2087, 2116-2122, 2173, 2518, 2547
- , cyclic
 - C: 89, 103, 181, 199, 203-206, 210-212, 214, 215, 449, 1383, 1450(review), 1461(review), 1466(review), 1469(review), 1470(review), 1526, 1568, 1571, 1572, 1575, 1582(review), 1677-1681, 1686, 1688, 1690, 2704, 2879, 2880, 2892, 2898, 2994, 3006-3010, 3012(review), 3013, 3014, 3017, 3668, 4160, 4205, 4230, 4231, 4242, 4299-4301, 4303-4305, 4308, 4318, 4326, 4485, 4594
 - G: 20, 91, 113, 184, 189-192, 194-200, 209, 470, 498, 506, 508, 519, 596, 604, 610, 641, 675, 677, 685, 695, 714, 715, 736, 737, 739, 741-745, 758, 889, 1136, 1188, 1189, 1199, 1262, 1350, 1399, 1418, 1421, 1448, 1470-1474, 1476-1479, 1481-1483, 1485, 1487, 1502, 1506, 1814, 1862, 1903, 1912, 1996, 2026, 2046, 2050, 2058, 2061, 2123, 2125-2129, 2131-2142, 2146, 2154, 2173, 2177
 - P: 107, 154, 253
 - E: 78, 751, 1340, 2075, 2076
- --- , halogen derivatives
 - C: 116, 217, 218, 329, 1568, 1575, 1687-1690, 2901, 3010, 3018-3020, 3027, 4199, 4309-4311
 - G: 18, 73, 83, 91, 94, 133, 143, 153, 156, 202-204, 207, 210-213, 215-218, 220-225, 616, 648, 665, 675, 677, 691, 715, 731, 736, 746-757, 759-763, 765-774, 989, 991, 992, 994, 996-998, 1000, 1002, 1003, 1006, 1008, 1009, 1011, 1012, 1018, 1020, 1024, 1188, 1200, 1205, 1207, 1351, 1356, 1379, 1409, 1415, 1418, 1421, 1448, 1479, 1484, 1488, 1490-1504, 1506, 1751, 1814, 1862, 1874, 1903, 1996, 1997, 2090, 2097, 2131, 2139, 2143-2160, 2162-2166, 2206
 - P: 29, 241

see also Biphenyl and derivatives; Pesticides, chlorinated

- --- , complex mixtures
 - C: 110, 219, 220, 1680, 3022-3024, 4315, 4319
 - G: 138, 143, 540, 613, 775, 776, 1061, 1187, 1216, 1235, 1367, 1388, 1422, 1505, 1508, 1513, 1944, 2078, 2167-2172, 2174, 2508
 - P: 632(review)

Hydrogen

- G: 1320, 1964, 2545, 2547
- Hydrolases, acting on ester bonds (E.C. 3.1.-.-)
 - C: 41, 797, 799-821, 2167, 2239-2260, 3107, 3567-3586, 4398, 4632, 4735, 4736(review), 4737-4743
 - P: 5
 - E: 404, 405, 407-418, 1068-1088, 1754-1759, 2212, 2359-2370, 2445
- , , structural studies
 - C: 801, 2246, 3344, 3366, 4601, 4632, 4738
 - E: 1086, 2361

- Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)
 - C: 748, 822-829, 849, 2122, 2261-2268, 2270-2272, 3587-3600, 4743-4748, 4852, 5084
 - P: 710
 - E: 386, 419-423, 433, 1089-1093, 1760-1762, 2338, 2371-2373
- 🗕 , 🛶 , structural studies
 - C: 2262, 2269
 - G: 740
 - E: 422
- , acting on ether bonds (E.C. 3.3.-.-)
- E: 2374
- —, acting on peptide bonds (E.C. 3.4.-.-)
 - C: 831-835, 838, 840, 842-845, 847-851, 853, 854, 856, 1654, 2171, 2274, 2275, 2277, 2279-2285, 2287, 2289, 2291, 2292, 2951, 3311, 3349, 3601-3607, 3609, 3610, 3612, 3613, 3615, 3617, 3618, 4749, 4751-4761
 - E: 425-428, 430-434, 436, 437, 981, 1095, 1097-1100, 1102, 1106, 1108-1117, 1157, 1763-1767, 1769, 1770, 2375, 2376, 2379-2383, 2385, 2386, 2388
- —, —, structural studies
 - C: 564, 577, 836, 855, 2043, 2281, 3349, 3368, 4616
 - G: 341
 - E: 1523, 1525
- —, acting on C-N bonds other than peptide bonds (E.C. 3.5.-.-)
 - C: 728, 837, 839, 846, 1650, 2286, 2290, 3608
 - E: 1104, 2378
- —, —, structural studies
 - C: 4600
- --- , acting on acid anhydride bonds (E.C. 3.6.-.-)
 - C: 841, 2273, 2278, 2288, 3614, 4762
 - E: 406, 424, 429, 476, 1094, 1096, 1101, 1103, 1105, 1107, 1178, 1768, 2219, 2377, 2384, 2387, 2389, 2434
- ___ , __ , structural studies
 - C: 575, 830, 852, 857, 3353, 3364, 3611, 3616
 - E: 193, 435, 830, 1519, 1853
- —, activity measurement
 - C: 827, 2253, 2274-2276
 - E: 436, 1095, 1111, 2338, 2381

Hydroxylamines

C: 3259

Hypnotics (barbiturates, sedatives)

- C: 143, 1243, 1245, 1246, 1252, 1263, 1267, 1272, 2494, 2549, 2567, 2575, 2595, 3891, 3895, 3896, 3917, 3936, 3941, 4251, 4971, 4980, 4994
- G: 431, 433, 440, 441, 454, 572, 1100, 1103, 1117, 1137, 2440, 2443, 2444, 2455
- P: 192, 401, 403, 405, 406, 571, 574, 576, 754
- E: 1262

Hypolipidemic agents

- C: 1057, 1331, 1908, 2662, 2668, 3844, 3872, 4003, 4038
- P: 166, 204, 759

Hypotensives and antihypertensives

- C: 1189, 1191, 1193, 1197, 1215-1217, 1220, 1222, 2522, 2525, 2526, 2529, 2530, 2537, 2541, 2543, 3864, 3870, 3879, 4954, 4963
- G: 426, 1088, 1826
- P: 395, 396, 696
- E: 1260

see also Adrenergic and adrenergic blocking agents

```
Iron, see Cations, inorganic, analytical group III
                                                                           Isocyanates and cyanates, inorganic, see Halides and other inorganic
 Imidazoles and related compounds
                                                                              halogen containing compounds
     C: 168, 517, 957, 1320, 1985, 2317, 2348, 2349, 2351, 2353,
                                                                           --- , organic
        2354, 2649, 3697, 3698
                                                                              C: 87, 1546, 4502, 4517, 4920
     P: 147, 243, 687
                                                                              G: 1284, 1671
    see also Histamine and related substances
                                                                           Isomerases
 Immunosuppressives and immunomodulatory drugs
                                                                              C: 865-867, 2297, 3625-3630, 4766-4769
    C: 1039, 1040, 1046, 1058, 1063, 1071, 1082(review), 2397,
                                                                              E: 441, 442, 491, 1120-1122, 1774-1780, 2391, 2392
        2514, 2666, 3770, 4000, 4005, 4866, 5064
                                                                           . structural studies
    P: 167, 169, 199, 579, 734
                                                                              C: 571, 2296
    see also Peptide and amino acid antibiotics
                                                                              E: 831
Indole alkaloids
    C: 933, 2336, 2340, 4799
    P: 364
Indoles, techniques
    C: 944, 2349, 2674, 3245
                                                                          Juvenile hormones
    E: 1269
                                                                              G: 692
   - , applications
    C: 944-946, 995, 1945, 1960, 1975, 2345, 3241, 3691-3694,
       4507, 4510, 4511, 4833
    G: 917, 2340
    P: 222, 699
Inhibitors of enzymic activity, proteinous
                                                                          Larvicides, insecticides
                                                                              C: 1108, 2433, 2455, 2459, 3818, 3798, 4049
    C: 706, 722, 723, 725, 1654, 2100, 2127, 2196, 2286, 3333,
                                                                              P: 174, 181, 212, 550, 553
       3417, 3447, 4573
                                                                          Lead, see Cations, inorganic, analytical group I and Ila
    E: 198, 203, 344, 365, 368, 370, 927, 1621, 1706-1708, 1713
                                                                          - , organic
- , structural studies
                                                                              C: 4824
    C: 725, 3355, 3360, 3363, 3427
                                                                              G: 371, 1420, 1723, 2364, 2368
    E: 365, 1706
                                                                              E: 608

    , non-proteinous

                                                                          Lectins
    C: 503, 1029, 1057, 1078, 1218, 1275, 1276, 1334, 1340, 1496,
                                                                              C: 304, 307, 310, 314, 320, 321, 1784, 2179, 3105, 3109, 3112,
       1654, 2301, 2355, 2398, 2418, 2517, 2537, 2543, 2614, 2629.
                                                                                 3120, 3122, 3124-3126, 3132, 4361, 4392, 4393, 4596
       2632, 2660, 2665, 3721, 3771, 3772, 3783, 3793, 3979, 3984.
                                                                              P: 473
       4009, 4147, 4210, 4336, 4492, 4876, 4963, 4983, 5028, 5049,
                                                                             E: 118, 120, 1000, 1459, 2086, 2090
       5065, 5066
                                                                         Lichen acids
    G: 1853
                                                                             C: 1349, 4407
    P: 50, 166, 547, 624, 733, 737
                                                                         Ligases, forming C-O bonds (E.C. 6.1.-.-)
    E: 1934
                                                                              C: 868, 3633, 4770
Inks
                                                                             E: 98, 443, 1782, 1783, 2393
    C: 3823
                                                                          — , — , structural studies
   P: 554
                                                                             C: 4611
Inorganic compounds
                                                                          --- , forming C-S bonds (E.C. 6.2.-.-)
    C: 1398-1439, 2730-2775, 4080-4132, 5108-5174
                                                                             C: 869
    G: 553-562, 1244-1254, 1954-1967, 2539-2552
                                                                         -, forming C-N bonds (E.C. 6.3.-.-)
   P: 224-229, 442-449, 605-609, 779-785
                                                                             C: 3632
   E: 641-649, 1287-1298, 1966-1977, 2542-2559
                                                                             E: 1781
   see also Anions, inorganic; Cations, inorganic; individual types of
                                                                         --- , --- , structural studies
   anions and cations
                                                                             C: 3634

    reviews and books

                                                                         — , forming C-C bonds (E.C. 6.4.-.-)
   C: 1462, 5131
                                                                             C: 3631, 3635
   P: 235, 236
                                                                         -, -, structural studies
Insulin and analogues
                                                                             C: 4618
   C: 523, 2009, 2087, 2092, 3312, 3322, 4583
                                                                         - , other (including E.C. 6.5.-.-)
   E: 183, 816, 2150
— , structural studies
                                                                          — , — , structural studies
   E: 2147
                                                                             E: 1784
Iridoid glucosides
                                                                         --- , activity measurement
   C; 1352, 1357
                                                                             C: 2298, 3635
   P: 214, 769
```

