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Bibliography Section

Liquid Column Chromatography

1. REVIEWS AND BOOKS

- 3436 Ahuja, S.: *Chemical Analysis: Trace and Ultratrace Analysis by HPLC*. Vol. 115, Wiley, New York, 1992, 419 p.; C.A., 116 (1992) 120004q.
- 3437 Chaiken, I., Rose, S. and Karlsson, R.: Analysis of macromolecular interactions using immobilized ligands. *Anal. Biochem.*, 201 (1992) 197-210 - a review with 54 refs.
- 3438 Dernick, R. and Stauder, V. (Editors): *Sixth Fast Protein Liquid Chromatography*. Seminar. Titisee (Germany), February 27 - March 1, 1991. *J. Chromatogr.*, 1991, Vol. 587, No. 1, Elsevier, Amsterdam, 1991, 126 p.; C.A., 116 (1992) 124353a.
- 3439 Dybczynski, R.: Role of ion-exchange and extraction chromatography in neutron activation analysis. *J. Chromatogr.*, 600 (1992) 17-36 - a review with 77 refs.
- 3440 Fujimoto, C. and Jinno, K.: Chromatography/FT-IR spectrometry approaches to analysis. *Anal. Chem.*, 64 (1992) 476A-481A.
- 3441 Kawa, S. and Uno, B.: (Derivatization reactions for high-performance liquid chromatography). *Gifu Yakka Daigaku Kiyo*, (1991) 1-17; C.A., 115 (1991) 294073f - a review with 177 refs.
- 3442 Majors, R.E.: Trends in HPLC column usage. *LC-GC*, 9 (1991) 686-693; C.A., 116 (1992) 75295x - a review with 5 refs.
- 3443 Scott, R.P.W.: *Liquid Chromatography Column Theory*. Wiley, Chichester, 1992, 279 p.; C.A., 116 (1992) 114241y.
- 3444 Shah, V.P., Midha, K.K., Dighe, S., McGilveray, I.J., Skelly, J.P., Yacobi, A., Layloff, T., Viswanathan, C.T., Cook, C.E., McDowall, R.D. et al.: Analytical methods validation: bioavailability, bioequivalence and pharmacological studies. *Eur. J. Drug Metab.*, 16 (1991) 249-255.

See also 3459, 3464, 3482, 3487, 3488, 3490, 3494, 3515, 3527, 3528, 3532, 3565, 3566, 3570, 3572, 3573, 3575, 3579, 3585, 3588, 3598, 3600, 3601, 3606, 3609, 3785, 3851, 3900, 3993, 4024, 4031, 4032, 4037, 4141, 4160, 4178, 4407, 4477, 4492, 4525, 4530, 4535, 4537, 4541, 4548, 4578, 4712, 4713, 4714, 4730, 4731.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 3445 Eriksson, H., Sandahl, K. and Brewer, J.: Reactive planning for chromatography. *Chemom. Intell. Lab. Syst.*, 13 (1991) 185-194; C.A., 116 (1992) 79788h.

- 3446 Norinder, U.: Analysis of reversed-phase liquid chromatographic separations using the data-reduction methods PCR and PLS. *Anal. Chim. Acta*, 259 (1992) 105-108.
- 3447 Parker, M.: Working in harmony. *Lab. Pract.*, 40 (1991) 13-17; C.A., 116 (1992) 3087h.
- 3448 Shaw, R., Elliott, W.H. and Barisas, B.G.: Estimation of critical micelle concentrations of bile acids by reversed-phase high performance liquid chromatography. *Microchim. Acta*, 3 (1991) 137-145; C.A., 116 (1992) 46781x.
- 3449 Stevenson, R.: Chromatography currents. ISPPP '91: a glimpse into the future. *Int. Lab.*, 22, No. 5 (1992) P4-P8.
- 3450 Zoest, A.R., Hung, C.T., Lam, F.C., Taylor, R.B. and Wanwimolruk, S.: Prediction of retention in reversed phase ion-pair chromatography using sodium dodecyl sulphate as pairing ion. *J. Liq. Chromatogr.*, 15 (1992) 395-410.

For additional information see C.A.:

116 (1992) 6084r.

See also 3506, 3553, 3558, 3562, 3599, 3604, 4335.

2b. Thermodynamics and theoretical relationships

- 3451 Afzal, M., Khan, M. and Ahmad, H.: Heats of adsorption of chromatographic silica gel. *J. Chem. Soc. Pak.*, 13 (1991) 157-160; C.A., 116 (1992) 114158b.
- 3452 Bahowick, T.J. and Synovec, R.E.: Sequential chromatogram ratio technique: evaluation of the effects of retention time precision, adsorption isotherm linearity, and detector linearity on qualitative and quantitative analysis. *Anal. Chem.*, 64 (1992) 489-496.
- 3453 Blackwell, J.A. and Carr, P.W.: Development of an eluotropic series for the chromatography of Lewis bases on zirconium oxide. *Anal. Chem.*, 64 (1992) 863-873.
- 3454 Blumberg, L.M. and Berger, T.A.: Variance of a zone migrating in a non-uniform time-invariant linear medium. *J. Chromatogr.*, 596 (1992) 1-13.
- 3455 De Bokx, P.K., Baarlag, P.C. and Urbach, H.P.: Calculation and experimental verification of solute retention in liquid chromatography using binary eluents. *Sep. Sci. Technol.*, 27 (1992) 875-899; C.A., 116 (1992) 114210n.
- 3456 Kvalheim, O.M. and Liang, Y.: Heuristic evolving latent projections: resolving two-way multicomponent data. 1. Selectivity, latent-projective graph, datascope, local rank, and unique resolution. *Anal. Chem.*, 64 (1992) 936-946.

- 3457 Liang, Y., Kvalheim, O.M., Keller, H.R., Massart, D.L., Kiechle, P. and Erni, F.: Heuristic evolving latent projections: resolving two-way multicomponent data. 2. Detection and resolution of minor constituents. *Anal. Chem.*, 64 (1992) 946-953.
- 3458 Liapis, A.I. and McCoy, M.A.: Theory of perfusion chromatography. *J. Chromatogr.*, 599 (1992) 87-104.
- 3459 Meyer, V.R. and Ettre, L.S.: Early evolution of chromatography: the activities of Charles Dhéré. *J. Chromatogr.*, 600 (1992) 3-15 - a review with 43 refs.
- 3460 Renn, C.N. and Synovec, R.E.: Effect of temperature on separation efficiency for high-speed size exclusion chromatography. *Anal. Chem.*, 64 (1992) 479-484.
- 3461 Tauler, R., Durand, G. and Barcelo, D.: Devolution and quantitation of unresolved mixtures in liquid chromatographic-diode array detection using evolving factor analysis. *Chromatographia*, 33 (1992) 244-254.
- 3462 Wätzig, H.: Peak recognition technique by a computer program copying the human judgement. *Chromatographia*, 33 (1992) 218-224.
- 3463 Zhang, Y.K., Zou, H.F., Hong, M.F. and Lu, P.C.: Effect of inorganic salt concentration on the retention volume in reversed phase ion-pair liquid chromatography. *Chromatographia*, 32 (1991) 538-542.

For additional information see C.A.:

116 (1992) 92158x, 92159y, 114211p, 114220r, 120112y.

See also 3443, 3496, 3513, 3535, 3545, 3557, 3602, 3629, 3978, 4755.

2c. Relationship between structure and chromatographic behaviour

- 3464 Alkorta, I., Elguero, J., Goya, P. and Martinez, A.: (Molecular modeling: examples of application). *Rev. R. Acad. Cienc. Exactas, Fis. Nat. Madrid*, 84 (1990) 183-188; C.A., 116 (1992) 79556f - a review with 4 refs.
- 3465 Camilleri, P., Murphy, J.A., Saunders, M.R. and Thorpe, C.J.: Molecular modeling studies and the chromatographic behavior of oxiracetam and some closely related molecules. *J. Comput.-Aided Mol. Des.*, 5 (1991) 277-284; C.A., 116 (1992) 40596u.
- 3466 Lee, H.K. and Hoffman, N.E.: Retention of some simple organic anions in ion exchange HPLC. *J. Chromatogr. Sci.*, 30 (1992) 98-105.

See also 3954.

2d. Measurement of physico-chemical and related values

- 3467 Anigbogu, V.C., de la Pena, A.M., Ndou, T.T. and Warner, I.M.: Determination of formation constants for β -cyclodextrin complexes of anthracene and pyrene using reversed-phase liquid chromatography. *Anal. Chem.*, 64 (1992) 484-489.
- 3468 Hu, G., Song, L. and Song, M.: Study on the concentration effects in gel permeation chromatography (GPC). 6. A new method for determination of the radius of gyration macromolecules. *Polym. Test.*, 10 (1991) 91-99; C.A., 116 (1992) 84568r.

- 3469 Kaur, P., Mundhara, G.L., Tiwari, J.S. and Kar, H.S.: Sorption-desorption behavior of the amino acids glycine and serine on chemically pretreated silica gel in relation to chromatography. *J. Indian Chem. Soc.*, 68 (1991) 334-338; C.A., 116 (1992) 47013k.
- 3470 Klinskikh, A.F., Kuzaev, A.I. and Sokolov, M.I.: (Self-consistent procedure for gel chromatograph calibration during the determination of molecular characteristics). *Zh. Fiz. Khim.*, 65 (1991) 2724-2728; C.A., 116 (1992) 60400d.
- 3471 Ye, M.Y. and Schuler, K.H.: An application of HPLC and ion chromatography to study intramolecular charge transfer in poly-halogenated systems. *Res. Chem. Intermed.*, 15 (1991) 239-252; C.A., 116 (1992) 58565t.

For additional information see C.A.:

116 (1992) 84574q.

See also 3503, 3507, 3604, 3627, 3702, 3916, 4527, 4528, 4533, 4534, 4538, 4539, 4540.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 3472 Cazer, F.D., Scott, B.L. and Strobel, G.E.: Dual column pressurized-fluid chromatographic apparatus with switching capability. *U.S. Pat.* 5,071,547 (Cl. 210-198.2; B01D15/08), 10 Dec. 1991, Appl. 498,112, 23 Mar. 1990; 20 p.; C.A., 116 (1992) 75417p.
- 3473 Evans, C.E.: Fundamental studies of capillary columns in liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9129454, 1991, 288 p.; C.A., 116 (1992) 75074z.
- 3474 Halbmeyer, C. and Molnar, I.: (Biopolymer analyzer: HPLC-design for online-linkage of size exclusion chromatography and reversed-phase chromatography). *BioTec (Wuerzburg)*, 3 (1991) 56-59; C.A., 116 (1992) 3001a.
- 3475 Masuda, T., Horie, M., Sonobe, T. and Matsuda, F.: Method and apparatus for chromatographic separation of multicomponent fluids. *Ger. Offen. DE 4,041,414* (Cl. B01D15/08), 27 Jun. 1991, JP Appl. 89/337,248, 26 Dec. 1989; 16 p.; C.A., 116 (1992) 86928g.
- 3476 Steele, J.W.: Ion-chromatograph method and apparatus for analyzing total organic halogens. *U.S. Pat.* 5,073,502 (Cl. 436-125; G01N33/00), 17 Dec. 1991, Appl. 544,766, 27 Jun. 1990; 5 p.; C.A., 116 (1992) 75430n.
- 3477 Tomoff, T., Loechle, V., Chlosta, W. and Klemm, H.: Metering device for liquid chromatographs. *Eur. Pat. Appl. EP 423,517* (Cl. G01N30/18), 24 Apr. 1991, DE Appl. 3,934,699, 18 Oct. 1989; 21 p.; C.A., 116 (1992) 50497b.

For additional information see C.A.:

115 (1991) 294037x, 294041u, 294053z;

116 (1992) 50527m, 50570v, 120155q.

See also 3442, 3489, 3548, 3554, 3618.

3b. *Detectors and detection reagents*

- 3478 Bergens, A.: Reductive electrochemical detection in liquid chromatography with a zinc amalgam scrubber column. *J. Chromatogr.*, 598 (1992) 195-201.
- 3479 Cardot, P.J.P., Trolliard, P. and Guernet-Nivaud, E.: Optimisation of data handling and detection conditions for automated chromatographic assay software. *Chromatographia*, 33 (1992) 361-368.
- 3480 Colon, L.A.: Evaluation and characterization of an alternating current plasma as a detector for high-performance liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9125423, 1991, 197 p.; C.A., 116 (1992) 75042n.
- 3481 Dempsey, C.A., Lavicky, J. and Dunn, A.J.: Apparent inter-channel interference in dual-electrode electrochemical detection. *J. Chromatogr.*, 596 (1992) 110-113.
- 3482 Fielden, P.R.: Recent developments in LC detector technology. *J. Chromatogr. Sci.*, 30 (1992) 45-52 - a review with 73 refs.
- 3483 Hayakawa, K., Minogawa, E., Yokoyama, T., Miyazaki, M. and Imai, K.: A universal peroxyoxalate-chemiluminescence detection system for mobile phases of differing pH. *Biomed. Chromatogr.*, 6 (1992) 84-87.
- 3484 Lafosse, M., Elfakir, C., Morin-Allory, L. and Dreux, M.: The advantages of evaporative light scattering detection in pharmaceutical analysis by high performance liquid chromatography and supercritical fluid chromatography. *J. High Resolut. Chromatogr.*, 15 (1992) 312-318.
- 3485 Lehotay, S.J., Pless, A.M. and Winefordner, J.D.: Evaluation of diode-laser-based indirect fluorometric detection for high-performance liquid chromatography. *Anal. Sci.*, 7 (1991) 863-871; C.A., 116 (1992) 98633v.
- 3486 Mulder, R., Mars, C. and Smit, H.C.: The deconvolution of detector signals in correlation chromatography. Recovering response functions from fine-sample convolutions with pseudo-random binary sequences. *Chemom. Intell. Lab. Syst.*, 12 (1991) 155-168; C.A., 116 (1992) 98383p.
- 3487 Okada, T.: (Detection of nonelectrolytes and identification of ions by conductometry). *Bunseki*, (1991) 562-566; C.A., 116 (1992) 75294w - a review with 11 refs.
- 3488 Salvadori, P., Bertucci, C. and Rosini, C.: Circular dichroism detection in HPLC. *Chirality*, 3 (1991) 376-385; C.A., 116 (1992) 75296y - a review with 29 refs.
- 3489 Scott, R.P.W. and Schmidt, G.J.: Liquid detector apparatus for ion chromatographs. *U.S. US 5,073,345* (Cl. 422-70; G01N21/01), 17 Dec. 1991, US Appl. 499,702, 31 May 1983; 6 p.; C.A., 116 (1992) 120162q.
- 3490 Uden, P.C.: Plasma atomic emission spectroscopy for element specific chromatographic detection. In: Davies, A.M.C. and Creaser, C.S. (Editors), *Anal. Appl. Spectrosc. 2, (Proc. Int. Conf. Spectrosc. Spectrum)*, 2nd 1990, Royal Soc. Chem., Cambridge, 1991, pp. 165-182; C.A., 115 (1991) 293695y - a review with 68 refs.
- 3491 Vonach, B.: Peak quality control in HPLC with diode array detection. *LaborPraxis*, 15 (1991) 634-636; C.A., 115 (1991) 294084k.
- 3492 Xi, X.: Instrumental development of novel detection methods for liquid chromatography and capillary electrophoresis. Avail. *Univ. Microfilms Int.* Order No. DA9126271, 1991, 166 p.; C.A., 116 (1992) 98354e.
- 3493 Yao, T.: Development of electrochemical FIA system with immobilized enzymes as specific post-column detector of HPLC. *GBF Monogr.*, 14 (1991) 217-224; C.A., 116 (1992) 79563f.
- 3494 Zhou, F.-X., Thorne, J.M. and Krull, I.S.: Silica based, solid phase reagents for derivatizations in chromatography. *TrAC*, 11 (1992) 90-85 - a review with 13 refs.

For additional information see C.A.:

116 (1992) 67304j.

See also 3441, 3565, 3570, 3572, 3575, 3677, 3696, 3711, 3716, 3724, 3861, 3875, 3890, 3900, 3912, 3923, 3924, 3928, 3990, 4356, 4358, 4527, 4533, 4542, 4721, 4770.

3c. *Sorbents and columns, packing procedures*

- 3495 Arlt, D., Boemer, B., Grosser, R. and Lange, W.: (New chiral stationary polyamide-phase for chromatographic enantiomer separation). *Angew. Chem.*, 103 (1991) 1685-1687; C.A., 116 (1992) 75328k.
- 3496 Blackwell, J.A. and Carr, P.W.: The role of Lewis acid-base processes in ligand-exchange chromatography of benzoic acid derivatives on zirconium oxide. *Anal. Chem.*, 64 (1992) 853-862.
- 3497 Blackwell, J.A.: Metal-ion modified zirconium oxid-based chromatographic supports. Avail. *Univ. Microfilms Int.*, Order No. DA9127724, 1991, 425 p.; C.A., 116 (1992) 50546s.
- 3498 Bruns, A. and Polta, J.: Packed capillary HPLC: an attractive separation technique for small organic molecules. *J. High Resolut. Chromatogr.*, 15 (1992) 13-17.
- 3499 Cabrera, K., Lubda, D. and Jung, G.: Alkalines-stable stationary phases for HPLC (Part 1): Aluspher® Al. *Kontakte (Darmstadt)*, No. 1 (1992) 12-15.
- 3500 Cabrera, K., Lubda, D. and Jung, G.: Alkalines-stable stationary phases for HPLC (Part 2): Aluspher® RP-select B. *Kontakte (Darmstadt)*, No. 1 (1992) 32-35.
- 3501 Carlsson, J. and Batista-Viera, F.: Solid-phase disulfide oxides: a new approach to reversible immobilization and covalent chromatography of thiol compounds. *Biotechnol. Appl. Biochem.*, 14 (1991) 114-120; C.A., 116 (1992) 54975d.
- 3502 Choma, I. and Dawidowicz, A.L.: Controlled-porosity glasses as alternative adsorbents to silica gel for HPLC. *Chromatographia*, 33 (1992) 122-126.
- 3503 Cohen, Y., Eisenberg, P. and Chaimberg, M.: Permeability of graft-polymerized polyvinylpyrrolidone-silica resin in packed column. *J. Colloid Interface Sci.*, 148 (1992) 579-586; C.A., 116 (1992) 107742j.
- 3504 Drozhdenyuk, A.P.: (Preparation and chromatographic properties of calcium tartrate gel). *Biotekhnologia*, (1991) 65-68; C.A., 116 (1992) 79565p.
- 3505 Gewehr, M., Nakamura, K., Ise, N. and Kitano, H.: Gel permeation chromatography using porous glass beds modified with temperature-responsive polymers. *Macromol. Chem.*, 193 (1992) 249-256; C.A., 116 (1992) 107759v.
- 3506 Glunz, L.J., Perry, J.A., Invergo, B., Wagner, H., Szczerba, T.J., Rateike, J.D. and Glunz, P.W.: The semipermeable surface, a new restricted access medium. *J. Liq. Chromatogr.*, 15 (1992) 1361-1379.
- 3507 Grajek, H., Neffe, S. and Witkiewicz, Z.: Chromatographic determination of the physico-chemical parameters of adsorption on activated carbon fibres. *J. Chromatogr.*, 600 (1992) 67-77.

- 3508 Haginaka, J. and Wakai, J.: Preparation and characterization of mixed functional phase silica materials using phenyl-, butyl or octylchlorosilane as a silylating agent. *J. Chromatogr.*, 596 (1992) 151-156.
- 3509 Hanson, M., Unger, K.K., Mant, C.T. and Hodges, R.S.: Polymer-coated reversed-phase packings with controlled hydrophobic properties. I. Effect on the selectivity of protein separations. *J. Chromatogr.*, 599 (1992) 65-75.
- 3510 Hanson, M., Unger, K.K., Mant, C.T. and Hodges, R.S.: Polymer-coated reversed-phase packings with controlled hydrophobic properties. II. Effect on the selectivity of peptide separations. *J. Chromatogr.*, 599 (1992) 77-85.
- 3511 Hirayama, C., Ihara, H., Nagaoka, S. and Makise, H.: Porous polymer packing from vinyl ether derivatives for reversed-phase liquid chromatography. *Chromatographia*, 33 (1992) 19-24.
- 3512 Kaiser, G.G. and Anderson, J.T.: Sorbent for liquid chromatography based on the footprint principle. An exploratory study. *Fresenius J. Anal. Chem.*, 342 (1992) 834-838.
- 3513 Karsnäs, P. and Lindblom, T.: Characterization of hydrophobic interaction and hydrophobic interaction chromatography media by multivariate analysis. *J. Chromatogr.*, 599 (1992) 131-136.
- 3514 Kupperschmidt, R.: (Radial flow chromatography column for laboratory and production). *BioTec (Wuerzburg)*, 3 (1991) 68-70; *C.A.*, 116 (1992) 54833f.
- 3515 Lerch, M. and Kaur, B.: (Carbon as stationary phase of HPLC). *GIT Spez. Chromatogr.*, 11 (1991) 29-32; *C.A.*, 115 (1991) 294079n - a review with 16 refs.
- 3516 Lin, J.Y. and Yang, M.H.: Propylamido-modified C18 reversed-phase for high-performance liquid chromatography. *J. Chin. Chem. Soc. (Taipei)*, 38 (1991) 543-548; *C.A.*, 116 (1992) 98616s.
- 3517 Liu, G., Djordjevic, N.M. and Erni, F.: Reversed- and normal-phase separations by high-temperature open-tubular column liquid chromatography. *J. Chromatogr.*, 598 (1992) 153-158.
- 3518 Maruska, A., Serys, A., Liesiene, J., Urbonaviciene, J. and Zygas, A.: Evaluation of morphological structure of packings by gel permeation chromatography. *J. Chromatogr.*, 596 (1992) 157-164.
- 3519 Mohammad, A.W., Stevenson, D.G. and Wankat, P.C.: Pressure drop correlations and scale-up of size exclusion chromatography with compressible packings. *Ind. Eng. Chem. Res.*, 31 (1992) 549-561; *C.A.*, 116 (1992) 62265n.
- 3520 Nazarova, V.I., Shcherbakova, K.D. and Shcherbakova, O.A.: Chromatographic properties of graphitized thermal carbon black modified with a monolayer of liquid crystal. *J. Chromatogr.*, 600 (1992) 59-65.
- 3521 Okamoto, M., Nobuhara, K., Masatani, M. and Jinno, K.: Preparation of octadecyl modified column gels using heat-treated silicas and their retention behaviour in high-performance liquid chromatography. *Chromatographia*, 33 (1992) 203-207.
- 3522 Petit Dominquez, M.D., Sevilla Escribano, M.T., Pinilla Marcias, J.M. and Hernandez Hernandez, L.: (Preparation and evaluation of the analytical usefulness of a xylene orange chelating resin). *An. Quim.*, 87 (1991) 95-99; *C.A.*, 116 (1992) 75056v.
- 3523 Pfeffer, W.D.: Novel methods of separation and detection for columns of capillary dimension. Avail. *Univ. Microfilms Int.*, Order No. DA9126236, 1991, 156 p.; *C.A.*, 116 (1992) 50406w.
- 3524 Pharr, D.Y., Uden, P.C. and Siggia, S.: Preparation and HPLC characterization of 3-(2,4,5-trichlorophenoxy)propylsilane and 3-(pentachlorophenoxy)propylsilane bonded phases. *J. Chromatogr. Sci.*, 30 (1992) 124-130.
- 3525 Pobi, M. and Das, J.: Synthesis of N-benzoyl phenyl hydroxyl amine derivative of styrene divinyl benzene copolymer and its application in separation of zirconium from hafnium. *Anal. Lett.*, 25 (1992) 779-789.
- 3526 Samain, D., Boissard, F., Meniali, J. and Delrieu, P.: Preparation of porous particles with region-specific characteristics especially for chromatography. *Fr. Demande FR 2,653,034 (Cl. B01J20/32)*, 19 Apr. 1991, Appl. 89/13,873, 13 Oct. 1989; 31 p.; *C.A.*, 116 (1992) 86930b.
- 3527 Scott, R.P.W. and Simpson, C.F.: A review of developments in bonded-phase synthesis carried out at Birkbeck College, London. *J. Chromatogr. Sci.*, 30 (1992) 59-64 - a review with 19 refs.
- 3528 Sebillé, B.: (Development of supports for biochromatography). *Spectra 2000*, 161(Suppl.) (1991) 19-24; *C.A.*, 116 (1992) 124107y - a review with 15 refs.
- 3529 Slais, K. and Friedl, Z.: Control of column influence on the wide range pH gradient in ion-exchange chromatography. *Chromatographia*, 33 (1992) 231-236.
- 3530 Svec, F. and Frechet, J.M.J.: Continuous rods of macroporous polymer as high-performance liquid chromatography separation media. *Anal. Chem.*, 64 (1992) 820-822.
- 3531 Szeman, J. and Szejtli, J.: Use of ionic cyclodextrin derivatives as mobile phase additives in RP-HPLC. In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins, 5th*, Ed. Sante, Paris, 1990, pp. 672-675; *C.A.*, 116 (1992) 33679v.
- 3532 Szumilo, H. and Szumilo, T.: (Internal surface reversed-phase columns - a new concept in HPLC analysis of drugs in biological material). *Wiad. Chem.*, 45 (1991) 89-99; *C.A.*, 116 (1992) 33772v - a review with 20 refs.
- 3533 Ukeda, H., Nakazono, Y., Matsumoto, K. and Osajima, Y.: Amperometric determination of amino group on a solid support using glutaraldehyde. *Biotechnol. Bioeng.*, 38 (1991) 948-951; *C.A.*, 116 (1992) 17952y.
- 3534 Vaisar, T., Vacek, I., Vanek, T., Zajicek, J. and Smolkova-Keulemansova, E.: β -Cyclodextrin bonded stationary phase for HPLC characterization by solid phase carbon-13 NMR spectroscopy and chromatographic behavior. In: Duchene, E. (Editor), *Minutes Int. Symp. Cyclodextrins, 5th*, Ed. Sante, Paris, 1990, pp. 638-642; *C.A.*, 116 (1992) 75330e.
- 3535 Vespalec, R. and Cigankova, M.: Applicability and precision of simultaneous chromatographic determination of some characteristics of solid phases and their beds. *Chromatographia*, 32 (1991) 514-522.
- 3536 Waksmundzka-Hajnos, M., Wawrzynowicz, T. and Dzido, T.H.: Comparison of adsorption properties of Florisil and silica in high-performance liquid chromatography. I. Retention behaviour of monofunctional model solutes. *J. Chromatogr.*, 600 (1992) 51-57.
- 3537 Watanabe, Y., Okuno, T., Ishigaki, K. and Takagi, T.: Assessment study on the high-performance liquid chromatography-type hydroxyapatite chromatography in the presence of sodium dodecyl sulfate. *Anal. Biochem.*, 202 (1992) 268-274.
- 3538 Wright, P.B., Lamb, E., Dorsey, J.G. and Kooser, R.G.: Microscopic order as a function of surface coverage in alkyl-modified silicas: spin probe studies. *Anal. Chem.*, 64 (1992) 785-789.

3539 Yuan, Z. and He, B.: Preparation of polyvinylamine ligand exchange resin grafted with L-proline. *Chin. Sci. Bull.*, 36 (1991) 903-906; C.A., 115 (1991) 294096r.

For additional information see C.A.:

115 (1991) 285285z, 294141b;
116 (1992) 3200q, 18069c, 54818e, 75064w, 75334j, 75340h, 83920n, 86111k, 120156r, 120169x, 120171s.

See also 3442, 3453, 3473, 3563, 3577, 3578, 3581, 3582, 3594, 3724, 3727, 3762, 3908, 3913, 3948, 3971, 3983, 4021, 4036, 4038, 4041, 4085, 4236, 4237, 4272, 4368, 4414, 4419, 4576, 4582, 4593, 4715, 4721, 4741, 4744, 4754.

3d. Quantitative analysis

See 3461, 3873, 3919, 4732.

3e. Preparative scale chromatography

3540 Cretier, G., El Khabchi, M. and Rocca, J.L.: (Sample injection conditions for preparative liquid chromatography: existence of optimum parameters for gradient elution). *Analisis*, 19 (1991) 220-222; C.A., 116 (1992) 58338w.

3541 Crétier, G., El Khabchi, M. and Rocca, J.L.: Preparative liquid chromatography. II. Existence of optimum injection conditions for overloaded gradient elution separations. *J. Chromatogr.*, 596 (1992) 15-25.

3542 Katti, A.M.: An example of the isolation of minor components from multi-component mixtures. *Chromatographia*, 33 (1992) 5-9.

3543 McDonald, P.D. and Bidlingmeyer, B.: (Principles of preparative liquid chromatography). *Preparativ. Zhidkost. Khromatogr., M.*, (1990) 9-130; C.A., 116 (1992) 105272g.

For additional information see C.A.:

116 (1992) 105271f.

See also 3514, 3588, 3598, 3691, 3956, 4000, 4326, 4514.

3f. Programmed temperature, pressure, vapors, gradients

3544 Gu, T., Truei, Y.H., Tsai, G.J. and Tsao, G.T.: Modeling of gradient elution in multicomponent nonlinear chromatography. *Chem. Eng. Sci.*, 47 (1992) 253-262; C.A., 116 (1992) 101997z.

3545 Velayudhan, A.L. and Michael, R.: Effect of modulator sorption in gradient elution chromatography: gradient deformation. *Chem. Eng. Sci.*, 47 (1992) 233-239; C.A., 116 (1992) 101996y.

See also 3541.

4. SPECIAL TECHNIQUES

4a. Automation

3546 Filaretov, G.F. and Saifulin, Zh.T.: Correlation method for measurements in systems for automation of chromatographic experiments). *Zavod. Lab.*, 57 (1991) 59-63; C.A., 116 (1992) 98376p.

3547 Frances, C. and Vazquez, P.: Automation of the preparation and injection of samples in an HPLC apparatus. *Tec. Lab.*, 13 (1991) 328-332; C.A., 116 (1992) 120090q.

3548 Kath, G.S., DiSalvo, J. and Feygin, I.: High-performance liquid chromatography fraction marker-timer controller. *Rev. Sci. Instrum.*, 62 (1991) 3102-3103; C.A., 116 (1992) 75325g.

3549 Meehan, E. and Cowell, G.M.: Automated SEC applied to routine QC of synthetic polymers. *Int. Lab.*, 22, No. 6 (1992) 28-32.

3550 Yanovskii, S.M., Burova, M.D., Kanunnikova, E.V., Krasnova, G.V., Popov, E.A., Saifi, R.N. and Silaeva, I.A.: (Automated chromatograph for determination of organic substances in aqueous solutions using vapor-phase and liquid feed). *Zavod. Lab.*, 57 (1991) 10-12; C.A., 116 (1992) 75317f.

See also 3479, 3556, 4465, 4475, 4512, 4680, 4733.

4b. Computerization and modelling

3551 Andrade, J.S., Jr. and Rajagopal, K.: Percolation disorder in chromatographic systems. *J. Phys. A: Math. Gen.*, 24 (1991) L1379-L1384; C.A., 116 (1992) 86473e.

3552 Berninger, J.A., Whitley, R.D., Zhang, X. and Wang, N.H.L.: A versatile model for simulation of reaction and nonequilibrium dynamics in multicomponent fixed-bed adsorption processes. *Comput. Chem. Eng.*, 15 (1991) 749-768; C.A., 116 (1992) 62283s.

3553 Drouen, A., Dolan, J.W., Snyder, L.R., Poile, A. and Schoenmakers, P.J.: Software for chromatographic method development. *LC-GC*, 9 (1991) 714-724; C.A., 116 (1992) 74978k.

3554 Dyson, N.: The validation of integrators and computers for chromatographic measurements. *Int. Lab.*, 22, No. 6 (1992) 38-46.

3555 Fasanmade, A.A. and Fell, A.F.: Application of computer-aided spectral deconvolution technique in validation of high performance liquid chromatographic peaks. *Anal. Lett.*, 25 (1992) 363-378.

3556 Head, M. and Smith, K.: Flexible instrument control. *Int. Lab.*, 22, No. 6 (1992) 22-26.

3557 Heinisch, S., Riviere, P. and Rocca, J.L.: A computer routine for the selection and optimization of multisolvent mobile phase systems in reversed-phase liquid chromatography. *Chromatographia*, 32 (1991) 559-565.

3558 Hsu, J.T.: Simulation of adsorption and chromatography processes by Fast Fourier Transform algorithm. *Proc. Summer Comput. Simul. Conf.*, 22nd (1990) 313-318; C.A., 116 (1992) 62255j.

3559 Keller, H.R., de Aguiar, P.F. and Massart, D.L.: Simulations of analytical processes using visual Basic. *TrAC*, 11 (1992) 131-134.

3560 Lee, K.W., Feinstein, P., Gordon-Gilmore, R., Eseifan, A.H. and Fitchman, M.I.: Coordinated chromatography system. *Eur. Pat. Appl. EP 461,382* (Cl. G01N30/34), 18 Dec. 1991, US Appl. 520,533, 04 May 1990; 28 p.; C.A., 116 (1992) 98666h.

3561 Marmonier, C.: (HPLC 1020 Plus system). *Analisis*, 19 (1991) M41; C.A., 116 (1992) 98363g.

3562 Quattrocchi, O.A. and Imperiale, L.: (Optimization of HPLC methods). *SAFYBI*, 31 (1991) 37-60; C.A., 116 (1992) 120108b.