4432, 4440

E: 1633

--- , oxidation products

P: 55, 56, 59, 60, 63, 66, 68, 74-76, 304, 308, 323, 487, 492,

C: 362, 374, 391, 402, 1849, 1858, 3152, 3181(review), 4441,

493, 500, 507, 514, 516, 653, 657, 658, 666, 686

G: 845 Lignin compounds P: 51, 74, 267, 475, 481 C: 1706 G: 90, 534, 549, 792, 1074, 1218, 1220, 1225, 1232, 1236, 1237, Lipopolysaccharides C: 4213 1607, 1936, 1937, 1942, 1945, 2527, 2532 G: 817 P. 38 E: 756 E: 103, 1410 Lipoproteins (including apolipoproteins), reviews Lipids C: 360-395, 1847-1884, 3173-3190, 4432-4459 G: 1886 G: 291, 292, 859-865, 1615-1626, 2264-2276 — , techniques C: 398-400 P: 51-87, 282-326, 485-518, 653-686 G: 926 E: 134, 775, 1471, 1472 E: 141, 776, 1487, 2126 --- , reviews and books - , applications C: 363, 364, 377, 3181, 4438 C: 396-401, 706, 1885-1891, 2107, 2372, 3164, 3191-3199, G: 1427, 1884, 1901 4438(review), 4460-4469, 4685, 4686 P: 660 E: 135-140, 142-150, 344, 345, 585, 777-803, 879, 1473-1477, --- , general techniques 1479-1486, 1488-1490, 1612, 1689, 1826, 2099-2104, C: 341, 360, 368, 373, 372, 376, 381, 383, 387, 1589, 1850, 2105(review), 2106-2125, 2184, 2282 1853, 1872, 1977, 3175, 3182, 4433, 4437, 4441-4443, 4450, see also Proteins of blood, serum and blood cells 4453-4455 - . structural studies G: 170, 862 P: 10, 84, 282, 285, 294, 296, 306, 307, 309, 315, 479, 502, 518, G: 1637 E: 1478, 2113 615, 644, 675, 680, 682, 685 Local anaesthetics, see Anaesthetics --- , group separation Lyases, carbon-carbon (E.C. 4.1.-.-) C: 379, 1862, 3174, 3175, 3180 C: 861, 865, 2097, 3621, 3622, 3623, 4764, 4765, 4823 G: 1615, 1617, 1620 E: 892, 1118, 1772, 1773, 2390 P: 63, 66, 314, 315, 493, 509, 658 --- , --- , structural studies , applications, non-biological C: 384, 402, 1817, 1853, 1856, 1868, 1880, 4445 C: 2293 --- , carbon-oxygen (E.C. 4.2.-.-) G: 711 C: 837, 858-860, 862, 864, 4823 P: 51, 65, 285, 288, 291, 308, 322, 496, 501, 512, 691 E: 438, 1771, 1987 — , — , microorganisms ---, ---, structural studies C: 366, 1855, 1882 C: 3369 G: 552 P: 52, 64, 76, 289, 291, 499, 504, 509, 517, 644 --- , carbon-nitrogen (E.C. 4.3.-.-) C: 863, 2294, 2295, 3620, 3624, 4763 --- , --- , plants E: 439, 1119 C: 365, 375, 390, 1859, 3176, 3187 - , other G: 269, 838, 861, 1625, 1951 C: 3619 P: 58, 83, 291, 292, 324, 486, 504, 508, 511, 513, 659 F: 440 __ , __ , blood C: 385, 1851, 1875, 3178 P: 54, 70, 79, 86, 276, 284, 490, 495, 684 - , - , brain and nerve tissue M C: 371, 382, 394, 3180, 3495, 3506 P: 61, 62, 71, 78, 81, 293, 487, 489, 493 Macrolides (including erythromycine) __ , __ , milk and food products C: 1033, 1042, 1050, 1056, 1058, 1059, 1063, 1066, 1070, 1071, C: 364(review), 365, 368, 372, 375, 377(review), 390, 1864-1074, 1077, 1082(review), 2423, 2429, 3761, 3767, 3770, 1866, 1869, 1870, 1873, 1879, 1881, 3179, 4434, 4446, 4447, 3774, 3779, 3785, 3791, 4858, 4860, 4864, 4872 4452 G: 383, 982, 1732 G: 1455, 1616, 1624, 1886 P: 161, 164, 165, 167-169, 546, 730, 732, 738 P: 283, 297, 649, 655, 669, 674 F: 1927 see also Food analysis Magnesium, see Alkaline earths -, -, other animal material Manganese, see Cations, inorganic, analytical group III C: 370, 379, 386, 391-393, 1863, 1884, 3180, 3188, 3190, 3495, Medicated feeds

C: 2373, 2696

E: 617, 1958

Melamines

C: 2397

Mercury, see Cations, inorganic, analytical group I and Ila	Nitro compounds
, organo-compounds	C: 325, 447-450, 505, 1549, 1930-1932, 1943, 2864, 3219-3222,
C: 2364, 3722, 4260	4242, 4287, 4499, 4500, 4811
G: 364, 365, 964, 967, 1722, 1742, 2363, 2364, 2382	G: 20, 37, 109, 503, 506, 789, 790, 911, 1205, 1231, 1405, 1532,
E: 1922	1664-1667, 2137, 2194
Metal carbonyls	P: 45, 107-109, 340, 341, 478, 623, 696, 721
G: 1348	E: 648, 1494
Mineral oils, hydrocarbons in	see also Explosives
C: 220	Nitrogen
G: 200, 530, 740, 1206, 1312, 1468, 1496, 1510, 2132, 2175	G: 910, 1954, 2544
see also Hydrocarbons, aliphatic, Hydrocarbons, complex mix-	Nitrogen compounds, inorganic
tures; Crude oil and petroleum analysis	C: 1421, 1422, 1426, 1432, 1435, 2770, 4096, 4117, 4126, 5084,
Mitogens, mutagens and related compounds (growth factors)	5090, 5147, 5155, 5164, 5172
C: 2723	G: 1857, 1954
see also Growth factors	E: 647, 1294, 1295, 1975, 2553, 2555
Molybdenum, see Cations, inorganic, analytical group IIb Mycolic acids	see also Ammonia
G: 1153	Nitrogen oxides
Mycotoxins, other	C: 245, 4132
	G: 2552
C: 233, 234(review), 236(review), 1714, 1720(review), 1723, 1724, 1727, 1936, 2013, 3047-3049, 3698, 4340, 4342, 4343,	Nitrosamines
4344(review), 4345, 4346	C: 3220
G: 238-242, 806, 1537, 1538, 2201-2203, 2205	P: 341
P: 34, 262-264	E: 2128
E: 101(review), 603	Nitroso compounds C: 2358
see also Aflatoxins	
Myorelaxants	G: 2309 Noble gases
C: 1244, 1251, 1262, 1330, 2333, 2358, 2403, 2552, 2562, 2564,	G: 623
2568, 2572, 2573	Noble metals, see Platinum metals and gold
P: 398, 406, 415	Nucleic acids, see DNA; RNA
1. 336, 166, 113	Nucleosides, see Purines, pyrimidines, nucleosides, nucleotides
	Nucleotides, see Purines, pyrimidines, nucleosides, nucleotides
N	
Narcotic analgesics and antagonists	0
C: 1229, 1247, 1258, 3892, 3897, 4006, 4017, 4022, 4978	•
G: 457, 933, 1104, 1133, 1863, 1864, 2456	Oestrogens, techniques and theory
P: 402	C: 157, 413, 3200
E: 1940, 1952	P: 687
Neuroleptics	E: 151
C: 1209, 2566, 2578, 2588, 3910, 3925, 3928, 3929, 4970	, applications, non-biological
G: 435, 442, 1111, 2454	C: 414
E: 629	, , biological
Neuromuscular blocking agents, see Myorelaxants; Cholinergic and	C: 412, 3206, 3207
cholinergic blocking substances	G: 296, 298, 867, 872, 1633, 1634
Nickel, see Cations, inorganic, analytical group III	, non-steroidal
Nicotinic acid and derivatives	C: 138, 1660, 1899, 1900
C: 2382, 3695, 3696, 3748, 3752	G: 1632
G: 1693, 1697, 1702, 1778	Oil additives
P: 369	C: 2726
E: 2131	Oligonucleotides and polynucleotides
Niobium, see Cations, inorganic, analytical group III	C: 519, 878, 883, 886, 893, 1569, 2312, 2318, 2321, 3646, 3650,
Nitriles	3671
C: 222, 4520	P: 132, 356, 357, 535
G: 453, 510	E: 446, 447(review), 450, 452, 527, 549, 716, 820, 1130-1133,
E: 1975	1790, 1794, 2023, 2139, 2401, 2403
see also Nitrogen compounds, inorganic	Oligosaccharides
	C: 250, 252, 254, 259, 268, 271, 272, 274, 275, 312, 613, 629, 642, 768, 816, 974, 1740, 1743, 1747-1749, 1753, 1758-