- 3563 Taylor, D.R.: Is there a rational basis for the selection and/or desing of chiral stationary phases for high-performance liquid chromatography? In: Stevenson, D. and Wilson, I.D. (Editors), *Recent Adv. Chiral Sep.*, (Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.), 2nd 1989, Plenum, New York, 1990, pp. 5-14; C.A., 116 (1992) 120096w.
- 3564 Wang, Q., Gao, R., Wang, H. and Yan, B.: Optimization of multi-component solvent selection in high-performance liquid chromatography using a statistical method. *Chin. J. Chem.*, 9 (1991) 222-230; C.A., 116 (1992) 98621q.

For additional information see C.A.:
116 (1992) 98598n.

See also 3454, 3462, 3544, 3549, 4547, 4777.

4c. *Combination with other physico-chemical techniques (MS, IR etc.)*

- 3565 Barry, E.F., Colon, L.A. and Constanzo, R.B.: Alternating-current plasma detection for gas chromatography and high-performance liquid chromatography. *ACS Symp. Ser.*, 479 (1992) 170-188 C.A., 116 (1992) 120077r - a review with 34 refs.
- 3566 Borsier, M.: (Hyphenation techniques: recent progress in combination methods using inductively coupled plasma (ICP) sources). *Spectra 2000*, 159 (1991) 5-8; C.A., 116 (1992) 74962a - a review with 12 refs.
- 3567 Griffiths, P.R. and Lange, A.J.: On-line use of the concentric flow nebulizer for direct deposition liquid chromatography-Fourier transform-infrared spectrometry. *J. Chromatogr. Sci.*, 30 (1992) 93-97.
- 3568 Hsu, J.: Interfacing ion chromatography with particle beam mass spectrometry for the determination of organic anionic compounds. *Anal. Chem.*, 64 (1992) 434-443.
- 3569 Ikai, Y., Oka, H., Hayakawa, J., Harada, K. and Suzuki, M.: (Evaluation of applicability of the flow splitter to frit-FAB (fast atom bombardment) LC/MS (liquid chromatography/mass spectrometry) system). *Shitsuryo Bunseki*, 39 (1991) 199-204; C.A., 116 (1992) 98602j.
- 3570 Imasaka, T.: Supersonic jet spectrometry and its application to chromatograph detectors. *Spectrochim. Acta Rev.*, 14 (1991) 261-274; C.A., 116 (1992) 120071j - a review with 39 refs.
- 3571 Luque de Castro, M.D. and Valcárcel, M.: New approaches to coupling flow-injection analysis and high-performance liquid chromatography. *J. Chromatogr.*, 600 (1992) 183-188.
- 3572 Olson, L.K., Heitkemper, D.T. and Caruso, J.A.: Chromatographic detection by plasma mass spectrometry. *ACS Symp. Ser.*, 479 (1992) 288-308; C.A., 116 (1992) 120079t - a review with 71 refs.
- 3573 Polyakova, A.A.: Trends in the development of instrumental mass spectrometric sets and their application in organic analysis. *Zh. Anal. Chem.*, 46 (1991) 1675-1686; C.A., 115 (1991) 294076j - a review with 17 refs.
- 3574 Riviello, J.M., Siriraks, A., Manabe, R.M., Roehl, R. and Alforque, M.: Using IC to enhance the performance of inductively coupled plasma-optical emission spectrometry and inductively coupled plasma-mass spectrometry. *LC-GC*, 9 (1991) 704-712; C.A., 116 (1992) 79797k.
- 3575 Uden, P.C.: Atomic spectral chromatographic detection. An overview. *ACS Symp. Ser.*, 479 (1992) 1-24; C.A., 116 (1992) 120073m - a review with 67 refs.
- 3576 Wils, E.R.J. and Hulst, A.G.: The use of thermospray-liquid chromatography/mass spectrometry for the verification of chemical warfare agents. *Fresenius J. Anal. Chem.*, 342 (1992) 749-758.

For additional information see C.A.:
116 (1992) 120092s.

See also 3440, 3490, 3498, 3620, 3622, 3626, 3642, 3683, 3754, 3762, 3781, 3857, 3974, 3993, 4006, 4124, 4180, 4379, 4384, 4387, 4407, 4493, 4545, 4601, 4629, 4692, 4747.

4d. *Affinity chromatography (advances)*

- 3577 Fadeev, A.Yu., Mingalyov, P.G., Staroverov, S.M., Lunina, E.V., Lisichkin, G.V., Gaida, A.V. and Monastyrsky, V.A.: Silica sorbents with one- and two-site attached bacitracin in affinity chromatography. *J. Chromatogr.*, 596 (1992) 114-117.
- 3578 Guo, W., Shang, Z., Yu, Y., Guan, Y. and Zhou, L.: Membrane affinity chromatography used for the separation of trypsin inhibitor. *Biomed. Chromatogr.*, 6 (1992) 95-98.
- 3579 Kasai, K., Matsumoto, I. and Beppu, M.: (*Affinity Chromatography*). Tokyo Kagaku Dojin, Tokyo, 1991, 284 p.; C.A., 115 (1991) 294139g.
- 3580 Pezzuto, J.M., Che, C.T., McPherson, D.D., Zhu, J.P., Topcu, G., Erdelmeier, C.A.J. and Cordell, G.A.: DNA as an affinity probe useful in the detection and isolation of biologically active natural products. *J. Nat. Prod.*, 54 (1991) 1522-1530; C.A., 116 (1992) 98778w.
- 3581 Smidl, P., Plicka, J. and Kleinmann, I.: Separon HEMA modified for immobilized metal ion affinity chromatographic separation of proteins. *J. Chromatogr.*, 598 (1992) 15-21.
- See also 3699, 3708, 3749, 4041, 4047, 4054, 4060, 4084, 4091, 4105, 4110, 4141, 4160, 4161, 4167, 4177, 4178, 4193, 4241, 4248, 4262, 4272, 4282, 4294, 4735.

4e. *Functional analysis*

- 3582 Mathur, R., Bohra, S., Mathur, V., Narang, C.K. and Mathur, N.K.: Chiral ligand exchange chromatography on polygalactomannan (guaran). *Chromatographia*, 33 (1992) 336-338.

4f. *Trace analysis and preseparation techniques*

- 3583 Jonsson, J.A. and Mathiasson, L.: Supported liquid membrane techniques for sample preparation and enrichment in environmental and biological analysis. *TrAC*, 11 (1992) 106-114.
- 3584 Westerink, B.H.C.: Monitoring molecules in the conscious brain by microdialysis. *TrAC*, 11 (1992) 176-182.

For additional information see C.A.:
116 (1992) 75175h.

See also 3436, 3587, 4757.

4g. Enantiomers, separation

- 3585 Ahuja, S. (Editor): *ACS Symposium Series: Chiral Separations by Liquid Chromatography. Developed from a Symposium at the 200th National Meeting of the American Chemical Society, Washington, D.C., August 27-31, 1990*. Vol. 471, American Chemical Society, Washington, 1991, 284 p.; C.A., 115 (1991) 294138f.
- 3586 Berthod, A., Chang, S.-C. and Armstrong, D.W.: Empirical procedure that uses molecular structure to predict enantioselectivity of chiral stationary phases. *Anal. Chem.*, 64 (1992) 395-404.
- 3587 Collicott, R.J.: A note on some examples of chiral high-performance liquid chromatographic resolution in the pharmaceutical industry. In: Stevenson, D. and Wilson, I.D. (Editors), *Recent Adv. Chiral Sep., (Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.)*, 2nd 1989, Plenum, New York, 1990, pp. 25-30; C.A., 115 (1991) 263552g.
- 3588 Francotte, E. and Junker-Buchheit, A.: Preparative chromatographic separation of enantiomers. *J. Chromatogr.*, 576 (1992) 1-45 - a review with 199 refs.
- 3589 Gaskell, R.M. and Crooks, B.: The role of mobile phase additives in developing and optimizing separations of water-soluble enantiomers by high-performance liquid chromatography. In: Stevenson, D. and Wilson, I.D. (Editors), *Recent Adv. Chiral Sep., (Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.)* 2nd 1989, Plenum, New York, 1990, pp. 85-92; C.A., 116 (1992) 120103w.
- 3590 Hu, W., Takeuchi, T. and Haraguchi, H.: Enantiomeric separation of 1,1'-binaphthyl-2,2'-diyl hydrogen phosphate by microcolumn liquid chromatography with micellar bile acid derivatives as mobile phase additive. *J. High Resolut. Chromatogr.*, 15 (1992) 275-277.
- 3591 Hu, W., Takeuchi, T. and Haraguchi, H.: Retention mechanism of enantiomeric separation by liquid chromatography with micellar bile-salt mobile phases. *Chromatographia*, 33 (1992) 63-66.
- 3592 Hu, W., Takeuchi, T. and Haraguchi, H.: Retention behaviour of binaphthyl compounds in enantiomeric separation by microcolumn liquid chromatography with micellar bile-salt mobile phases. *Chromatographia*, 33 (1992) 58-62.
- 3593 Jacobson, S.C. and Guiochon, G.: Contribution of ionically immobilized bovine serum albumin to the retention of enantiomers. *J. Chromatogr.*, 600 (1992) 37-42.
- 3594 Mathur, R., Bohra, S., Narang, C.K. and Mathur, N.K.: Guarane: a novel polysaccharide for racemate resolution. *J. Liq. Chromatogr.*, 15 (1992) 573-584.
- 3595 Perrin, S.R. and Pirkle, W.H.: Commercially available brush-type chiral selectors for the direct resolution of enantiomers. *ACS Symp. Ser.*, 471 (Chiral Sep. Liq. Chromatogr.) (1991) 43-66; C.A., 116 (1992) 37137q.
- 3596 Pirkle, W.H. and Burke, J.A.: Separation of the enantiomers of the 3,5-dinitrobenzamide derivatives of α -amino phosphonates on four chiral stationary phases. *J. Chromatogr.*, 598 (1992) 159-167.
- 3597 Pirkle, W.H., Chang, J.-P. and Burke, J.A.: Contribution of specific hydrophobic interactions to chiral recognition. *J. Chromatogr.*, 598 (1992) 1-6.
- 3598 Smith, R.M., Hall, G.M. and Subramanian, G.: Chiral chromatography on the process scale. In: Stevenson, D. and Wilson, I.D. (Editor), *Recent Adv. Chiral Sep., [Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.]*, 2nd 1989, Plenum, New York, 1990, pp. 135-142; C.A., 116 (1992) 5921z.
- 3599 Smolkova-Keulemansova, E., Feltl, L. and Snopek, J.: Cyclodextrins and their derivatives in modern analytical high-performance methods. In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins*, 5th, Ed. Sante, Paris, 1990, pp. 617-622; C.A., 116 (1992) 33678u.
- 3600 Stalcup, A.M. and Armstrong, D.W.: (The role of the new derivatized cyclodextrins in chemical analysis). In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins*, 5th, Ed. Sante, Paris, 1990, pp. 607-616; C.A., 116 (1992) 33643d - a review with 23 refs.
- 3601 Taylor, D.R. and Maher, K.: Chiral separations by high-performance liquid chromatography. *J. Chromatogr. Sci.*, 30 (1992) 67-85 - a review with 179 refs.
- 3602 Zou, H., Zhang, Y. and Lu, P.: Separation mechanism of chiral compounds in chiral stationary phase liquid chromatography. *Chin. J. Chem.*, 9 (1991) 231-236; C.A., 116 (1992) 120105y.

For additional information see C.A.:

116 (1992) 5920y, 67318s, 91538j, 106783m.

See also 3488, 3495, 3534, 3539, 3563, 3727, 3762, 3822, 3904, 3910, 3913, 3933, 3945, 3962, 3963, 3971, 4329, 4359, 4406, 4510, 4541, 4566, 4572, 4576, 4577, 4582, 4585, 4589, 4593, 4596, 4599, 4612, 4625, 4626, 4640, 4641, 4642, 4684, 4702, 4759.

4h. Other special techniques

- 3603 Adachi, S.: (Fundamental study on the continuous separation by column liquid chromatography and its application to bioreactors). *Nippon Nogei Kagaku Kaishi*, 65 (1991) 1611-1616; C.A., 116 (1992) 19668j.
- 3604 Berthod, A.: (Liquid-liquid partition coefficients by countercurrent chromatography (CCC)). *Analisis*, 19 (1991) 223-224; C.A., 116 (1992) 68573h.
- 3605 Foucalt, A. and Coffic, F.: (Countercurrent chromatography (CCC): comparison with HPLC and practical aspects of gradient elution). *Analisis*, 19 (1991) 227-235; C.A., 116 (1992) 98630s.
- 3606 Ge, Z. and Lin, H.: (Current status and development of micellar and inclusion chromatography). *Fenxi Huaxue*, 19 (1991) 1092-1099; C.A., 115 (1991) 294075h - a review with 72 refs.
- 3607 Grob, K., Artho, A. and Le Donne, P.: Mixing in the sample loop of the loop-type interface in coupled LC-GC. *J. High Resolut. Chromatogr.*, 15 (1992) 71-74.
- 3608 Kononenko, V.L. and Shimkus, J.K.: Use of integral Doppler anemometry in field-flow fractionation. *J. Chromatogr.*, 600 (1992) 139-148.
- 3609 Schuler, R.H.: Chromatographic methods in radiation chemistry. *Radiat. Phys. Chem.*, 39 (1992) 105-112; C.A., 116 (1992) 95348v - a review with 8 refs.
- 3610 Semenov, S.N.: Integral Doppler anemometry in porous membranes for the analysis of liquid mixtures and examination of membrane properties. *J. Chromatogr.*, 600 (1992) 129-132.
- 3611 Semenov, S.N.: Transverse particle redistribution in a flat channel for SPLITT or integral Doppler anemometry. *J. Chromatogr.*, 600 (1992) 133-137.

For additional information see C.A.:

116 (1992) 55596t.

See also 3571, 3626, 3844, 3897, 3898, 3944, 4246, 4405, 4414, 4492.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. Aliphatic hydrocarbons

3612 Grob, K., Artho, A., Biedermann, M., Caramaschi, A. and Minkle, H.: Batching oils on sisal bags used for packaging foods: analysis of coupled LC/GC. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 283-287.

5b. Cyclic hydrocarbons

3613 Boos, K.-S., Lintelmann, J. and Kettrup, A.: Coupled-column high-performance liquid chromatographic method for the determination of 1-hydroxypyrene in urine of subjects exposed to polycyclic aromatic hydrocarbons. *J. Chromatogr.*, 600 (1992) 189-194.

3614 De Vooght, P., Wegener, J.W.M., Brinkman, U.A.T. and Govers, H.: Retention of neutral and basic heteroaromatic hydrocarbons in RPLC systems and its use in predictive studies. I. Concentration of the organic modifier. *Sci. Total Environ.*, 109-110 (1991) 69-87; *C.A.*, 116 (1992) 68215t.

3615 Geahchan, A., Le Gren, I., Chambon, P. and Chambon, R.: Improved method for determination of polynuclear aromatic hydrocarbons in pharmacopoeial paraffin and mineral oils. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 968-973.

3616 IUPAC Commission on Oils, Fats and Derivatives: Determination of benzo[a]pyrene in oils and fats by reversed-phase high-performance liquid chromatography. Results of a collaborative study and the standardized method. *Pure Appl. Chem.*, 63 (1991) 1659-1666; *C.A.*, 116 (1992) 5385c.

3617 Lopez-Garcia, A., Blanco Gonzales, E., Garcia Alonso, J.I. and Sanz-Medel, A.: Determination of some selected polycyclic aromatic hydrocarbons in environmental samples by high-performance liquid chromatography with fluorescence detection. *Chromatographia*, 33 (1992) 225-230.

3618 Nemirovskaya, I.A. and Pilipenko, V.P.: (The Milichrom chromatograph for analysis of polyarenes in natural materials). *Okeanologiya (Moscow)*, 31 (1991) 678-682; *C.A.*, 116 (1992) 75338p.

3619 Pauls, R.E., Weight, G.J. and Munowitz, P.S.: A comparison of methods to determine benzene in gasoline boiling range material. *J. Chromatogr. Sci.*, 30 (1992) 32-39.

3620 Perreault, H., Ramaley, L., Sim, P.G. and Benoit, F.M.: Use of a moving-belt interface for on-line high-performance liquid chromatography/mass spectrometry characterization of polycyclic aromatic compounds of molecular weight up to 580 Da in environmental samples. *Rapid Commun. Mass Spectrom.*, 5 (1991) 604-610; *C.A.*, 116 (1992) 75357u.

3621 Rekker, R.F., de Vries, G. and Koopmans, R.E.: Evaluation of some hydrophobic aspects of polymethyl- and polychloroderivatives of benzene and biphenyl. *Sci. Total Environ.*, 109-110 (1991) 179-195; *C.A.*, 116 (1992) 68216u.

3622 Teffera, Y., Baird, W.M. and Smith, D.L.: Detection of benzo[a]pyrene sulfate and glucuronide conjugates in cell culture medium by directly coupled microbore high-performance liquid chromatography-fast atom bombardment mass spectrometry. *J. Chromatogr.*, 577 (1992) 69-76.

3623 Upadhyaya, P., Roy, A.K., Fu, P.P. and El-Bayoumy, K.: Metabolism and DNA binding of 2-nitropyrene in the rat. *Cancer Res.*, 52 (1992) 1176-1181.

See also 3467, 3483, 3502, 3511, 3512, 3516, 3524, 3557, 3612.

5c. Halogen derivatives

3624 Kimura, R., Ohishi, N., Kato, Y., Yamada, S. and Sato, M.: Identification of biliary metabolites of *m*-dichlorobenzene in rats. *Drug Metab. Disp.*, 20 (1992) 161-171.

3625 Sericano, J.L., El-Husseini, A.M. and Wade, T.L.: Isolation of planar polychlorinated biphenyls by carbon column chromatography. *Chemosphere*, 23 (1991) 915-924; *C.A.*, 116 (1992) 50566y.

See also 3476, 3524, 3621.

5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)

3626 Welch, K.J. and Hoffman, N.E.: Analysis of fossil-fuel fractions by on-line coupled microcolumn HPLC capillary column GC-MS. *J. High Resolut. Chromatogr.*, 15 (1992) 171-175.

3627 Zander, M. and Haenel, M.W.: Average molecular weight of coal-tar pitch fractions. *Erdoel, Kohle, Erdgas, Petrochem.*, 44 (1991) 368; *C.A.*, 116 (1992) 63203c.

For additional information see *C.A.*:
116 (1992) 109705y, 109775w.

See also 3615, 4718.

6. ALCOHOLS

3628 Gosselet, M. and Sebillé, B.: The use of β -cyclodextrin for the indirect detection of alcohols in reverse phase liquid chromatography. In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins*, 5th, Ed. Sante, Paris, 1990, pp. 629-633; *C.A.*, 116 (1992) 15117f.

See also 3769, 3795, 3811, 4403.

7. PHENOLS

3629 Busto, O., Olucha, J.C. and Borrull, F.: Optimization of isocratic mobile phase composition for HPLC analysis of eleven substituted phenols. *Chromatographia*, 32 (1991) 566-572.

3630 Coquart, V. and Hennion, M.-C.: Trace-level determination of polar phenolic compounds in aqueous samples by high-performance liquid chromatography and on-line preconcentration on porous graphitic carbon. *J. Chromatogr.*, 600 (1992) 195-201.

- 3631 Dem'yanov, P.I., Khimenes, M.P. and Petrosyan, V.S.: (High-performance liquid chromatography determination of phenols as dabsylates). *Zh. Fiz. Khim.*, 65 (1991) 2808-2815; *C.A.*, 116 (1992) 98638a.
- 3632 Hansen, A.M., Poulsen, O.M., Christensen, J.M. and Hansen, S.H.: Determination of α -naphthol in human urine by high performance liquid chromatography. *J. Liq. Chromatogr.*, 15 (1992) 479-499.
- 3633 King, J.M., McEvily, A.J. and Iyengar, R.: Liquid chromatographic determination of the processing aid 4-hexylresorcinol in shrimp. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 1003-1005.
- 3634 Lobov, V.A., Yurchenko, V.V., Zulfigarov, O.S. and Shevchuk, V.U.: (Analysis of alkylphenol mixtures by high-performance liquid chromatography). *Zavod. Lab.*, 57 (1991) 6-7; *C.A.*, 116 (1992) 98637z.
- 3635 Mahmud, Z., Khan, M.N., Lajis, N.H. and Toia, R.F.: Perakensol: a phenanthrenoid isolated from *Alseodaphne perakensis*. *J. Natural Prod.*, 55 (1992) 533-535.
- 3636 Mullin, W.J. and Collins, F.W.: Purification and identification of alk(en)ylresorcinols. *J. Food Compos. Anal.*, 4 (1991) 270-275; *C.A.*, 116 (1992) 39849x.
- 3637 Nomura, N., Kaneko, R. and Hara, M.: Reversed-phase liquid chromatography of alkylphenols depending on their dissociation constants. *J. Liq. Chromatogr.*, 15 (1992) 885-896.
- 3638 Shnukal, I.M., Gaisinskii, V.B. and Titova, V.B.: (Determination of metrological characteristics for chromatographic determination of the mass fraction of components of resorcinol monomethyl ether). *Metrologiya*, (1990) 47-51; *C.A.*, 116 (1992) 120130c.
- 3639 Stehly, G.R. and Plakas, S.M.: Disposition of 1-naphthol in the channel carfish (*Ictalurus punctatus*). *Drug Metab. Disp.*, 20 (1992) 70-73.
- 3640 Ye, M.Y.: Determination of products in hydroxyl addition of phenol using high-performance liquid chromatography. *J. Liq. Chromatogr.*, 15 (1992) 875-884.
- 3641 Zhu, J., Ng, J. and Filippich, L.J.: Determination of tannic acid and its phenolic metabolites in biological fluids by high-performance liquid chromatography. *J. Chromatogr.*, 577(1992) 77-85.
- 3644 Gildersleeve, R.R., Smith, G.R., Pamberton, I.J. and Gilbert, C.L.: Detection of isoflavones in seedling subterranean clover. *Crop Sci.*, 31 (1991) 889-892; *C.A.*, 116 (1992) 54812y.
- 3645 Jagota, N.K. and Cheatham, S.F.: HPLC separation of flavonoids and flavonoid glycosides using a polystyrene/divinylbenzene column. *J. Liq. Chromatogr.*, 15 (1992) 603-615.
- 3646 Liu, H. and Wehmeyer, K.R.: Solid-phase extraction with supercritical fluid elution as a sample preparation technique for the ultratrace analysis of flavone in blood plasma. *J. Chromatogr.*, 577 (1992) 61-67.
- 3647 Lobstein, A., Rietsch-Jako, L., Haag-Berrurier, M. and Anton, R.: Seasonal variations of the flavonoid content from *Ginkgo biloba* leaves. *Planta Medica*, 57 (1991) 430-433; *C.A.*, 116 (1992) 91516a.
- 3648 Lu, Y.-L., Ho, D.K., Cassady, J.M., Cook, V.M. and Baird, W.M.: Isolation of potential cancer chemopreventive agents from *Eriodictyon californicum*. *J. Nat. Prod.*, 55 (1992) 357-363.
- 3649 Moumou, Y., Trotin, F., Dubois, J., Vasseur, J. and El-Boustani, E.: Influence of culture conditions on polyphenol production by *Fagopyrum esculentum* tissue cultures. *J. Nat. Prod.*, 55 (1992) 33-38.
- 3650 Pérez-Illarbe, F.J., Martínez, V., Hernández, T. and Estrella, I.: Liquid chromatographic determination of apple pulp procyanidins. *J. Liq. Chromatogr.*, 15 (1992) 637-646.
- 3651 Reynaud, J., Couble, A. and Raynaud, J.: La chimie flavonique de *Centaurea macrocephala* Muss. Puschk. ex Willd. (Compositae). *Pharmazie*, 47 (1992) 51-52.
- 3652 Wakui, Y., Yanagisawa, E., Ishibashi, E., Matsuzaki, Y., Takeda, S., Sasaki, H., Aburada, M. and Oyama, T.: Determination of baicalin and baicalein in rat plasma by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 575 (1992) 131-136.

For additional information see C.A.:
116 (1992) 46388z, 55638g, 57639h.

See also 4703, 4705, 4708.

8b. Aflatoxins and other mycotoxins

For additional information see C.A.:
116 (1992) 75346q.

See also 3516, 3524, 3557, 3683, 4702, 4703, 4710.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 3642 Dewald, H.D., Worst, S.A., Butcher, J.A., Jr. and Saulinskas, E.F.: Separation and identification of isoflavones with on-line-liquid chromatography-electrochemistry-thermospray mass spectrometry. *Electroanalysis (N.Y.)*, 3 (1991) 777-782; *C.A.*, 116 (1992) 75343m.
- 3643 El-Domiati, M.M.: Improved high-performance liquid chromatographic determination of khellin and visnagin in *Ammi visnaga* fruits and pharmaceutical formulations. *J. Pharm. Sci.*, 81 (1992) 475-478.
- 3653 Farjam, A., van de Merbel, N.C., Lingeman, H., Frei, R.W. and Brinkman, U.A.T.: Non-selective desorption of immuno precolumns coupled on-line with column liquid chromatography: determination of aflatoxins. *Int. J. Environ. Anal. Chem.*, 45 (1991) 73-87; *C.A.*, 116 (1992) 127139w.
- 3654 Hongyo, K.-i., Itoh, Y., Hifumi, E., Takeyasu, A. and Uda, T.: Comparison of monoclonal antibody-based enzyme-linked immunosorbent assay with thin-layer chromatography and liquid chromatography for aflatoxin B₁ determination in naturally contaminated corn and mixed feed. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 307-312.
- 3655 Roch, O.G., Blunden, G., Coker, R.D. and Nawaz, S.: The development and validation of a solid phase extraction/HPLC method for the determination of aflatoxins in groundnut meal. *Chromatographia*, 33 (1992) 208-212.
- 3656 Savard, M.E. and Miller, J.D.: Characterization of fusarin F, a new fusarin from *Fusarium moniliforme*. *J. Nat. Prod.*, 55 (1992) 64-70.

- 3657 Sharman, M., Gilbert, J. and Chelkowski, J.: A survey of the occurrence of the mycotoxin moniliformin in cereal samples from sources worldwide. *Food Addit. Contam.*, 8 (1991) 459-466; C.A., 116 (1992) 82371x.
- 3658 Stubblefield, R.D., Honstead, J.P. and Shotwell, O.L.: An analytical survey of aflatoxins in tissues from swine grown in regions reporting 1988 aflatoxin-contaminated corn. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 897-899.
- 3659 Sydenham, E.W., Sheppard, G.S. and Thiel, P.G.: Liquid chromatographic determination of fumonisins B₁, B₂, and B₃ in food and feeds. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 313-318.
- 3660 Urano, T., Trucksess, M.W., Matusik, J. and Dorner, J.W.: Liquid chromatographic determination of cyclopiiazonic acid in corn and peanuts. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 319-322.
- 3661 Wilson, T.J. and Romer, T.R.: Use of Mycosep multifunctional cleanup column for liquid chromatographic determination of aflatoxins in agricultural products. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 951-956.
- For additional information see C.A.:
116 (1992) 82308g.
- 8c: Other compounds with heterocyclic oxygen (incl. tannins)
- 3662 Kaczvinsky, J.R., Jr. and Read, S.A.: Development and use of a stability-indicating high-performance liquid chromatographic assay for Meldrum's acid. *J. Chromatogr.*, 575 (1992) 177-181.
- 3663 Liu, Z., Hu, B. and Franklin, M.R.: A sensitive and accurate assay for 7-ethoxycoumarin deethylase activity determination using column-switching high-performance liquid chromatography. *Toxicol. Methods*, 1 (1991) 199-209; C.A., 116 (1992) 101500g.
- 3664 Morales, F.J., Romero, C. and Jimenez-Perez, S.: An enhanced liquid chromatographic method for 5-hydroxymethylfurfural determination in UHT milk. *Chromatographia*, 33 (1992) 45-48.
- 3665 Nomeir, A.A., Silveira, D.M., McComish, M.F. and Chadwick, M.: Comparative metabolism and disposition of furfural and furfuryl alcohol in rats. *Drug Metab. Disp.* 20 (1992) 198-204.
- 3666 Villalón Mir, M., Quesada Granados, J., López G^a de la Serrana, H. and López Martínez, M.C.: High performance liquid chromatography determination of furanic compounds in commercial brandies and caramels. *J. Liq. Chromatogr.*, 15 (1992) 513-524.
- 3667 Zhao, G., Hui, Y., Rupprecht, J.K., McLaughlin, J.L. and Wood, K.V.: Additional bioactive compounds and trilobacin, a novel highly cytotoxic acetogenin, from the bark of *Asimia triloba*. *J. Nat. Prod.*, 55 (1992) 347-356.
- See also 3649, 3650, 3915, 4515, 4520, 4701.
9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- 3668 Baltas, M., Benbakkar, M., Gorrichon, L. and Zedde, C.: Plant growth regulators G₁, G₂, G₃. Synthesis, extraction and determination of leaf content in *Eucalyptus grandis*. *J. Chromatogr.*, 600 (1992) 323-326.
- 3669 Botsoglou, N.A. and Spais, A.B.: Ion-pair, liquid chromatographic analysis of total gossypol in chicken liver. *Chromatographia*, 33 (1992) 174-176.
- 3670 Dye, C. and Oehme, M.: Comments concerning the HPLC separation of acrolein from other C3 carbonyl compounds as 2,4-dinitrophenylhydrazones: a proposal for improvement. *J. High Resolut. Chromatogr.*, 15 (1992) 5-8.
- 3671 Gopala Krishna, A.G. and Prabhakar, J.V.: Effect of water activity on secondary products formation in autoxidizing methyl linoleate. *J. Am. Oil Chem. Soc.*, 69 (1992) 178-183.
- 3672 Ishida, J., Sonezaki, S. and Yamaguchi, M.: 4,5-Diaminophthalhydrazide as a highly sensitive chemiluminescence derivatization reagent for α -dicarbonyl compounds in high-performance liquid chromatography. *J. Chromatogr.*, 598 (1992) 203-208.
- 3673 Kikugawa, K., Kojima, T., Yamaki, S. and Kosugi, H.: Interpretation of the thiobarbituric acid reactivity of rat liver and brain homogenates in the presence of ferric ion and ethylenediaminetetraacetic acid. *Anal. Biochem.*, 202 (1992) 249-255.
- 3674 Kruglov, E.A. and Ushakova, Z.I.: (Study of colorforming impurities in products of ionol manufacture). *Zh. Fiz. Khim.*, 65 (1991) 2804-2807; C.A., 116 (1992) 50560s.
- 3675 Lane, R.H. and Smarthers, J.L.: Monitoring aldehyde production during frying by reversed-phase liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 957-960.
- 3676 Meyer, U., Salzer, R. and Raddatz, J.: HPLC-FTIR identification of reactive diluents in epoxy resins. *Macromol. Chem. Macromol. Symp.*, 52 (1991) 261-268; C.A., 116 (1992) 107303s.
- 3677 Nakashima, K., Nagata, M., Takahashi, M. and Akiyama, S.: Peroxyoxalate chemiluminescence detection of condensates of malondialdehyde with thiobarbituric acids using a flow system. *Biomed. Chromatogr.*, 6 (1992) 55-58.
- 3678 Nourooz-Zadeh, J., Uematsu, T., Borhan, B., Kurth, M.J. and Hammock, B.D.: Characterization of the cytosolic epoxide hydrolase-catalyzed hydration products from 9,10:12,13-diepoxy stearic esters. *Arch. Biochem. Biophys.*, 294 (1992) 675-685.
- 3679 Osawa, T. and Shibamoto, T.: Analysis of free malonaldehyde formed in lipid peroxidation systems via a pyrimidine derivative. *J. Am. Oil Chem. Soc.*, 69 (1992) 466-468.
- 3680 Reynolds, T.M. and Brain, A.: A simple internally-standardised isocratic HPLC assay for vitamin B₆ in human serum. *J. Liq. Chromatogr.*, 15 (1992) 897-914.
- 3681 Richard, M.J., Guiraud, P., Meo, J. and Favier, A.: High-performance liquid chromatographic separation of malondialdehyde-thiobarbituric acid adduct in biological materials (plasma and human cells) using a commercially available reagent. *J. Chromatogr.*, 577 (1992) 9-18.
- 3682 Shara, M.A., Dickson, P.H., Bagchi, D. and Stohs, S.J.: Excretion of formaldehyde, malondialdehyde, acetaldehyde and acetone in the urine of rats in response to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, paraquat, endrin and carbon tetrachloride. *J. Chromatogr.*, 576 (1992) 221-233.
- 3683 Simal Gandara, J., Pasiero Losada, P., Lopez Mahia, P., Simal Lozano, J. and Paz Abuin, S.: RP-HPLC-TSP-MS of epoxy resins bisphenol A diglycidyl ether type. *J. Chromatogr. Sci.*, 30 (1992) 11-16.
- 3684 Uno, B., Kawai, K., Kawasaki, C., Kawai, S., Asakura, E. and Tomita, M.: High-performance liquid chromatographic determination of urinary malondialdehyde asp-nitrophenylhydrazine derivative. *Anal. Sci.*, 7 (1991) 963-965; C.A., 116 (1992) 54832e.

- 3685 Van Uden, W., Homan, B., Woerdenbag, J., Pras, N., Malingre, T.M., Wichers, H.J. and Harkes, M.: Isolation, purification and cytotoxicity of 5-methoxydopophyllotoxin, a lignan from a root culture of *Linum flavum*. *J. Nat. Prod.*, 55 (1992) 102-110.
- 3686 Young, I.S. and Trimble, E.R.: Measurement of malondialdehyde in plasma by high performance liquid chromatography with fluorimetric detection. *Ann. Clin. Biochem.*, 28 (1991) 504-508; C.A., 116 (1992) 100671b.

For additional information see C.A.:
116 (1992) 39865z, 62009g.