E: 375, 385, 1045

```
Oxidoreductases, acting on CH-NH2 group of donors (E.C. 1.4.-.-),
      1761, 1763, 1768, 1769, 1771, 1785, 1790, 1855, 2270, 3069,
                                                                             structural studies
      3071, 3076, 3083, 3091, 3111, 3114, 4356, 4358-4361, 4363,
                                                                             C: 4617
      4365-4367, 4371, 4379
                                                                             G: 2355
   G: 816, 1580
                                                                          — , acting on CH-NH group of donors (E.C. 1.5.-.-)
   P: 40, 41, 54, 75, 150, 271, 274, 289, 323, 638, 641
                                                                             C: 728
   E: 104, 106, 110(review), 112, 113, 115, 116, 125, 727, 1443,
                                                                             F: 2337
      2080, 2081, 2084
                                                                         -, acting on reduced NAD or NADP as donor (E.C. 1.6.-.-)
Opium alkaloids
                                                                             C: 726, 731, 736, 738, 2205, 3535, 4703
   C: 930, 1255, 2330, 2338, 4022, 4802
                                                                             E: 2327, 2328
   G: 459, 1695, 1860, 2464
                                                                         --- , acting on other nitrogenous compounds as donor (E.C. 1.7.-.-)
   P: 539
                                                                             C: 735, 742, 3540
Organoleptics (flavors, volatiles, odours)
   C: 222, 1372, 1438, 2696, 2698, 3223, 4039, 4053, 5095
                                                                             E: 378
                                                                         --- , acting on the sulphur group of donors (E.C. 1.8.-.-)
   G: 286, 315, 467, 469, 471, 473, 478-485, 487-492, 494, 495,
      497, 673, 681, 687, 689, 897-899, 905, 1138, 1159, 1164-
                                                                             C: 729, 3523
      1167, 1169-1180, 1182-1185, 1417, 1425, 1439, 1647, 1879,
                                                                             E: 1718
                                                                          ---, acting on a haem group of donors (E.C. 1.9.-.-)
      1885, 1894-1902, 1946, 1948, 2092, 2220, 2246, 2292, 2297,
                                                                             E: 379, 1041, 1715
      2298, 2307, 2489-2500, 2521
                                                                          —, —, structural studies
    P: 221, 221, 441
                                                                             C: 752
    E: 636
                                                                          — , acting on H<sub>2</sub>O<sub>2</sub> as acceptors (E.C. 1.11.-.-)
Organometallic compounds, reviews and books
                                                                             C: 748, 2212, 2213
    C: 156, 4259, 5137
                                                                             E: 386, 1046, 2241, 2338
- (other)
                                                                          - , acting on single donors with incorporation of oxygen (oxy-
   C: 5134
                                                                             genases) (E.C. 1.13.-.-)
   G: 369, 963, 972, 973, 1724
                                                                             C: 733, 749, 754, 3525, 3537, 4704, 4711, 4713, 4714
   P: 447, 608, 782
                                                                              E: 1053, 1720
   E: 709, 1248, 1918
                                                                          - , acting on paired donors with incorporation of oxygen into one
   see also Coordination compounds; Porphyrins and metallopor-
                                                                             donor (hydroxylases) (E.C. 1.14.-.-)
   phyrins; Tin, organic; Ferrocenes
                                                                              C: 270, 727, 730, 739, 740, 743, 744, 750, 1911, 2198, 2206,
Oxazines
                                                                                 2207, 2210, 3534, 3536, 4707, 4708
    C: 4505
                                                                             E: 373, 383, 384, 380, 1048, 1716, 1722, 1723, 1729, 2211,
    E: 1920
                                                                                 2330-2334, 2336, 2339
Oxazoles and isoxazoles
                                                                          -, acting on superoxide radicals as acceptor (E.C. 1.15.-.-)
    E: 607
                                                                             C: 751, 755, 2211, 2214, 3532
Oxazolines
                                                                             E: 1051, 1721
    C: 4389
                                                                          — , — , structural studies
    P: 721
Oxidoreductases, acting on the C-OH group of donors (E.C. 1.1.-.-)
                                                                              C: 2211
                                                                          -, other and uncompletely identified oxidoreductases (E.C. 1.99.-.-)
    C: 727, 732, 737, 741, 745, 747, 759, 1652, 2197, 2200, 2202,
                                                                              C: 734, 753, 2199, 3527, 3531, 3538, 3539
       2203, 2208, 2209, 2228, 3522, 3524, 3529, 3530, 3541, 3542,
                                                                              E: 377
                                                                          -, activity measurements
    E: 95, 376, 382, 1042, 1047, 1050, 1054, 1719, 1724, 1725,
                                                                              C: 736
      1727, 1730, 2326, 2329
                                                                              G: 2355
--- , --- , structural studies
                                                                              E: 381, 2338
    C: 570, 3526
                                                                          Oxo compounds, general techniques
    E: 832
                                                                              C: 222, 244, 245, 880, 3053, 4497
--- , acting on aldehyde or keto group of donors (E.C. 1.2.-.-)
                                                                              G: 2078
    C: 758, 2201, 3533, 4709, 4710
                                                                          - , aliphatic aldehydes and ketones
    E: 387, 534, 1049, 1728, 2431
                                                                              C: 241-243, 247, 1732, 1734-1736, 1739, 3055, 3057, 3058,
—, —, structural studies
                                                                                 3061, 3062, 4351, 4353, 4354
    C: 2035, 2204
                                                                              G: 254-257, 460, 518, 690, 693, 807, 808, 810, 811, 1065, 1129,
    E: 1043
                                                                                 1514, 1556-1559, 1562, 1564, 1904, 1990, 2182, 2208, 2209,
—, acting on CH-CH group of donors (E.C. 1.3.-.-)
                                                                                 2211, 2213, 2214, 2217-2219, 2240
    C: 2209, 3031, 3528, 4715
                                                                              P: 267, 269
    E: 374, 1717
                                                                              E: 102, 709
--- , --- , structural studies
                                                                          - , cyclic aldehydes and ketones
    C: 565
                                                                              C: 24, 182, 222, 238, 246, 1728, 1733, 1734, 1737, 1739, 2980,
--- , acting on CH-NH2 group of donors (E.C. 1.4.-.-)
                                                                                 3056, 3059, 3060, 4042, 4350, 4353
    C: 746, 756, 757, 4390, 4712
                                                                              G: 253, 260, 452, 460, 690, 809, 877, 1560
```

P: 36, 221, 268, 269, 279, 755 Oxygen G: 1247, 1956, 1958, 2544

P

Panthothenic acid and coenzyme A

C: 992, 3736

Papaveraceae alkaloids (excluding opium alkaloids)

C: 924, 929

P: 141, 201, 363

E: 1245

Penicillins (including carbapenem antibiotics)

C: 1036, 1049, 1054, 1062, 1075, 1081(review), 2409, 2410, 2419, 3773, 3793, 4856, 4863, 4865, 4868, 4869, 4875, 4878

G: 383

P: 159, 243, 379, 729, 735

Peptide (and amino acid) antibiotics

C: 130, 1039, 1040, 1046, 1047, 2406, 2417, 3778, 3782, 3789, 3792, 4866

P: 158, 376, 579, 734

E: 76

Peptides

C: 520-561, 1992-2034, 3290-3339, 4559-4595

G: 1689

P: 123-127, 346-350, 530-534, 708

E: 164-187, 810-823, 1499-1514, 2140-2158

--- , reviews and books

C: 607, 1964, 3303, 3306

E: 207, 226, 1513

- , techniques

C: 36, 83, 95, 399, 483, 490, 492, 518, 519, 521, 522, 524, 526, 531, 534, 536, 540, 542, 548, 550, 551, 560, 586, 594, 601, 1507, 1603, 1643, 1890, 1971, 2001, 2003, 2006, 2019, 2020, 2025, 2026, 2030, 2031, 2065, 2071, 2474, 2905, 3292, 3295, 3297, 3301, 3302, 3304, 3305, 3314, 3316, 3317, 3323, 3325, 3326, 3334, 3356, 3388, 3714, 4263, 4386, 4561, 4566-4568, 4577, 4578, 4580, 4589, 4591, 4594, 4595, 4977

G: 1689

P: 124, 347, 532, 706, 707

E: 58, 76, 86, 164, 166-169, 171, 176-178, 180, 185, 213, 224, 688, 727, 773, 801, 810, 812, 813, 815, 820, 822, 823, 842, 858, 1499, 1504, 1505, 1507-1509, 1511, 1514, 1520, 1535, 2023, 2025, 2032, 2133, 2137, 2140, 2142, 2149, 2156

--- , applications, non-biological

C: 130, 488, 527, 535, 542-544, 546, 1992, 2005, 2010, 2019, 2021, 3300, 3309, 3328, 3330, 3336, 3400, 3554, 4569, 4571, 4584, 4587, 4593

P: 348, 531, 533, 711

E: 165, 179, 181, 814, 1502, 1506, 1512, 2151, 2154, 2157

--- , ---- , microorganisms

C: 309, 539, 1999, 2013, 2017, 3307, 3315, 3337, 4683

P: 708

E: 394, 2145, 2155

— , — , plants

C: 625, 1993, 1997

P: 349

E: 819

Peptides, applications,, animal material

C: 311, 480, 520, 524, 529, 533, 538, 549, 552-555, 559, 561, 580, 622, 629, 637, 642, 645, 662, 708, 715, 1996, 1998, 2000, 2004, 2008, 2012, 2016, 2018, 2022, 2023, 2027, 2087, 204, 3290, 3291, 3293, 3307, 3313, 3319-3321, 3331-3333, 3338, 3472, 3497, 4560, 4569, 4575, 4581, 4586-4588, 4590

P: 123, 125-127, 346, 350, 530, 534, 708

E: 122, 170, 172, 173, 175, 179, 182, 184, 187, 325, 329, 402, 455, 811, 818, 1501, 1686, 2145, 2152-2154, 2384

see also Hormones peptidic and proteinous; Pituitary hormones and proteins; individual types of peptide hormones