See also 3638, 3664, 3665, 3666, 3772, 4517.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 3687 Benetti, G., Cavalli, S. and Renzetti, R.: (HPLC determination of sugars in licorice roots and extracts by using an ion-exchange column and amperometric detection). *Ind. Aliment. (Pinerolo)*, 30 (1991) 845-852; C.A., 116 (1992) 39871y.
- 3688 Clement, A., Yong, D. and Brechet, C.: Simultaneous identification of sugars by HPLC using evaporative light scattering detection (ELSD) and refractive index detection (RI). Application to plant tissues. *J. Liq. Chromatogr.*, 15 (1992) 805-817.
- 3689 Dieckmann-Schuppert, A., Bender, S., Odenthal-Schnittler, M., Bause, E. and Schwarz, R.T.: Apparent lack of N-glycosylation in the asexual intraerythrocytic stage of *Plasmodium falciparum*. *Eur. J. Biochem.*, 205 (1992) 815-825.
- 3690 Endo, T., Ohbayashi, H., Kanazawa, K., Kochibe, N. and Kobata, A.: Carbohydrate binding specificity of immobilized *Psathyrella velutina* lectin. *J. Biol. Chem.*, 267 (1992) 707-713.
- 3691 Ganetsos, G. and Barker, P.E.: Preparative scale, semi-continuous, counter-current, chromatographic refiner in carbohydrate separations. *Chromatographia*, 32 (1991) 573-578.
- 3692 Herbreteau, B., Lafosse, M., Morin-Allory, L. and Dreux, M.: High performance liquid chromatography of raw sugars and polyols using bonded silica gels. *Chromatographia*, 33 (1992) 325-330.
- 3693 Hommes, F.A. and Varghese, M.: High-performance liquid chromatography of urinary oligosaccharides in the diagnosis of glycoprotein degradation disorders. *Clin. Chim. Acta*, 203 (1991) 211-224.
- 3694 Karsten, U., Thomas, D.N., Weykam, G., Daniel, C. and Kirst, G.O.: A simple and rapid method for extraction and separation of low molecular weight carbohydrates from macroalgae using high-performance liquid chromatography. *Plant Physiol. Biochem. (Paris)*, 29 (1991) 373-378; C.A., 116 (1992) 101971m.
- 3695 Kiba, N., Matsushita, R. and Furusawa, M.: Column liquid chromatographic determination of sucrose and fructose with use of an enzyme reactor and spectrofluorimetric detection. *Anal. Chim. Acta*, 259 (1992) 15-18.
- 3696 Krämer, M. and Engelhardt, H.: Analysis of carbohydrates by HPLC with post-column derivatization. *J. High Resolut. Chromatogr.*, 15 (1992) 24-29.
- 3697 Krull, L.H. and Cote, G.L.: Determination of gulose and/or guluronic acid by ion chromatography and pulsed amperometric detection. *Carbohydr. Polym.*, 17 (1992, Pub. 1991) 205-207; C.A., 116 (1992) 101990s.
- 3698 Matsuura, F., Ohta, M., Murakami, K., Hirano, K. and Sweeley, C.C.: The combination of normal phase with reversed phase high performance liquid chromatography for the analysis of asparagine-linked neutral oligosaccharides labelled with *p*-aminobenzoic ethyl ester. *Biomed. Chromatogr.*, 6 (1992) 77-83.
- 3699 Mega, T., Oku, H. and Hase, S.: Characterization of carbohydrate-binding specificity of concanavalin A by competitive binding of pyridylamino sugar chains. *J. Biochem. (Tokyo)*, 111 (1992) 396-400.
- 3700 Otvos, L., Jr., Urge, L. and Thurin, J.: Influence of different N- and O-linked carbohydrates on the retention times of synthetic peptides in reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 599 (1992) 43-49.
- 3701 Peschet, J.L.: (A new concept in sugar analysis: pulsed amperometric coupled ionic chromatography). *Ind. Aliment. Agric.*, 107 (1991) 583-586; C.A., 116 (1992) 82307f.
- 3702 Rohrer, J.S. and Olechno, J.D.: Secondary isotope effect: the resolution of deuterated glucoses by anion exchange chromatography. *Anal. Chem.*, 64 (1992) 914-916.
- 3703 Sampath, D., Varki, A. and Freeze, H.H.: The spectrum of incomplete N-linked oligosaccharides synthesized by endothelial cells in the presence of brefeldin A. *J. Biol. Chem.*, 267 (1992) 4440-4455.
- 3704 Shibata, S., Midura, R.J. and Hascall, V.C.: Structural analysis of the linkage region oligosaccharides and unsaturated disaccharides from chondroitin sulfate using CarboPac PA1. *J. Biol. Chem.*, 267 (1992) 6548-6555.
- 3705 Tanaka, S., Nakamori, K., Akanuma, H. and Yabuuchi, M.: High performance liquid chromatographic determination of 1,5-anhydroglucitol in human plasma for diagnosis of diabetes mellitus. *Biomed. Chromatogr.*, 6 (1992) 63-66.
- 3706 Yamaguchi, H., Funaoka, H. and Iwamoto, H.: Structures of sugar chains of the subunits of an α -amylase inhibitor from *Phaseolus vulgaris* white kidney beans. *J. Biochem. (Tokyo)*, 111 (1992) 388-395.

For additional information see C.A.:

116 (1992) 19847s, 54827g, 79608z, 86151y, 86152z, 86158f, 86159g, 86160a, 86166g, 86167h, 101978u, 101985u.

See also 3498, 3714, 3718, 3736, 3737, 4237, 4287, 4714.

10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 3707 Akiyama, H., Toida, T. and Imanari, T.: Chemiluminescence high-performance liquid chromatography for the determination of hyaluronic acid in blood plasma. *Anal. Sci.*, 7 (1991) 807-809; C.A., 116 (1992) 3000z.
- 3708 Antalík, M., Bona, M., Gazová, Z. and Kuchár, A.: Spectrophotometric detection of the interaction between cytochrome c and heparin. *Biochim. Biophys. Acta*, 1100 (1992) 155-159.
- 3709 Brockhausen, I., Möller, G., Pollex-Krüger, A., Rutz, V., Paulsen, H. and Matta, K.L.: Control of O-glycan synthesis: specificity and inhibition of O-glycan core 1 UDP-galactose:N-acetylgalactosamine- α -R β 3-galactosyltransferase from rat liver. *Biochem. Cell Biol.*, 70 (1992) 99-108.

- 3710 Elmroth, I., Larsson, L., Wester Dahl, G. and Odham, G.: Determination of muramic acid by high-performance liquid chromatography-plasma spray mass spectrometry. *J. Chromatogr.*, 598 (1992) 41-50.
- 3711 Fishman, M.L., Cooke, P., Levaj, B., Gillespie, D.T., Sondey, S.M. and Scorza, R.: Pectin microgels and their subunit structure. *Arch. Biochem. Biophys.*, 294 (1992) 253-260.
- 3712 Greis, K.D., Turco, S.J., Thomas, J.R., McConville, M.J., Homans, S.W. and Ferguson, M.A.J.: Purification and characterization of an extracellular phosphoglycan from *Leishmania donovani*. *J. Biol. Chem.*, 267 (1992) 5876-5881.
- 3713 Karamanos, N.K., Aletras, A.J., Tseganidis, T., Tsiganos, C.P. and Antonopoulos, C.A.: Isolation, characterization and properties of the oversulphated chondroitin sulphate proteoglycan from squid skin with peculiar glycosaminoglycan sulphation pattern. *Eur. J. Biochem.*, 204 (1992) 553-560.
- 3714 Kitazume, S., Kitajima, K., Inoue, S. and Inoue, Y.: Detection, isolation, and characterization of oligo/poly(sialic acid) and oligo/poly(deaminoneuraminic acid) units in glycoconjugates. *Anal. Biochem.*, 202 (1992) 25-34.
- 3715 Kristensen, H.I., Tromborg, E.M., Nielsen, J.R., Nielsen, J.I., Johansen, K.B. and Oestergaard, P.B.: Development and validation of a size exclusion chromatography method for determination of molecular masses and molecular mass distribution in low molecular weight heparin. *Thromb. Res.*, 64 (1991) 131-141; *C.A.*, 116 (1992) 37232s.
- 3716 Kubota, Y., Fukuda, M., Ohtsui, K. and Koizumi, K.: Microanalysis of β -cyclodextrin and glucosyl- β -cyclodextrin in human plasma by high-performance liquid chromatography with pulsed amperometric detection. *Anal. Biochem.*, 201 (1992) 99-102.
- 3717 Linhardt, R.J., Wang, H., Loganathan, D. and Bae, J.: Search for the heparin antithrombin III-binding site precursor. *J. Biol. Chem.*, 267 (1992) 2380-2387.
- 3718 Orberger, G., Geyer, R., Stirn, S. and Tauber, R.: Structure of the N-linked oligosaccharides of the human transferrin receptor. *Eur. J. Biochem.*, 205 (1992) 257-267.
- 3719 Otsu, K., Kato, S., Ohtake, K. and Akamatsu, N.: Alteration of rat liver proteoglycans during regeneration. *Arch. Biochem. Biophys.*, 294 (1992) 544-549.
- 3720 Rosenfeld, L., Prior, M.T. and Girardi, L.M.: Comparison of the separation of bovine heparin by strong anion exchange and by gel filtration chromatography. *Thromb. Res.*, 64 (1991) 203-211; *C.A.*, 116 (1992) 37233t.
- 3721 Ruo, T.I., Wang, Z., Dordal, M.S. and Atkinson, A.J., Jr.: Assay of inulin in biological fluids by high-performance liquid chromatography with pulsed amperometric detection. *Clin. Chim. Acta*, 204 (1991) 217-222.
- 3722 Santos, J.A., Mulloy, B. and Mourao, P.A.S.: Structural diversity among sulfated α -L-galactans from ascidians (tunicates). Studies on the species *Ciona intestinalis* and *Herdmania monus*. *Eur. J. Biochem.*, 204 (1992) 669-677.
- 3723 Schick, B.P. and Senkowski-Richardson, S.: Proteoglycan synthesis in human erythroleukaemia (HEL) cells. *Biochem. J.*, 282 (1992) 651-658.
- 3724 Sommermeyer, K., Cech, F., Pfitzer, E. and Rössler, K.: Characterisation of polymers by size exclusion chromatography using multiple detection. Investigations on the determination of structural differences of hydroxyethyl starches. *Chromatographia*, 33 (1992) 151-153.
- 3725 Sugumaran, G., Katsman, M. and Silbert, J.E.: Effects of brefeldin on the synthesis of chondroitin-4-sulfate by cultures of mouse mastocytoma cells. *Biochem. Biophys. Res. Commun.*, 183 (1992) 357-361.
- 3726 Volpi, N., Mascellani, G. and Bianchini, P.: Low molecular weight heparins (5 kDa) and oligoheparins (2 kDa) produced by gel permeation enrichment or radial process: comparison of structures and physicochemical and biological properties. *Anal. Biochem.*, 200 (1992) 100-107.

For additional information see *C.A.*:
116 (1992) 723b, 120129j.

See also 3736, 3746, 3886, 4106.

10c. Glycoproteins and their constituents

- 3727 Arvidsson, E., Jansson, S.O. and Schill, G.: Optimization of chiral separations on silica-bonded α_1 -acid glycoprotein by mobile phase additives. *ACS Symp. Ser.*, 471 (1991) 126-140; *C.A.*, 116 (1992) 50548u.
- 3728 Bendixen, E., Halkier, T., Magnusson, S., Sottrup-Jensen, L. and Kristensen, T.: Complete primary structure of bovine β_2 -glycoprotein I: localization of the disulfide bridges. *Biochemistry*, 31 (1992) 3611-3617.
- 3729 Block, J.A., Inerot, S.E. and Kimura, J.H.: Heterogeneity of keratan sulfate substituted on human chondrocytic large proteoglycans. *J. Biol. Chem.*, 267 (1992) 7245-7252.
- 3730 Butz, H., Stuhlsatz, H.W., Maier, G. and Schwartz-Albiez, R.: Secreted and cellular proteochondroitin sulfates of a human B lymphoblastoid cell line contain different protein cores. *J. Biol. Chem.*, 267 (1992) 3402-3408.
- 3731 Camejo, G., Hurt-Camejo, E., Rosengren, B., Wiklund, O., Lopez, F. and Bodjers, G.: Modification of copper-catalyzed oxidation of low density lipoprotein by proteoglycans and glycosaminoglycans. *J. Lipid Res.*, 32 (1991) 1983-1991.
- 3732 Carnemolla, B., Borsi, L., Bannikov, G., Troyanovsky, S. and Zardi, L.: Comparison of human tenascin expression in normal, Simian-virus-40-transformed and tumor-derived cell lines. *Eur. J. Biochem.*, 205 (1992) 561-567.
- 3733 Doige, C.A. and Sharom, F.J.: Strategies for the purification of P-glycoprotein from multidrug-resistant Chinese hamster ovary cells. *Protein Expression Purif.*, 2 (1991) 256-265; *C.A.*, 116 (1992) 55049s.
- 3734 Flannery, C.R., Lark, M.W. and Sandy, J.D.: Identification of a stromelysin cleavage site within the interglobular domain of human aggrecan. Evidence for proteolysis at this site *in vivo* in human articular cartilage. *J. Biol. Chem.*, 267 (1992) 1008-1014.
- 3735 Hall, J.C. and Reddy, N.G.: Protein D is differentially expressed and regulated in the rat epididymis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1109-1116.
- 3736 Hanisch, F.-G. and Peter-Katalinic, J.: Structural studies on fetal mucins from human amniotic fluid. Core typing of short-chain O-linked glycans. *Eur. J. Biochem.*, 205 (1992) 527-535.

- 3737 Hard, K., Damm, J.B.L., Spruijt, M.P.N., Bergwerff, A.A., Kamerling, J.P., van Dedem, G.W.K. and Vliegenthart, J.F.G.: The carbohydrate chains of the β subunit of human chorionic gonadotropin produced by the choriocarcinoma cell line BeWo. Novel O-linked and novel bisecting-GlcNAc-containing N-linked carbohydrates. *Eur. J. Biochem.*, 205 (1992) 785-798.
- 3738 Helsing, M., van Schijndel, H.B., van Grunsven, W.M.J., Wolf, H. and Middeldorp, J.M.: Purification and quantification of recombinant Epstein-Barr viral glycoproteins gp350/220 from Chinese hamster ovary cells. *J. Chromatogr.*, 599 (1992) 267-272.
- 3739 Marikar, Y., Zachariah, B. and Basu, D.: Leaching of concanavalin A during affinity chromatographic isolation of cell surface glycoproteins from human fetal neurons and glial cells. *Anal. Biochem.*, 201 (1992) 306-310.
- 3740 Noguchi, S., Hatanaka, Y., Tobita, T. and Nakano, M.: Structural analysis of the N-linked carbohydrate chains of the 55-kDa glycoprotein family (PZP3) from porcine zona pellucida. *Eur. J. Biochem.*, 204 (1992) 1089-1100.
- 3741 Parkinson, J.F., Vlahos, C.J., Yan, S.C.B. and Bang, N.U.: Recombinant human thrombomodulin. Regulation of cofactor activity and anticoagulant function by a glycosaminoglycan side chain. *Biochem. J.*, 283 (1992) 151-157.
- 3742 Price, K.L.H., Choi, H.U., Rosenberg, L. and Stanley, E.R.: The predominant form of secreted colony stimulating factor-1 is a proteoglycan. *J. Biol. Chem.*, 267 (1992) 2190-2199.
- 3743 Saginati, M., Siri, A., Balza, E., Ponassi, M. and Zardi, L.: A simple procedure for tenascin purification. *Eur. J. Biochem.*, 205 (1992) 545-549.
- 3744 Saitoh, O., Wang, W., Lotan, R. and Fukuda, M.: Differential glycosylation and cell surface expression of lysosomal membrane glycoproteins in sublines of a human colon cancer exhibiting distinct metastatic potentials. *J. Biol. Chem.*, 267 (1992) 5700-5711.
- 3745 Sano, A., Mizuno, T., Kondoh, K., Hineno, T., Ueno, S.-i., Kakimoto, Y. and Morita, N.: Saposin-C from bovine spleen; complete amino acid sequence and relation between the structure and its biological activity. *Biochim. Biophys. Acta*, 1120 (1992) 75-80.
- 3746 Treuheit, M.J., Costello, C.E. and Halsall, H.B.: Analysis of the five glycosylation sites of human α_1 -acid glycoprotein. *Biochem. J.*, 283 (1992) 105-112.
- 3747 Visser, N.A., Brand, H.S., Vankampen, G.P.J., Vandestadt, R.J. and Vanderkorst, J.K.: A high-molecular-weight (8.10⁵) non-collagenous glycoprotein is synthesized by bovine cartilage *in vitro*. *Biochim. Biophys. Acta*, 1120 (1992) 308-314.
- 3748 Yamamoto, K., Konami, Y., Osawa, T. and Irimura, T.: Carbohydrate-binding peptides from several anti-H(O) lectins. *J. Biochem. (Tokyo)*, 111 (1992) 436-439.
- 3749 Zachariah, B., Marikar, Y. and Basu, D.: Affinity chromatographic isolation of cell surface glycoproteins from human fetal brains and their human fetal brains and their interaction with lectins. *Indian J. Biochem. Biophys.*, 28 (1991) 412-417; *C.A.*, 116 (1992) 17886e.
- For additional information see *C.A.*:
116 (1992) 3190m.
- See also 3937, 3949, 4013, 4173, 4174.
11. ORGANIC ACIDS AND LIPIDS
- 11a. Organic acids and simple esters
- 3750 Brega, A., Quadri, A., Villa, P., Prandini, P., Wei, J.-Q. and Lucrelli, C.: Improved HPLC determination of plasma and urine oxalate in the clinical diagnostic laboratory. *J. Liq. Chromatogr.*, 15 (1992) 501-511.
- 3751 Byczkowski, J. and Kulkarni, A.P.: Vanadium redox cycling, lipid peroxidation and co-oxygenation of benzo(a)pyrene-7,8-dihydrodiol. *Biochim. Biophys. Acta*, 1125 (1992) 134-141.
- 3752 Chang, W., Ning, C., Lin, M.T. and Huang, J.: Epidermal growth factor enhances a microsomal 12-lipoxygenase activity in A431 cells. *J. Biol. Chem.*, 267 (1992) 3657-3666.
- 3753 Fry, I.D.R. and Starkey, B.J.: The determination of oxalate in urine and plasma by high performance liquid chromatography. *Ann. Clin. Biochem.*, 28 (1991) 581-587; *C.A.*, 116 (1992) 101976s.
- 3754 Galimberti, R., Lecchi, P., de Angelis, L., Caruso, D., Toia, A., Volterra, A., Racagni, G. and Galli, G.: A particle beam-liquid chromatography-mass spectrometry method for the determination of lipoxygenase metabolites of arachidonic acid. *Anal. Biochem.*, 201 (1992) 356-361.
- 3755 Gérard, H.C., Moreau, R.A., Fett, W.F. and Osman, S.F.: Separation and quantitation of hydroxy and epoxy fatty acids by high-performance liquid chromatography with an evaporative light-scattering detector. *J. Am. Oil Chem. Soc.*, 69 (1992) 301-304.
- 3756 Hampson, A.J., Rowley, A.F., Barrow, S.E. and Steadman, R.: Biosynthesis of eicosanoids by blood cells of the crab. *Biochim. Biophys. Acta*, 1124 (1992) 143-150.
- 3757 Husain, S., Narsimha, R., Alvi, S.N. and Rao, R.N.: Monitoring the effluents of the trichloroacetic acid process by high-performance liquid chromatography. *J. Chromatogr.*, 600 (1992) 316-319.
- 3758 Joly, F., Breton, M., Wolf, C., Ninio, E. and Colard, O.: Heterogeneity of arachidonate and paf-acether precursor pools in mast cells. *Biochim. Biophys. Acta*, 1125 (1992) 305-312.
- 3759 Knothe, G., Bagby, M.O., Peterson, R.E. and Hou, C.T.: 7,10-Dihydroxy-8(E) octadecenoic acid: stereochemistry and a novel derivative, 7,10-dihydroxyoctadecanoic acid. *J. Am. Oil Chem. Soc.*, 69 (1992) 367-371.
- 3760 Koch, J. and Fuchs, G.: Enzymatic reduction of benzoyl-CoA to alicyclic compounds, a key reaction in anaerobic aromatic metabolism. *Eur. J. Biochem.*, 205 (1992) 195-202.
- 3761 Kropp, J., Knapp, F.F., Jr., Nissen, N.P., Assmann, T., Ambrose, K.R. and Biersack, H.J.: Metabolites of IPPA, BMIPP, and DMIPP fatty acids in rat hearts. A quantitative HPLC-study. *Nucl. Med. (Stuttgart)*, 27 (1991) 109-111; *C.A.*, 116 (1992) 101885m.
- 3762 Küsters, E., Spöndlin, C., Volken, C. and Eder, C.: Direct resolution of β -hydroxy myristic acid enantiomers by chiral phase gas and liquid chromatography. *Chromatographia*, 33 (1992) 159-162.
- 3763 Laethem, R.M., Laethem, C.L. and Koop, D.R.: Purification and properties of a cytochrome P450 arachidonic acid epoxidase from rabbit renal cortex. *J. Biol. Chem.*, 267 (1992) 5552-5559.

- 3764 Link, W. and Spiteller, G.: Produkte der Dimerisierung ungesättigter Fettsäuren VI: Untersuchungen zur Kinetik der Bildung dimerer Fettsäuren. *Fat Sci. Technol.*, 94 (1992) 9-13.
- 3765 Llorente, M., Villarroya, B. and Gomez-Cordoves, C.: Reverse-phase HPLC of organic acids in musts. *Chromatographia*, 32 (1991) 555-558.
- 3766 Mangino, M.J., Zografakis, J., Murphy, M.K. and Anderson, C.B.: Improved and simplified tissue extraction method for quantitating long-chain acyl-coenzyme A thioesters with picomolar detection using high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 157-162.
- 3767 Marcé, R.M., Calull, M., Olucha, J.C., Borrull, F., Rius, F.X. and Zupan, J.: Optimizing the liquid chromatographic separation of major carboxylic acids in wine by a modelling surface response method. *Anal. Chim. Acta*, 259 (1992) 237-242.
- 3768 Möhring, H. and Spiteller, G.: Produkte der Dimerisierung ungesättigter Fettsäuren VII: Kinetische Untersuchung der Mono- und Dimeren, die bei der Dimerisierung von Ölsäure entstehen. *Fat Sci. Technol.*, 94 (1992) 41-46.
- 3769 O'Connor, C.J., Petricevic, S.F., Coddington, J.M. and Stanley, R.A.: An NMR assay for quantitating lipase activity in biphasic macroemulsions. *J. Am. Oil Chem. Soc.*, 69 (1992) 295-300.
- 3770 Pastore, P., Magno, F., Volpin, S. and Biscontin, G.: Chromatographic determination of oxalate ion in patinas covering ancient materials. *Ann. Chim. (Rome)*, 81 (1991) 233-241; *C.A.*, 116 (1992) 5873k.
- 3771 Petrarulo, M., Bianco, O., Marangella, M., Pellegrino, S. and Linari, F.: Improved ion chromatographic determination of urine citrate and isocitrate. *G. Ital. Chim. Clin.*, 16 (1991) 17-22; *C.A.*, 116 (1992) 79601s.
- 3772 Pinot, F., Salaün, J.-P., Bosch, H., Lesot, A., Mioskowski, C. and Durst, F.: ω -Hydroxylation of Z9-octadecenoic, Z9,10-epoxystearic and 9,10-dihydroxystearic acids by microsomal cytochrome P450 systems from *Vicia sativa*. *Biochem. Biophys. Res. Commun.*, 184 (1992) 183-193.
- 3773 Polhuijs, M., Tergau, A.C. and Mulder, G.J.: Chiral inversion and stereoselective glutathione conjugation of the four 2-bromo-3-methylvaleric acid stereoisomers in the rat *in vivo* and *in vitro*. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1349-1354.
- 3774 Ramis, I., Rosello-Catafau, J. and Gelpi, E.: *In vivo* transformation of arachidonic acid into 12-hydroxy-5,8,10,14-eicosatetraenoic acid by human nasal mucosa. *J. Chromatogr.*, 575 (1992) 143-146.
- 3775 Ratnayake, W.M.N. and Pelletier, G.: Positional and geometrical isomers of linoleic acid in partially hydrogenated oils. *J. Am. Oil Chem. Soc.*, 69 (1992) 95-105.
- 3776 Rittich, B. and Zetek, J.: Effect of experimental condition on sensitivity of the determination of abscisic and indole-3-acetic acids by reversed phase liquid chromatography. *Chem. Listy*, 85 (1991) 1119-1123; *C.A.*, 116 (1992) 75356t.
- 3777 Schwartz, D.P. and Rady, A.H.: Quantitation and occurrence of hydroxy fatty acids in fats and oils. *J. Am. Oil Chem. Soc.*, 69 (1992) 170-173.
- 3778 Stein, J., Kulemeier, J., Lembcke, B. and Caspary, W.F.: Simple and rapid method for determination of short-chain fatty acids in biological materials by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr.*, 576 (1992) 53-61.
- 3779 Tsuyama, Y., Uchida, T. and Goto, T.: Analysis of underivatized C₁₂-C₁₈ fatty acids by reversed-phase ion-pair high-performance liquid chromatography with conductivity detection. *J. Chromatogr.*, 596 (1992) 181-184.
- 3780 Wang, T., Yu, W.-g. and Powell, W.S.: Formation of monohydroxy derivatives of arachidonic acid, linoleic acid, and oleic acid during oxidation of low density lipoprotein by copper ions and endothelial cells. *J. Lipid Res.*, 33 (1992) 525-537.
- 3781 Yamane, M. and Abe, A.: High-performance liquid chromatography-thermospray mass spectrometry of hydroxy-polyunsaturated fatty acid acetyl derivatives. *J. Chromatogr.*, 575 (1992) 7-18.
- 3782 Yang, S.S.: A rapid method for the determination of methoprene in tobacco by high performance liquid chromatography. *Chromatographia*, 33 (1992) 309-312.
- 3783 Zhang, J.Y., Prakash, C., Yamashita, K. and Blair, I.A.: Regio-specific and enantioselective metabolism of 8,9-epoxyeicosatrienoic acid by cyclooxygenase. *Biochem. Biophys. Res. Commun.*, 183 (1992) 138-143.

For additional information see C.A.:

116 (1992) 54806z, 75343s, 82310b, 104598f.

See also 3453, 3466, 3493, 3496, 3583, 3662, 3667, 3671, 3678, 3805, 3820, 3833, 3838, 3870, 3872, 4186, 4392, 4413, 4700, 4701, 4714.

11b. Prostaglandins

- 3784 Inazu, N., Ruepp, B., Wirth, H. and Wermuth, B.: Carbonyl reductase from human testis: purification and comparison with carbonyl reductase from human brain and rat testis. *Biochim. Biophys. Acta*, 1116 (1992) 50-56.
- 3785 Lohmus, M. and Lille, O.: HPLC of prostanoids and their metabolites. I - stability aspects. *Chim. Oggi*, 9 (1991) 21-25; *C.A.*, 116 (1992) 128401n - a review with 95 refs.
- 3786 Riutta, A., Mucha, I. and Vapaatalo, H.: Solid-phase extraction of urinary 11-dehydrothromboxane B₂ for reliable determination with radioimmunoassay. *Anal. Biochem.*, 202 (1992) 299-305.

See also 3793.

11c. Lipids and their constituents

- 3787 Abidi, S.L. and Mounts, T.L.: High-performance liquid chromatographic separation of molecular species of neutral phospholipids. *J. Chromatogr.*, 598 (1992) 209-218.
- 3788 Aitzetmüller, K. and Grönheim, M.: Separation of high unsaturated triacylglycerols by reversed phase HPLC with short wavelength UV detection. *J. High Resolut. Chromatogr.*, 15 (1992) 219-226.
- 3789 Akasaka, K., Ijichi, S., Watanabe, K., Ohru, H. and Meguro, H.: High-performance liquid chromatography and post-column derivatization with diphenyl-1-pyrenylphosphine for fluorimetric determination of triacylglycerol hydroperoxides. *J. Chromatogr.*, 596 (1992) 197-202.
- 3790 Akoh, C.C., Cooper, C. and Nwosu, C.V.: Lipase G-catalyzed synthesis of monoglycerides in organic solvent and analysis by HPLC. *J. Am. Oil Chem. Soc.*, 69 (1992) 257-260.

- 3791 Ando, Y., Nishimura, K., Aoyanagi, N. and Takagi, T.: Stereo-specific analysis of fish oil triacyl-*sn*-glycerols. *J. Am. Oil Chem. Soc.*, 69 (1992) 417-424.
- 3792 Bayer, E., Tang, L., Waidelich, D. and Kutubuddin, M.: Selektive Hydrierung von ölsäurereichen Ölen im Wasser mit einem PVP-Ni-Katalysator. *Fat Sci. Technol.*, 94 (1992) 79-82.
- 3793 Bioque, G., Tost, D., Closa, D., Roselló-Catafau, J., Ramis, I., Cabrer, F., Cargánico, G. and Gelpí, E.: Concurrent C18 solid phase extraction of platelet activating factor (PAF) and arachidonic acid metabolites. *J. Liq. Chromatogr.*, 15 (1992) 1249-1258.
- 3794 Bonnano, L.M., Denizot, B.A., Tchoreloff, P.C., Puisieux, F. and Cardot, P.J.: Determination of phospholipids from pulmonary surfactant using on-line coupled silica/reversed-phase high-performance liquid chromatography system. *Anal. Chem.*, 64 (1992) 371-379.
- 3795 Brearley, C.A. and Hanke, D.E.: 3- And 4-phosphorylated phosphatidylinositols in the aquatic plant *Spirodela polyrhiza* L. *Biochem. J.*, 283 (1992) 255-260.
- 3796 Chong, C.N., Hoh, Y.M. and Wang, C.W.: Fractionation procedures for obtaining cocoa butter-like fat from enzymatically interesterified palm olein. *J. Am. Oil Chem. Soc.*, 69 (1992) 137-140.
- 3797 Cubitt, A.B. and Firtel, R.A.: Characterization of phospholipase activity in *Dictyostelium discoideum*. Identification of a Ca²⁺-dependent polyphosphoinositidase-specific phospholipase C. *Biochem. J.*, 283 (1992) 371-378.
- 3798 Eder, K., Reichlmayr-Lais, A.M. and Kirchgessner, M.: Simultaneous determination of amounts of major phospholipid classes and their fatty acid composition in erythrocyte membranes using high-performance liquid chromatography and gas chromatography. *J. Chromatogr.*, 598 (1992) 33-42.
- 3799 Elmer-Frohlich, K. and Lachance, P.A.: Faster and easier methods for quantitative lipid extraction and fractionation from miniature samples of animal tissues. *J. Am. Oil Chem. Soc.*, 69 (1992) 243-245.
- 3800 Foglia, T.A. and Maeda, K.: High-performance liquid chromatographic separation of enantiomeric alkyl glycerol ethers. *Lipids*, 26 (1991) 769-773; *C.A.*, 116 (1992) 37218s.
- 3801 Forsell, P., Kervinen, R., Lappi, M., Linko, P., Suortti, T. and Poutanen, K.: Effect of enzymatic interesterification on the melting point of tallow-rapeseed oil (LEAR) mixture. *J. Am. Oil Chem. Soc.*, 69 (1992) 126-129.
- 3802 Gordon, M.H. and Griffith, R.E.: Steryl ester analysis as an aid to the identification of oils in blends. *Food Chem.*, 43 (1992) 71-78; *C.A.*, 116 (1992) 57644f.
- 3803 Han, X., Zupan, L.A., Hazen, S.L. and Gross, R.W.: Semisynthesis and purification of homogeneous plasmenylcholine molecular species. *Anal. Biochem.*, 200 (1992) 119-124.
- 3804 Hanras, C. and Perrin, J.L.: Gram-scale preparative HPLC of phospholipids from soybean lecithins. *J. Am. Oil Chem. Soc.*, 68 (1991) 804-808.
- 3805 Havel, C.M. and Watson, J.A.: Isopentanoic acid synthesis in isolated embryonic *Drosophila* cells: absolute, basal mevalonate synthesis rate determination. *Arch. Biochem. Biophys.*, 294 (1992) 639-646.
- 3806 Hori, M., Sugiura, K., Sahashi, Y. and Koike, S.: Determination of molecular species of triacylglycerols by reversed phase liquid chromatography/double focussing mass spectrometry with a frit-Cl interface. *Shitsuryo Bunseki*, 39 (1991) 133-140; *C.A.*, 116 (1992) 66880g.
- 3807 Kasurinen, J. and Somerharju, P.: Metabolism of pyrenyl fatty acids in baby hamster kidney fibroblasts. Effect of the acyl chain length. *J. Biol. Chem.*, 267 (1992) 6563-6569.
- 3808 Krisnangkura, K. and Simamaharnop, R.: Continuous trans-methylation of palm oil in an organic solvent. *J. Am. Oil Chem. Soc.*, 69 (1992) 166-169.
- 3809 Kurumi, Y., Adachi, Y., Itoh, T., Kobayashi, H., Nanno, T. and Yamamoto, T.: Novel high-performance liquid chromatography for determination of membrane phospholipid composition of rat hepatocytes. *Gastroenterol. Jpn.*, 26 (1991) 628-632; *C.A.*, 116 (1992) 121145j.
- 3810 Leopold, K. and Fischer, W.: Hydrophobic interaction chromatography fractionates lipoteichoic acid according to the size of the hydrophobic chain: a comparative study with anion-exchange and affinity chromatography for suitability in species analysis. *Anal. Biochem.*, 201 (1992) 350-355.
- 3811 Li, G., Pralong, W.-F., Pittet, D., Mayr, G.W., Schlegel, W. and Wollheim, C.B.: Inositol tetrakisphosphate isomers and elevation of cytosolic Ca²⁺ in vasopressin-stimulated insulin-secreting RINm5F cells. *J. Biol. Chem.*, 267 (1992) 4349-4356.
- 3812 Long, Y. and Lu, W.: Nonaqueous reversed phase HPLC with low-wavelength UV detection for triglyceride analysis. *Chin. Chem. Lett.*, 2 (1991) 393-396; *C.A.*, 116 (1992) 98618u.
- 3813 Matsuki, N., Tamura, S., Ono, K., Watari, T., Goitsuka, R., Takagi, S. and Hasegawa, A.: The high-performance liquid chromatographic analysis for the peroxidized phospholipids in equine erythrocytes and skeletal muscle. *J. Vet. Med. Sci.*, 53 (1991) 717-719; *C.A.*, 116 (1992) 54810w.
- 3814 Maurin, R., Fellat-Zarrouck, K. and Ksir, M.: Positional analysis and determination of triacylglycerol structure of *Argania spinosa* seed oil. *J. Am. Oil Chem. Soc.*, 69 (1992) 141-145.
- 3815 Mounts, T.L., Abidi, S.L. and Rennick, K.A.: HPLC analysis of phospholipids by evaporative laser light-scattering detection. *J. Am. Oil Chem. Soc.*, 69 (1992) 438-442.
- 3816 Neff, W.E., Selke, E., Mounts, T.L., Rinsch, W., Frenkl, E.N. and Zeitoun, M.A.M.: Effect of triacylglycerol composition and structures on oxidative stability of oils from selected soybean germplasm. *J. Am. Oil Chem. Soc.*, 69 (1992) 111-118.
- 3817 Olechno, J.D. and Rohrer, J.S.: Analysis of inositol phosphates. *Am. Biotechnol. Lab.*, 9 (1991) 8; *C.A.*, 116 (1992) 79598w.
- 3818 Pal, S., Saito, M., Ariga, T. and Yu, R.K.: UDP-galactose:globotriaosylceramide α -galactosyltransferase activity in rat pheochromocytoma (PC 12h) cells. *J. Lipid Res.*, 33 (1992) 411-417.
- 3819 Prieto, J.A., Ebri, A. and Collar, C.: Optimized separation of nonpolar and polar lipid classes from wheat flour by solid-phase extraction. *J. Am. Oil Chem. Soc.*, 69 (1992) 387-391.
- 3820 Priol, J., Duclos, M.P., Larpent, C. and Patin, H.: (Identification of the main constituents of the lipidic coating on *Cairina moschata* feathers). *Analisis*, 19 (1991) 297-301; *C.A.*, 116 (1992) 102182s.
- 3821 Riehl, T., Turk, J. and Stenson, W.F.: Metabolism of oxygenated derivatives of arachidonic acid by Caco-2 cells. *J. Lipid Res.*, 33 (1992) 323-331.
- 3822 Sempore, G. and Balard, J.: Determination of molecular species of oil triacylglycerols by reversed-phase and chiral-phase high-performance liquid chromatography. *J. Am. Oil Chem. Soc.*, 68 (1991) 702-709; *C.A.*, 116 (1992) 127136t.
- 3823 Sempore, B.G. and Bézard, J.A.: Separation of monoacylglycerols by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 596 (1992) 185-195.

- 3824 Sosada, M.: The preparation of rapeseed lecithin with high phosphatidyl-choline content. *Fat Sci. Technol.*, 94 (1992) 35-37.
- 3825 Stephan, V., Benhamou, M., Gutkind, J.S., Robbins, K.C. and Siraganian, R.P.: FcεRI-induced protein tyrosine phosphorylation of pp72 in rat basophilic leukemia cells (RBL-2H3). Evidence for a novel signal transduction pathway unrelated to G protein activation and phosphatidylinositol hydrolysis. *J. Biol. Chem.*, 267 (1992) 5434-5441.
- 3826 Stinson, A.M., Wiegand, R.D. and Anderson, R.E.: Recycling of docosahexaenoic acid in rat retinas during n-3 fatty acid deficiency. *J. Lipid Res.*, 32 (1991) 2009-2017.
- 3827 Tauskela, J.S., Akler, M. and Thompson, M.: The size dependence of cholate-dialyzed vesicles on phosphatidylcholine concentration. *Anal. Biochem.*, 201 (1992) 282-287.
- 3828 Taylor, D.C., Weber, N., Hogge, L.R., Underhill, E.W. and Pomeroy, M.K.: Formation of trierucoylglycerol (trierucin) from 1,2-dierucoylglycerol by a homogenate of mictospore-derived embryos of *Brassica napus* L. *J. Am. Oil Chem. Soc.*, 69 (1992) 355-358.
- 3829 Viani, P., Cervato, G., Gatti, P. and Cestaro, B.: Calcitonin-induced changes in the organization of sulfatide-containing membranes. *Biochim. Biophys. Acta*, 1106 (1992) 77-84.
- 3830 Wheelan, P., Zirolli, J.A. and Clay, K.L.: Analysis of glycerophosphocholine molecular species as derivatives of 7-[(chloro-carbonyl)-methoxy]-4-methylcoumarin. *J. Lipid Res.*, 33 (1992) 111-121.
- 3831 Xin, Y. and Aitzetmüller, K.: AgNO₃-TLC/HPLC Untersuchungen zur Struktur des chinesischen Talgbaumfettes. *Fat Sci. Technol.*, 94 (1992) 123-130.
- 3832 Xu, C.j. and Nelsestuen, G.L.: Association of α-phosphatidylinositol-specific phospholipase C with phospholipid vesicles. *Biochim. Biophys. Acta*, 1120 (1992) 49-58.
- 3833 Yang, B. and Chen, J.: Analysis of neutral lipids and glycerolysis products from olive oil by liquid chromatography. *J. Am. Oil Chem. Soc.*, 68 (1991) 980-982.
- 3837 Helmhold, M., Bigge, J., Muche, R., Mainoo, J., Thiery, J., Seidel, D. and Armstrong, V.W.: Contribution of the apo[a] phenotype to plasma Lp[a] concentrations shows considerable ethnic variation. *J. Lipid Res.*, 32 (1991) 1919-1928.
- 3838 Li, J., Wetzel, M. and O'Brien, P.J.: Transport of n-3 fatty acids from the intestine to the retina in rats. *J. Lipid Res.*, 33 (1992) 539-548.
- 3839 Li, Q-T. and Sawyer, W.H.: Effect of unesterified cholesterol on the compartmentation of a fluorescent cholesteryl ester in a lipoprotein-like lipid microemulsion. *J. Lipid Res.*, 33 (1992) 503-512.
- 3840 Marsh, J.B. and Diffenderfer, M.R.: Use of [¹⁵N]glycine in the measurement of apolipoprotein B synthesis in perfused rat liver. *J. Lipid Res.*, 32 (1991) 2019-2024.
- 3841 Parks, J.S., Gebre, A.K., Edwards, I.J. and Wagner, W.D.: Role of LDL subfraction heterogeneity in the reduced binding of low density lipoproteins to arterial proteoglycans in cynomolgus monkeys fed a fish oil diet. *J. Lipid Res.*, 32 (1991) 2001-2008.
- 3842 Rudling, M.: Hepatic mRNA levels for the LDL receptor and HMG-CoA reductase show coordinate regulation *in vivo*. *J. Lipid Res.*, 33 (1992) 493-501.
- 3843 Rye, K.A., Garrety, K.H. and Barter, P.J.: Changes in the size of reconstituted high density lipoproteins during incubation with cholesteryl ester transfer protein - a role of apolipoproteins. *J. Lipid Res.*, 33 (1992) 215-224.
- 3844 Shibusawa, Y., Ito, Y., Ikewaki, K., Rader, D.J. and Brewer, H.B., Jr.: Counter-current chromatography of lipoproteins with a polymer phase system using the cross-axis synchronous coil planet centrifuge. *J. Chromatogr.*, 596 (1992) 118-122.
- 3845 Sparks, D.L. and Phillips, M.C.: Quantitative measurement of lipoprotein surface charge by agarose gel electrophoresis. *J. Lipid Res.*, 33 (1992) 123-130.

For additional information see C.A.:
116 (1992) 79614y, 81409d.

For additional information see C.A.:

116 (1992) 2397x, 37458v, 46407e.

See also 3493, 3498, 3751, 4728.

11d. Lipoproteins and their constituents

- 3834 Campos, E., Nakajima, K., Tanaka, A. and Havel, R.J.: Properties of an apolipoprotein E-enriched fraction of triglyceride-rich lipoproteins isolated from human blood plasma with a monoclonal antibody to apolipoprotein B-100. *J. Lipid Res.*, 33 (1992) 369-380.
- 3835 Gillett, M.P.T. and Owen, J.S.: Comparison of the cytolytic effects *in vitro* on *Trypanosoma brucei brucei* of plasma, high density lipoproteins, and apolipoprotein A-I from hosts both susceptible (cattle and sheep) and resistant (human and baboon) to infection. *J. Lipid Res.*, 33 (1992) 513-523.
- 3836 Grove, R.I., Mazzucco, C., Allgretto, N., Kiener, P.A., Spitalny, G., Radka, S.F., Shoyab, M., Antonaccio, M. and Warr, G.A.: Macrophage-derived factors increase low density lipoprotein uptake and receptor number in cultured human liver cells. *J. Lipid Res.*, 32 (1991) 1889-1897.

12. ORGANIC PEROXIDES

- 3846 Foglia, T.A. and Silbert, L.S.: Peroxide synthesis from alkyl halides, alcohols and alkenes. *J. Am. Oil Chem. Soc.*, 69 (1992) 151-154.

See also 3668, 3751, 3789, 3813.

13. STEROIDS

13a. General techniques

- 3847 Clark, B.J.: Separation of steroid isomers by HPLC on porous graphitic carbon by the addition of mobile phase additives. In: Gorog, S. and Heftmann, E. (Editors), *Adv. Steroid Anal.* '90, Proc. Symp. Anal. Steroids, 4th 1990, Akad. Kiado, Budapest, 1991, pp. 129-137; C.A., 116 (1992) 785y.

- 3848 Gower, D.B., Marshall, D.E. and Houghton, E.: Exploitation of chromatographic techniques in quantitative and biosynthetic studies of equine steroid endocrinology. In: Gorog, S. and Heftmann, E. (Editors), *Adv. Steroid Anal. '90, Proc. Symp. Anal. Steroids, 4th, 1990* Akad. Kiado, Budapest, 1991, pp. 211-217; C.A., 116 (1992) 15901g.
- 3849 Lam, S., Malikin, G. and Karmen, A.: Determination of the stereochemistry of steroids by HPLC with post-column reactors containing immobilized hydroxysteroid dehydrogenases. In: Gorog, S. and Heftmann, E. (Editors), *Adv. Steroid Anal. '90, Proc. Symp. Anal. Steroids, 4th 1990*, Akad. Kiado, Budapest, 1991, pp. 157-164; C.A., 116 (1992) 51689c.
- 3850 Sabartova, J., Vyskovska, M. and Kubes, J.: HPLC of steroids in ointments. In: Gorog, S. and Heftmann, E. (Editors), *Adv. Steroid Anal. '90, Proc. Symp. Anal. Steroids, 4th 1990*, Akad. Kiado, Budapest, 1991, pp. 149-155; C.A., 115 (1991) 263468s.
- 3851 Shimada, K.: (Application of inclusion chromatography to the analysis of steroids in biological fluids). *Bunseki*, (1991) 730-732; C.A., 116 (1992) 99358w - a review with 13 refs.
- See also 3510.
- 13b. Pregnane and androstane derivatives**
- 3852 Bidard, M., Pouliquen, I., Clair, P. and Lesgards, G.: (The measurement of salivary cortisol by HPLC-UV. Comparison with other methods). *Analisis*, 19 (1991) 302-306; C.A., 116 (1992) 76501y.
- 3853 Carlin, J.R., Höglund, P., Eriksson, L.-O., Christofalo, P., Greoire, S.L., Taylor, A.M. and Andersson, K.-E.: Disposition and pharmacokinetics of [¹⁴C]finasteride after oral administration in humans. *Drug Metab. Disp.*, 20 (1992) 148-155.
- 3854 Hariharan, M., Naga, S., VanNoord, T. and Kindt, E.K.: Simultaneous assay of corticosterone and cortisol in plasma by reversed-phase liquid chromatography. *Clin. Chem. (Winston-Salem)*, 38 (1992) 346-352.
- 3855 Matilla, M.J., Jimenez, M.M. and Montiel, M.: Deoxycorticosterone, 18-OH-deoxycorticosterone and corticosterone determination by high performance liquid chromatography in monolayer adrenal cell culture. *Biochem. Int.*, 24 (1991) 951-957; C.A., 116 (1992) 793z.
- 3856 Mirshahi, M., Pagano, M., Mirshahi, A. and Agarwal, M.K.: Generation of polyclonal antibodies against the mineralocorticoid receptor and analysis of mineralocorticoid in rat myocardium by immunophotochemistry. *Biochim. Biophys. Acta*, 1120 (1992) 17-23.
- 3857 Poon, G.K., Jarman, M., McCague, R., Davies, J.H., Heeremans, C.E.M., van der Hoeven, R.A.M., Niessen, W.M.A. and van der Greef, J.: Identification of 4-hydroxyandrost-4-ene-3,17-dione metabolites in prostatic cancer patients by liquid chromatography-mass spectrometry. *J. Chromatogr.*, 576 (1992) 235-244.
- 3858 Raeside, J.I., Renaud, R.L. and Khalil, M.W.: Formation of C₁₉ 11-hydroxysteroids by porcine Leydig cells. *Biochem. Cell Biol.*, 70 (1992) 174-176.
- 3859 Shibasaki, S., Arai, I., Furuta, T. and Kasuya, Y.: Simultaneous determination of cortisol and cortisone in human plasma by stable-isotope dilution mass spectrometry. *J. Chromatogr.*, 576 (1992) 47-52.
- 3860 Yamazaki, T., Nawa, K., Kominami, S. and Takemori, S.: Cytochrome P-450_{17 α ,lyase}-mediating pathway of androgen synthesis in bovine adrenocortical cultured cells. *Biochim. Biophys. Acta*, 1134 (1992) 143-148.
- For additional information see C.A.:
116 (1992) 57853y.
- See also 3862, 4137, 4568.
- 13c. Estrogens**
- 3861 Kwakman, P.J.M., Kammaing, D.A., Brinkman, U.A.T. and de Jong, G.J.: Liquid chromatographic determination of oestradiol in serum by pre-column derivatization with dansyl chloride or lauryl chloride and peroxyoxalate chemiluminescence detection. *J. Pharm. Biomed. Anal.*, 9 (1991) 753-759.
- 3862 Scheybal, A., Ganschow, S. and Heil, W.: Purity test of estriol and flumethasone pivalate in the pharmacopeia of the GDR. In: Gorog, S. and Heftmann, E. (Editors), *Adv. Steroid Anal. '90, Proc. Symp. Anal. Steroids, 4th 1990*, Akad. Kiado, Budapest, 1991, pp. 143-148; C.A., 115 (1991) 263567r.
- 3863 Upadrashta, S.M., Parikh, B.V. and Nuessle, N.O.: HPLC analysis of estrone released from polylactic acid microspheres. *Anal. Lett.*, 25 (1992) 535-542.
- 3864 Zacur, H.A., Linkins, S., Chang, V., Smith, B., Kimball, A.W. and Burkman, R.: Ethinyl estradiol and norethindrone radioimmunoassay following Sephadex LH-20 column chromatography. *Clin. Chim. Acta*, 204 (1991) 209-216.
- 13d. Sterols**
- 3865 D'Auria, M.I., Paloma, L.G., Minale, L., Riccio, R., Debitus, C. and Levi, C.: Unique 3 β -O-methylsterols from the pacific sponge *Jereicopsis graphidiophora*. *J. Nat. Prod.*, 55 (1992) 311-320.
- 3866 Herz, J.E., Swaminathan, S., Pinkerton, F.D., Wilson, W.K. and Schroepfer, G.J., Jr.: Inhibitors of sterol synthesis. A highly efficient and specific side-chain oxidation of 3 β -acetoxy-5 α -cholest-8(14)-en-15-one for construction of metabolites and analogs of the 15-ketosterol. *J. Lipid Res.*, 33 (1992) 579-598.
- 3867 Kim, S.K. and Nawar, W.W.: Oxidative interactions of cholesterol with triacylglycerols. *J. Am. Oil Chem. Soc.*, 68 (1991) 931-934.
- 3868 Nourouz-Zadeh, J. and Appelquist, L.A.: Isolation and quantitative determination of sterol oxides in plant-based foods: soybean oil and wheat flour. *J. Am. Oil Chem. Soc.*, 69 (1992) 288-293.
- 3869 Parks, J.S. and Crouse, J.R.: Reduction of cholesterol absorption by dietary oleinate and fish oil in African green monkeys. *J. Lipid Res.*, 33 (1992) 559-568.
- 3870 Rezanika, T.: Analysis of sterol esters from alga and yeast by high-performance liquid chromatography and capillary gas chromatography-mass spectrometry with chemical ionization. *J. Chromatogr.*, 598 (1992) 219-226.
- For additional information see C.A.:
116 (1992) 46403a.
- See also 4470, 4502.

13e. *Bile acids and alcohols*

- 3871 Batta, A.K., Aggarwal, S.K. and Salen, G.: High-performance liquid chromatography of bile acids. Effect of hydroxyl groups at C-3, 6, 7 and 12 on bile acid mobility. *J. Liq. Chromatogr.*, 15 (1992) 467-478.
- 3872 Gatti, R., Cavrini, V. and Roveri, P.: 2-Bromoacetyl-6-methoxynaphthalene: a useful fluorescent labelling reagent for HPLC analysis of carboxylic acids. *Chromatographia*, 33 (1992) 13-18.
- 3873 Li, B. and Li, X.: (Quantitation of conjugated and free bile acids in human serum by high performance liquid chromatography with a polymer-based reversed phase column). *Sepu*, 9 (1991) 374-376; *C.A.*, 116 (1992) 54835h.
- 3874 Little, J.M., Pyrek, J.S., Radomska, A., Shattuck, K.E. and Lester, R.: Hepatic metabolism of short-chain bile acids. Inversion of the 3-hydroxyl group of isoethianic acid (3 β -hydroxy-5-androstane-17 β -carboxylic acid) by the adult rat. *J. Lipid Res.*, 32 (1991) 1949-1957.

For additional information see C.A.:
116 (1992) 17844q.

See also 3827.

13f. *Ecdysones and other insect steroid hormones*

- 3875 Pis, J. and Harmatha, J.: Phenylboronic acid as a versatile derivatization agent for chromatography of ecdysteroids. *J. Chromatogr.*, 596 (1992) 271-275.
- 3876 Whiting, P. and Dinan, L.: Chromatographic separations of ecdysone acyl esters and their application to the distribution and identification of ecdysteroids in adult house crickets, *Acheta domesticus*. In: McCaffery, A.R. and Wilson, I.D. (Editors), *Chromatogr. Isol. Insect Horm. Pheromones, [Proc. Int. Symp.]*, 1st 1989, Plenum, New York, 1990, pp. 53-67; *C.A.*, 116 (1992) 2991m.

For additional information see C.A.:
116 (1992) 101977t.

13g. *Other steroids*

For additional information see C.A.:
116 (1992) 46396a.

14. STEROID GLYCOSIDES AND SAPONINS

- 3877 Amarowicz, R., Shimoyamada, M. and Okubo, K.: Application of reversed phase liquid chromatography in the analysis of saponins in faba bean. *Nahrung*, 35 (1991) 217-219; *C.A.*, 116 (1992) 57641c.
- 3878 Oleszek, W., Jurzysta, M., Ploszynski, M., Colquhoun, I.J., Price, K.R. and Fenwick, G.R.: Zanic acid tridesmoside and other dominant saponins from alfalfa (*Medicago sativa* L.) aerial parts. *J. Agric. Food Chem.*, 40 (1992) 191-196.
- 3879 Tran Van Sung and Adam, G.: An acetylated bidesmosidic saponin from *Schefflera octophylla*. *J. Natural Prod.*, 55 (1992) 503-505.

- 3880 Uniyal, S.K., Badoni, V. and Sati, O.P.: A new triterpenoidal saponin from *Acacia auriculiformis*. *J. Natural Prod.*, 55 (1992) 500-502.

For additional information see C.A.:
116 (1992) 46404b, 76486x.

See also 4709.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. *Terpenes*

- 3881 Cohen, H., Charrier, C., Ricard, L. and Perreau, M.: Isolation and characterization of a secondary metabolite produced by *Fusarium graminearum*. 2,6,6,9-Tetramethyltricyclo[5.4.0.0]undecane-5,8,11-triol (5-hydroxyculmorin). *J. Nat. Prod.*, 55 (1992) 326-332.
- 3882 Hufford, C.D., Oguntimein, B. and Muhammad, I.: New stemodane diterpenes from *Stemodia maritima*. *J. Nat. Prod.*, 55 (1992) 48-52.
- 3883 Ohtani, K., Aikawa, Y., Fujisawa, Y., Kasai, R., Tanaka, O. and Yamasaki, K.: Solubilization of steviolbioside and steviolmonoside with γ -cyclodextrin and its application to selective syntheses of better sweet glycosides from stevioside and rubusoside. *Chem. Pharm. Bull.*, 39 (1991) 3172-3174.
- 3884 Sugawara, H., Kasuya, A., Iitaka, Y. and Shibata, S.: Further studies on the structure of retigeranic acid. *Chem. Pharm. Bull.*, 39 (1991) 3051-3054.
- 3885 Vanhaelen-Fastre, R., Diallo, B., Jaziri, M., Faes, M.-L., Homes, J. and Vanhaelen, M.: High-speed countercurrent chromatography separation of taxol and related diterpenoids from *Taxus baccata*. *J. Liq. Chromatogr.*, 15 (1992) 697-706.

See also 3880, 4698.

15c. *Bitter substances*

For additional information see C.A.:
116 (1992) 91527e.

16. NITRO AND NITROSO COMPOUNDS

- 3886 Konkina, L.N., Taganov, N.G., Ermakova, V.D. and Morozov, V.A.: (Chromatography with a combination of detectors for the study of nitrogen distribution in nitrocellulose). *Zh. Fiz. Khim.*, 65 (1991) 2768-2770; *C.A.*, 116 (1992) 43293d.
- 3887 Sen, N.P., Baddoo, P.A., Seaman, S.W. and Weber, D.: Simultaneous determination of 2-(hydroxymethyl)-N-nitrosothiazolidine-4-carboxylic acid and 2-(hydroxymethyl)-N-nitrosothiazolidine in smoked meats and cheese. *J. Agric. Food Chem.*, 40 (1992) 221-226.
- 3888 Via, J.C. and Taylor, L.T.: Chromatographic analysis of non-polymeric single base propellant components. *J. Chromatogr. Sci.*, 30 (1992) 106-110.

See also 3483, 3502.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 3889 Bartók, T., Börcsök, G. and Sági, F.: RP-HPLC separation of polyamines after automatic FMOC-Cl derivatization and precolumn sample clean-up using column switching. *J. Liq. Chromatogr.*, 15 (1992) 777-790.
- 3890 Cox, R.L., Schneider, T.W. and Koppang, M.D.: Ferrocene tagging of amines, amino acids and peptides for liquid chromatography with electrochemical detection. *Anal. Chim. Acta*, 262 (1992) 145-159.
- 3891 Forgacs, E. and Cserhati, T.: Detection of some ring-substituted aniline derivatives by porous graphitized carbon. Dependence on physico-chemical parameters. *Chromatographia*, 33 (1992) 356-360.
- 3892 Forgacs, E. and Cserhati, T.: High-performance liquid chromatographic retention behaviour of ring-substituted aniline derivatives on a porous graphitized carbon column. *J. Chromatogr.*, 600 (1992) 43-49.
- 3893 Ibe, A., Tamura, Y., Kamimura, H., Tabata, S., Hashimoto, H., Iida, M. and Nishima, T.: (Determination and contents of nonvolatile amines in miso and soy sauce). *Eisei Kagaku*, 37 (1991) 379-386; *C.A.*, 116 (1992) 104749f.
- 3894 Price, N.P.J., Firmin, J.L. and Gray, D.O.: Screening for amines by dansylation and automated high-performance liquid chromatography. *J. Chromatogr.*, 598 (1992) 51-57.
- 3895 Singh, A.B., Thomas, T.J., Thomas, T., Singh, M. and Mann, R.A.: Differential effects of polyamine homologues on the prevention of DL- α -difluoromethylornithine-mediated inhibition of malignant cell growth and normal immune response. *Cancer Res.*, 52 (1992) 1840-1847.

For additional information see C.A.:
116 (1992) 120172t.

See also 3502, 3583, 3888, 4697.

17b. Catecholamines and their metabolites

- 3896 Cooper, B.R., Jankowski, J.A., Leszczyszyn, D.J., Wightman, R.M. and Jorgenson, J.W.: Quantitative determination of catecholamines in individual bovine adrenomedullary cells by reversed-phase microcolumn liquid chromatography with electrochemical detection. *Anal. Chem.*, 64 (1992) 691-694.
- 3897 Descombes, A.A. and Haerdi, W.: HPLC separation of catecholamines after derivatization with 9-fluorenylmethyl chloroformate. *Chromatographia*, 33 (1992) 83-86.
- 3898 Jeon, H.-K., Nohta, H. and Ohkura, Y.: High-performance liquid chromatographic determination of catecholamines and their precursor and metabolites in human urine and plasma by postcolumn derivatization involving chemical oxidation followed by fluorescence reaction. *Anal. Biochem.*, 200 (1992) 332-338.
- 3899 Konishi-Imamura, L., Kim, D.-H. and Kobashi, K.: Effect of enzymatic sulfation on biochemical and pharmacological properties of catecholamines and tyrosine-containing peptides. *Chem. Pharm. Bull.*, 39 (1991) 2994-2998.

- 3900 Ohkura, Y. and Nohta, H.: Fluorogenic reagents for the derivatization of catecholamines and related compounds for liquid chromatographic analysis of biological samples. *TrAC*, 11 (1992) 74-79 - a review with 47 refs.

- 3901 Tricard, C., Cazabeil, J.M. and Salagoity, M.H.: (Determination of biogenic amines in wine by HPLC). *Analisis*, 19 (1991) M53-M55; *C.A.*, 116 (1992) 104608j.

For additional information see C.A.:

116 (1992) 16314e, 19687q, 102212b.

See also 3481, 3584, 4550, 4632.

17c. Urea and guanidine derivatives

See 4186.

17d. Other amine derivatives and amides (excl. peptides)

- 3902 Ikarashi, Y., Iwatsuki, H., le Roy Blank, C. and Maruyama, Y.: Glassy carbon pre-column for direct determination of acetylcholine and choline in biological samples using liquid chromatography with electrochemical detection. *J. Chromatogr.*, 575 (1992) 29-37.
- 3903 Salamoun, J., Nguyen, P.T. and Remien, J.: Cation-exchange liquid chromatography of choline and acetylcholine on free shielded silanols of silica-based reversed-phase stationary phases. *J. Chromatogr.*, 596 (1992) 43-49.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. Amino acids and their derivatives

- 3904 Adamson, J.G., Hoang, T., Crivici, A. and Lajoie, G.A.: Use of Marley's reagent to quantitate racemization upon anchoring of amino acids to solid supports for peptide synthesis. *Anal. Biochem.*, 202 (1992) 210-214.
- 3905 Armstrong, D.W., Duncan, J.D. and Lee, S.H.: Evaluation of D-amino acid levels in human urine and in commercial L-amino acid samples. *Amino Acids*, 1 (1991) 97-106; *C.A.*, 116 (1992) 125375w.
- 3906 Baffi, F., Ianni, M.C., Cardinale, A.M., Magi, E., Frache, R. and Ravera, M.: Study of reversed-phase C₁₈-silica in liquid chromatography for the determination of free dissolved amino acids and copper(II)-amino acid complexes at the picomole level in marine matrices. *Anal. Chim. Acta*, 260 (1992) 99-106.
- 3907 Belliaro, J.J., Faure, U. and Ooghe, W.: (Determination of free amino acids in orange juice - a European collaborative study). *Fluess. Obst.*, 58 (1991) 368-372 and 113-116; *C.A.*, 116 (1992) 5373x.
- 3908 Blackwell, J.A. and Carr, P.W.: Ligand exchange chromatography of free amino acids on phosphated zirconium oxide supports. *J. Liq. Chromatogr.*, 15 (1992) 727-751.
- 3909 Bourdelais, A. and Kalivas, P.W.: High sensitivity HPLC assay for GABA in brain dialysis studies. *J. Neurosci. Methods*, 39 (1991) 115-121; *C.A.*, 116 (1992) 121038r.

- 3910 Brueckner, H., Keller-Hoehl, C., Godel, H. and Wittner, R.: Rational design of new reagents for the resolution of DL-amino acids by HPLC. In: Giralt, E. and Andreu, D. (Editors), *Pept. 1990, Proc. Eur. Pept. Symp., 21st 1990*, ESCOM Sci. Publ., Leiden, 1991, pp. 334-336; C.A., 116 (1992) 33664m.
- 3911 Busini, S., Bavazzano, P. and Occhiato, E.: High-performance liquid chromatographic determination of 3,5-dimethylhippuric acid in the occupational exposure to trimethylbenzenes. *J. Chromatogr.*, 577 (1992) 180-184.
- 3912 Christen, S. and Stocker, R.: Simultaneous determination of 3-hydroxyanthranilic and cinnabarinic acid by high-performance liquid chromatography with photometric or electrochemical detection. *Anal. Biochem.*, 200 (1992) 273-279.
- 3913 Chui, W.-K. and Wainer, I.W.: Enzyme-based high-performance liquid chromatography supports as probes of enzyme activity and inhibition: the immobilization of trypsin and α -chymotrypsin on an immobilized artificial membrane high-performance liquid chromatography support. *Anal. Biochem.*, 201 (1992) 237-245.
- 3914 Colette, C., Benmbarek, A., Boniface, H., Astre, C., Pares-Herbutte, N., Monnier, L. and Guitter, J.: Determination of protein-bound urinary gamma-carboxyglutamic acid in calcium nephrolithiasis. *Clin. Chim. Acta*, 204 (1991) 43-50.
- 3915 Delgado, T., Corzo, N., Santa-Maria, G., Jimeno, M.L. and Olano, A.: Determination of furosine in milk samples by ion-pair reversed phase liquid chromatography. *Chromatographia*, 33 (1992) 374-376.
- 3916 El Tayar, N., Tsai, R.S., Carrupt, A. and Testa, B.: Octan-1-ol-water partition coefficients of zwitterionic α -amino acids. Determination of centrifugal partition chromatography and factorization into steric/hydrophobic and polar component. *J. Chem. Soc., Perkin Trans. 2*, (1992) 79-84; C.A., 116 (1992) 92486c.
- 3917 Galushko, S.V., Shishkina, I.P., Gerus, I.I. and Kolycheva, M.T.: High-performance ligand-exchange liquid chromatography of fluoro derivatives of alanine. *J. Chromatogr.*, 600 (1992) 83-85.
- 3918 Green, G.D. and Reagan, K.: Determination of hydroxyproline by high pressure liquid chromatography. *Anal. Biochem.*, 201 (1992) 265-269.
- 3919 Grunau, J.A. and Swiader, J.M.: Chromatographic quantitation of free amino acids: S-methylmethionine, methionine and lysine in corn. *Commun. Soil Sci. Plant Anal.*, 22 (1991) 1873-1882; C.A., 116 (1992) 54828h.
- 3920 Hawkes, W.C. and Kutnink, M.A.: High-performance liquid chromatographic determination of selenocysteine with the fluorescent reagent, N-(iodoacetylaminioethyl)-5-naphthylamine-1-sulfonic acid. *J. Chromatogr.*, 576 (1992) 263-270.
- 3921 Hay, B.A., Homiski, J.W. and Priest, M.A.: A simplified method for synthesis of tetrahydroiso- α -acid standards for high-performance liquid chromatography. *J. Am. Soc. Brew. Chem.*, 49 (1991) 115-118; C.A., 116 (1992) 19671e.
- 3922 Hendrich, C.E., Berdecia-Rodriguez, J., Wiedmeier, V.T. and Porterfield, S.P.: Method for the quantitation of iodothyronines in body tissues and fluids using high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 19-24.
- 3923 Hou, W. and Wang, E.: Liquid chromatography with electrocatalytic detection of cysteine, N-acetylcysteine and glutathione by a Prussian blue film-modified electrode. *J. Electroanal. Chem. Interfacial Electrochem.*, 316 (1991) 155-163; C.A., 116 (1992) 98646b.
- 3924 Ishii, T., Iwahashi, H., Sugata, R. and Kido, R.: Formation of hydroxanthommatin-derived radical in the oxidation of 3-hydroxykynurenine. *Arch. Biochem. Biophys.*, 294 (1992) 616-622.
- 3925 Kawakami, Y., Ohga, T., Shimamoto, C., Satoh, N. and Ohmori, S.: Determination of free N-acetylamino acids in biological samples and N-terminal acetylamino acids of proteins. *J. Chromatogr.*, 576 (1992) 63-70.
- 3926 Lee, B.L., Chua, S.C., Ong, H.Y., Lee, H.P. and Ong, C.N.: Determination of beta-amino-isobutyric acid in urine and serum using pre-column derivatization technique. *J. Liq. Chromatogr.*, 15 (1992) 1351-1360.
- 3927 Mansoor, M.A., Svardal, A.M. and Ueland, P.M.: Determination of the *in vivo* redox status of cysteine, cysteinylglycine, homocysteine, and glutathione in human plasma. *Anal. Biochem.*, 200 (1992) 218-229.
- 3928 Martens, D.A. and Frankenberger, W.T., Jr.: Pulsed amperometric detection of amino acids separated by anion exchange chromatography. *J. Liq. Chromatogr.*, 15 (1992) 423-439.
- 3929 Mazzi, G., Fioravanzo, F. and Scappini, P.: (Anion exchange high-performance liquid chromatographic determination of hydroxyproline in urine). *G. Ital. Chim. Clin.*, 15 (1990) 397-404; C.A., 116 (1992) 79603u.
- 3930 Monastero, E., Deutsch, W. and Ellero, M.: (Apricot characterization using amino acid analysis). *Ind. Aliment. (Pinerolo)*, 30 (1991) 817-830; C.A., 116 (1992) 39870x.
- 3931 Morita, I., Kawamoto, M. and Yoshida, H.: Difference in the concentration of tryptophan metabolites between maternal and umbilical foetal blood. *J. Chromatogr.*, 576 (1992) 334-339.
- 3932 Morvai, M., Fábíán, V. and Molnár-Perl, I.: Buffer and pH dependence of the retention of phenylthiocarbamylamino acids in reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 600 (1992) 87-92.
- 3933 Nagata, Y., Yamamoto, K. and Shimojo, T.: Determination of D- and L-amino acids in mouse kidney by high-performance liquid chromatography. *J. Chromatogr.*, 575 (1992) 147-152.
- 3934 Nathans, G.R. and Gere, D.R.: Rapid robust separation of hydroxyproline and proline. *Anal. Biochem.*, 202 (1992) 262-267.
- 3935 Ng, L.T.: Ion-exchange chromatography for physiological fluid amino acid analysis. *J. Nutr. Biochem.*, 2 (1991) 671-679; C.A., 116 (1992) 17885d.
- 3936 Ohshita, T. and Katunuma, N.: Analysis of degradation of proteins labeled with fluorescein isothiocyanate by Sephadex G-25 affinity chromatography. *Anal. Biochem.*, 202 (1992) 400-404.
- 3937 Palladino, D.E.H., House, R.M. and Cohen, K.A.: Measurement of amino acid compositions of glycoprotein systems by gas-phase hydrolysis and reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 599 (1992) 3-11.
- 3938 Paroni, R., de Vecchi, E., Fermo, I., Arcelloni, C., Diomede, L., Magni, F. and Bonini, P.A.: Total urinary hydroxyproline determined with rapid and simple high-performance liquid chromatography. *Clin. Chem. (Winston-Salem)*, 38 (1992) 407-411.
- 3939 Qu, Y., Miller, J.B., Slocum, R.H. and Shapira, E.: Rapid automated quantitation of isoleucine, leucine, tyrosine and phenylalanine from dried blood filter paper specimens. *Clin. Chim. Acta*, 203 (1991) 191-198.
- 3940 Roennestad, H.: A study on the possibilities of using 3-methylhistidine to quantify skeletal proteins in meat trimmings. *Meat Sci.*, 30 (1991) 257-264; C.A., 116 (1992) 39835q.