- . - . food products

C: 1997, 2016

Peroxides

C: 18(review), 345, 391, 380, 402, 1733, 1849, 1858, 2848, 3135, 3143, 3152, 4035, 4470

G: 37, 293-295, 866, 2277

P: 51, 74, 239(review), 519

Pesticides

C: 1086-1109, 2433-2459, 3797-3819, 4880-4900

G: 385-413, 983-1056, 1734-1785, 2378-2414

P: 172-182, 380-383, 548-553, 739, 740

E: 1250, 1251, 2508-2512

--- , reviews and books

C: 1087, 3802, 3803, 4883

G: 983, 984, 987, 1738, 2409

P: 2, 172, 177

— , techniques and complex mixtures

C: 1086, 1088-1091, 1107, 1382, 2434, 2435, 2702, 2707, 3797, 3799-3801, 3804, 4880-4882, 4884, 4899

G: 64, 136, 157, 173, 385, 387-391, 407, 509, 513, 516, 526, 666, 669, 986, 988, 1017, 1042, 1054, 1055, 1081, 1119, 1162, 1196, 1197, 1200, 1202, 1329, 1734-1737, 1739-1741, 1745, 1778, 1919, 2378-2381, 2383, 2387

P: 7, 173, 231, 244, 255, 548, 549, 739

--- , carbamates

C: 43, 1095-1099, 2439-2442, 3806-3808, 4187, 4889

G: 380, 390, 406, 515, 1034-1037, 1041, 1765-1770, 1866, 2400, 2401

P: 176, 177(review), 181, 552, 553, 622

--- , chlorinated

C: 116, 1093, 2436, 2437, 4059, 4886

G: 83, 205, 213, 275, 390, 392-397, 470, 515, 616, 715, 985, 989-994, 996-1010, 1012-1016, 1019, 1020, 1028, 1047, 1051, 1205, 1743, 1744, 1746, 1748-1755, 1757, 1922, 2056, 2384-2391

P: 550

- , phosphorus

C: 1092, 2438, 2843, 4059, 4887, 4888

G: 390, 398, 400-404, 406, 515, 719, 956, 995, 1010, 1021-1023, 1025-1027, 1029-1033, 1052, 1263, 1756-1764, 1783, 1983, 2387, 2388, 2393-2399

P: 175, 380, 551

Petroleum hydrocarbons, see Mineral oils, hydrocarbons in Pharmaceutical applications

C: 1147-1359, 2494-2685, 3839-4042, 4922-5083

G: 425-461, 1079-1142, 1811-1870, 2425-2483

P: 189-220, 389-436, 559-595, 748-775

E: 619-632, 1254-1270, 1933-1955, 2516-2531

Pharmaceutical applications, reviews and books

- C: 9, 198, 1037, 1082, 1151, 1152, 1154, 1159, 1160, 1164, 1165, 1293, 1468, 2505, 2783, 2842, 3842, 3847-3849, 3869, 3894, 4924, 4953
- P: 6
- E: 620, 624, 1255, 1257, 1935, 1938, 1941, 2516
- , synthetic drugs, general techniques
 - C: 28, 121, 127, 137, 155, 188, 1147-1150, 1153, 1155-1158, 1161, 1162, 1164, 1166, 1167, 1604, 1643, 2325, 2494-2504, 2506-2508, 2652, 2872, 2897, 3238, 3383, 3840, 3841, 3843-3846, 3995, 4236, 4247, 4277, 4290, 4785, 4922, 4925-4934, 4997, 5006, 5111
 - G: 455, 2334, 2470
 - P: 18, 19, 21, 24, 25, 189, 190, 389-393, 538, 559-561, 616, 748, 749
 - E: 45, 55, 91, 619, 621-623, 625, 633, 1254, 1256, 1258, 1265, 1268, 1498, 1933, 1936, 1937, 1939, 1940, 2036, 2059, 2064, 2517-2519
- , systematic analysis and screening programs
 - G: 449
 - P: 559, 561
- , complex mixtures
 - G: 1455, 1747, 1811
- auxiliary compounds (excipients)
 - C: 4533
 - G: 1128, 2345
 - P: 449

Pharmaceutical and cosmetic dyes

- C: 2461
- P: 183

Pharmacokinetic studies, see Drug monitoring and pharmacokinetic studies

Phenois, reviews and books

- C: 18, 226
- , theory
 - C: 228
 - G: 20
- P: 31
 , techniques
 - C: 24, 89, 222, 228-230, 1358, 1548, 1699, 1701, 2359, 2433, 3032, 4160, 4174, 4326, 4328, 4331
 - G: 145, 233, 763, 786, 912, 1329, 1524, 1535
 - P: 139, 243, 253, 634
 - E: 99, 634, 1440, 2078
- , applications
 - C: 225, 227, 229, 1368, 1390, 1700, 1702, 1704-1706, 1708, 2685, 3033-3036, 3063, 3828, 4053, 4176, 4217, 4247, 4324, 4325, 4327, 4329, 4332
 - G: 148, 204, 235-237, 259, 332, 766, 785, 787-791, 829, 1065, 1212, 1421, 1529-1534, 1543, 1555, 1896, 2187-2194, 2508
 - P: 30, 32, 258, 259, 423, 470
 - E: 98

Pheromones

G: 228, 230, 2186, 2346

Phospholipids

C: 115, 361, 366, 369, 379, 380, 382, 383, 385, 386, 389, 394, 395, 754, 974, 1847, 1849, 1851, 1852, 1855, 1857, 1860, 1861, 1867, 1874, 1876-1878, 2362, 2363, 3173, 3175, 3177, 3180, 3183-3186, 3188-3190, 3495, 3711, 3712, 3718, 4432, 4435, 4439, 4440, 4444, 4445, 4449, 4451, 4456, 4458, 4459.

- 4820
- G: 1600, 1602, 1627, 2275
- P: 51, 52, 55-57, 62, 63, 66-68, 70, 72, 76, 78, 79, 81, 83, 84, 86, 150, 284, 286, 288-290, 293, 295, 299, 302, 304, 306, 307, 313, 315, 319-321, 487, 488, 492-495, 497, 499, 503, 504, 509, 512, 514, 517, 518, 650, 653, 654, 656, 658, 659, 661, 663, 666, 668, 670, 680, 681, 683, 684, 686, 691, 726
- E: 1471

see also Sphingolipids

Phosphorus compounds, inorganic

- C: 43, 1391, 1428, 2711, 2763, 2773, 4126-4129, 5149, 5154, 5155
- G: 474
- P: 448
- E: 1294, 1296
- , organic, techniques
 - C: 2360, 2711, 3710(review), 4066
 - G: 363, 958, 959, 1577, 2033
 - P: 6

— , — , applications

- C: 442, 584, 802, 883, 973-982, 1695, 1698, 1851, 1852, 1874, 2240, 2361-2363, 3093, 3166, 3183, 3293, 3334, 3554, 3574, 3711-3721, 4064, 4182, 4459, 4532, 4654, 4737, 4817-4823
- G: 361, 539, 1263, 1681, 1717-1720, 1759, 2356, 2357
- P: 123, 125, 127, 150, 151, 257, 345, 367, 530, 531, 534, 543, 551, 707, 708, 726
- E: 76, 161, 172-174, 182, 184, 187, 400, 401, 860, 874, 1028, 1496, 1501, 1502, 1548, 1552, 1555, 1556, 1686, 2048, 2145, 2188, 2236, 2247

see also Purines etc.; Phospholipids

Pigments natural (and fluorescent substances)

- C: 993, 999, 1005, 1013, 1017, 1027, 1111(review), 1112, 1113, 1116, 1117, 1119, 1367, 1579, 1858, 2084, 2371, 2380, 2468, 2679, 3050, 3733, 3753, 3826-3829, 4838, 4851, 4904-4909
- G: 1277, 1995, 2535
- P: 187, 188, 384, 387, 555-558, 746
- E: 617

Pituitary hormones and proteins

- C: 530, 532, 537, 545, 2014, 2029, 2033, 3298, 3299, 3315, 3318, 3324
- E: 174, 817, 821

Plant extracts, reviews and books

- C: 1359, 5081
- P: 455
- , applications
 - C: 965, 1318, 1348-1358, 1367, 1715, 1923, 1926, 1939, 1988, 2570, 2679-2685, 2903, 3209, 3877, 4026-4042, 4336, 4363, 4494, 4495, 4792, 4795, 4907, 5017, 5082, 5083
 - G: 447, 450, 1005, 1129, 1142, 1554, 1868
 - P: 48, 135, 137, 141, 149, 206, 208-213, 215-220, 260, 265, 266, 336, 361, 363, 365, 366, 421-436, 523, 524, 583-595, 642, 693, 694, 715, 716, 722, 758, 766-775
 - E: 632, 1915, 1954, 1955, 2127, 2530, 2531

Plasticizers, stabilizers (including other additives)

- C: 1128, 1138, 3834, 4910
- G: 415, 1059, 1209, 1931, 2515
- P: 600

Plastics and other synthetic polymers (including intermediates)

- C: 1120-1146, 2471-2493, 3830-3838, 4910-4921
- G: 414-424, 1057-1078, 2415-2424

B514

- P: 747
- E: 618, 1253, 1931, 1932, 2515

Plastics and other synthetic polymers (including intermediates), reviews and books

- C: 2477, 2485(review), 4139-4141
- -, techniques and theory
 - C: 60, 167, 1121, 1122, 1124, 1127, 1129, 1132, 1136, 1138, 1139, 1143, 1391, 1514, 2473-2476, 2478, 2480, 2484, 2487, 2488, 2491, 2493, 2825, 2846, 2855, 2898, 3830, 3831, 3836, 3838, 4164, 4348, 4910-4912, 4915, 4918-4921
 - G: 421, 422, 424, 1062, 1066, 1071, 1271, 1810
 - P: 337
 - E: 618, 1253, 1932
 - see also individual types of plastics