- 3941 Sherwood, R.A., Bayliss, E.M. and Chappatte, O.: Assay of plasma glycine by HPLC with electrochemical detection in patients undergoing glycine irrigation during gynaecological surgery. *Clin. Chim. Acta*, 203 (1991) 275-284.
- 3942 Stolz, A., Nörtemann, B. and Knackmuss, H.-J.: Bacterial metabolism of 5-aminosalicylic acid. Initial ring cleavage. *Biochem. J.*, 282 (1992) 675-680.
- 3943 Sud, D., Hothi, H.S. and Pannu, B.S.: Role of metal ions in the ligand-exchange separation of amino acids. *J. Chromatogr.*, 596 (1992) 281-284.
- 3944 Sumitani, H., Suekane, S., Sakai, Y. and Tatsuka, K.: Precolumn o-phthalaldehyde derivatization and reverse-phase liquid chromatography of S-methylmethioninesulfonium in Satsuma mandarin juice. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 77-79.
- 3945 Takeuchi, T. and Nagae, N.: Enantiomeric resolution of dansyl phenylalanine and analogs by microcolumn liquid chromatography with γ -cyclodextrin as mobile phase additive. *J. High Resolut. Chromatogr.*, 15 (1992) 121-123.
- 3946 Tessari, P., Inchiostro, S., Vettore, M., Sabadin, L. and Biolo, G.: A fast high-performance liquid chromatographic method for the measurement of plasma concentration and specific activity of phenylalanine. *Clin. Biochem.*, 24 (1991) 425-428; *C.A.*, 116 (1992) 124150g.
- 3947 Voelker, T., Wuensche, J., Borgmann, E. and Souffrant, W.B.: (Determination of 2,6-diaminopimelic acid in porcine feces and chyme). *Arch. Anim. Nutr.*, 41 (1991) 615-621; *C.A.*, 116 (1992) 54819f.
- 3948 Zhou, C., Sun, W., Wang, Y., Zhao, Z., Cui, Y. and Li, C.: (Application of Sep-Pak C₁₈ column as precolumn in amino acid analysis). *Sepu*, 9 (1991) 391-392; *C.A.*, 116 (1992) 54837k.
- For additional information see *C.A.*:
115 (1991) 294106u;
116 (1992) 2998u, 75438w, 102228m, 106729y.
- See also 3469, 3478, 3539, 3840, 3890, 3895, 3950, 4007, 4014, 4035, 4048, 4385, 4404, 4679, 4714.
- 18b. *Peptides, peptidic and proteinous hormones, growth factors*
- 3949 Bellamy, W., Takase, M., Yamauchi, K., Wakabayashi, H., Kawase, K. and Tomita, M.: Identification of the bactericidal domain of lactoferrin. *Biochim. Biophys. Acta*, 1121 (1992) 130-136.
- 3950 Boyle, W.J., van der Geer, P. and Hunter, T.: Phosphopeptide mapping and phosphoamino acid analysis by two-dimensional separation on thin-layer cellulose plates. *Methods Enzymol.*, 201 (1991) 110-149; *C.A.*, 116 (1992) 55025f.
- 3951 Bramucci, M., Miano, A. and Amici, D.: Epidermal inhibitory pentapeptide phosphorylated *in vitro* by calf thymus protein kinase Nil is protected from serum enzyme hydrolysis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 474-480.
- 3952 Broekaert, W.F., Marien, W., Terras, F.R.G., de Bolle, M.F.C., Proost, P., van Damme, J., Dillen, L., Claeys, M., Rees, S.B. et al.: Antimicrobial peptides from *Amaranthus caudatus* seeds with sequence homology to the cysteine/glycine-rich domain of chitin-binding proteins. *Biochemistry*, 31 (1992) 4308-4314.
- 3953 Cammue, B.P.A., de Bolle, M.F.C., Terras, F.R.G., Proost, P., van Damme, J., Rees, S.B., Vanderleyden, J. and Broekaert, W.F.: Isolation and characterization of a novel class of plant antimicrobial peptides from *Mirabilis jalapa* L. seeds. *J. Biol. Chem.*, 267 (1992) 2228-2233.
- 3954 Chabanet, C. and Yvon, M.: Prediction of peptide retention time in reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 599 (1992) 211-225.
- 3955 Clogston, C.L., Hsu, Y.-R., Boone, T.C. and Lu, H.S.: Detection and quantitation of recombinant granulocyte colony-stimulating factor charge isoforms: comparative analysis by cationic-exchange chromatography, isoelectric focusing gel electrophoresis, and peptide mapping. *Anal. Biochem.*, 202 (1992) 375-383.
- 3956 Cox, G.B.: Influence of operating parameters on the preparative gradient elution chromatography of insulins. *J. Chromatogr.*, 599 (1992) 195-203.
- 3957 Dandeu, J.-P., Rabillon, J., Lux, M., David, B., Guillaume, J.-L. and Camoin, L.: Isolation of *Der pl*, the *Dermatophagoides pteronyssinus* major mite allergen, from a crude mite culture extract, purification by ion-chromatography, and comparison between the material obtained and a cDNA-coded *Der pl*. *J. Chromatogr.*, 599 (1992) 105-111.
- 3958 Dillen, L., Boel, S., de Potter, W.P. and Claeys, M.: Mass spectrometric characterization of bovine chromaffin granule peptides related to chromogranin B. *Biochim. Biophys. Acta*, 1120 (1992) 105-112.
- 3959 Enjalbert, F., Gallion, C., Jehl, F., Monteil, H. and Faulstich, H.: Simultaneous assay for amatoxins and phallotoxins in *Amanita phalloides* Fr. by high-performance liquid chromatography. *J. Chromatogr.*, 598 (1992) 227-236.
- 3960 Estivariz, F.E., Friedman, T.C., Chikuma, T. and Loh, Y.P.: Processing of adrenocorticotropin by two proteases in bovine intermediate lobe secretory vesicle membranes. A distinct acidic, tetrabasic residue-specific calcium-activated serine protease and a PC2-like enzyme. *J. Biol. Chem.*, 267 (1992) 7456-7463.
- 3961 Fassina, G. and Cassan, G.: Design and recognition properties of a hydrophatically complementary peptide to human interleukin β . *Biochem. J.*, 282 (1992) 773-779.
- 3962 Friebe, S., Krauss, G.J. and Nitsche, H.: High-performance liquid chromatographic separation of *cis-trans* isomers of proline-containing peptides. I. Separation on cyclodextrin-bonded silica. *J. Chromatogr.*, 598 (1992) 139-142.
- 3963 Galushko, S.V., Belik, M.Y., Solodenko, V.A., Kasheva, T.N. and Kukhar, V.P.: Ion-exchange high-performance liquid chromatography of diastereoisomers of some phosphonodipeptides. *J. Chromatogr.*, 600 (1992) 79-81.
- 3964 Grimmelikhuijzen, C.J.P., Rinehart, K.L. and Spencer, A.N.: Isolation of the neuropeptide Glu-Trp-Leu-Gly-Arg-Phe-NH₂ (Pol-RFamide II) from the hydromedusa *Polyorchis penicillatus*. *Biochem. Biophys. Res. Commun.*, 183 (1992) 375-382.
- 3965 Hage, D.S., Taylor, R.L. and Kao, P.C.: Improved recovery of a radiolabeled peptide with an albumin-treated reversed-phase HPLC column. *Clin. Chem. (Winston-Salem)*, 38 (1992) 303-304.
- 3966 Hageman, M.J., Bauer, J.M., Possert, P.L. and Darrington, R.T.: Preformulation studies oriented toward sustained delivery of recombinant somatotropins. *J. Agric. Food Chem.*, 40 (1992) 348-355.

- 3967 Hageman, M.J., Possert, P.L. and Bauer, J.M.: Prediction and characterization of the water sorption isotherm for bovine somatotropin. *J. Agric. Food Chem.*, 40 (1992) 342-347.
- 3968 Harris, R.J., Ling, V.T. and Spellman, M.W.: O-Linked fucose is present in the first epidermal growth factor domain of factor XII but not protein C. *J. Biol. Chem.*, 267 (1992) 5102-5107.
- 3969 Higashiyama, S., Lau, K., Besner, G.E., Abraham, J.A. and Klagsbrun, M.: Structure of heparin-binding EGF-like growth factor. Multiple forms, primary structure, and glycosylation of the mature protein. *J. Biol. Chem.*, 267 (1992) 6205-6212.
- 3970 Hober, S., Forsberg, G., Palm, G., Hartmanis, M. and Nilsson, B.: Disulfide exchange folding of insulin-like growth factor I. *Biochemistry*, 31 (1992) 1749-1756.
- 3971 Impellizzeri, G., Maccarrone, G., Rizzarelli, E., Vecchio, G., Gorradini, R. and Marchelli, R.: (6-Deoxy-6-N-histamino- β -cyclodextrin-cooper(II) complex, a new enantioselective receptor for aromatic amino acids). *Angew. Chem.*, 103 (1991) 1363-1365; *C.A.*, 115 (1991) 294102q.
- 3972 Khan, Z., Aitken, A., del Rio Garcia, J. and Smyth, D.G.: Isolation and identification of two neutral thyrotropin releasing hormone-like peptides, pyroglutamylphenylalanineproline amide and pyroglutamylglutamineproline amide, from human seminal fluid. *J. Biol. Chem.*, 267 (1992) 7464-7469.
- 3973 Klughammer, B., Benz, R., Betz, M., Thume, M. and Dietz, K.-J.: Reconstitution of vacuolar ion channels into planar lipid bilayers. *Biochim. Biophys. Acta*, 1104 (1992) 308-316.
- 3974 Knadler, M.P., Ackermann, B.L., Coutant, J.E. and Hurst, G.H.: Metabolism of the anticoagulant peptide, MDL 28,050, in rats. *Drug Metab. Disp.*, 20 (1992) 89-95.
- 3975 Kondo, M., Ishida, N., Kobayashi, M. and Mitsui, Y.: Secretion of endothelin-1 in human endothelial cell line but not in B cell line by transfection of preproendothelin-1 cDNA. *Biochim. Biophys. Acta*, 1134 (1992) 242-246.
- 3976 Krien, P.M., Margou, V. and Kermici, M.: Electrochemical determination of femtomole amounts of free reduced and oxidized glutathione. Application to human hair follicles. *J. Chromatogr.*, 576 (1992) 255-261.
- 3977 Kristjansson, F., Thakur, A. and Stobaugh, J.F.: Selective fluorogenic derivatization of Pro²-Lys peptides with naphthalene-2,3-dicarboxaldehyde/cyanide. *Anal. Chim. Acta*, 262 (1992) 209-215.
- 3978 Lemieux, L., Piot, J.-M., Guillochon, D. and Amiot, J.: Study of the efficiency of a mobile phase used in size-exclusion HPLC for the separation of peptides from a casein hydrolysate according to their hydrodynamic volume. *Chromatographia*, 32 (1991) 499-504.
- 3979 Li, K.W. and Geraerts, W.P.M.: Isolation and chemical characterization of a novel insulin-related neuropeptide from the freshwater snail, *Lymnaea stagnalis*. *Eur. J. Biochem.*, 205 (1992) 675-678.
- 3980 Miller, L.J., Hadac, E.M., Gates, L.K. and Gaisano, H.Y.: Binding on a phenylethyl ester analogue of cholecystokinin to the solubilized pancreatic cholecystokinin receptor: use in ligand-affinity chromatography. *Biochem. Biophys. Res. Commun.*, 183 (1992) 396-404.
- 3981 Müllner, S. and Hoyle, V.: A method for directly determining intact recombinant insulin fusion proteins in crude fermentation extracts. *Anal. Biochem.*, 202 (1992) 394-399.
- 3982 Ogawa, Y., Schmidt, D.K., Dasch, J.R., Chang, R. and Glaser, C.B.: Purification and characterization of transforming growth factor- β 2.3 and - β 1.2 heterodimers from bovine bone. *J. Biol. Chem.*, 267 (1992) 2325-2328.
- 3983 Ohta, T., Ishimura, K. and Takitani, S.: Preparation of anhydrochymotrypsin diol silica as selective adsorbent for affinity chromatography of peptides with aromatic amino acids at C-termini. *Chromatographia*, 33 (1992) 113-116.
- 3984 Olstad, O.K., Reppe, S., Gabrielsen, O.S., Hartmanis, M., Blingsmo, O.R., Gautvik, V.T., Haflan, A.K., Christensen, T.B., Oyen, T.B. and Gautvik, K.M.: Isolation and characterization of two biologically active O-glycosylated forms of human parathyroid hormone produced in *Saccharomyces cerevisiae*. Identification of a new motif for O-glycosylation. *Eur. J. Biochem.*, 205 (1992) 311-319.
- 3985 Prosser, C.G. and Fleet, I.R.: Secretion of insulin-like growth factor II into milk. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1230-1237.
- 3986 Qiu, P., Wang, D. and Pan, X.: (Analysis of enkephalin, Naga and substance P in rabbits cerebrospinal fluid by high performance liquid chromatography). *Sepu*, 9 (1991) 389-390; *C.A.*, 116 (1992) 99443v.
- 3987 Rand-Weaver, M. and Kawauchi, H.: A rapid procedure for the isolation of bioactive growth hormone. *Gen. Comp. Endocrinol.*, 85 (1992) 341-345; *C.A.*, 116 (1992) 121072x.
- 3988 Reid, G.E. and Simpson, R.J.: Automated solid-phase peptide synthesis: use of 2-(1H-benzotriazol-1-yl)-1,1,3,3-tetramethyluronium tetrafluoroborate for coupling of *tert*-butyloxycarbonyl amino acids. *Anal. Biochem.*, 200 (1992) 301-309.
- 3989 Selsted, M.E., Novotny, M.J., Morris, W.L., Tang, Y., Smith, W. and Cullor, J.S.: Indolicidin, a novel bactericidal tridecapeptide amide from neutrophils. *J. Biol. Chem.*, 267 (1992) 4292-4295.
- 3990 Severdia, A.G., Strohl, G.K., Fox, O.F. and Iyer, K.S.: Applications of size exclusion chromatography with low-angle laser light scattering detection to proteins, including somatotropins. *J. Agric. Food Chem.*, 40 (1992) 337-341.
- 3991 Shoelson, S.E., Lu, Z., Parlautan, L., Lynch, C.S. and Weiss, M.A.: Mutations at the dimer, hexamer, and receptor-binding surfaces of insulin independently affect insulin-insulin and insulin-receptor interactions. *Biochemistry*, 31 (1992) 1757-1767.
- 3992 Siller-Cepeda, J.H., Chen, T.H.H. and Fuchigami, L.H.: High performance liquid chromatography analysis of reduced and oxidized glutathione in woody plant tissues. *Plant Cell Physiol.*, 32 (1991) 1179-1185; *C.A.*, 116 (1992) 54830c.
- 3993 Stachowiak, K.: (Analysis of peptide and protein structures by the thermospray LC/MS method). *Wiad. Chem.*, 44 (1991) 819-830; *C.A.*, 116 (1992) 101927b - a review with 36 refs.
- 3994 Szokan, G., Mezo, G., Majer, Z., Schon, I., Nyeki, O. and Doelling, R.: Racemization analyses of synthetic peptides by chromatography with precolumn derivatization. In: Giralt, E. and Andreu, D. (Editors), *Pept. 1990, Proc. Eur. Proc. Eur. Pept. Symp., 21st 1990*, ESCOM Sci. Publ., Leiden, 1991, pp. 339-340; *C.A.*, 116 (1992) 33690s.
- 3995 Thompson, S.A.: The disulfide structure of bovine pituitary basic fibroblast growth factor. *J. Biol. Chem.*, 267 (1992) 2269-2273.
- 3996 Togashi, K., Fujita, S. and Kawakami, M.: Presence of brain natriuretic peptide in urine. *Clin. Chem. (Winston-Salem)*, 38 (1992) 322-323.

- 3997 Torres-Ruiz, J.A. and McFadden, B.A.: Purification and characterization of chaperonin 10 from *Chromatium vinosum*. *Arch. Biochem. Biophys.*, 295 (1992) 172-179.
- 3998 Vita, C., Gozzini, L. and di Bello, C.: Total synthesis of horse heart apocytochrome c by conformation-assisted condensation of two chemically synthesized fragments. *Eur. J. Biochem.*, 204 (1992) 631-640.
- 3999 Yialouris, P.P., Coles, B., Tsitsiloni, O., Schmid, B., Howell, S., Aitken, A., Voelter, W. and Haritos, A.A.: The complete sequences of trout (*Salmo gairdneri*) thymosin β_{11} and its homologue thymosin β_{12} . *Biochem. J.*, 283 (1992) 385-389.
- 4000 Young, P., Wheat, T., Grant, J. and Kearney, T.: Preparative isolation of a synthetic peptide using a two-step approach. *LC-GC*, 9 (1991) 726-731; *C.A.*, 116 (1992) 42035j.
- 4001 Zlatopolsky, A.D., Chubukina, A.N. and Berman, A.E.: Heparin-binding fibronectin fragments containing cell-binding domains and devoid hep2 and gelatin-binding domains promote human embryo fibroblast proliferation. *Biochem. Biophys. Res. Commun.*, 183 (1992) 383-389.
- For additional information see *C.A.*:
116 (1992) 802b, 37365n, 99444w.
- See also 3510, 3537, 3890, 3899, 4004, 4019, 4062, 4083, 4098, 4100, 4107, 4134, 4139, 4168, 4175, 4208, 4394.
- 18c. *Elucidation of structure of proteins and enzymes*
- 4002 Beuchter, D.D., Medzihradzky, K.F., Burlingame, A.L. and Kenyon, G.L.: The active site of creatine kinase. Affinity labeling of cysteine 282 with N-(2,3-epoxypropyl)-N-amidinoglycine. *J. Biol. Chem.*, 267 (1992) 2173-2178.
- 4003 Christiansen, J. and Houen, G.: Comparison of different staining methods for polyvinylidene difluoride membranes. *Electrophoresis (Weinheim)*, 13 (1992) 179-183.
- 4004 Fernandez, J., DeMott, M., Atherton, D. and Mische, S.M.: Internal protein sequence analysis: enzymatic digestion for less than 10 μ g of protein bound to polyvinylidene difluoride or nitrocellulose membranes. *Anal. Biochem.*, 201 (1992) 255-264.
- 4005 Godovac-Zimmermann, J., Sheil, M., Wrench, P.M. and Hiller, R.G.: Amino acid sequence of the β -subunit of phycoerythrin from the cryptophyte algae *Chroomonas CS 24*. *Biochim. Biophys. Acta*, 1120 (1992) 117-121.
- 4006 Hirayama, K., Akashi, S., Furuya, M. and Fukuhara, K.: Study on the primary structure of bovine serum albumin by using LC/FABMS. *Pept. Chem.*, 28th (1991) 177-182; *C.A.*, 116 (1992) 2436j.
- 4007 Iwamatsu, A.: S-Carboxymethylation of proteins transferred onto polyvinylidene difluoride membranes followed by *in situ* protease digestion and amino acid microsequencing. *Electrophoresis (Weinheim)*, 13 (1992) 142-147.
- 4008 Jones, A.T. and Roberts, N.B.: Peptide maps of five human pepsin isoenzymes and other aspartic proteinases. *J. Chromatogr.*, 599 (1992) 179-184.
- 4009 Kjalke, M., Andersen, M.B., Schneider, P., Christensen, B., Schüle, M. and Welinder, K.G.: Comparison of structure and activities of peroxidases from *Coprinus cinereus*, *Coprinus macrorhizus* and *Arthromyces ramosus*. *Biochim. Biophys. Acta*, 1120 (1992) 248-256.
- 4010 Lo Bello, M., Petruzzelli, R., Reale, L., Ricci, G., Barra, D. and Federici, G.: Chemical modification of human placental glutathione transferase by pyridoxal 5'-phosphate. *Biochim. Biophys. Acta*, 1121 (1992) 167-172.
- 4011 Minchiotti, L., Galliano, M., Stoppini, M., Ferri, G., Crespeau, H., Rochu, D. and Porta, F.: Two albumins with identical electrophoretic mobility are produced by differently charged amino acid substitutions. *Biochim. Biophys. Acta*, 1119 (1992) 232-238.
- 4012 Moritz, R.L. and Simpson, R.J.: Application of capillary reversed-phase high-performance liquid chromatography to high-sensitivity protein sequence analysis. *J. Chromatogr.*, 599 (1992) 119-130.
- 4013 Muramoto, K. and Kamiya, H.: The amino-acid sequence of a lectin from conger eel, *Conger myriaster*, skin mucus. *Biochim. Biophys. Acta*, 1116 (1992) 129-136.
- 4014 Ploug, M., Stoffer, B. and Jensen, A.L.: *In situ* alkylation of cysteine residues in a hydrophobic membrane protein immobilized on polyvinylidene difluoride membranes by electroblotting prior to microsequence and amino acid analysis. *Electrophoresis (Weinheim)*, 13 (1992) 148-153.
- 4015 Potter, M.D. and Powers-Lee, S.G.: Location of the ATP γ -phosphate-binding sites on rat liver carbamoyl-phosphate synthetase I. Studies with the ATP analog 5'-*p*-fluorosulfonylbenzoyladenosine. *J. Biol. Chem.*, 267 (1992) 2023-2031.
- 4016 Van Kuilenburg, A.B.P., van Beeumen, J.J., Demol, H., van den Bogert, C., Schouten, I. and Muijsers, A.O.: Subunit IV of human cytochrome c oxidase, polymorphism and a putative isoform. *Biochim. Biophys. Acta*, 1119 (1992) 218-224.
- 4017 Visser, S., Slangen, C.J. and Robben, A.J.P.M.: Determination of molecular mass distributions of whey protein hydrolysates by high-performance size-exclusion chromatography. *J. Chromatogr.*, 599 (1992) 205-209.
- 4018 Yannoukakos, D., Vasseur, C., Piau, J.-P., Wajcman, H. and Bursaux, E.: Phosphorylation sites in human erythrocyte band 3 protein. *Biochim. Biophys. Acta*, 1061 (1991) 253-266.
- 4019 Yasuda, A., Yamaguchi, K., Noso, T., Papkoff, H., Polenov, A.L., Nicoll, C.S. and Kawachi, H.: The complete amino acid sequence of growth hormone from sturgeon (*Acipenser guldenstadti*). *Biochim. Biophys. Acta*, 1120 (1992) 297-304.
- For additional information see *C.A.*:
116 (1992) 55094c.
- See also 3745, 3937, 3949, 4020, 4035, 4043, 4045, 4057, 4089, 4098, 4114, 4124, 4129, 4155, 4169, 4185, 4196, 4220, 4303.
19. PROTEINS
- See 3437.
- 19a. *General techniques*
- 4020 Ahmed, F. and Modrek, B.: Biosep-SEC-S high-performance size-exclusion chromatographic columns for proteins and peptides. *J. Chromatogr.*, 599 (1992) 25-33.

- 4021 Blackwell, J.A. and Carr, P.W.: Ion- and ligand-exchange chromatography of proteins using porous zirconium oxide supports in organic and inorganic Lewis base eluents. *J. Chromatogr.*, 596 (1992) 27-41.
- 4022 Bonde, M., Pontoppidan, H. and Pepper, D.S.: Direct dye binding - a quantitative assay for solid-phase immobilized protein. *Anal. Biochem.*, 200 (1992) 195-198.
- 4023 Briefs, K.G. and Kula, M.R.: Fast protein chromatography on analytical and preparative scale using modified microporous membranes. *Chem. Eng. Sci.*, 47 (1992) 141-149; *C.A.*, 116 (1992) 101994w.
- 4024 Ditz, R., Hauke, G. and Muller, W.: Novel ion-exchangers for the chromatographic purification of biopolymers - chemistry and column technology. *Aust. J. Biotechnol.*, 5 (1991) 101-102; *C.A.*, 116 (1992) 37208p.
- 4025 Eriksson, H.: Domain-oriented knowledge-acquisition tool for protein purification planning. *J. Chem. Inf. Comput. Sci.*, 32 (1992) 90-95; *C.A.*, 116 (1992) 54993h.
- 4026 Fang, F.W., Aguilar, M.I. and Hearn, M.T.W.: High-performance liquid chromatography of amino acids, peptides and proteins. CXX. Evaluation of bandwidth behaviour of proteins chromatographed on tentacle-type anion exchangers. *J. Chromatogr.*, 599 (1992) 163-170.
- 4027 Geng, X. and Chang, X.: High-performance hydrophobic interaction chromatography as a tool for protein refolding. *J. Chromatogr.*, 599 (1992) 185-194.
- 4028 Gerstner, J.A., Hamilton, R. and Cramer, S.M.: Membrane chromatographic systems for high-throughput protein separations. *J. Chromatogr.*, 596 (1992) 173-180.
- 4029 Gooding, K.M. and Schmuck, M.N.: Building ruggedness into HPLC quality control procedures. *BioTechniques*, 11 (1991) 232-234; *C.A.*, 116 (1992) 37209q.
- 4030 Gorbunov, A.A. and Skvortsov, A.M.: Resolution obtainable with the gel permeation chromatography method applied to polymers and proteins. *Polymer*, 32 (1991) 3001-3005; *C.A.*, 116 (1992) 60407m.
- 4031 Hearn, T.W. (Editor): *HPLC of Proteins, Peptides, and Polynucleotides: Contemporary Topics and Applications*. VCH, New York, 1991, 776 p.; *C.A.*, 116 (1992) 37486c.
- 4032 Jansen, C. and Mueller, W.: Separation of proteins and nucleic acids using "tentacle-type" ion exchangers. In: Tschesche, H. (Editor), *Mod. Methods Protein-Nucleic Acid Res.*, de Gruyter, Berlin, 1990, pp. 99-115; *C.A.*, 116 (1992) 37315p - without refs.
- 4033 Nishiyama, J. and Kuninori, T.: Assay of thiols and disulfides based on the reversibility of N-ethylmaleimide alkylation of thiols combined with electrolysis. *Anal. Biochem.*, 200 (1992) 230-234.
- 4034 Patterson, S.D., Hess, D., Yungwirth, T. and Aebersold, R.: High-yield recovery of electroblotted proteins and cleavage fragments from a cationic polyvinylidene fluoride-based membrane. *Anal. Biochem.*, 202 (1992) 193-203.
- 4035 Pavlik, M., Voburka, Z., Kluh, I. and Kostka, V.: Evaluation of aminolysis of anilinothiazolinones to phenylthiocarbonyl amino acid methyl amides as an alternative conversion method in protein sequencing. *Anal. Biochem.*, 201 (1992) 9-16.
- 4036 Phillips, D.J., Cheli, P.J., Dion, D.M., Hodgdon, H.L., Pomfret, A.M. and San Souci, B.R.: Schemes for efficient protein purification on a family of polymeric ion exchangers in glass columns. *J. Chromatogr.*, 599 (1992) 239-253.
- 4037 Stauder, U.: Protein chromatography with gradients. *Labor-Praxis*, 15 (1991) 840-845; *C.A.*, 116 (1992) 59974n.
- 4038 Wu, D. and Walters, R.R.: Effects of stationary phase ligand density on high-performance ion-exchange chromatography of proteins. *J. Chromatogr.*, 598 (1992) 7-13.
- 4039 Yamamoto, S., Nomura, M. and Sano, Y.: Stepwise elution chromatography as a method for both purification and concentration of proteins. *Chem. Eng. Sci.*, 47 (1992) 185-188; *C.A.*, 116 (1992) 101995x.
- 4040 Yang, Y., Velayudhan, A., Ladisch, C.M. and Ladisch, M.R.: Protein chromatography using a continuous stationary phase. *J. Chromatogr.*, 598 (1992) 169-180.
- 4041 Zachariou, M. and Hearn, M.T.W.: High-performance liquid chromatography of amino acids, peptides and proteins. CXXI. 8-Hydroxyquinoline-metal chelate chromatographic support: an additional mode of selectivity in immobilized-metal affinity chromatography. *J. Chromatogr.*, 599 (1992) 171-177.

For additional information see *C.A.*:

116 (1992) 3003c, 3005e, 54813z.

See also 3509, 3530, 3581, 3993, 4121, 4292.

19b. *Proteins of cells, viruses and subcellular particles*

- 4042 Diggle, T.A. and Denton, R.M.: Comparison of the effects of insulin and adrenergic agonists on the phosphorylation of an acid-soluble 22-kDa protein in rat epididymal fat-pads and isolated fat-cells. *Biochem. J.*, 282 (1992) 729-736.
- 4043 Gorman, J.J.: Mapping post-translational modifications of viral proteins by mass spectrometry. *TrAC*, 11 (1992) 96-105.
- 4044 Joseph, A., Bhargava, M., Rosen, E. and Goldberg, I.D.: Binding of scatter factor to epithelial cell membrane protein: identification of its receptor. *Biochim. Biophys. Acta*, 1105 (1992) 141-147.
- 4045 Lackmann, M., Cornish, C.J., Simpson, R.J., Moritz, R.L. and Geczy, C.L.: Purification and structural analysis of a murine chemotactic cytokine (CP-10) with sequence homology to S100 proteins. *J. Biol. Chem.*, 267 (1992) 7499-7504.
- 4046 Landemore, G., Ouhaj, N., Letaief, S.-E. and Izard, J.: The major Kurloff cell glycoproteins: lectin affinities, glycosidase susceptibilities and relationship with the sialylated acid phosphatases of the Kurloff body. *Biochim. Biophys. Acta*, 1116 (1992) 112-121.
- 4047 Michalik, L., Vanier, M.T. and Launay, J.F.: Microtubule affinity chromatography: a new technique for isolating microtubule-binding proteins from rat pancreas. *Cell. Mol. Biol.*, 37 (1991) 805-811; *C.A.*, 116 (1992) 102008q.
- 4048 Palmero, S., de Marchis, M., Prati, M. and Fugassa, E.: HPLC analysis of free amino acids and amino acids of total proteins in cultured cells: an application to the study of rat Sertoli cell protein metabolism. *Anal. Biochem.*, 202 (1992) 152-158.
- 4049 Patrick, J.S. and Lagu, A.L.: Determination of recombinant human proinsulin fusion protein produced in *Escherichia coli* using oxidative sulfitolysis and two-dimensional HPLC. *Anal. Chem.*, 64 (1992) 507-511.
- 4050 Sairam, M.R. and Marcil, J.: Chromatographic separation of the isoforms of the ribosome inactivating protein, gelonin. *Biochem. Int.*, 25 (1991) 905-912; *C.A.*, 116 (1992) 124163p.