Platinum metals and gold

- C: 2743, 4083, 4091, 4099, 5116, 5128
- P: 447, 784

Polyamides, polyimides and their intermediates

- C: 1131, 1139, 3833, 4920
- G: 2419

Polyamines, see Amines, polyamines and their derivatives Polycarbonates

- C: 1138, 4921
- G: 1068

Polyene antibiotics

- C: 1052, 1053, 1078, 4864, 4873
- P: 162, 163, 732

Polyether antibiotics

C: 1055, 2399, 2421, 3763, 3766, 3777

Polyethers

- C: 1141, 1142, 2489, 2492, 4913
- G: 32, 1068
- P: 747

Polynucleotides, see Oligo- and polynucleotides Polyolefins

- C: 1123, 1130, 1133, 1144, 2477(review), 2481, 2490, 2825
 - G: 414, 419, 1063, 1064, 1067, 1271, 1808, 1810

Polyoxyethylene and related polymers (inclusive pyrolysis products)

- C: 218, 1140
- G: 2418

Polysaccharides and their constituents

- C: 20(review), 259, 279(review), 287, 292, 294, 295, 298, 301, 1396; 1765-1767, 1770, 1772-1777, 2986, 3087, 3094, 3096-3100, 3102, 4373, 4374, 4376, 4380
- G: 263, 472, 814, 1435, 1566, 1606, 2224
- P: 472, 642, 643
- E: 125, 748, 757, 1450, 1451
- see also Starch components
- , structural studies
 - C: 293, 3084, 3093, 4375, 4377
 - G: 29, 34, 1934, 1942, 2423, 2528
 - P: 271, 273
 - E: 110(review), 125

Polyurethanes, see Urethanes and polyurethanes

Porphyrins and metalloporphyrins

- C: 939-941, 1114, 2674, 3686, 3690, 3824, 4803, 4806, 4807
- G: 348, 973, 1288, 1698-1700
- P: 145, 718
- E: 604, 1246, 1269, 1918, 2502

Potassium, see Alkali metals

Pregnane derivatives, techniques

- C: 403, 407, 413, 1892, 1893, 1897, 4471-4474
- P: 91.687
- , applications, non-biological
 - C: 406, 1894, 1895, 2159, 3204, 3205, 4477, 4478
 - P: 90, 522
- --- , --- , biological
 - C: 404, 405, 408-411, 1896, 1898, 3201, 3202, 4476
 - G: 868, 1631, 2278
 - P: 521

Prostaglandins and thromboxanes

- C: 357-359, 1816, 1841-1846, 2022, 3170-3172, 4431
- G: 288-290, 448, 855-858, 1304, 1612-1614, 2258-2263
- P: 243, 616, 652

Protamines, histones and other nuclear proteins (including chromatin proteins)

- C: 650, 651, 656, 2147, 2148, 3462-3466, 4665
- E: 232, 308, 305-307, 309, 896, 951-957, 1643, 1649-1653, 2253-2256
- -, -, structural studies
 - C: 2148
 - E: 308, 956

Proteins

- C: 578-725, 2051-2196, 3370-3520, 4619-4700
- G: 926
- P: 351
- E: 195-379, 839-1036, 1527-1713, 2165-2324
- , reviews and books
 - C: 573, 578, 589, 602, 606, 607, 1364, 1582, 1964, 2051, 2056, 2060, 2066, 2077, 2117, 2784, 3379, 3384, 3385, 3387, 3393, 3423, 3509, 4656
 - P: 92
 - E: 207, 226, 243, 841, 851, 876, 1608, 1619, 2166
- -, general techniques
 - C: 31, 96, 99, 109, 122-124, 490, 579-588, 590-601, 603-605, 608, 755, 1166, 1431, 1503, 1550, 1559, 1569, 1575, 1591, 1595, 1597, 1603, 1605, 1971, 2047, 2052-2055, 2057-2059, 2061-2065, 2067-2076, 2172, 2325, 2868, 2880, 2889, 2891, 2898, 3370-3378, 3380-3383, 3386, 3388, 3431, 4071, 4263, 4268, 4619-4624
 - E: 4, 27, 40, 46, 60, 73, 76, 86, 92, 93, 194, 195-206, 208-225, 284, 352, 366, 668, 672, 674, 679, 680, 727, 732, 742, 834, 839, 840, 842-850, 852-859, 1316, 1317, 1371, 1402, 1436, 1439, 1527-1539, 1992, 2022, 2023, 2025, 2027, 2032, 2052, 2066, 2068, 2070, 2151, 2165, 2167-2181, 2534

see also Glycoproteins, lipoproteins

- -, -, sequence and structural studies
 - C: 518, 567, 573(review), 594, 616, 1573, 2031, 2040, 2044, 2047, 2076, 3345, 3346, 3356, 3361, 3362, 3367, 3401, 4546, 4561, 4566, 4614, 4615
 - E: 188-191, 194, 200, 213, 677, 727, 825-827, 834, 835, 838, 1516, 1517, 1520, 1522, 1538, 2160, 2162-2164

see also structural studies on individual categories of proteins

- , cells, subcellular particles and viruses (including ribosomal proteins)
 - C: 609, 611, 613-615, 1788, 2077(review), 2078-2088, 2282, 3277, 3389-3392, 3393(review), 3394, 3407, 3630, 4625, 4626
 - E: 227-242, 243(review), 244, 245, 308, 342, 350, 424, 470, 478,

860-875, 876(review), 877-884, 1005, 1018, 1024, 1532, 1540-1546, 1548-1562, 1570, 1580, 1682, 1697, 1734, 1779, 1825, 1962, 2182-2207, 2264, 2293, 2308

Proteins, cells, subcellular particles and viruses (including ribosomal proteins), structural studies

- C: 563, 569, 572, 610, 612, 2088, 3355, 4597
- P: 709
- E: 227, 837, 2182
- , synthesized by gene manipulation
 - C: 158, 566, 616, 617, 621, 680, 681, 903, 2009, 2079, 2088, 2089-2097, 2104, 2124, 2143, 2178, 2894, 3395-3405, 3489, 3599, 4269, 4563, 4627-4635, 4640
 - E: 186, 246-251, 272, 775, 816, 875, 883, 885-892, 895, 906, 910, 927, 995, 1053, 1064, 1090, 1178, 1563-1575, 2208-2223, 2233, 2261, 2339, 2361, 2363, 2434
- , microbial and plant proteins (including proteins of foods of plant origin)
 - C: 618-621, 623, 858, 1703, 1993, 2098-2105, 2149, 2184, 2190, 3406-3408, 3410-3422, 3423(review), 3425, 3426, 3428, 4071, 4627, 4636-4642, 4683, 4695, 4700
 - P: 351
 - E: 190, 231, 237, 248, 252-278, 340, 640, 775, 865, 887, 891, 894-911, 1011, 1026, 1326, 1547, 1563, 1565, 1576-1603, 1840, 2208, 2214, 2220, 2224-2235, 2302
- —, —, structural studies
 - C: 568, 625, 2004, 3352, 3363, 3409, 3427, 4607, 4613
 - E: 833
- --- , of blood serum and blood cells
 - C: 36, 158, 590, 591, 626-644, 664, 720, 1651, 2089, 2095, 2106-2116, 2117(review), 2118-2141, 2150, 2181, 2192, 2960, 3374, 3398, 3429-3451, 4275, 4385, 4631, 4643-4653, 4655, 4656(review), 4657-4660, 4667, 4668, 4686, 4688
 - E: 10, 39, 135, 205, 228, 243(review), 246, 259, 278, 279-281, 283-296, 352, 367, 412, 494, 741, 886, 912-934, 1004-1006, 1010, 1022, 1030, 1054, 1254, 1371, 1527, 1533, 1539, 1571, 1572, 1604-1607, 1608(review), 1609-1618, 1619(review), 1620-1631, 1657, 2087, 2236-2247, 2260, 2291

see also Lipoproteins; Chromoproteins and metalloproteins; Specific binding proteins (receptors)

- --- , --- , structural studies
 - C: 2041, 2048, 2127, 3340, 4599
 - E: 282, 1610
- , structural proteins (except contractile elements)
 - C: 479, 645, 649, 2143, 2144, 3452-3454, 3457, 3459-3461, 4654, 4661, 4664, 5105
 - E: 302-304, 818, 935, 938-940, 943-945, 947, 1034, 1036, 1632-1638, 1644-1647, 2069, 2185, 2250, 2304
- ___, ___, structural studies
 - C: 646, 647, 2146
 - E: 944, 945, 2159, 2161
- -, of brain, nerves, cerebrospinal fluid and eye
 - C: 679-686, 688, 746, 2173-2176, 3488, 4678-4682
 - E: 138, 293, 328-333, 385, 400, 438, 469, 983-992, 1034, 1569, 1671-1676, 2270-2275
- __ , __ , structural studies
 - C: 687, 2038, 2050, 3348, 4609, 4612

For eye pigments see Pigments natural (and fluorescent substances)

Proteins, of muscle and meat products (including related contractile proteins)

- C: 580, 648, 2142, 2145, 3455, 3456, 3458, 4662, 4663
- E: 297-301, 400, 482, 936, 937, 941, 942, 946, 948-950, 1606, 1637, 1639-1643, 1648, 1719, 2248, 2249, 2252
- --- , --- , structural studies
 - C: 3351, 3358, 4603, 4608, 4610
 - E: 946, 1515, 1524
- , of glands and gland products (except mammary gland), various zymogens
 - C: 673, 675, 678, 684, 695, 607, 705, 2164, 2166, 2170, 2172, 2468, 3480, 3483, 3486, 4275, 4676, 4698
 - E: 29, 308, 321-323, 326, 327, 330, 337, 342, 475, 969, 971, 972, 976-980, 982, 1140, 1663-1669, 1697, 2244, 2264-2266, 2768, 2319
- , , structural studies
 - C: 678, 3357, 3479
 - E: 1525, 1661
- ---, of milk
 - C: 671, 674, 676, 2139, 2165, 2168, 3481, 3482, 3484, 3485, 4675, 4677
 - E: 164, 319, 320, 974, 1662, 2267, 2269
- —, —, structural studies
- C: 2165, 3368
- , of eggs
 - C: 1602, 2073
- , urinary
 - C: 721, 4697
 - E: 360-364, 369, 1031, 1032, 1699-1703, 2317, 2318
- -, from neoplastic tissue
 - C: 637, 689, 2177, 2178, 3451, 3489
 - E: 235, 767, 993-998, 1564, 1628, 1677, 1678, 2276-2280, 2314, 2422
- ___, ___, structural studies
 - E: 192
- -, complex mixtures and uncompletely specified proteins
 - C: 2175, 2193-2195, 3406, 3517, 3519, 4698-4700
 - E: 259, 366, 367, 1033-1036, 1704, 1705, 1709-1712, 2319-2324