- 4051 Schubert, U., Schneider, T., Henklein, P., Hoffmann, K., Berthold, E., Hauser, H., Pauli, G. and Porstmann, T.: Human-immunodeficiency-virus-type-1-encoded Vpu protein is phosphorylated by casein kinase II. *Eur. J. Biochem.*, 204 (1992) 875-883.
- 4052 Steinebach, O.M. and Wolterbeek, B.T.: Metallothionein biodegradation in rat hepatoma cells: a compartmental analysis aided ³⁵S-radiotracer study. *Biochim. Biophys. Acta*, 1116 (1992) 155-165.
- 4053 Stracke, M.L., Krutzsch, H.C., Unsworth, E.J., Årestad, A., Cioce, V., Schiffmann, E. and Liotta, L.A.: Identification, purification, and partial sequence analysis of autotaxin, a novel motility-stimulating protein. *J. Biol. Chem.*, 267 (1992) 2524-2529.
- 4054 Tajima, Y., Nagumo, F., Nishimura, T. and Tadano, J.: Phosphotungstate as a useful eluent for hepatitis-B virus surface antigen purification by heparin-Sepharose affinity chromatography. *Biomed. Chromatogr.*, 6 (1992) 72-76.
- 4055 Welling, G.W., Hiemstra, Y., Feijlbrief, M., Örvell, C., van Ede, J. and Welling-Wester, S.: Comparison of detergents for extraction and ion-exchange high-performance liquid chromatography of Sendai virus membrane proteins. *J. Chromatogr.*, 599 (1992) 157-162.
- For additional information see C.A.:
116 (1992) 19860r.
- See also 4014, 4031.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*
- 4056 Bayer, M.G., Gebhart, U.B., Maier, T.L. and Schenk, H.E.A.: Two-step purification of *Cyanophora* ferredoxin and its identification in soluble protein preparations by isoelectric focusing. *Protein Expression Purif.*, 2 (1991) 240-247; C.A., 116 (1992) 37478b.
- 4057 Chang, J., Ngai, P.K., Priestle, J.P., Joss, U., Vosbeck, K.D. and van Oostrum, J.: Identification of a reactive lysyl residue (Lys¹⁰³) of recombinant human interleukin-1 β . Mechanism of its reactivity and implication of its functional role in receptor binding. *Biochemistry*, 31 (1992) 2874-2878.
- 4058 Evans, D.B., Tarpley, W.G. and Sharma, S.K.: Expression and characterization of chimeric rDNA proteins engineered for purification and enzymic cleavage. *Protein Expression Purif.*, 2 (1991) 205-213; C.A., 116 (1992) 37415d.
- 4059 Flecker, P.: "Activation chromatography". In: Tschesche, H. (Editor), *Mod. Methods Protein-Nucleic Acid Res.*, de Gruyter, Berlin, 1990, pp. 173-180; C.A., 116 (1992) 37217r.
- 4060 Hochuli, E.: Immobilized metal ion affinity chromatography of recombinant proteins. In: Tschesche, H. (Editor), *Mod. Methods Protein-Nucleic Acid Res.*, de Gruyter, Berlin, 1990, pp. 117-131; C.A., 116 (1992) 37216q.
- 4061 Janknecht, R., de Martynoff, G., Lou, J., Hipskind, R.A., Nordheim, A. and Stunnenberg, H.G.: Rapid and efficient purification of native histidine-tagged protein expressed by recombinant vaccinia virus. *Proc. Natl. Acad. Sci. U.S.A.*, 88 (1991) 8972-8976; C.A., 116 (1992) 79602t.
- 4062 Langley, K.E., Wypych, J., Mendiaz, E.A., Clogston, C.L., Parker, V.P., Farrar, D.H., Brothers, M.O., Satygal, V.N., Leslie, I., Birkett, N.C. et al.: Purification and characterization of soluble forms of human and rat stem cell factor recombinantly expressed by *Escherichia coli* and by Chinese hamster ovary cells. *Arch. Biochem. Biophys.*, 295 (1992) 21-28.
- 4063 McCartney, J.E.: Rapid purification of a recombinant protein using tandem radial flow ion-exchange column chromatography. *BioTechniques*, 11 (1991) 648-649; C.A., 116 (1992) 124146k.
- 4064 Scapol, L., Rappuoli, P. and Viscomi, G.C.: Purification of recombinant human interferon- β by immobilized antisense peptides. *J. Chromatogr.*, 600 (1992) 235-242.
- 4065 Tarditi, L., Camagna, M., Parisi, A., Vassarotto, C., DeMonte, L.B., Letarte, M., Malavasi, F. and Mariani, M.: Selective high-performance liquid chromatographic purification of bispecific monoclonal antibodies. *J. Chromatogr.*, 599 (1992) 13-20.
- See also 4126.
- 19d. *Microbial and plant proteins*
- 4066 Cosio, E.G., Frey, T. and Ebel, J.: Identification of a high-affinity binding protein for a hepta- β -glucoside phytoalexin elicitor in soybean. *Eur. J. Biochem.*, 204 (1992) 1115-1123.
- 4067 Courcoux, P., Serot, T., Larre, C. and Popineau, Y.: Characterization and identification of wheat cultivars by multi-dimensional analysis of reversed-phase high-performance liquid chromatograms. *J. Chromatogr.*, 596 (1992) 225-232.
- 4068 Lookhart, G.L., Graybosch, R., Peterson, J. and Lukaszewski, A.: Identification of wheat lines containing the 1BL/1RS translocation by high-performance liquid chromatography (HPLC). In: Bushuk, W. and Tkachuk, R. (Editors), *Gluten Proteins 1990, [Int. Workshop], 4th 1990*, Am. Assoc. Cereal Chem., St. Paul, 1991, pp. 688-706; C.A., 116 (1992) 2992n.
- 4069 Lookhart, G.L., Juliano, B.O. and Webb, B.D.: Effect of solvent extraction, environment, and genetic background on differentiating rice by reversed-phase high-performance liquid chromatography. *Cereal Chem.*, 68 (1991) 396-400; C.A., 116 (1992) 37211j.
- 4070 Marschall, H.F., Jr. and Conkerton, E.J.: Analytical evaluation of the globulin proteins of cottonseed meals. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 918-920.
- 4071 Matsuo, M., Hamato, N., Takano, R., Kamei-Hayashi, K., Yasuda-Kamatani, Y., Nomoto, K. and Hara, S.: Trypsin inhibitors from bottle gourd (*Lagenaria leucantha* Rusby var. *depressa* Makino) seeds. Purification and amino acid sequences. *Biochim. Biophys. Acta*, 1120 (1992) 187-192.
- 4072 Munoz, S.M., Salvarelli, S.M., Saiz, M.I. and Conde, F.P.: A toxic protein from *Bryonia dioica* Jacq. fruits: the brydiofin. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1011-1018.
- 4073 Naegele, R., Belitz, H.D. and Wieser, H.: (Analysis of food and feed via partial sequences of characteristic protein components. Part 2. Detection and determination of wheat in food and feed). *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 326-331; C.A., 116 (1992) 57663m.
- 4074 Nozawa, H., Yamagata, H., Aizono, Y. and Iwasaki, T.: Reconstitution of the active form from the amino- and carboxyl-terminal fragments of a reactive site-modified subtilisin inhibitor of adzuki beans (*Vigna angularis*). *J. Biochem. (Tokyo)*, 111 (1992) 456-459.

- 4075 Paulis, J.W., Bietz, J.A., Lambert, R.J. and Villegas, E.M.: Identification of modified high-lysine maize genotypes by reversed-phase high-performance liquid chromatography. *Cereal Chem.*, 68 (1991) 361-365; C.A., 116 (1992) 37210h.
- 4076 Persson, L.-O. and Srere, P.A.: Purification of the mitochondrial citrate transporter in yeast. *Biochem. Biophys. Res. Commun.*, 183 (1992) 70-76.
- 4077 Polya, G.M., Chandra, S., Chung, R., Neumann, G.M. and Höj, P.B.: Purification and characterization of wheat and pine small basic protein substrates for plant calcium-dependent protein kinase. *Biochim. Biophys. Acta*, 1120 (1992) 273-280.
- 4078 Roozen, J.P. and de Groot, J.: Analysis of residual trypsin inhibitor activity in feed flour. In: Huisman, J., van der Poel, T.F.B. and Liener, I.E. (Editors), *Recent Adv. Res. Antinutr. Factors Legume Seeds, Proc. Int. Workshop, 1st 1988*, Pudoc, Wageningen, 1989, pp. 114-117; C.A., 116 (1992) 57634c.
- 4079 Yang, H.-L., Luo, R.-S., Wang, L.-X., Zhu, D.-X. and Chi, C.-W.: Primary structure and disulfide bridge location of arrowhead double-headed proteinase inhibitors. *J. Biochem. (Tokyo)*, 111 (1992) 537-545.
- For additional information see C.A.:
116 (1992) 2995r, 80423s.
- See also 3537, 3578, 4049, 4107, 4173.
- 19e. *Proteins of blood, serum and blood cells*
- 4080 Beach, C.M., de Beer, M.C., Sipe, J.D., Loose, L.D. and de Beer, F.C.: Human serum amyloid A protein. Complete amino acid sequence of a new variant. *Biochem. J.*, 282 (1992) 615-620.
- 4081 Cohen, M.P.: Caution: interpretation of results of HPLC assay for serum glycosylated albumin. *Diabetologica*, 34 (1991) 766; C.A., 116 (1992) 124149p.
- 4082 Da Fonseca-Wollheim, F.: Ultrafiltrate analysis confirms the specificity of the selected method for plasma ammonia determination. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 15-19.
- 4083 De Beer, M.C., de Beer, F.C., Beach, C.M., Carreras, I. and Sipe, J.D.: Mouse serum amyloid A protein. Complete amino acid sequence and mRNA analysis of a new isoform. *Biochem. J.*, 283 (1992) 673-678.
- 4084 Fulton, S.P., Meys, M., Varady, L., Jansen, R. and Afeyan, N.B.: Antibody quantitation in seconds using affinity perfusion chromatography. *BioTechniques*, 11 (1991) 226-231; C.A., 116 (1992) 103868g.
- 4085 Knudsen, K.L., Hansen, M.B., Henriksen, L.R., Andersen, B.K. and Lihme, A.: Sulfone-aromatic ligands for thiophilic adsorption chromatography: purification of human and mouse immunoglobulins. *Anal. Biochem.*, 201 (1992) 170-177.
- 4086 Michaelsen, T.E., Loefsgaard, M.F., Aase, A. and Heyman, B.: Unexpected interaction of some anti-TNP hybridoma antibodies with Superose HPLC gel filtration resins. *J. Immunol. Methods*, 146 (1992) 9-16; C.A., 116 (1992) 103885k.
- 4087 Nishimura, H., Yamashita, S., Zeng, Z., Walz, D.A. and Iwanaga, S.: Evidence for the existence of O-linked sugar chains consisting of glucose and xylose in bovine thrombospondin. *J. Biochem. (Tokyo)*, 111 (1992) 460-464.
- 4088 Nishimura, K., Takeda, K., Harada, K., Nakayama, M. and Sugii, A.: Application of an N-methylpyridinium polymer column to chromatographic investigation of human serum albumin-sodium aurothiomalate complex. *J. Liq. Chromatogr.*, 15 (1992) 791-803.
- 4089 Pittman, D.D., Wang, J.H. and Kaufman, R.J.: Identification and functional importance of tyrosine sulfate residues within recombinant factor VIII. *Biochemistry*, 31 (1992) 3315-3325.
- 4090 Pontet, F., Diemert, M.C., Pressac, M. and Bienvenu, J.: Study of six antisera used for the immunonephelometric assay of human IgG. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 145-152.
- 4091 Regnault, V., Rivat, C., Vallar, L. and Stoltz, J.-F.: Dye-affinity purification of transthyretin from an unexploited by-product of human plasma chromatographic fractionation. *J. Chromatogr.*, 576 (1992) 87-93.
- 4092 Vegh, Z., Kremmer, T., Boldizsar, M., Gesztesi, K.A. and Szajani, B.: A re-evaluation of the lipid-bound sialic acid determination. *Clin. Chim. Acta*, 203 (1991) 259-268.
- 4093 Viani, E., Flamminio, G., Caruso, A., Foresti, I., de Francesco, M., Pollara, P., Balsari, A. and Turano, A.: Purification of natural human IFN- γ antibodies. *Immunol. Lett.*, 30 (1991) 53-58; C.A., 116 (1992) 39238x.
- For additional information see C.A.:
116 (1992) 55093b, 104328t.
- See also 3504, 3526, 3529, 3838, 4001, 4006, 4011, 4064, 4065, 4142.
- 19f. *Structural and muscle proteins*
- 4094 Chiodo, A.A., Hockey, A. and Cole, W.G.: A base substitution at the splice acceptor site of intron 5 of the COL1A2 gene activates a cryptic splice site within exon 6 and generates abnormal type I procollagen in a patient with Ehlers-Danlos syndrome type VII. *J. Biol. Chem.*, 267 (1992) 6361-6369.
- 4095 Crimmins, D.L. and Thoma, R.S.: Chromatographic analysis of tropomyosins from rabbit skeletal, chicken gizzard and earthworm muscle. *J. Chromatogr.*, 599 (1992) 51-63.
- 4096 Kato, K., Sinochara, H., Goto, S., Inaguma, Y., Morishita, R. and Asano, T.: Copurification of small heat shock protein with α B crystallin from human skeletal muscle. *J. Biol. Chem.*, 267 (1992) 7718-7725.
- 4097 Kato, Y., Uchida, K. and Kawakishi, S.: Oxidative degradation of collagen and its model peptide by ultraviolet irradiation. *J. Agric. Food Chem.*, 40 (1992) 373-379.
- 4098 Kuypers, R., Tyler, M., Kurth, L.B., Jenkins, I.D. and Horgan, D.J.: Identification of the loci of the collagen-associated Ehrlich chromogen in type I collagen confirm its role as a trivalent cross-link. *Biochem. J.*, 283 (1992) 129-136.
- 19g. *Protamines, histones and other nuclear proteins*
- 4099 Amick, G.D. and Damuni, Z.: Protamine kinase phosphorylates eukaryotic protein synthesis initiation factor 4E. *Biochem. Biophys. Res. Commun.*, 183 (1992) 431-437.

- 4100 Fendrick, J.L., Iglewski, W.J., Moehring, J.M. and Moehring, T.J.: Characterization of the endogenous ADP-ribosylation of wild-type and mutant elongation factor 2 in eukaryotic cells. *Eur. J. Biochem.*, 205 (1992) 25-31.
- 4101 Flores, O., Lu, H. and Reinberg, D.: Factors involved in specific transcription by mammalian RNA polymerase II. Identification and characterization of factor IIH. *J. Biol. Chem.*, 267 (1992) 2786-2793.
- 4102 Hallupp, M., Buck, F. and Strätling, W.H.: Structure analysis of purified histone H5 and of H5 in nuclei by limited proteolysis. *Biochem. J.*, 282 (1992) 435-441.
- 4103 Lindner, H., Helliger, W., Dirschlmaier, A., Jaquemar, M. and Puschendorf, B.: High-performance capillary electrophoresis of core histones and their acetylated modified derivatives. *Biochem. J.*, 283 (1992) 467-471.
- 4104 Shimogawara, K. and Muto, S.: Purification of *Chlamydomonas* 28-kDa ubiquitinated protein and its identification as ubiquitinated histone H2B. *Arch. Biochem. Biophys.*, 294 (1992) 193-199.
- 4105 Smith, H.O., Tabiti, K., Schaeffner, G., Soldati, D., Albrecht, U. and Birnstiel, M.L.: Two-step affinity purification of U7 small nuclear ribonucleoprotein particles using complementary biotinylated 2'-O-methyl oligoribonucleotides. *Proc. Natl. Acad. Sci. U.S.A.*, 88 (1991) 9784-9788; *C.A.*, 116 (1992) 102168s.
- 4106 Westergren-Thorsson, G., Schmidtchen, A., Särnstrand, B., Fransson, L.-A. and Malmström, A.: Transforming growth factor- β induces selective increase of proteoglycan production and changes in the copolymeric structure of dermatan sulphate in human skin fibroblasts. *Eur. J. Biochem.*, 205 (1992) 277-286.
- 19h. *Chromoproteins and metalloproteins*
- 4107 Abrahamson, S.L., Speiser, D.M. and Ow, D.W.: A gel electrophoresis assay for phytochelatin. *Anal. Biochem.*, 200 (1992) 239-243.
- 4108 Bienvenu, T., Rey, E., Pons, G., D'Athis, P. and Olive, G.: A simple non-invasive procedure for the investigation of cytochrome P-450 IIIA dependent enzymes in humans. *Int. J. Clin. Pharmacol., Ther. Toxicol.*, 29 (1991) 441-445; *C.A.*, 116 (1992) 101492f.
- 4109 Brouwer, M., Schlenk, D., Ringwood, A.H. and Brouwer-Hoexum, T.: Metal-specific induction of metallothionein isoforms in the blue crab *Callinectes sapidus* in response to single- and mixed-metal exposure. *Arch. Biochem. Biophys.*, 294 (1992) 461-468.
- 4110 Kabzinski, A.K.M. and Paryjczak, T.: (Separation of liver metallothionein from rats exposed to cadmium by covalent chromatography on Sepharose-DTNB bed). *Chem. Anal. (Warsaw)*, 36 (1991) 123-133; *C.A.*, 116 (1992) 122708w.
- 4111 Nakazawa, M., Yoshida, Y. and Manabe, K.: Differences between the surface properties of the P_R and P_{FR} forms of native pea phytochrome, and their application to a simplified procedure for purification of the phytochrome. *Plant Cell Physiol.*, 32 (1991) 1187-1194; *C.A.*, 116 (1992) 55059v.
- 4112 Rivat, C., Sertillanges, P., Patin, E. and Stoltz, J.F.: Single-step method for purification of human transferrin from a by-product of chromatographic fractionation of plasma. *J. Chromatogr.*, 576 (1992) 71-77.
- 4113 Takamatsu, K., Kitamura, K. and Noguchi, T.: Isolation and characterization of recoverin-like Ca²⁺-binding protein from rat brain. *Biochem. Biophys. Res. Commun.*, 183 (1992) 245-251.
- 4114 Toda, H., Yazawa, M. and Yagi, K.: Amino acid sequence of calmodulin from *Euglena gracilis*. *Eur. J. Biochem.*, 205 (1992) 653-660.
- 4115 Wallace, C.J.A. and Clark-Lewis, I.: Functional role of heme ligation in cytochrome c. Effects of replacement of methionine 80 with natural and non-natural residues by semisynthesis. *J. Biol. Chem.*, 267 (1992) 3852-3861.
- For additional information see *C.A.*:
116 (1992) 100673d, 102227k.
- See also 4052, 4056, 4088, 4148, 4439.
- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 4116 Bedi, G.S.: Purification and characterization of kallikrein-like serine proteases from rat submandibular glands. *Prepar. Biochem.*, 22 (1992) 67-81.
- 4117 Creuzenet, C., Touati, A., Dufour, E., Choiset, Y., Chobert, J.M. and Haertle, T.: Acylation and alkylation of bovine β -lactoglobulin in organic solvents. *J. Agric. Food Chem.*, 40 (1992) 184-190.
- 4118 Franco, F.J., Diaz, C., Barcia, M. and Freire, M.: Thymosin α_1 is a native peptide in several tissues. *Biochim. Biophys. Acta*, 1120 (1992) 43-48.
- 4119 Fuchs, M.J. and Keim, V.: Separation of rat pancreatic secretory proteins by cation-exchange fast protein liquid chromatography. *J. Chromatogr.*, 576 (1992) 287-295.
- 4120 Lawrence, J.F. and Menard, C.: Liquid chromatographic determination of paralytic shellfish poisons in shellfish after prechromatographic oxidation. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 1006-1012.
- 4121 Lemque, R., Jaulmes, A., Sébille, B., Vidal-Madjar, C. and Cyswski, P.: Study of the adsorption of self-associating proteins on an anion exchanger. Application to the chromatography of β -lactoglobulin B. *J. Chromatogr.*, 599 (1992) 255-265.
- 4122 Mueller, G. and Reimerdes, D.: (Research methods for milk proteins. Chromatography of milk proteins). *Lebensmittelchem. Lebensmittelqual.*, 4(Milchproteine) (1991) 130-144; *C.A.*, 116 (1992) 127095d.
- See also 4017, 4155, 4257.
- 19j. *Proteins of brain, cerebrospinal fluid and eye*
- 4123 Groenen, P.J.T.A., Bloemendal, H. and de Jong, W.W.: The carboxy-terminal lysine of α B-crystallin is an amine-donor substrate for tissue transglutaminase. *Eur. J. Biochem.*, 205 (1992) 671-674.
- 4124 Labdon, J.E., Nieves, E. and Schubart, U.K.: Analysis of phosphoprotein p19 by liquid chromatography/mass spectrometry. Identification of two proline-directed serine phosphorylation sites and a blocked amino terminus. *J. Biol. Chem.*, 267 (1992) 3506-3513.
- 4125 Llona, I., Annaert, W.G. and de Potter, W.P.: Simultaneous purification of the neuroproteins synapsin I and synaptophysin. *J. Chromatogr.*, 596 (1992) 51-58.

- 4126 Merck, K.B., de Haard-Hoekman, W.A., Essink, B.B.O., Bloemendal, H. and de Jong, W.W.: Expression and aggregation of recombinant α A-crystallin and its two domains. *Biochim. Biophys. Acta*, 1130 (1992) 267-276.
- 4127 Nagaraj, R.H. and Monnier, V.M.: Isolation and characterization of a blue fluorophore from human eye lens crystallins: *In vitro* formation from Maillard reaction with ascorbate and ribose. *Biochim. Biophys. Acta*, 1116 (1992) 34-42.
- 4128 Nice, E.C., Fabri, L., Hammacher, A., Holden, J., Simpson, R.J. and Burgess, A.W.: The purification of a Rap1 GTPase-activating protein from bovine brain cytosol. *J. Biol. Chem.*, 267 (1992) 1546-1553.
- 4129 Xu, Z., Liu, W. and Willard, M.B.: Identification of six phosphorylation sites in the COOH-terminal tail region of the rat neurofilament protein M. *J. Biol. Chem.*, 267 (1992) 4467-4471.
- See also 4113, 4145, 4156.
- 19k. *Proteins of neoplastic tissue and transformed cells*
- 4130 Berger, G.: Hypothesis on differentiation of cancerous cells: a possible means for isolation by HPLC of differentiation factors from mouse embryo cells. *J. Liq. Chromatogr.*, 15 (1992) 767-775.
- 4131 Kawamoto, K., Yamaguchi, T., Watanabe, S. and Uchida, K.: An androgen-dependent subclone derived from a mouse mammary tumor, Shionogi carcinoma 115, secretes a heparin-binding growth factor having an apparent molecular weight of 31 000 in response to androgen. *Biochim. Biophys. Acta*, 1134 (1992) 183-188.
- 4132 Leibl, H., Mannhalter, J.W. and Eibl, M.M.: IgG subclass determination in human sera with commercially available reagents: comparison of different assay system. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 85-93.
- 4133 Shcherban, A.I., Marchuk, S.I., Besarab, I.M., Sudnik, I.V., Ivanov, P.K. and Piskunova, T.V.: Method for purification of 125I-carcinoembryonic antigen. *U.S.S.R. SU 1,668,948 (Cl. G01N33/531)*, 07 Aug. 1991, Appl. 4,612,857, 01 Dec. 1988; *C.A.*, 116 (1992) 126810w.
- See also 4052, 4172.
- 19l. *Specific binding and receptor proteins*
- 4134 Alpha, B., Cox, L., Crowther, N., Clark, P.M.S. and Hales, C.N.: Sensitive amplified immunoenzymometric assays (IEMA) for human insulin and intact proinsulin. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 27-32.
- 4135 Ang, S.-G. and Wong, V.W.T.: Chromatographic analysis of low-molecular-mass copper-binding ligands from the crab species *Scylla serrata* and *Portunus pelagicus*. *J. Chromatogr.*, 599 (1992) 21-24.
- 4136 Bandorowicz, J., Pikula, S. and Sobota, A.: Annexins IV (p32) and VI (p68) interact with erythrocyte membrane in a calcium-dependent manner. *Biochim. Biophys. Acta*, 1105 (1992) 201-206.
- 4137 Banner, C.D., Goos-Nilsson, A., Sjövall, J., Gustafsson, J.-A. and Rafter, J.J.: A method for characterization of endogenous ligands to orphan receptors belonging to the steroid hormone receptor superfamily - isolation of progesterone from pregnancy plasma using progesterone receptor ligand-binding domain. *Anal. Biochem.*, 200 (1992) 163-170.
- 4138 Bhattacharjee, M. and Ali, E.: Protein purification using a soluble affinity matrix: purification of estrogen receptor with estradiol-polylysine conjugate. *Anal. Biochem.*, 201 (1992) 233-236.
- 4139 Calvete, J.J., Mann, K., Alvarez, M.V., Lopez, M.M. and Gonzales-Rodriguez, J.: Proteolytic dissection of two isolated platelet fibrinogen receptor, integrin GPIIb/IIIa. Localization of GPIIb and GPIIa sequences putatively involved in the subunit interface and in intrasubunit and intrachain contacts. *Biochem. J.*, 282 (1992) 523-532.
- 4140 Favarato, M., Mizzen, C.A. and McLachlan, D.R.: Resolution of serum aluminum-binding proteins by size-exclusion chromatography: identification of a new carrier of aluminum in human serum. *J. Chromatogr.*, 576 (1992) 271-285.
- 4141 Jacobson, K.A., Boring, D.L., Ji, X.D., Barrington, W., Ramkumar, V., Olah, M.E. and Stiles, G.L.: Molecular probes for adenosine receptors: affinity labeling and affinity chromatography. In: Imai, S. and Nakazawa, M. (Editors): *Role Adenosine Adenine Nucleotides Biol. Syst. Proc. Int. Symp., 4th 1990*, Elsevier, Amsterdam, 1991, pp. 71-80; *C.A.*, 116 (1992) 120959e - a review with 22 refs.
- 4142 Jhun, B.H., Berenski, C.J., Craik, J.D., Paterson, A.R.P., Cass, C.E. and Jung, C.Y.: Glucose and nucleoside transporters of human erythrocytes: effects of detergents on immunoadsorption of a membrane protein to its monoclonal antibody. *Biochim. Biophys. Acta*, 1061 (1991) 149-155.
- 4143 Kamata, H., Hirata, M., Ozaki, S., Kusaka, I., Kagawa, Y. and Hirata, H.: Partial purification and reconstitution of inositol 1,4,5-trisphosphate receptor/ Ca^{2+} -channel of bovine liver microsomes. *J. Biochem. (Tokyo)*, 111 (1992) 546-552.
- 4144 Keidel, S., Rupp, E. and Szardenings, M.: Recombinant human retinoic acid receptor α . Binding of DNA and synthetic retinoids to the protein expressed in *Escherichia coli*. *Eur. J. Biochem.*, 204 (1992) 1141-1148.
- 4145 Kontani, K., Takahashi, K., Inanobe, A., Ui, M. and Katada, T.: Molecular heterogeneity of the β -subunits of GTP-binding proteins in bovine brain membranes. *Arch. Biochem. Biophys.*, 294 (1992) 527-533.
- 4146 Krupenko, S.A. and Strel'chyonok, O.A.: Testosterone destroys the transcortin-receptor complex. *Biochem. Biophys. Res. Commun.*, 184 (1992) 491-497.
- 4147 Lam, K.T. and Calderwood, S.K.: Hsp70 binds specifically to a peptide derived from the highly conserved domain (I) region of p53. *Biochem. Biophys. Res. Commun.*, 184 (1992) 167-174.
- 4148 Mangels, L.A., Neubig, R.R., Hamm, H.E. and Gnegy, M.E.: Calmodulin binding distinguishes between β subunits of activated G proteins and transducin. *Biochem. J.*, 283 (1992) 683-690.
- 4149 Moraga, D., Rivas-Berrios, A., Farías, G., Wallin, M. and Maccioni, R.B.: Estramustine-phosphate binds to a tubulin binding domain on microtubule-associated proteins MAP-2 and TAU. *Biochim. Biophys. Acta*, 1121 (1992) 97-103.
- 4150 Morgan, B.P.: Isolation and characterization of the complement-inhibiting protein CD59 antigen from platelet membranes. *Biochem. J.*, 282 (1992) 409-413.

- 4151 Ramachandran, C., Aebersold, R., Tonks, N.K. and Pot, D.A.: Sequential dephosphorylation of a multiply phosphorylated insulin receptor peptide by protein tyrosine phosphatases. *Biochemistry*, 31 (1992) 4232-4238.
- 4152 Rivas, G.A., Calvete, J.J. and Gonzalez-Rodriguez, J.: A large-scale procedure for the isolation of integrin GPIIb/IIIa, the human platelet fibrinogen receptor. *Protein Expression Purif.*, 2 (1991) 248-255; C.A., 116 (1992) 55048r.
- 4153 Robinson, R.C. and Burtnick, L.D.: Stabilization of the structure of horse plasma vitamin D binding protein by disulfide bonds. *Biochem. Cell Biol.*, 70 (1992) 10-15.
- 4154 Roelen, C.A.M., Donker, G.H., Thijssen, J.H.H. and Blankenstein, M.A.: A method for measuring the binding affinity and capacity of growth hormone binding protein in human serum using FPLC to separate bound and free ligand. *J. Liq. Chromatogr.*, 15 (1992) 1259-1275.
- 4155 Sanz, L., Calvete, J.J., Schäfer, W., Mann, K. and Töpfer-Petersen, E.: Isolation and biochemical characterization of two isoforms of a boar sperm zona pellucida-binding protein. *Biochim. Biophys. Acta*, 1119 (1992) 127-132.
- 4156 Sohma, H., Hashimoto, H., Ohguro, H. and Akino, T.: Two γ -subunits, γ -I and γ -II, complex with the same β -subunits in bovine brain G-proteins (Gi/o). *Biochem. Biophys. Res. Commun.*, 184 (1992) 175-182.
- 4157 Sugii, S. and Hirota, Y.: Improved methods for purification of a bovine serum mannan-binding protein. *J. Vet. Med. Sci.*, 53 (1991) 769-772; C.A., 116 (1992) 54811x.
- 4158 Suzuki, M., Kohmoto, K. and Sakai, S.: Radioreceptor assay of serum prolactin using microcellulose membrane-immobilized mammary prolactin receptor. *Anal. Biochem.*, 200 (1992) 42-46.
- 4159 Tsao, F.H.C., Tian, Q. and Strickland, M.S.: Purification, characterization and substrate specificity of rabbit lung phospholipid transfer proteins. *Biochim. Biophys. Acta*, 1125 (1992) 321-329.
- 4160 Wada, T., Handa, H., Inomata, S. and Kawaguchi, H.: (DNA affinity chromatography purification of transcription factors with the affinity latex particles). *Cell Sci.*, 7 (1991) 373-381; C.A., 116 (1992) 37150p - a review with 12 refs.
- 4161 Warren, H.S.: Purification of LPS binding factors in tolerant serum by affinity chromatography. *Report*, 1991, Order No. AD-A233638, 5 pp.; C.A., 116 (1992) 124164q.
- 4162 Yoshida, H., Yusin, M., Ren, I., Kuhlenkamp, J., Hirano, T., Stolz, A. and Kaplowitz, N.: Identification, purification, and immunochemical characterization of a tocopherol-binding protein in rat liver cytosol. *J. Lipid Res.*, 33 (1992) 343-350.
- 4163 Zezula, J., Fuchs, K. and Sieghart, W.: Separation of α_1 , α_2 and α_3 subunits of the GABA_A-benzodiazepine receptor complex by immunoaffinity chromatography. *Brain Res.*, 563 (1991) 325-328; C.A., 116 (1992) 797d.
- 4164 Zhang, X.-Y., Asiedu, C.K., Supakar, P.C. and Ehrlich, M.: Increasing the activity of affinity-purified DNA-binding proteins by adding high concentrations of nonspecific proteins. *Anal. Biochem.*, 201 (1992) 366-374.
- 19m. *Urinary proteins*
- 4165 Arai, H., Tomizawa, S., Maruyama, K., Seki, Y., Ushijima, Y. and Kuroume, T.: Reversed-phase high-performance liquid chromatography with a new column for analysis of urinary proteins. *Nephron*, 59 (1991) 160-161; C.A., 116 (1992) 54809c.
- 4166 Lehman-McKeeman, L.D. and Caudill, D.: Quantitation of urinary α_2 -globulin and albumin by reverse-phase high performance liquid chromatography. *J. Pharmacol. Methods*, 26 (1991) 239-247; C.A., 116 (1992) 101979v.
- 4167 Okutani, R., Itoh, Y., Hirata, H., Kasahara, T., Mukaida, N. and Kawai, T.: Simple and high-yield purification of urine protein 1 using immunoaffinity chromatography: evidence for the identity of urine protein 1 and human Clara cell 10-kilodalton protein. *J. Chromatogr.*, 577 (1992) 25-35.
- 19n. *Other proteins (incl. proteinous inhibitors of enzymic activity)*
- 4168 Austin, R.C., Sheffield, W.P., Rachubinski, R.A. and Blajchman, M.A.: The N-terminal domain of antithrombin-III is essential for heparin binding and complex-formation with, but not cleavage by, α -thrombin. *Biochem. J.*, 282 (1992) 345-351.
- 4169 Chatrenet, B. and Chang, J.: The folding of hirudin adopts a mechanism of trial and error. *J. Biol. Chem.*, 267 (1992) 3038-3043.
- 4170 Chu-Ping, M., Slaughter, C.A. and DeMartino, G.N.: Purification and characterization of a protein inhibitor of the 20S proteasome (macropain). *Biochim. Biophys. Acta*, 119 (1992) 303-311.
- 4171 Dunwiddie, C.T., Vlasuk, G.P. and Nutt, E.M.: The hydrolysis and resynthesis of a single reactive site peptide bond in recombinant antistasin by coagulation factor Xa. *Arch. Biochem. Biophys.*, 294 (1992) 647-653.
- 4172 Fil'chenkov, A.A., Ivasachenko, Yu.D. and Kulik, G.A.: (Purification of epidermal growth factor by hydrophobic chromatography). *Eksp. Onkol.*, 13 (1991) 71-74; C.A., 116 (1992) 15905m.
- 4173 Oshita, T., Ike, Y. and Katunuma, N.: Incorporation and degradation by kidney lysosomes of cystatin α injected intravenously. *Eur. J. Biochem.*, 205 (1992) 347-353.
- 4174 Roozen, J.P. and de Groot, J.: Analysis of trypsin inhibitors and lectins in white kidney beans (*Phaseolus vulgaris*, var. Processor) in a combined method. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 940-943.
- 4175 Tsukamoto, T., Ichimaru, Y., Kanegae, N., Watanabe, K., Yamaura, I., Katsura, Y. and Funatsu, M.: Identification and isolation of endogenous insect phenoloxidase inhibitors. *Biochem. Biophys. Res. Commun.*, 184 (1992) 86-92.
- 4176 Voss, T., Schäfer, K.P., Nielsen, P.F., Schäfer, A., Maier, C., Hannappel, E., Maassen, J., Landis, B., Klemm, K. and Przybylski, M.: Primary structure differences of human surfactant-associated proteins isolated from normal and proteinosis lung. *Biochim. Biophys. Acta*, 1138 (1992) 261-267.

For additional information see C.A.:
116 (1992) 51677x.

See also 3748, 3949, 3981, 4046, 4066, 4076, 4088, 4113.

For additional information see C.A.:
116 (1992) 1325k.

See also 4062, 4079.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

- 4177 Byra, A., Dworniczak, K. and Szumilo, T.: Immobilized metal ion affinity chromatography in enzyme fractionation. *Acta Biochim. Pol.*, 38 (1991) 101-105; *C.A.*, 116 (1992) 123725m.
- 4178 Ehle, H. and Horn, A.: Immunoaffinity chromatography of enzymes. *Bioseparation*, 1 (1990) 97-100; *C.A.*, 116 (1992) 123613y - a review with 92 refs.
- 4179 Safarik, I.: The use of FPLC for the microdetermination of enzyme activity. *Biotechnol. Tech.*, 5 (1991) 485-488; *C.A.*, 116 (1992) 123634f.
- See also 3437, 4021.
- 20a. *Oxidoreductases*
- 4180 Ball, S.E., Maurer, G., Zollinger, M., Ladona, M. and Vickers, A.M.: Characterization of the cytochrome P-450 gene family responsible for the N-dealkylation of the ergot alkaloid CQA 206-291 in humans. *Drug Metab. Disp.*, 20 (1992) 56-63.
- 4181 Blatter, E.E., Abriola, D.P. and Pietruszko, R.: Aldehyde dehydrogenase. Covalent intermediate in aldehyde dehydrogenation and ester hydrolysis. *Biochem. J.*, 282 (1992) 353-360.
- 4182 De, P.K. and Banerjee, R.K.: Purification and characterization of a soluble peroxidase of rat preputial gland: comparison with lactoperoxidase. *Biochim. Biophys. Acta*, 1120 (1992) 167-172.
- 4183 Deyashiki, Y., Taniguchi, H., Amano, T., Nakayama, T., Hara, A. and Sawada, H.: Structural and functional comparison of two human liver dihydrodiol dehydrogenases associated with 3α -hydroxysteroid dehydrogenase activity. *Biochem. J.*, 282 (1992) 741-746.
- 4184 Dickinson, F.M. and Wadforth, C.: Purification and some properties of alcohol oxidase from alkane-grown *Candida tropicalis*. *Biochem. J.*, 282 (1992) 325-331.
- 4185 Dombrowski, K.E., Huang, Y. and Colman, R.F.: Identification of amino acids modified by the bifunctional affinity label 5'-*p*-(fluorosulfonyl)benzoyl)-8-azidoadenosine in the reduced coenzyme regulatory site of bovine liver glutamate dehydrogenase. *Biochemistry*, 31 (1992) 3785-3793.
- 4186 Falgoutat, J.-P., Desmarais, S., Roy, P.J. and Riendeau, D.: N-(4-Chlorophenyl)-N-hydroxy-N'-(3-chlorophenyl)urea, a general reducing agent for 5-, 12-, and 15-lipoxygenases and a substrate for their pseudoperoxidase activities. *Biochem. Cell Biol.*, 70 (1992) 228-236.
- 4187 Höög, J.-O., Eklund, H. and Jörnvall, H.: A single-residue exchange gives human recombinant $\beta\beta$ alcohol dehydrogenase $\beta\beta$ isozyme properties. *Eur. J. Biochem.*, 205 (1992) 519-526.
- 4188 Hurley, T.D. and Bosron, E.F.: Human alcohol dehydrogenase: dependence of secondary alcohol oxidation on the amino acids at positions 93 and 94. *Biochem. Biophys. Res. Commun.*, 183 (1992) 93-99.
- 4189 Kataoka, M., Doi, Y., Sim, T.-S., Shimizu, S. and Yamada, H.: A novel NADPH-dependent carbonyl reductase of *Candida macedoniensis*: purification and characterization. *Arch. Biochem. Biophys.*, 294 (1992) 469-474.
- 4190 Kornblatt, J.A., Nthale, J. and McOdimba, F.: Purification of *sn*-glycerol-3-phosphate dehydrogenase from *Trypanosoma brucei brucei*. *Biochem. Cell Biol.*, 70 (1992) 136-141.
- 4191 Kuchinke, W., Barsky, O., Watanabe, K. and Hayaishi, O.: A lung type prostaglandin F synthase is expressed in bovine liver: cDNA sequence and expression in *E. coli*. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1238-1246.
- 4192 Makemson, J.C., Hastings, J.W. and Quirke, J.M.E.: Stabilization of luciferase intermediates by fatty amines, amides, and nitriles. *Arch. Biochem. Biophys.*, 294 (1992) 361-366.
- 4193 Michalski, W.P.: Resolution of three forms of superoxide dismutase by immobilised metal affinity chromatography. *J. Chromatogr.*, 576 (1992) 340-345.
- 4194 Müller, S. and Walter, R.D.: Purification and characterization of polyamine oxidase from *Ascaris suum*. *Biochem. J.*, 283 (1992) 75-80.
- 4195 Ogata, T., Myers, C. and Blumer, J.L.: Determination of platelet monoamine oxidase activity by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 575 (1992) 39-49.
- 4196 Rüetschi, U., Odelhög, B., Lindstedt, S., Barros-Söderling, J., Persson, B. and Jörnvall, H.: Characterization of 4-hydroxyphenylpyruvate dioxygenase. Primary structure of the *Pseudomonas* enzyme. *Eur. J. Biochem.*, 205 (1992) 459-466.
- 4197 Segura-Aguilar, J., Kaiser, R. and Lind, C.: Separation and characterization of isoforms of DT-diaphorase from rat liver cytosol. *Biochim. Biophys. Acta*, 1120 (1992) 33-42.
- 4198 Sheldon, P.S., Kekwick, R.G.O., Smith, C.G., Sidebottom, C. and Slabas, A.R.: 3-Oxoacyl-[ACP] reductase from oilseed rape (*Brassica napus*). *Biochim. Biophys. Acta*, 1120 (1992) 151-159.
- 4199 Shen, S. and Strobel, H.W.: The role of cytochrome P450 lysine residues in the interaction between cytochrome P450A1 and NADPH-cytochrome P450 reductase. *Arch. Biochem. Biophys.*, 294 (1992) 83-90.
- 4200 Sikorska, M., Kwast-Wefeld, J., Youdale, T., Richards, R., Whitfield, J.F. and Walker, P.R.: The M1 subunit of rat liver ribonucleotide reductase appears to be modified by ubiquitination. *Biochem. Cell Biol.*, 70 (1992) 215-223.
- 4201 Snider, J., Neville, C., Yuan, L.-C. and Bullock, J.: Characterization of the heterogeneity of polyethylene glycol-modified superoxide dismutase by chromatographic and electrophoretic techniques. *J. Chromatogr.*, 599 (1992) 141-155.
- 4202 Tsuboi, S., Kawase, M., Takada, A., Hiramatsu, M., Wada, Y., Kawakami, Y., Ikeda, M. and Ohmori, S.: Purification and characterization of formaldehyde dehydrogenase from rat liver cytosol. *J. Biochem. (Tokyo)*, 111 (1992) 465-471.
- 4203 Vettakkorumakankav, N., Danson, M.J., Hough, D.W., Stevenson, K.J., Davison, M. and Young, J.: Dihydroliipoamide dehydrogenase from the halophilic archaeobacterium *Haloferax volcanii*: characterization and N-terminal sequence. *Biochem. Cell Biol.*, 70 (1992) 70-75.
- 4204 Weigel, T.M., Liu, L. and Liu, H.: Mechanistic studies of the biosynthesis of 3,6-dideoxyhexoses in *Yersinia pseudotuberculosis*: purification and characterization of CDP-4-keto-6-deoxy-D-glucose-3-dehydrase. *Biochemistry*, 31 (1992) 2129-2139.
- See also 3784, 4016, 4023, 4177, 4298.

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

- 4205 Abendinia, M., Layfield, R., Jones, S.M., Nixon, P.F. and Mattick, J.S.: Nucleotide and predicted amino acid sequence of a cDNA clone encoding part of human transketolase. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1159-1166.
- 4206 Björnstedt, R., Widerstein, M., Board, P.G. and Mannervik, B.: Design of two chimaeric human-rat class alpha glutathione transferases for probing the contribution of C-terminal segments of protein structure to the catalytic properties. *Biochem. J.*, 282 (1992) 505-510.
- 4207 Davis, A.S., Davey, M.R., Clothier, R.C. and Cocking, E.C.: Quantification and comparison of chloramphenicol acetyltransferase activity in transformed plant protoplasts using high-performance liquid chromatography- and radioisotope-based assays. *Anal. Biochem.*, 201 (1992) 87-93.
- 4208 Fink, M.L., Shao, Y.Y. and Kersh, G.J.: A fluorometric, high-performance liquid chromatographic assay for transglutaminase activity. *Anal. Biochem.*, 201 (1992) 270-276.
- 4209 Furukawa, Y., Urano, T., Hida, Y., Itoh, H., Takahashi, C. and Kimura, S.: Interaction of rat lecithin-cholesterol acyltransferase with rat apolipoprotein A-I and with lecithin-cholesterol vesicles. *J. Biochem. (Tokyo)*, 111 (1992) 413-418.
- 4210 Homma, H., Kamakura, M., Nakagome, I. and Matsui, M.: Purification of a rat liver phenol sulphotransferase (P-ST_G) with the aid of guanidine hydrochloride treatment. *Chem. Pharm. Bull.*, 39 (1991) 3307-3312.
- 4211 Homma, H., Nakagome, I., Kamakura, M. and Matsui, M.: Immunohistochemical characterization of developmental changes in rat hepatic hydroxysteroid sulfotransferase. *Biochim. Biophys. Acta*, 1121 (1992) 69-74.
- 4212 Ide, H., Hamaguchi, K., Kobata, S., Murakami, A., Kimura, Y., Makino, K., Kamada, M., Miyamoto, S., Nagaya, T., Kamogawa, K. and Izumi, Y.: Purification of serine hydroxymethyltransferase from *Bacillus stearothermophilus* with ion-exchange high-performance liquid chromatography. *J. Chromatogr.*, 596 (1992) 203-209.
- 4213 Kurzban, G.P. and Horowitz, P.M.: Purification of bovine liver rhodanase by low-pH column chromatography. *Protein Expression Purif.*, 2 (1991) 379-384; *C.A.*, 116 (1992) 54239s.
- 4214 MacLachlan, G., Levy, B. and Farkas, V.: Acceptor requirements for GDP-fucose:xyloglucan 1,2- α -L-fucosyltransferase activity solubilized from pea epicotyl membranes. *Arch. Biochem. Biophys.*, 294 (1992) 200-205.
- 4215 Mayer, D., Seelmann-Eggebert, G. and Letsch, I.: Glycogen phosphorylase isoenzymes from hepatoma 3924A and from a non-tumorigenic liver cell line. Comparison with the liver and brain enzymes. *Biochem. J.*, 282 (1992) 665-673.
- 4216 Ploux, O. and Marquet, A.: The γ -amino-7-oxopelargonate synthase from *Bacillus sphaericus*. Purification and preliminary characterization of the cloned enzyme overproduced in *Escherichia coli*. *Biochem. J.*, 283 (1992) 327-331.
- 4217 Sakac, D., Zachos, M. and Lingwood, C.A.: Purification of the testicular galactolipid:3'-phosphoadenosine 5'-phosphosulfate sulfotransferase. *J. Biol. Chem.*, 267 (1992) 1655-1659.
- 4218 Sarnesto, A., Köhlin, T., Hindsgaul, O., Vogele, K., Blaszczyk-Thurin, M. and Thurin, J.: Purification of the β -N-acetylglucosaminide α 1 \rightarrow 3-fucosyltransferase from human serum. *J. Biol. Chem.*, 267 (1992) 2745-2752.
- 4219 Singhal, S.S., Saxena, M., Ahmad, H. and Awasthi, Y.C.: Glutathione S-transferases of mouse liver: sex-related differences in the expression of various isozymes. *Biochim. Biophys. Acta*, 1116 (1992) 137-146.
- 4220 Takata, Y. and Fujioaka, M.: Identification of a tyrosine residue in rat guanidinoacetate methyltransferase that is photolabeled with S-adenosyl-L-methionine. *Biochemistry*, 31 (1992) 4369-4374.
- 4221 Varin, L. and Ibrahim, R.K.: Novel flavonol 3-sulfotransferase. Purification, kinetic properties, and partial amino acid sequence. *J. Biol. Chem.*, 267 (1992) 1858-1863.
- 4222 Wiebe, R.I., Tarr, A.H. and Bowness, J.M.: Increased transglutaminase in the aortas of cholesterol-fed rabbits: occurrence of buffer soluble and insoluble forms and an inhibitor. *Biochem. Cell Biol.*, 69 (1991) 821-827.

See also 3843, 4010, 4236, 4237.

20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.)*

- 4223 Barrett, C.B., Erikson, E. and Maller, J.L.: A purified S6 kinase from *Xenopus* eggs activates S6 kinase II and autophosphorylates on serine, threonine, and tyrosine residues. *J. Biol. Chem.*, 267 (1992) 4408-4415.
- 4224 Burns, F., Rodger, I.W. and Pyne, N.J.: The catalytic subunit of protein kinase A triggers activation of the type V cyclic GMP-specific phosphodiesterase from guinea-pig lung. *Biochem. J.*, 283 (1992) 487-491.
- 4225 Cottrell, J.M., Hall, R.L., Sturton, R.G. and Kent, P.W.: Polypeptide N-acetylgalactosaminyltransferase activity in tracheal epithelial microsomes. *Biochem. J.*, 283 (1992) 299-305.
- 4226 Feller, S.M. and Wong, T.W.: Identification and characterization of a cytosolic protein tyrosine kinase of HeLa cells. *Biochemistry*, 31 (1992) 3044-3051.
- 4227 Gray, H. and Wong, T.W.: Purification and identification of subunit structure of the human mitochondrial DNA polymerase. *J. Biol. Chem.*, 267 (1992) 5835-5841.
- 4228 Hartman, H.A., Edmondson, D.E. and McCormick, D.B.: Riboflavin 5'-pyrophosphate: a contaminant of commercial FAD, a coenzyme for FAD-dependent oxidases, and an inhibitor of FAD synthetase. *Anal. Biochem.*, 202 (1992) 348-355.
- 4229 Oude Weernink, P.A., Rijkse, G., Mascini, E.M. and Staal, G.E.J.: Phosphorylation of pyruvate kinase type K is restricted to the dimeric form. *Biochim. Biophys. Acta*, 1121 (1992) 61-68.
- 4230 Purushotham, K.R., Bologna, J., Nakagawa, Y. and Humphreys-Beher, M.G.: Isolation and characterization of a new Ca²⁺/calmodulin-dependent protein kinase from isoproterenol-stimulated proliferating rat parotid acinar cells. *Biochem. Cell Biol.*, 70 (1992) 250-255.
- 4231 Sakakibara, R., Hashida, K., Kitahara, T. and Ishiguro, M.: Characterization of a unique nonsecretory ribonuclease from urine of pregnant women. *J. Biochem. (Tokyo)*, 111 (1992) 325-330.
- 4232 Sakuma, R., Nishina, T., Yamanaka, H., Kamatani, N., Nishioka, K., Maeda, M. and Tsuji, A.: Phosphoribosylpyrophosphate synthetase in human erythrocytes: assay and kinetic studies using high-performance liquid chromatography. *Clin. Chim. Acta*, 203 (1991) 143-152.

- 4233 Sanghera, J.S., Charlton, L.A., Paddon, H.B. and Pelech, S.L.: Purification and characterization of echinoderm casein kinase II. Regulation by protein kinase C. *Biochem. J.*, 283 (1992) 829-837.
- 4234 Schein, C.H., Boix, E., Haugg, M., Holliger, K.P., Hemmi, S., Frank, G. and Schwalbe, H.: Secretion of mammalian ribonucleases from *Escherichia coli* using the signal sequence of murine spleen ribonuclease. *Biochem. J.*, 283 (1992) 137-144.
- 4235 Skolysheva, L.K., Shur, S.A. and Vulfson, P.L.: (Purification and characterization of three forms of glycogen phosphorylase and phosphorylase kinase from human skeletal muscles). *Bio-khimiya (Moscow)*, 57 (1992) 27-39.
- 4236 Stocchi, V., Masat, L., Biagiarelli, B., Accorsi, A., Piccoli, G., Palma, F., Cucchiari, L. and Dacha, M.: High resolution of multiple forms of red blood cell enzymes using a Toyopearl DEAE 650 S. *Prepar. Biochem.*, 22 (1992) 11-40.
- 4237 Stocchi, V., Masat, L., Biagiarelli, B., Piccoli, G., Palma, F., Cucchiari, L. and Dacha, M.: Preparative purification of pig red blood cell hexokinase type III using a new efficient chromatographic support. *Prepar. Biochem.*, 22 (1992) 41-51.
- 4238 Watts, J.D., Wilson, G.M., Ettehadi, E., Clark-Lewis, I., Kubanek, C.-A., Astell, C.R., Marth, J.D. and Aebersold, R.: Purification and initial characterization of the lymphocyte-specific protein-tyrosyl kinase p56^{lck} from a baculovirus expression system. *J. Biol. Chem.*, 267 (1992) 901-907.
- 4239 Yamashita, M., Fukada, S., Yoshikuni, M., Bulet, P., Hirai, T., Yamaguchi, A., Yasuda, H., Ohba, Y. and Nagahama, Y.: M-Phase-specific histone H1 kinase in fish oocytes. Purification, components and biochemical properties. *Eur. J. Biochem.*, 205 (1992) 537-543.
- 4240 Zwizinski, C.W. and Schmid, H.H.O.: Peroxidative damage to cardiac mitochondria: identification and purification of modified adenine nucleotide translocase. *Arch. Biochem. Biophys.*, 294 (1992) 178-183.
- For additional information see C.A.:
116 (1992) 2979p.
- See also 4002.
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-)*
- 4241 Andres, C., El Mourabit, M., Mark, J. and Waksman, A.: Separation in a single step by affinity chromatography of cholinesterases differing in subunit number. *Protein Expression Purif.*, 2 (1991) 266-269; C.A., 116 (1992) 54209g.
- 4242 Aparicio, J.F., Freije, J.M.P., Lopez-Otin, C., Cal, S. and Sanchez, J.: A *Streptomyces glaucescens* endodeoxyribonuclease which shows a strong preference for CC dinucleotide. *Eur. J. Biochem.*, 205 (1992) 695-699.
- 4243 Artemyev, N.O. and Hamm, H.E.: Two-site high-affinity interaction between inhibitory and catalytic subunits of rod cyclic GMP phosphodiesterase. *Biochem. J.*, 283 (1992) 273-279.
- 4244 Banno, Y., Nakashima, T., Kumada, T., Ebisawa, K., Nonomura, Y. and Nozawa, Y.: Effects of gelsolin on human platelet cytosolic phosphoinositide-phospholipase C isozymes. *J. Biol. Chem.*, 267 (1992) 6488-6494.
- 4245 Bethke, T., Eschenhagen, T., Klimkiewicz, A., Kohl, C., van der Leyen, H., Mehl, H., Mende, U., Meyer, W., Neumann, J., Ross-wag, S., Schmitz, W., etc.: Phosphodiesterase inhibition by enoximone in preparations from nonfailing and failing human hearts. *Arzneim.-Forsch.*, 42 (1992) 437-445.
- 4246 Chemnitz, G.C., Erdmann, H. and Schmid, R.D.: Solubilized substrates for the on-line measurement of lipases by flow injection analysis during chromatographic enzyme purification. *Anal. Biochem.*, 202 (1992) 16-24.
- 4247 Freeman, C. and Hopwood, J.J.: Human glucosamine-6-sulphatase deficiency. Diagnostic enzymology towards heparin-derived trisaccharide substrates. *Biochem. J.*, 282 (1992) 605-614.
- 4248 Gao, K., Yang, L. and Cheng, L.: Novel synthesized colorless ligands in affinity chromatography for purification of alkaline phosphatase. *Biotechnol. Tech.*, 5 (1991) 259-264; C.A., 116 (1992) 123650h.
- 4249 Giorgi, M., Piscitelli, D., Rossi, P. and Geremia, R.: Purification and characterization of a low- K_m 3':5'-cyclic adenosine phosphodiesterase from post-meiotic male mouse germ cells. *Biochim. Biophys. Acta*, 1121 (1992) 178-182.
- 4250 Glaser, D.S., Yost, T.J. and Eckel, R.H.: Preheparin lipoprotein lipolytic activities-relationship to plasma lipoproteins and postheparin lipolytic activities. *J. Lipid Res.*, 33 (1992) 209-214.
- 4251 Glazova, N.V., Dmitrenko, L.V., Vinarskaya, V.A., Efimova, T.B. and Rudometova, N.V.: (Analysis of pyrogenicity in pancreatic ribonuclease preparations). *Khim.-Farm. Zh.*, 25 (1991) 79-81; C.A., 116 (1992) 98769a.
- 4252 Jagiello, I., Donella-Deana, A., Szczegielniak, J., Pinna, L.A. and Muszynska, G.: Identification of protein phosphatase activities in maize seedlings. *Biochim. Biophys. Acta*, 1134 (1992) 129-136.
- 4253 Kirchberger, J. and Kopperschlaeger, G.: An improved purification procedure of alkaline phosphatase from calf intestine by applying partition in aqueous two-phase systems and dye-ligand chromatography. *Bioseparation*, 1 (1990) 33-41; C.A., 116 (1992) 123706f.
- 4254 Krizaj, I., Liang, N.-S., Pungercar, R., Strukelj, B., Ritonja, A. and Gubensek, F.: Amino acid and cDNA sequences of a neutral phospholipase A₂ from the long-nosed viper (*Vipera ammodytes ammodytes*) venom. *Eur. J. Biochem.*, 204 (1992) 1057-1062.
- 4255 Magnusson, P., Löfman, O. and Larsson, L.: Determination of alkaline phosphatase isoenzymes in serum by high-performance liquid chromatography with post-column reaction detection. *J. Chromatogr.*, 576 (1992) 79-86.
- 4256 Okuda, H., Morimoto, C. and Tsujita, T.: Relation between cyclic AMP production and lipolysis induced by forskolin in rat fat cells. *J. Lipid Res.*, 33 (1992) 225-231.
- 4257 Possani, L.D., Mochca-Morales, J., Amezcua, J., Martin, B.M., Prestipino, G. and Nobile, M.: Anionic currents of chick sensory neurons are affected by a phospholipase A₂ purified from the venom of the taipan snake. *Biochim. Biophys. Acta*, 1134 (1992) 210-216.
- 4258 Raatikainen, M.J.P., Peuhkurinen, K.J., Kiviluoma, K.T., Hiltunen, J.K. and Hassinen, I.E.: 5'-Nucleotidase activity and adenosine production in rat liver mitochondria. *Biochim. Biophys. Acta*, 1099 (1992) 238-246.

- 4259 Rascón, A., Lindgren, S., Stavenow, L., Belfrage, P., Andersson, K.-E., Manganiello, V.C. and Degerman, E.: Purification and properties of the cGMP-inhibited cAMP phosphodiesterase from bovine aortic smooth muscle. *Biochim. Biophys. Acta*, 1134 (1992) 149-156.
- 4260 Swan, J.S., Hoffman, M.M., Lord, M.K. and Poehmann, J.L.: Two forms of human milk bile-salt-stimulated lipase. *Biochem. J.*, 283 (1992) 119-122.
- 4261 Sztajer, H., Lünsdorf, H., Erdmann, H., Menge, U. and Schmid, R.: Purification and properties of lipase from *Penicillium simplicissimum*. *Biochim. Biophys. Acta*, 1124 (1992) 253-261.
- 4262 Tashiro, J., Kobayashi, J., Shirai, K., Saito, Y., Nakamura, H., Morimoto, Y. and Yoshida, S.: Trypsin treatment may impair the interfacial activation action of lipoprotein lipase. *J. Biochem. (Tokyo)*, 111 (1992) 509-514.
- 4263 Tremblay, N.M., Nicholson, D., Potier, M. and Weech, P.K.: Cytosolic phospholipase A₂ from U937 cells: size of the functional enzyme by radiation inactivation. *Biochem. Biophys. Res. Commun.*, 183 (1992) 121-127.
- 4264 Verjans, B., Lecocq, R., Moreau, C. and Erneux, C.: Purification of bovine brain inositol-1,4,5-trisphosphate 5-phosphatase. *Eur. J. Biochem.*, 204 (1992) 1083-1087.
- 4265 Zhang, Z., Bai, G., Deans-Zirattu, S., Browner, M.F. and Lee, E.Y.C.: Expression of the catalytic subunit of phosphorylase phosphatase (protein phosphatase-1) in *Escherichia coli*. *J. Biol. Chem.*, 267 (1992) 1484-1490.
- 4273 Piesecki, S. and Alhadeff, J.A.: The effect of carbohydrate removal on the properties of human liver α -L-fucosidase. *Biochim. Biophys. Acta*, 1119 (1992) 194-200.
- 4274 Romaniec, M.P.M., Fauth, U., Kobayashi, T., Huskisson, N.S., Barker, P.J. and Demain, A.L.: Purification and characterization of a new endoglucanase from *Clostridium thermocellum*. *Biochem. J.*, 283 (1992) 69-73.
- 4275 Schwien, U.: (Purification of lysosomal β -glucosidase by means of ion exchange). *Bioforum*, 14 (1991) 247-249; *C.A.*, 116 (1992) 36691d.
- 4276 Suzuki, Y., Yonezawa, K., Hattori, M. and Takii, Y.: Assignment of *Bacillus thermoamyloliquefaciens* KP1071 α -glucosidase I to an exo- α -1,4-glucosidase, and its striking similarity to bacillary oligo-1,6-glucosidases in N-terminal sequence and in structural parameters calculated from the amino acid composition. *Eur. J. Biochem.*, 205 (1992) 249-256.
- 4277 Unger, C., Hofsteenge, J. and Sturm, A.: Purification and characterization of a soluble β -fructofuranosidase from *Daucus carota*. *Eur. J. Biochem.*, 204 (1992) 915-921.
- 4278 Vaccaro, A.M., Tatti, M., Ciaffoni, F., Salvioli, R. and Roncaioli, P.: Reconstitution of glucosylceramidase on binding to acidic phospholipid-containing vesicles. *Biochim. Biophys. Acta*, 1119 (1992) 239-246.
- 4279 Williamson, G., Belshaw, N.J. and Williamson, M.P.: O-Glycosylation in *Aspergillus glucoamylase*. Conformation and role in binding. *Biochem. J.*, 282 (1992) 423-428.
- For additional information see C.A.:
116 (1992) 17607q, 17688s.
- See also 4298.
- 20e. *Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)*
- 4266 Ashida, H., Yamamoto, K., Kumagai, H. and Tochikura, T.: Purification and characterization of membrane-bound endoglycoce-ramidase from *Corynebacterium* sp. *Eur. J. Biochem.*, 205 (1992) 729-735.
- 4267 Chen, H., Hayn, M. and Esterbauer, H.: Purification and characterization of two extracellular β -glucosidases from *Trichoderma reesei*. *Biochim. Biophys. Acta*, 1121 (1992) 54-60.
- 4268 Chen, J.Q. and Black, C.C.: Biochemical and immunological properties of alkaline invertase isolated from sprouting soybean hypocotyls. *Arch. Biochem. Biophys.*, 295 (1992) 61-69.
- 4269 Ho, K.J.: A large-scale purification of β -glucuronidase from human liver by immunoaffinity chromatography. *Biotechnol. Appl. Biochem.*, 14 (1991) 296-305; *C.A.*, 116 (1992) 54249v.
- 4270 Huynh, Q.K., Hironaka, C.M., Levine, E.B., Smith, C.E., Borgmeyer, J.R. and Shah, D.M.: Antifungal proteins from plants. Purification, molecular cloning, and antifungal properties of chitinases from maize seed. *J. Biol. Chem.*, 267 (1992) 6635-6640.
- 4271 Kamimura, H., Ogata, H. and Takahara, H.: α -Glucoside formation of xenobiotics by rat liver α -glucosidases. *Drug Metab. Disp.*, 20 (1992) 309-315.
- 4272 Li, H. and Geng, X.: Preparation of high performance affinity chromatography packings for specific adsorption to α -amylase and purification of crude α -amylase. *J. Liq. Chromatogr.*, 15 (1992) 707-714.
- 4280 Blee, E. and Schuber, F.: Occurrence of fatty acid epoxide hydrolases in soybean (*Glycine max*). Purification and characterization of the soluble form. *Biochem. J.*, 282 (1992) 711-714.
- 4281 Bowyer, J.R., Packer, J.C.L., McCormack, B.A., Whitelegge, J.P., Robinson, C. and Taylor, M.A.: Carboxyl-terminal processing of the D1 protein and photoactivation of water-splitting in photosystem II. Partial purification and characterization of the processing enzyme from *Scenedesmus obliquus* and *Pisum sativum*. *J. Biol. Chem.*, 267 (1992) 5424-5433.
- 4282 Callaghan, J.M., Toh, B.-H., Simpson, R.J., Baldwin, G.S. and Gleeson, P.A.: Rapid purification of the gastric H⁺/K⁺-ATPase complex by tomato-lectin affinity chromatography. *Biochem. J.*, 283 (1992) 63-68.
- 4283 DuPont, F.M. and Morrissey, P.J.: Subunit composition and Ca²⁺-ATPase activity of the vacuolar ATPase from barley roots. *Arch. Biochem. Biophys.*, 294 (1992) 341-346.
- 4284 Eijnsink, V.G.H., van den Burg, B. and Venema, G.: High performance affinity chromatography of *Bacillus* neutral proteases. *Biotechnol. Appl. Biochem.*, 14 (1991) 275-283; *C.A.*, 116 (1992) 54248u.
- 4285 Eto, I. and Grubbs, C.J.: Separation, purification and N-terminal sequence analysis of a novel leupeptin-sensitive serine endo-peptidase present in chemically induced rat mammary tumour. *Biochem. J.*, 283 (1992) 209-216.
- For additional information see C.A.:
116 (1992) 37483z.
- See also 4177, 4225.
- 20f. *Other hydrolases*

- 4286 Foltmann, B., Drohse, H.B., Nielsen, P.K. and James, M.N.G.: Separation of porcine pepsinogen A and progastricsin. Sequencing of the first 73 amino acid residues in progastricsin. *Biochim. Biophys. Acta*, 1121 (1992) 75-82.
- 4287 Gerwig, G.J., Kamerling, J.P., Vliegthart, J.F.G., Morag, E., Lamed, R. and Bayer, E.A.: Novel oligosaccharide constituents of the cellulase complex of *Bacteroides cellulosolvens*. *Eur. J. Biochem.*, 205 (1992) 799-808.
- 4288 Gottschalk, E.M., Hippe, H. and Patzke, F.: Creatinine deiminase (EC 3.5.4.21) from bacterium BN11: purification, properties and applicability in a serum/urine creatinine assay. *Clin. Chim. Acta*, 204 (1991) 223-238.
- 4289 Hiroi, Y., Endo, Y. and Natori, Y.: Purification and properties of an aminopeptidase from rat-liver cytosol. *Arch. Biochem. Biophys.*, 294 (1992) 440-445.
- 4290 Huet, G., Richet, C., Demeyer, D., Bisiau, H., Soudan, B., Tetaert, D., Han, K.K. and Degand, P.: Characterization of different proteolytic activities in *Trypanosoma brucei brucei*. *Biochim. Biophys. Acta*, 1138 (1992) 213-221.
- 4291 Kabzinski, A.K.M. and Paryczak, T.: (Use of chromatography for purification of urease). *Chem. Anal. (Warsaw)*, 36 (1991) 377-388; C.A., 116 (1992) 101563e.
- 4292 Kong Sing, Y.L., Krovjarski, Y., Cochet, S., Dherny, D. and Bertrand, O.: High-performance hydrophobic interaction chromatography of proteins on reversed-phase supports coated with non-ionic surfactants of polyoxyethylene type. Purification of a fungal aspartic proteinase. *J. Chromatogr.*, 598 (1992) 181-187.
- 4293 Krieger, T.J. and Hook, V.Y.H.: Purification and characterization of a cathepsin D protease from bovine chromaffin granules. *Biochemistry*, 31 (1992) 4223-4231.
- 4294 Lobarzewski, J., Kowalska-Pylka, H. and Cybulski, W.: A simple affinity chromatography method for the separation of gastric proteases from mucous substances. *J. Chem. Technol. Biotechnol.*, 52 (1991) 359-367; C.A., 116 (1992) 39695u.
- 4295 Mach, L., Stüwe, K., Hagen, A., Ballaun, C. and Glössl, J.: Proteolytic processing and glycosylation of cathepsin B. The role of the primary structure of the latent precursor and of the carbohydrate moiety for cell-type-specific molecular forms of the enzyme. *Biochem. J.*, 282 (1992) 577-582.
- 4296 Mileykovskaya, E.I., Kormer, S.S. and Allison, W.S.: Significant quantities of endogenous GDP and ADP are present on catalytic sites of the F₁-ATPase isolated from *M. lysodeikticus* in the absence of added nucleotides. *Biochim. Biophys. Acta*, 1099 (1992) 219-225.
- 4297 Moreno-Vivian, C., Soler, G. and Castillo, F.: Arginine catabolism in the phototrophic bacterium *Rhodobacter capsulatus* E1F1. Purification and properties of arginase. *Eur. J. Biochem.*, 204 (1992) 531-537.
- 4298 Nagasawa, M., Koide, H., Ohsawa, K. and Hoshi, T.: Purification of brush border membrane vesicles from rat renal cortex by size-exclusion chromatography. *Anal. Biochem.*, 201 (1992) 301-305.
- 4299 Page, A.E., Warburton, M.J., Chambers, T.J., Pringle, J.A.S. and Hayman, A.R.: Human osteoclastomas contain multiple forms of cathepsin B. *Biochim. Biophys. Acta*, 1116 (1992) 57-66.
- 4300 Pereira, M.E., Yu, B. and Wilk, S.: Enzymatic changes of the bovine pituitary multicatalytic proteinase complex, induced by magnesium ions. *Arch. Biochem. Biophys.*, 294 (1992) 1-8.
- 4301 Pike, R.N., Coetzer, T.H.T. and Dennison, C.: Proteolytically active complexes of cathepsin L and a cysteine proteinase inhibitor; purification and demonstration of their formation *in vitro*. *Arch. Biochem. Biophys.*, 294 (1992) 623-629.
- 4302 Ryan, J.W., Valido, F., Berryer, P., Chung, A.Y.K. and Ripka, J.E.: Purification and characterization of guinea pig serum aminoacylproline hydrolase (aminopeptidase P). *Biochim. Biophys. Acta*, 1119 (1992) 140-147.
- 4303 Scaloni, A., Jones, W.M., Barra, D., Pospischil, M., Sassa, S., Popowicz, A., Manning, L.R., Schneewind, O. and Manning, J.M.: Acylpeptide hydrolase: inhibitors and some active site residues of the human enzyme. *J. Biol. Chem.*, 267 (1992) 3811-3818.
- 4304 Schalk, C., Remy, J.-M., Chevrier, B., Moras, D. and Tarnus, C.: Rapid purification of the *Aeromonas proteolytica* aminopeptidase: crystallization and preliminary X-ray data. *Arch. Biochem. Biophys.*, 294 (1992) 91-97.
- 4305 Shinagawa, T., Do, Y.S., Baxter, J. and Hsueh, W.A.: Purification and characterization of human truncated prorenin. *Biochemistry*, 31 (1992) 2758-2764.
- 4306 Tollersrud, O.K. and Aronson, N.N., Jr.: Comparison of liver glycosylasparaginases from six vertebrates. *Biochem. J.*, 282 (1992) 891-897.
- 4307 Toomim, C.C. and Hook, V.Y.H.: Thiol and aspartyl proteolytic activities in secretory vesicles of bovine pituitary. *Biochem. Biophys. Res. Commun.*, 183 (1992) 449-455.
- 4308 Tyulkova, N.A.: Purification of bacterial luciferase from *Photobacterium leiognathi* with the use of an FPLC-system. In: Jezowska-Trzebiatowska, B. (Editor), *Biol. Lumin., Proc. Int. Sch., 1st 1989*, World Sci., Singapore, 1990, pp. 369-374; C.A., 116 (1992) 101508r.
- 4309 Wakagi, T., Lee, C.-H. and Oshima, T.: An extremely stable inorganic pyrophosphatase purified from the cytosol of a thermoacidophilic archaeobacterium, *Sulfolobus acidocaldarius* strain 7. *Biochim. Biophys. Acta*, 1120 (1992) 289-296.
- 4310 Yoshikawa, K., Tsuzuki, H., Fujiwara, T., Nakamura, E., Iwamoto, H., Matsumoto, K., Shin, M., Yoshida, N. and Teraoka, H.: Purification, characterization and gene cloning of a novel glutamic acid-specific endopeptidase from *Staphylococcus aureus* ATCC 12600. *Biochim. Biophys. Acta*, 1121 (1992) 221-228.