Psychostimulants

- C: 1268, 2333, 2403, 2591, 3894(review), 3900, 4984, 5073
- G: 437, 439, 456, 1086, 1091, 1108, 1109, 1132, 1815, 1818, 1821, 1823, 1825, 1828, 1832, 1859, 1861, 2431, 2437, 2449

Psychotropic drugs

- C: 1227, 1266, 2570, 2573, 3869(review), 3914
- G: 458, 1098, 1105, 1830

Purgatives

P: 426

Purine alkaloids (xanthines)

- C: 84, 923, 927, 932, 1212, 1232, 1723, 2331, 2333, 2403, 2579, 2580, 3678, 3681, 3683, 3684, 3795, 4789, 4796
- G: 1691
- P: 142, 143, 393
- E: 7, 601, 602, 1916, 1917, 2497

Purines, pyrimidines, nucleotides, nucleosides

- C: 871-897, 2301-2318, 3640-3661, 4772-4783
- G: 341-343, 927-929, 1690-1692, 2333-2335
- P: 128-132, 352-357, 535-537, 712
- E: 446-453, 1130-1133, 1790-1794, 2400-2404

Purines, pyrimidines, nucleotides, nucleosides, reviews Pyridine and piperidine derivatives, carboxylic acids C: 876, 894 C: 222, 5008 E: 448, 2400 E: 606 -, techniques see also Nicotinic acid and derivatives C: 519, 873, 880, 887, 890, 895, 896, 912, 915, 976, 977, 1640, **Pyridones** 2303, 2307, 2314, 2316, 2317, 2674, 3640, 3641, 3643, C: 948 3650-3653, 3655-3659, 3661, 3667, 3684, 3697, 4772, 4775. P: 146 4777, 4778, 4783, 4785 Pyridoxine, see Vitamins, B₆ group G: 341-343, 929, 2333 Pyrimidines, see Purines, pyrimidines, nucleosides, nucleotides P: 129, 243, 352, 353 γ-Pyrone derivatives, see Flavonoids and γ-pyrone derivatives E: 449, 451, 820, 1130, 1132, 1133, 1792, 1793, 1917, 2404 Pyrroles, pyrrolidines and pyrrolidones - , analogues of purines, pyrimidines, nucleotides and nucleosides C: 222, 938, 3998, 4804, 4805 C: 203, 871, 874, 875, 877, 880-882, 887, 1212, 2301, 2302, G: 418, 803, 1070, 1266 2304, 2305, 2314, 2596, 2608, 2625, 2642, 3645, 3654, 3659, P: 527, 719 3660, 3719, 3957, 3980, 4773, 4774, 4776, 4779, 4780, 4785, E: 2501(review) 4809, 5005, 5022, 5031, 5032, 5065, 5071 see also Bile pigments; Porphyrins and metalloporphyrins G: 927, 928, 1692, 2335 Pyrrolizidine and pyrrolizide alkaloids P: 129, 724 C: 4790, 5081 E: 29, 601, 1131, 2402 G: 2336 - , applications, non-biological P: 714, 716 C: 879, 2315, 3642, 3649, 4782 G: 1404 P: 355 Q E: 1791 – , — , enzymic Quinazolines C: 885 C: 4966 G: 1692 Quinoline and isoquinoline alkaloids P: 131 C: 936, 2341, 3679 —, —, microorganisms F: 2498 C: 885, 912, 3647, 4781 Quinolines and isoquinolines P: 130, 536, 537 C: 938, 956, 1251, 1343, 2347, 2349, 3784 E: 2155 G: 352, 946 --- , --- , plants P: 31, 109, 243, 412, 616 C: 2309 Quinolizidine alkaloids P: 354, 535 P: 362, 366 — . — . animal material Quinones C: 525, 871, 872, 884, 888, 889, 891, 892, 897, 976, 2308, 2310, C: 227, 240, 938, 1738, 5092 2311, 2313, 2314, 2382, 2567, 3282, 3490, 3644, 3648, 3660 G: 252 P: 128 P: 37, 261, 266 E: 345, 1131 -, -, food products G: 1690 R **Pyrazines** C: 958, 1739 Radioactive and other isotope compounds P- 269 C: 1539, 2776-2779, 3269, 4133, 5123 see also Diazines Pyrazoles P: 230, 231, 450, 451, 610-612, 786-789 Radiopharmaceuticals G: 803 C: 1329, 3901, 4134 P: 182 Rare earths Pyrethrins (and other natural insecticides) C: 1398, 1408, 1415-1417, 2367, 2741, 2745, 2749, 2751, 5108, C: 2343, 2454, 2456, 2843, 3798, 4042, 4907 G: 334, 399, 1053, 1056, 1754, 1784, 1785, 2406, 2413, 2414 P: 180 P: 444, 606, 607, 780 E: 1974 Pyridine and piperidine derivatives Rauwolfia alkaloids C: 947, 1739, 2347, 2993, 3695, 3696, 3748, 4228, 4501 C: 934, 2340 G: 19, 640, 1907 P: 364 P: 269, 409, 760 Repellents, see Larvicides, insecticides E: 1247 Resins, alkyd

G: 1215, 1802

Resins, phenolic C: 4240 G: 1794, 1806, 2422 --- , polyester C: 1126 G: 1068, 1949 - , polyethylene and polypropylene glycols C: 82, 112, 223, 1120, 1145, 2483, 3235 --- , poly(vinyl acetate) G: 1788 - , poly(vinyl chloride) C: 1128, 1134 G: 1271 - , poly(vinylidene fluoride) - , poly(vinylpyrrolidone) C: 1146, 4915 G: 1060 see also Acrylic resins; Epoxy resins; Polyolefins; Rubber (natural and synthetic); Styrene polymers RNA, reviews C: 907, 3666 E: 456, 462, 468, 471 - , techniques C: 593, 899, 2319, 2320, 3665, 4777, 4786 E: 457, 467, 477, 531, 857, 889, 1139, 1146, 1165, 1166, 1371, 1535, 1797, 2027, 2103, 2424 - , applications, non-biological applications (in vitro processing) C: 879, 2327, 3663, 3664, 4784 E: 238, 458-460, 463-466, 470, 474, 478, 480, 481, 483, 578, 977, 990, 1136-1138, 1142, 1143, 1145, 1147, 1149-1154, 1156, 1157, 1160, 1161, 1163, 1177, 1564, 1673, 1745, 1796, 1799, 1804, 1812, 1818-1822, 1889, 1909, 2200, 2300, 2321, 2405, 2408-2410, 2412, 2417, 2420, 2422, 2423, 2425, 2427-2432, 2436-2441, 2443, 2444, 2446, 2455, 2470 - , - , microorganisms C: 901, 3422, 3662 E: 476, 479, 482, 519, 1158, 1815, 2433, 2434 -- , -- , plants E: 2235 — , — , animal material C: 898, 900, 2321, 3664 E: 143, 333, 373, 397, 407, 410, 454, 455, 461, 469, 472, 473, 475, 485, 1134, 1135, 1140, 1141, 1144, 1148, 1154, 1155, 1159, 1162, 1164, 1188, 1211, 1646, 1720, 1795, 1796, 1798, 1800-1803, 1805-1811, 1813, 1814, 1816, 1817, 2406, 2407, 2411-2416, 2418, 2419, 2421, 2426, 2428, 2432, 2435, 2442, 2445, 2482 - , structural studies C: 3663, 3672 E: 448(review), 463, 526, 544-547, 558(review), 1164, 1175, 1208, 1219, 1868, 1869, 2368 Rodenticides C: 4413 G: 918, 1674 E: 151, 1251

Rubber natural and synthetic (inclusive pyrolysis products)

C: 3836, 4912

G: 1229, 1481

Rubidium, see Alkali metals

S

Saponins and sapogenins

- C: 430, 432-434, 1351, 1356, 1921, 1923, 1924, 1926, 3213, 4027, 4028, 4031-4034
- P: 136, 336, 366, 524, 583, 693, 694, 772
- E: 632

Secretolytics

E: 1951, 1953

Selenium compounds, inorganic, see Cations, inorganic, analytical group IIb

- --- , organic
 - C: 4811
 - G: 377, 920, 922, 925, 1725, 1726, 2371, 2375
 - E: 2542

Sexual attractants, see Pheromones

Sialic acids, see Glycosaminoglycans

Silicium compounds, inorganic

- C: 4125
- G: 971, 2373
- organic
- G: 370, 378, 596, 969, 1071, 1727, 1787, 1805, 2372-2374

Silver, see Cations, inorganic, analytical group I and Ila

Snake venoms, see Venoms, snake

Sodium, see Alkali metal

Soil pollution

- C: 181, 212, 214, 229, 1110, 1383, 2455, 2709, 2712, 3784, 3807, 3816, 4059, 4300, 4402, 4413, 4884, 4894, 5171
- G: 194, 195, 221, 235, 403, 523, 524, 743, 770, 954, 967, 1027, 1041, 1045, 1195, 1202, 1207, 1216, 1313, 1471, 1473, 1482, 1491, 1495, 1502, 1504, 1534, 1541, 1545, 1717, 1750, 1772, 1776, 1777, 2014, 2131, 2133, 2135, 2139, 2145, 2163, 2207, 2240, 2360, 2361, 2384, 2388, 2402, 2404, 2501, 2514
- P: 229
- E: 128, 2130

see also individual polluting compounds

Spasmolytics

- C: 4001, 4811, 4967
- G: 425, 438, 974, 1090, 1093, 1824, 2432, 2439

Specific binding proteins (receptors)

- C: 172, 690-712, 714-720, 738, 1890, 2153, 2179-2192, 2233, 3123, 3388, 3490-3505, 3507, 3508, 3509(review), 3510-3516, 3841, 4393, 4440, 4460, 4466, 4654, 4683-4685, 4687-4696
- E: 29, 180, 240, 247, 281, 334-359, 368, 455, 505, 780, 801, 928, 999-1030, 1463, 1476, 1564, 1669, 1679-1688, 1690-1698, 2090, 2103, 2168, 2187, 2193, 2242, 2276, 2281-2316, 2323, 2425
- , structural studies
 - C: 709, 713, 3277, 3342, 3343, 3347, 3357, 4602, 4604 E: 1518, 2300
- Sphingolipids (sulfatides, gangliosides, ceramides, cerebrosides)
 - C: 370, 371, 378, 388, 392, 1854, 1871, 1883, 3495, 4436, 4448, 4456
 - G: 1579

G: 1708

E: 1277, 1278, 1284(review), 1285, 1286, 1961-1964

P: 41, 60, 61, 69, 73, 75, 77, 80, 82, 87, 286, 287, 300, 301, Sulphatides, see Sphingolipids 310-312, 316, 317, 321, 323, 325, 326, 344, 487, 489, 496, Sulphides (thioethers) and polysulphides 498, 505, 506, 510, 664, 665, 667, 671-673, 676-679, 683 C: 968 E: 134, 1472 G: 490, 559, 1250, 1254, 1707, 1711-1713, 1716, 2038, 2551 Stabilizers, see Plasticizers and stabilizers Sulphonamides Starch components C: 1284, 1296, 1297, 1334, 2597, 2599, 2606, 2610, 2905, 3844. C: 280, 297(review), 3085, 3100 3951, 3952, 3960, 5015, 5018 P: 687 G: 445, 954, 1414, 2459 see also Polysaccharides P: 200, 756 Steroid alkaloids E: 1947, 1987 C: 926, 2332, 2342, 5081 Sulphonate esters P: 136, 359 C: 3034, 5097 Steroids G: 1595, 1925, 1926 C: 403-429, 1892-1922, 3200-3212, 4471-4489 Sulphones G: 296-305, 867-881, 1628-1640, 2278-2286 C: 2673 P: 88-96, 327-334, 520-523, 687-692 G: 953, 1765 E: 151, 804, 1491-1493 Sulphonylamines — , reviews and books G: 192, 390, 517, 1919, 1924 C: 1918, 1920 Sulphoxides G: 941 C: 965, 3700, 3703, 3706 P: 334 G: 559, 1765 — , general techniques and theory P: 149 C: 403, 428, 429, 1603, 1921, 1922, 3200, 4279 Sulphur compounds, inorganic G: 2124 C: 1424(review), 1435, 2722, 2758, 2768, 4058, 4119, 4121, 4123, 4124, 4126, 4127, 4506, 5158, 5168, 5171 P: 88, 89, 243, 616 see also Androstane derivatives; Oestrogens; Pregnane derivatives; G: 558, 561, 562, 1210, 1250, 1254, 1715, 1961, 2548, 2549, 2551 Sterols, reviews E: 1294, 1295, 2554, 2555 C: 422 - , organic, techniques P: 454 C: 965, 967, 969, 1981, 2356, 2359, 2722, 3699, 3702, 3705, techniques 3707, 3708, 4187, 4808, 4816, 5099 C: 418-420, 1849, 1901, 1907, 4480, 4485 G: 948, 1210, 1347, 1705, 1710, 1714, 1715, 1991, 2033, 2035, G: 303, 874, 876, 878, 879, 1155, 2285 2349; 2351, 2353, 2354, 2551 P: 10 P: 149, 308, 723 - , applications, non-biological E: 1323 --, ---, acids and derivatives C: 380, 423, 4479, 4481, 4483 G: 299, 302, 873, 1636, 1637 C: 103, 963, 970, 972, 1384, 1386, 2355, 2357, 2474, 2710, P: 94, 98, 328, 329, 689, 690 3701, 3709, 4435, 4809, 4810, 4812-4815 -, -, biological G: 354-356, 490, 520, 539, 950, 955, 1254, 1707, 1709, 1717, C: 391, 394, 415-417, 421, 995, 1848, 1902-1906, 1908, 3176, 2339 3208, 3209, 4029, 4482, 4484, 4708 P: 148, 656, 724, 756 G: 300, 301, 304, 305, 875, 1236, 1240, 1464, 1585, 1600, 1622, E: 639, 2503 1627, 1635, 1638, 1639, 2283, 2284, 2286, 2468 see also Heterocyclics, sulphur P: 74, 78, 92, 93, 327, 479, 486, 497, 523, 586, 688 Sulphur elemental E: 804, 1491 C: 4119 Stimulants, see Psychostimulants G: 1710, 1713 Strontium, see Alkaline earths P: 449 Strychnine group oxides P: 358, 360 C: 1829 Styrene polymers (inclusive pyrolysis products) G: 559, 561 C: 2472, 2479, 2482, 2825, 3832, 3835, 3838, 4163, 4164, 4170 E: 649 G: 416, 420, 1265, 1282, 1789, 1797, 1801, 1803, 1804, 1809, Surfactants, emulsifiers and detergents 2042, 2416 C: 1384-1386, 1645, 2070, 2605, 2710-2717, 4060-4063, 4440, E: 2053 4919, 4926, 5096-5100 G: 527-529, 1208, 1925-1930 Subcellular particles C: 498, 1397, 2727, 2729, 4071, 4075, 4076, 4077(review), 4079 P: 254, 408, 437, 438, 596, 776

E: 639, 649, 1273, 2554

C: 2729, 3464, 4409, 5107

E: 1279, 1280, 1282, 1283, 1286, 2535, 2536(review), 2537,

Suspensions, various

Thiocyanates and isothiocyanates 2541 Sweeteners, artificial C: 962 G: 353, 358-360, 496, 949, 1706, 1889, 2347, 2350, 2543 C: 1328, 2692 G: 1887 Thioglucosides F: 2140 C: 3704 Sympathicomimetics, see Adrenergic and adrenergic blocking agents E: 1921 Thiols C: 83, 222, 964, 971, 1968, 2358, 4192 T E: 2503 Thiophenes Tannins G: 357, 952, 2348 C: 1706, 1707, 1717, 1730, 1731, 2683, 2695, 4330 Thioureas Tantalum, see Cations, inorganic analytical group III C: 959, 2451, 2673 Technetium, see Cations, inorganic, analytical group IIb Thorium, see Cations, inorganic, analytical group III Tellurium, see Cations, inorganic, analytical group IIb Tin, inorganic, see Cations, inorganic, analytical group III Terpenes C: 435-446, 1927-1929, 3214-3218, 4493-4498 C: 983, 2369, 2677, 2742, 4825 G: 307-321, 882-909, 1641-1663, 2287-2307 G: 366-368, 372-375, 960-962, 965-968, 1721, 2360-2362, 2364-P: 97-106, 337-339, 526, 695 2370 E: 2127 E: 709 , general techniques Titanium, see Cations, inorganic, analytical group III C: 446, 1927, 2968, 3214, 4497 Toad venoms, see Venoms, other G: 885, 1306, 1434, 2287 Tobacco alkaloids - , applications C: 935, 1345, 2337, 2339, 2344, 4011, 4791 C: 435-439, 443-445, 975, 1318, 1358, 1737, 1908, 1929, 2637, G: 943 3176, 3213, 3215, 4027, 4034, 4035, 4493-4496 Tocopherols, see Vitamins, E G: 307, 309, 311, 312, 317, 480, 678, 691, 809, 882-884, 887, Toxicological (and forensic) analysis, reviews and books 891, 892, 900, 1018, 1311, 1358, 1426, 1641, 1643-1646, C: 2505, 2676, 2678, 3847, 3894, 4705, 5076, 5077 1657, 1662, 1867, 1870, 2268, 2288, 2289, 2293 P: 2 P: 97-99, 103, 105, 151, 268, 367, 486, 583, 733 E: 1270 E: 2127 , general techniques - , acids C: 917, 2574, 2590, 2674, 3956, 4015, 4016, 4019, 4024, 4902. C: 343, 4286 4903, 5072-5074, 5078, 5080 G: 283, 693 P: 6, 419, 581, 764, 765 P: 100, 337 E: 599, 726, 1269, 2527-2529 — , alcohols —, applications C: 343, 440-442, 1695, 1698, 1928, 3213 C: 204, 337, 931, 951, 970, 1200, 1246, 1255, 1344-1347, 2671, G: 487, 693, 886, 888, 890, 893, 909, 1425, 1431, 1433, 1642, 2675, 2677, 2744, 3161, 3645, 3721, 3918, 4006, 4011-4014, 2290, 2294, 2521 4017, 4018, 4020-4023, 4025, 4191, 4329, 4343, 4788, 4789, P: 100-102, 104, 106, 257, 338, 733 4801, 4826, 4990, 4991, 5075, 5079 — , resins G: 1135, 1828, 1855 G: 234, 885, 894, 1140, 1236, 1358, 1657, 1935 P: 207, 401, 420, 582, 713, 762, 763 Tetracyclines E: 1952, 2497, 2500 C: 1034, 1038, 1043, 1048, 1083, 2404, 2426, 2431, 3768, 4874 see also Proteins of blood, serum and blood cells P: 375, 736 Toxins (non-proteinous or unidentified) E: 2505 C: 951, 1317, 1955, 4014, 4020, 4021, 4213, 4804, 5079 Tetrazoles G: 241, 243, 796, 1701, 2204 C: 950 E: 2501(review) Textile dyes (including bleaching agents) see also Aflatoxins; Mycotoxins P: 182, 386 -, proteinous Thallium, see Cations, inorganic, analytical group I and Ila C: 622, 624, 672, 854, 2024, 3308, 3424, 3520, 4578 Thiamine, see Vitamins, B. Thiazoles, isothiazoles and thiazolones see also Proteins of glands and gland products; Venoms; individ-C: 222, 966, 970 ual enzyme types P: 243, 245, 404, 725 -, ---, structural studies Thiocarbamates C: 4578, 4585 C: 961 G: 795 P: 445

E: 274

G: 1798

P: 616 Tranquilizers (anxiolytics) C: 143, 1238, 1240, 1242, 1245, 1246, 1252, 1267, 1272, 1662, Triazoles 2345, 2549, 2554, 2555, 2571, 2575, 2584-2586, 2590, 2594, C: 1252 3891, 3893, 3895, 3896, 3906, 3911, 3924, 3938, 3940, 3941, P: 541 4251, 4971, 4979, 4994 Tropine alkaloids G: 72, 430, 436, 438, 444, 1102, 1106, 1833, 1834, 1838, 2445, C: 922, 925, 931, 1258, 1338, 1347, 2334, 4512, 4788, 4801, 2446, 2448, 2482 5062, 5080 P: 192, 401, 406, 571 G: 934, 1855 Transferases, transferring one atom groups (methyl-, hydroxy-, P: 144, 428, 713 formyl-, carbonyl-, carbamoyl-, amidine) and related transferases E: 2500 Trypsin inhibitor (antitrypsin) C: 771, 2219, 2656, 3277, 3548, 4716 C: 724, 1764, 3518, 4573 E: 1733, 1734, 2340 E: 203, 279, 1699, 1701 -, -, structural studies **Tuberculostatics** C: 2049, 3341 C: 1292, 5008, 5155 --- , transferring acyl- and aminoacyl groups (E.C. 2.3.-.-) Tungsten, see Cations, inorganic, analytical group IIb C: 778, 2223, 3543, 3547, 3551, 4686, 4720 E: 388, 393, 1058, 1731, 1732, 2345 --- , --- , structural studies U C: 2223, 3359 E: 1521 Ubiquinones (coenzyme Q) - , transferring glycosyl residues (hexosyl and pentosyl transferases) C: 442, 1858 (E.C. 2.4.-.-) Uranium, see Actinides and uranium C: 760, 762, 764, 766, 768, 770, 773, 774, 776, 2216, 2220-Urea and urea derivatives 2222 C: 1952, 1953, 4517, 4518 E: 391, 1059, 2342, 2344 G: 520, 945, 1704 --- , ---- , structural studies E: 805 C: 777, 2220 see also Thiourea E: 394, 828, 1735 Urethanes and polyurethanes (including pyrolysis products) — , transferring alkyl or aryl groups (E.C. 2.5.-.-) C: 2492, 3837, 4916, 4917 C: 761, 763, 767, 769, 775, 779, 2217, 2225-2227, 3545, 3550, G: 1786 4718, 4721-4723 E: 2515 E: 389, 390, 392, 1055, 1060, 1063, 1588, 1737, 2346 Uricosuric drugs --- , --- , structural studies C: 1325, 2652, 3984 C: 2036, 2215, 3350 Uric acids E: 1055, 1060 C: 1344, 2306, 3697, 4847 --- , transferring nitrogenous groups (E.C. 2.6.-,-) P: 114, 687 C: 772, 3544, 3546, 4717 E: 1056, 1061, 1736, 2343 -- , --- , structural studies C: 4606 — , transferring phosphorus containing groups (E.C. 2.7.-.-) Vanadium, see Cations, inorganic, analytical group IIb C: 780-798, 2098, 2228-2238, 3390, 3552-3566, 4724-4734, Vasodilatants (including coronar vasodilatants) 4736(review) C: 1186, 1195, 1196, 1211, 1215, 2358, 2533, 2542, 3886, 4964, E: 395-403, 899, 984, 1064-1067, 1437, 1545, 1567, 1738-1753, 5082 2197, 2210, 2223, 2347-2358, 2425 G: 1096, 1116, 1816, 1819, 1820 - , - , structural studies E: 2149 C: 576, 2039, 2042, 2045, 2046, 3354, 3365, 4605, 4728, 4729 Venom, snake E: 824, 829, 1526, 1744 C: 533, 677, 1554, 1575, 2169, 2171, 3487 transferring sulphur containing groups (E.C. 2.8.-.-) E: 324, 325, 975, 981, 1670 C: 765, 2218, 2224, 3549 — , — , structural studies E: 1057, 2341 C: 677, 2171 - , other and uncompletely identified E: 325, 981 C: 4719 - , other - , activity measurements C: 555, 672, 2163, 2167, 3520, 4576, 4585 C: 772, 787, 3564, 4717 E: 970, 973 E: 900 see also Proteins, of glands and gland products; Toxins, protei-Triazines and triazanes nous; individual enzyme types C: 1317, 1423, 1943

Vinca alkaloids C: 2635, 2647, 3680, 3982, 4794 Vitamins (for vitamin protein complexes, see Specific binding proteins) C: 989-1027, 2371-2394, 3728-3759, 4828-4854 G: 381, 382, 974-980, 2376 P: 152-154, 368-371, 728 E: 611-614, 1249 -, reviews and books C: 1003, 3740 G: 2291 P: 454 - , techniques for fat soluble vitamins C: 989, 1020, 3741 P· 154 - , techniques for water soluble vitamins C: 1008, 1025, 3756, 4831 G: 2482 P: 154 E: 614 - , A group (including synthetic retinoids) C: 702, 993, 994, 999, 1005, 1011, 1013, 1014, 1016, 1017, 1021, 1027, 1116, 1117, 1119, 1858, 2371, 2374, 2377, 2380, 2386, 2392, 2393, 3204, 3728, 3733, 3739, 3740(review); 3747, 3751, 3753, 3754, 4232, 4828, 4829, 4832, 4835, 4836, 4838, 4842, 4844, 4846, 4851, 4852 G: 889 P: 558, 728 E: 359, 611, 612 see also Pigments, natural (and fluorescent substances) — . B. C: 998, 1006, 2373, 2390, 3730, 3737, 4830, 4854 P: 369 - , B2 and other flavins C: 1010, 1019, 2086, 2373, 3750, 4830, 4837, 4839 P: 369 — , B₆ group C: 1001, 1007, 2373, 2383, 2385 --- , B₁₂ group (Cobalmin) C: 1004, 3757 P: 704 — , biotin group C: 462, 990, 1012, 2384, 4843 P: 152 — , C group C: 991, 997, 1709, 2381, 3249, 3734, 3735, 3744, 3758, 4840, 4845, 4847, 4849 G: 980, 1269 E: 613, 634 - D group C: 996, 1000, 1014, 1026, 2375, 2391, 2697, 3742, 3743, 3745, 3746, 3755, 4850, 4853 G: 382, 1731, 2376 P: 371, 454(review) — , E

C: 498, 993, 1002, 1014-1016, 1022-1024, 1027, 1858, 2372,

G: 381, 978, 979, 1451, 1464

P: 370, 523

2376-2378, 2388, 2393, 2394, 2721, 3209, 3729, 3732, 3733, 3751, 3753, 3759, 4029, 4834, 4835, 4841, 4846, 5138

```
Vitamins, K group
    C: 2697, 3749
    G: 977
   P: 153
Volatiles, flavours, odours, see Organoleptics
W
Water
   C: 2774
    G: 1252, 1253, 1320, 1960, 1965, 2023
Water analysis and pollution
    C: 329, 334, 450, 1086, 1088, 1089, 1091, 1093, 1099-1101,
       1104, 1365, 1377-1382, 1386, 1427, 1535, 1549, 1681, 1705,
       1943, 2359, 2434, 2435, 2444, 2700-2702, 2704-2708, 2736,
       2750, 2762, 2766, 2768, 2779, 2849, 2895, 2964, 3032, 3033,
       3058, 3220, 3784, 3799, 3801, 3804, 3806, 3811, 3819,
       4056-4058, 4060, 4067, 4088, 4095, 4281, 4299, 4306, 4325,
       4327, 4364, 4402, 4418, 4571, 4810, 4880, 4896, 4898,
       5090-5094, 5099, 5100, 5133, 5150, 5156, 5173, 5174
    G: 50, 57, 148, 151, 156, 202, 207, 212, 222, 224, 232, 236, 247,
       259, 285, 287, 323, 371, 373, 375, 386, 388, 402, 411, 513-
       516, 519, 521, 675, 749, 750, 761, 773, 774, 795, 804, 887,
       960-962, 968, 983, 984, 986, 1001, 1002, 1004, 1007, 1009,
       1017, 1024, 1032, 1033, 1045, 1047, 1052, 1188, 1193-1195,
       1197-1199, 1201, 1203, 1204, 1233, 1329, 1390, 1394, 1422,
       1469, 1474, 1479, 1487, 1499, 1500, 1504, 1513, 1514, 1529,
       1530, 1533, 1582, 1666, 1675, 1723, 1735, 1736, 1740-1742,
       1744, 1746, 1757, 1761, 1763, 1768, 1907, 1908, 1916-1918,
       1920-1923, 1927, 1931, 2014, 2095, 2131, 2136, 2138, 2142,
       2151, 2160, 2177, 2191, 2244, 2361, 2384, 2394, 2396, 2397,
       2402, 2501, 2508-2512
    P: 29, 32, 173, 174, 222, 552
    E: 128, 637, 638, 1271, 1272, 1295, 1297, 1298, 2130, 2510,
       2553
   see also individual polluting compounds
   C: 236, 1087, 1374, 2703, 4137, 4157
    E: 88, 101, 1977, 1978
Waxes
   C: 2724
   G: 1619, 2245, 2270, 2536
   P: 633
```

Z

X

Zinc, see Cations, inorganic, analytical group III Zirconium, see Cations, inorganic analytical group III

Xanthine alkaloids, see Purine alkaloids

X - ray contrast media

C: 3993

		A.M. A.M.		
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	2 n .			

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