For additional information see C.A.:
116 (1992) 52967d.

See also 4008, 4116.

20g. Lyases

- 4311 Idriss, S.D., Pilz, R.B., Sharma, V.S. and Boss, G.R.: Studies on cytosolic guanylate cyclase from human placenta. *Biochem. Biophys. Res. Commun.*, 183 (1992) 312-320.
- 4312 Kleanthous, C., Deka, R., Davis, K., Kelly, S.M., Cooper, A., Hardin, G.S.E., Price, N.C., Hawkins, A.R. and Coggins, J.R.: A comparison of the enzymological and biophysical properties of two distinct classes of dehydroquinase enzymes. *Biochem. J.*, 282 (1992) 687-695.

20h. *Isomerases*

- 4313 Boege, F., Gieseler, F., Biersack, H. and Meyer, P.: The measurement of nuclear topoisomerase II inhibition *in vitro*: a possible tool for detecting resistance on a subcellular level in haematopoietic malignancies. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 63-68.
- 4314 Ghatge, M., Mawal, Y., Gaikwad, S. and Deshpande, V.: Immunoaffinity purification of glucose/xylose isomerase from *Streptomyces*. *Appl. Biochem. Biotechnol.*, 31 (1991) 11-20; *C.A.*, 116 (1992) 79069z.
- 4315 Hu, C.-H. and Tsou, C.-L.: C-Terminal truncation of bovine protein disulfide isomerase increases its activity. *Biochem. Biophys. Res. Commun.*, 183 (1992) 714-718.
- 4316 Mrabet, N.T.: One-step purification of *Actinoplanes missouriensis* D-xylose isomerase by high-performance immobilized copper-affinity chromatography: functional analysis of surface histidine residues by site-directed mutagenesis. *Biochemistry*, 31 (1992) 2690-2702.
- 4317 Xia, T. and Jensen, R.A.: Monofunctional chorismate mutase from *Serratia rubidua*: a paradigm system for the three-isozyme gene family of enteric bacteria. *Arch. Biochem. Biophys.*, 294 (1992) 147-153.
- 4318 Zocher, R., Keller, U., Lee, C. and Hoffmann, K.: A seventeen kilodaltons peptidyl-prolyl *cis-trans* isomerase of the cyclosporin-producer *Tolypocladium inflatum* is sensitive to cyclosporin A. *J. Antibiot.*, 45 (1992) 265-268.

20i. *Ligases*

- 4319 Al-Bar, O.A.M., O'Connor, C.D., Giles, I.G. and Akhtar, M.: D-Alanine:D-alanine ligase of *Escherichia coli*. Expression, purification and inhibitory studies on the cloned enzyme. *Biochem. J.*, 282 (1992) 747-752.
- 4320 Altenschmidt, U. and Fuchs, G.: Novel aerobic 2-aminobenzoate metabolism. Purification and characterization of 2-aminobenzoate-CoA ligase, localisation of the gene on a 8-kbp plasmid, and cloning and sequencing of the gene from a denitrifying *Pseudomonas* sp. *Eur. J. Biochem.*, 205 (1992) 721-727.
- 4321 Schwecke, T., Aharonowitz, Y., Palissa, H., von Döhren, H., Kleinkauf, H. and van Liempt, H.: Enzymatic characterisation of the multifunctional enzyme δ -(L- α -aminoadipyl)-L-cysteiny-D-valine synthetase from *Streptomyces clavuligerus*. *Eur. J. Biochem.*, 205 (1992) 687-694.

See also 4015.

20j. *Complex mixtures and incompletely identified enzymes*

- 4322 Uchida, Y., Izai, K., Orii, T. and Hashimoto, T.: Novel fatty acid β -oxidation enzymes in rat liver mitochondria. II. Purification and properties of enoyl-coenzyme A (CoA) hydratase/3-hydroxyacyl-CoA dehydrogenase/3-ketoacyl-CoA thiolase trifunctional protein. *J. Biol. Chem.*, 267 (1992) 1034-1041.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

21a. *Purines, pyrimidines, nucleosides, nucleotides*

- 4323 Al-Deen, A., Cecchini, D.J. and Giese, R.W.: Purification of DNA-derived deoxynucleotides from leukocytes involving nuclease elution of an ion-exchange column. *J. Chromatogr.*, 600 (1992) 229-233.
- 4324 Ally, A. and Park, G.: Rapid determination of creatine, phosphocreatine, purine bases and nucleotides (ATP, ADP, AMP, GTP, GDP) in heart biopsies by gradient ion-pair reversed-phase liquid chromatography. *J. Chromatogr.*, 575 (1992) 19-27.
- 4325 Balcells, J., Guada, J.A., Peiro, J.M. and Parker, D.S.: Simultaneous determination of allantoin and oxypurines in biological fluids by high-performance liquid chromatography. *J. Chromatogr.*, 575 (1992) 153-157.
- 4326 Banerjee, A., Bose, H.S. and Roy, K.B.: Fast and simple anion-exchange chromatography for large-scale purification of self-complementary oligonucleotides. *BioTechniques*, 11 (1991) 650-656; *C.A.*, 116 (1992) 124147m.
- 4327 Bergot, B.J. and Egan, W.: Separation of synthetic phosphorothioate oligodeoxynucleotides from their oxygenated (phosphodiester) defect species by strong-anion-exchange high-performance liquid chromatography. *J. Chromatogr.*, 599 (1992) 35-42.
- 4328 Bonnefous, J.L., Gendre, P., Guillaumont, M., Frederich, A. and Aulagner, G.: Determination of six thioguanine nucleotides in human red blood cells using solid-phase extraction prior to high performance liquid chromatography. *J. Liq. Chromatogr.*, 15 (1992) 851-861.
- 4329 Coenen, A.J.J.M., Henckens, L.H.G., Mengerink, Y., van der Wal, S., Quaedflieg, P.J.L.M., Koole, L.H. and Meijer, E.M.: Optimization of the separation of the Rp and Sp diastereomers of phosphate-methylated DNA and RNA dinucleotides. *J. Chromatogr.*, 596 (1992) 59-66.
- 4330 Comess, K.M., Burstyn, J.N., Essigmann, J.M. and Lippard, S.J.: Replication inhibition and translesion synthesis on templates containing site-specifically placed *cis*-diaminedichloroplatinum(II) DNA adducts. *Biochemistry*, 31 (1992) 3975-3990.
- 4331 Dutta, P.K., Shanley, M. and O'Donovan, G.A.: Monitoring the accumulation of nucleoside triphosphates by high-performance liquid chromatography. *J. Chromatogr.*, 599 (1992) 137-140.
- 4332 Feldman, M.D., Ayers, C.R., Lehman, M.R., Taylor, H.E., Gordon, V.L., Sabia, P.J., Ras, D., Skalak, T.C. and Linden, J.: Improved detection of ischemia-induced increases in coronary sinus adenosine in patients with coronary artery disease. *Clin. Chem. (Winston-Salem)*, 38 (1992) 256-262.
- 4333 Gebelein, M., Merdes, G. and Berger, M.R.: Nucleotide preparation from cells and determination of nucleotides by ion-pair high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 146-150.
- 4334 Herpich, B. and Krauss, G.-J.: HPLC of nucleic acid components with volatile mobile phases I. Fast nucleotide separations using ammonium carbonate and ammonium bicarbonate gradients. *J. High Resolut. Chromatogr.*, 15 (1992) 41-42.
- 4335 Huang, S.Y. and Jin, J.D.: Operation strategy for displacement chromatography: selection of optimum mobile phase for separation of weak adsorptive nucleotides. *Chem. Eng. Sci.*, 47 (1992) 21-29; *C.A.*, 116 (1992) 101993v.

- 4336 Huber, C.G., Oefner, P.J. and Bonn, G.K.: High-performance liquid chromatographic separation of detritylated oligonucleotides on highly cross-linked poly-(styrene-divinylbenzene) particles. *J. Chromatogr.*, 599 (1992) 113-118.
- 4337 Janiszewski, J.S., Mulvana, D.E., Kaul, S., Dandekar, K.A. and Barbhaiya, R.H.: High-performance liquid chromatographic determination of 2',3'-didehydro-3'-deoxythymidine, a new anti-human immunodeficiency virus agent in human plasma and urine. *J. Chromatogr.*, 577 (1992) 151-156.
- 4338 Legendijk, J., Ubbink, J.B. and Vermaak, W.J.H.: Quantification of erythrocyte S-adenosyl-L-methionine levels and its application in enzyme studies. *J. Chromatogr.*, 576 (1992) 95-101.
- 4339 Metelev, V. and Agrawal, S.: Ion-exchange high-performance liquid chromatography analysis of oligodeoxyribonucleotide phosphorothioates. *Anal. Biochem.*, 200 (1992) 342-346.
- 4340 Naesens, L., Balzarini, J. and de Clercq, E.: Acyclic adenine nucleoside phosphonates in plasma determined by high-performance liquid chromatography with fluorescence detection. *Clin. Chem. (Winston-Salem)*, 38 (1992) 480-485.
- 4341 Pintor, J., Rotllan, P., Torres, M. and Miras-Portugal, M.T.: Characterization and quantification of diadenosine hexaphosphate in chromaffin cells: granular storage and secretagogue-induced release. *Anal. Biochem.*, 200 (1992) 296-300.
- 4342 Poston, J.M. and Parenteau, G.L.: Biochemical effects of ischemia on isolated, perfused rat heart tissues. *Arch. Biochem. Biophys.*, 295 (1992) 35-41.
- 4343 Prevost, D., Angers, D.A. and Nadeau, P.: Determination of ATP in soils by high performance liquid chromatography. *Soil Biol. Biochem.*, 23 (1991) 1143-1146; *C.A.*, 116 (1992) 82679d.
- 4344 Rydberg, B., Qiu, Z.-H., Dosanjh, M.K. and Singer, B.: Partial purification of a human DNA glycosylase acting on the cyclic carcinogen adduct 1,N⁶-ethenodeoxyadenosine. *Cancer Res.*, 52 (1992) 1377-1379.
- 4345 Saunders, P.P., Alvarez, E. and Kantarjian, H.M.: Determination of nicotinamide-adenine dinucleotide and thiazole-4-carboxamide-adenine dinucleotide in human leukocytes by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 37-41.
- 4346 Scott, M.D., Baudendistel, L.J. and Dahms, T.E.: Rapid separation of creatine, phosphocreatine and adenosine metabolites by ion-pair reversed-phase high-performance liquid chromatography in plasma and cardiac tissue. *J. Chromatogr.*, 576 (1992) 149-154.
- 4347 Van Delft, J.H.M., van Weert, E.J.M., van Winden, M.J.M. and Baan, R.A.: Determination of N7-(2-hydroxyethyl)guanine by HPLC with electrochemical detection. *Chem.-Biol. Interact.*, 80 (1991) 281-289; *C.A.*, 116 (1992) 35761q.
- 4348 Yang, B.L. and Goto, S.: Separation and concentration of adenosine triphosphate and adenosine monophosphate by using two chromatographic columns. *Sep. Sci. Technol.*, 27 (1992) 547-556; *C.A.*, 116 (1992) 17879e.

See also 3493, 4031, 4296, 4389.

21b. Nucleic acids, RNA

- 4349 Boado, R.J. and Pardridge, W.M.: A one-step procedure for isolation of poly(A)⁺ mRNA from isolated brain capillaries and endothelial cells in culture. *J. Neurochem.*, 57 (1991) 2136-2139; *C.A.*, 116 (1992) 18039y.

See also 4031, 4032, 4352.

21c. Nucleic acids, DNA

- 4350 Adegoke, J.A., Ighavini, B.O. and Onuigbo, R.O.: Characteristic features of the sonicated DNA of *Agama agama agama* on hydroxyapatite columns, using mouse DNA as a reference. *Genetics (The Hague)*, 83 (1991) 171-180; *C.A.*, 116 (1992) 16490j.
- 4351 Avignolo, C., Pizzorno, G., Cai, S. and Bignone, F.: HPLC analysis of DNA upon cytidine transamination at 100° C. *J. Biochem. Biophys. Methods*, 23 (1991) 202-205; *C.A.*, 116 (1992) 37224r.
- 4352 Jäschke, A., Cech, D. and Ehwald, R.: Inclusion and fractionated release of nucleic acids using microcapsules made from plant cells. *J. Chromatogr.*, 596 (1992) 165-171.
- 4353 Lutgerink, J.T., de Graaf, E., Hoebee, B., Stavenutez, H.F.C., Westra, J.G. and Kriek, E.: Detection of 8-hydroxyguanine in small amounts by DNA by ³²P postlabeling. *Anal. Biochem.*, 201 (1992) 127-133.
- 4354 Massom, L.R. and Jarrett, H.W.: High-performance affinity chromatography of DNA. II. Porosity effects. *J. Chromatogr.*, 600 (1992) 221-228.
- 4355 Palin, M.-F., Berthiaume, L., Lehoux, J.-G., Waterman, M.R. and Sygusch, J.: Direct expression of nature bovine adrenodoxin in *Escherichia coli*. *Arch. Biochem. Biophys.*, 295 (1992) 126-131.
- 4356 Sharma, M. and Freund, H.G.: Development of laser-induced fluorescence detection to assay DNA damage. *Proc. SPIE-Int. Soc. Opt. Eng.*, 1435 (Opt. Methods Ultrasensitive Detect. Anal.: Tech. Appl.) (1991) 280-291; *C.A.*, 116 (1992) 3181j.

See also 4031, 4032, 4144.

21e. Structural studies on DNA and DNA mapping

See 4323.

22. ALKALOIDS

- 4357 Aramaki, S., Suzuki, E., Isshidaka, O., Momose, A. and Umemura, K.: Pharmacokinetics of caffeine and its metabolites in horses after intravenous, intramuscular or oral administration. *Chem. Pharm. Bull.*, 39 (1991) 2999-3002.
- 4358 Augustijns, P. and Verbeke, N.: A microassay method for the determination of theophylline in biological samples using HPLC with electrochemical detection. *J. Liq. Chromatogr.*, 15 (1992) 1303-1313.
- 4359 Benes, K. and Pavelek, Z.: Method for determination of lysergic acid isomers using liquid chromatography. *Czech. CS 270,042 (Cl. G01N30/02)*, 12 Feb. 1991, Appl. 88/3,451, 23 May 1988; 3 p.; *C.A.*, 116 (1992) 120175w.
- 4360 Berlinck, R.G.S., Braekman, J.C., Daloz, D., Bruno, I., Riccio, R., Rogeau, D. and Amade, P.: Crambines C1 and C2: two further ichthyotoxic guanidine alkaloids from the sponge *Crambe crambe*. *J. Natural Prod.*, 55 (1992) 528-532.
- 4361 Bhargava, H.N. and Villar, V.M.: Pharmacodynamics and pharmacokinetics of intravenously administered morphine in spontaneously hypertensive and normotensive Wistar-Kyoto rats. *J. Pharmacol. Exp. Ther.*, 261 (1992) 290-296.

- 4362 Friedman, M. and Dao, L.: Distribution of glycoalkaloids in potato plants and commercial potato products. *J. Agric. Food Chem.*, 40 (1992) 419-423.
- 4363 Golkiewicz, W., Kuczynski, J. and Jusiak, L.: High performance liquid chromatography of alkaloids in silica gel/methanol-water system. *Chem. Anal. (Warsaw)*, 36 (1991) 67-72; *C.A.*, 116 (1992) 75341j.
- 4364 Gubar, S.I. and Konstantinova, E.P.: (Novel method for purification and determination of total alkaloids in Rauwolfia tissue cultures). *Khim. Prir. Soedin.*, (1991) 148-149; *C.A.*, 116 (1992) 82103m.
- 4365 Han, L.-F., Linert, W. and Gutmann, V.: Temperature dependence of the capacity factors of alkaloids in reversed-phase liquid chromatography. *J. Chromatogr. Sci.*, 30 (1992) 142-146.
- 4366 Kano, Y., Chen, X.-F., Kanemaki, S., Zong, Q. and Komatsu, K.: Pharmacological properties of galenical preparation. XV. Pharmacokinetics study of evocarpine and its metabolite in rats. *Chem. Pharm. Bull.*, 39 (1991) 3064-3066.
- 4367 Moia, F., Pellegatta, U., Rosso, R., Vignati, G. and Suigo, E.: (A rapid HPLC method for caffeine and theophylline determination in plasma). *G. Ita. Chim. Clin.*, 15 (1990) 411-415; *C.A.*, 116 (1992) 70m.
- 4368 Moors, M. and Massart, D.L.: Comparison of the elution profiles of a weakly basic drug on cyanopropyl-bonded silica cartridges from different manufacturers and different batches. *Anal. Chim. Acta*, 262 (1992) 135-144.
- 4369 Perico, A., Cocchini, A., Noferini, R., Mannucci, C. and Cambi, A.: HPLC analysis of Boldine in tablets and syrup. *J. Liq. Chromatogr.*, 15 (1992) 617-624.
- 4370 Roberts, S.M., Munson, J.W., James, R.C. and Harbison, R.D.: An assay for cocaethylene and other cocaine metabolites in liver using high-performance liquid chromatography. *Anal. Biochem.*, 202 (1992) 256-261.
- 4371 Sarkar, M.A., Hunt, C., Guzelian, P.S. and Karnes, H.T.: Characterization of human liver cytochromes P-450 involved in theophylline metabolism. *Drug Metab. Disp.*, 20 (1992) 31-37.
- 4372 Tsuda, Y., Ishiura, A., Takamura, S., Hosoi, S., Isobe, K. and Mohri, K.: Studies toward total synthesis of non-aromatic *Erythrina* alkaloids. (1). Synthesis and isomerization of unsaturated bicyclic δ -lactones. *Chem. Pharm. Bull.*, 39 (1991) 2797-2802.
- 4373 Van Belle, S.J.-P., de Smet, M., Monsaert, C., Geerts, F., Storme, G.A. and Massart, D.L.: High-performance liquid chromatographic determination of navelbine in MO_4 mouse fibrosarcoma cells and biological fluids. *J. Chromatogr.*, 576 (1992) 351-357.
- 4374 Vandenbossche, G.M.R., Lefebvre, R.A., de Wilde, G.A. and Remon, J.-P.: Performance of a modified starch hydrophilic matrix for the sustained release of theophylline in healthy volunteers. *J. Pharm. Sci.*, 81 (1992) 245-248.
- 4375 Vasiliades, J.: Sensitive, selective, and rapid procedure for the quantitation of ecgonine methyl ester in urine. *J. Anal. Toxicol.*, 15 (1991) 345; *C.A.*, 116 (1992) 100709v.
- For additional information see *C.A.*:
116 (1992) 15247y, 46395z, 46401y, 50776s, 91523a.
- See also 4419, 4619, 4695.
23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN
- 23a. *Porphyrins and other pyrroles*
- 4376 Kanayama, N., Yamazaki, T., Naruse, H., Sumimoto, K., Horichi, K. and Terao, T.: Determining zinc coproporphyrin in maternal plasma - a new method for diagnosing amniotic fluid embolism. *Clin. Chem. (Winston-Salem)*, 38 (1992) 526-529.
- 4377 Minder, E.I., Vuilleumier, J.P. and Vonderschmitt, D.J.: Prototype application of a robot in the clinical laboratory enabling fully automated quantification of fecal porphyrins. *Clin. Chem. (Winston-Salem)*, 38 (1992) 516-521.
- 4378 Shibata, Y., Saitoh, K. and Suzuki, N.: Control of the retention selectivity of rare earth octaethylporphyrins in reversed-phase high-performance liquid chromatography using amines as mobile phase additives. *J. Chromatogr.*, 598 (1992) 73-79.
- 4379 Wells, D.A., Hawi, A.A. and Digenis, G.A.: Isolation and identification of the major urinary metabolite of N-methylpyrrolidone in the rat. *Drug Metab. Disp.*, 20 (1992) 124-126.
- 4380 Will, W., Hoffmann, G. and Zober, A.: Determination of 1-vinyl-2-pyrrolidone in human serum by high performance liquid chromatography. *Fresenius J. Anal. Chem.*, 342 (1992) 744-745.
- 23c. *Indole derivatives and plant hormones (gibberellins)*
- 4381 Anjaneyulu, A.S.R., Prakash, C.V.S., Raju, K.V.S. and Mallavahani, U.V.: Isolation of new aromatic derivatives from a marine algal species *Caulerpa racemosa*. *J. Natural Prod.*, 55 (1992) 496-499.
- 4382 Gibis, M., Dehnhard, M. and Fischer, A.: (Determination of skatole and indole in backfat and lean meat of pigs by HPLC with fluorimetric detection). *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 220-223; *C.A.*, 116 (1992) 5383a.
- 4383 Smith, V.A., Sponset, V.M., Knatt, C., Gaskin, P. and MacMillan, J.: Immuno-chromatographic purification of gibberellins from vegetative tissues of *Cucumis sativus* L.: Separation and identification of 13-hydroxy and 13-deoxy gibberellins. *Planta*, 185 (1991) 583-586; *C.A.*, 116 (1992) 37377t.
- 4384 Swanson, S.P. and Catlow, J.: Disposition of the novel serotonin agonist, LY228729, in monkeys and rats. *Drug Metab. Disp.*, 20 (1992) 102-107.
- For additional information see *C.A.*:
116 (1992) 39693s.
- See also 3776, 3924, 3931, 4632.
- 23d. *Pyridine derivatives*
- See 3915, 4598.
- 23e. *Other N-heterocyclic compounds*
- 4385 Díez, M.T., Arín, M.J. and Resines, J.A.: Simultaneous determination of allantoin and creatinine in urine by a rapid reversed-phase liquid-chromatographic method. *J. Liq. Chromatogr.*, 15 (1992) 1337-1350.

- 4386 Moriyama, H., Komiya, K., Yamato, T. and Aoki, M.: Optimum chromatographic condition for 2,6-di-*t*-butyl-4-pyrazinylaminophenol on RP-HPLC: metal influence on its elution profile. *J. Liq. Chromatogr.*, 15 (1992) 411-421.
- 4387 Pleasance, S., Ayer, S.W., Laycock, M.V. and Thibault, P.: Ion-spray mass spectrometry of marine toxins. III. Analysis of paralytic shellfish poisoning toxins by flow-injection analysis, liquid chromatography/mass spectrometry, and capillary electrophoresis/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 6 (1992) 14-24; *C.A.*, 116 (1992) 77932b.
- 4388 Ramzan, I.: High-performance liquid chromatographic method for the determination of CHEB, a convulsant barbiturate, in rat biological fluids/tissue. *J. Pharm. Biomed. Anal.*, 9 (1991) 777-779.
- 4389 Schreurs, M., Vissers, J.P.C., Gooijer, C. and Velthorst, N.H.: Determination of orotate by liquid chromatography with sensitized lanthanide ion luminescence detection. *Anal. Chim. Acta*, 262 (1992) 201-208.
- 4390 Yamagami, C. and Takao, N.: Hydrophobicity parameters determined by reversed-phase liquid chromatography. III. Influence of stationary and mobile phases on the relationship between the capacity factor and the octanol-water partition coefficient for pyrazine derivatives. *Chem. Pharm. Bull.*, 39 (1991) 2924-2929.
- 4391 Yang, W. and Davis, P.J.: Microbial models of mammalian metabolism. Biotransformations of N-methylcarbazole using the fungus *Cunninghamella echinulata*. *Drug Metab. Disp.*, 20 (1992) 38-46.

For additional information see C.A.:
116 (1992) 6584d, 79596u.

See also 4395, 4513, 4662.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 4392 Bringmann, G., Feineis, D. and Hesselmann, C.: Determination of 1,3-thiazolidine-carboxylic acids in urine by reversed-phase HPLC after fluorescence labelling with dansyl chloride. *Anal. Lett.*, 25 (1992) 497-512.
- 4393 Carpenter, J.F. and Dawson, P.E.: Quantitation of dimethyl sulfoxide in solutions and tissues by high-performance liquid chromatography. *Cryobiology*, 28 (1991) 210-215; *C.A.*, 116 (1992) 2989s.
- 4394 Chau, M.H. and Nelson, J.W.: Direct measurement of the equilibrium between glutathione and dithiothreitol by high performance liquid chromatography. *FEBS Lett.*, 29 (1991) 296-298; *C.A.*, 116 (1992) 3009j.
- 4395 Chiang, C.-H., Hsieh, C.-H., Lu, D.-W. and Kao, K.-D.: Stability studies of topical carbonic anhydrase inhibitor 6-hydroxyethoxy-2-benzothiazole sulfonamide. *J. Pharm. Sci.*, 81 (1992) 299-302.
- 4396 Husain, S., Narsimha, R., Alvi, S.N. and Rao, R.N.: Studies on photoisomerization of 4,4'-diaminostilbene-2,2'-disulphonic acid for quality assurance by high-performance liquid chromatography. *J. Chromatogr.*, 596 (1992) 127-131.
- 4397 Lehotay, J., Brandsteterová, E. and Oktavec, D.: High-performance liquid chromatographic determination of ethylenethiourea in food. *J. Liq. Chromatogr.*, 15 (1992) 525-534.

- 4398 Morimitsu, Y., Morioka, Y. and Kawakishi, S.: Inhibitors of platelet aggregation generated from mixtures of *Allium* species and/or S-alk(en)yl-L-cysteine sulfoxides. *J. Agric. Food Chem.*, 40 (1992) 368-372.
- 4399 Noble, F., Soleilhac, J.M., Soroca-Lucas, E., Turcaud, S., Fournie-Zaluski, M.C. and Roques, B.P.: Inhibition of the enkephalin-metabolizing enzymes by the first systemically active mixed inhibitor prodrug RB 101 induces potent analgesic responses in mice and rats. *J. Pharmacol. Exp. Ther.*, 261 (1992) 181-190.
- 4400 Quinsac, A., Ribaillier, D., Elfakir, C., Lafosse, M. and Dreux, M.: A new approach to the study of glucosinolates by isocratic liquid chromatography. Part I. Rapid determination of desulfated derivatives of rapeseed glucosinolates. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 932-939.
- 4401 Sakai, T. and Nagasawa, T.: Simple, rapid and sensitive determination of plasma taurine by high-performance liquid chromatography using pre-column derivative formation with fluorescamine. *J. Chromatogr.*, 576 (1992) 155-157.

For additional information see C.A.:
116 (1992) 60552e, 98623s.

See also 3463, 3501, 3568, 3887, 3923, 4033, 4513, 4685, 4720.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 4402 Bueb, J.-L., da Silva, A., Mousli, M. and Landry, Y.: Natural polyamines stimulate G-proteins. *Biochem. J.*, 282 (1992) 545-550.
- 4403 Pulcinelli, F.M., Gazzaniga, P.P. and Salganicoff, L.: Use of Zn-pyrophosphatase in the high-performance liquid chromatographic analysis of cell extracts containing ³²P-labelled inositol phosphates. *J. Chromatogr.*, 575 (1992) 51-55.
- 4404 Ringer, D.P.: Separation of phosphotyrosine, phosphoserine, and phosphothreonine by high-performance liquid chromatography. *Methods Enzymol.*, 201 (Protein Phosphorylation, Pt. B) (1991) 3-10; *C.A.*, 116 (1992) 54814a.
- 4405 Tumanov, A.A. and Korostyleva, E.A.: (Chromato-enzymic methods to determine organophosphorus compounds in environmental samples). *Anal. Okruzh. Prirod. Sredy Gor'k. Gos. Un-T, Gor'kii*, (1990) 67-70; *C.A.*, 116 (1992) 120147p.

For additional information see C.A.:
116 (1992) 67339z.

See also 3590, 3591, 3592, 3596, 3795, 3797, 3811, 3817, 3950, 3963, 4331, 4348.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. Organometallic compounds

- 4406 Carrea, G., Pasta, P., Colonna, S. and Gaggero, N.: High-performance liquid chromatographic separation of chiral metallocenic ketones and alcohols. *J. Chromatogr.*, 600 (1992) 320-322.

- 4407 Donard, O.F.X. and Martin, F.M.: Hyphenated techniques applied to environmental speciation studies. *TrAC*, 11 (1992) 17-26 - a review with 37 refs.
- 4408 Parkin, J.E.: Interference by disodium edetate with the reaction of phenylmercury ions with dithiocarbamate derivatising agents. *J. Liq. Chromatogr.*, 15 (1992) 441-449.
- 4409 Pfeffer, M., Gelbe, B., Hample, P., Steinberg, B., Walenciak-Reddel, E., Wiocke, B. and Wykoff, B.: Sensitive fluorescence labelling for analysis of organotin compounds with morin. *Fresenius J. Anal. Chem.*, 342 (1992) 839-845.
- See also 4743, 4760.
- 26c. *Coordination compounds*
- 4410 Amoli, H.S.: Chromatographic investigation of some lanthanide complexes. *Avail. Univ. Microfilms Int.*, Order No. BRD-92728, 1990, 199 p.; C.A., 116 (1992) 98104y.
- See also 4746, 4748, 4764.
27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 4411 Behrens, W.A. and Madere, R.: Quantitative analysis of ascorbic acid and isoascorbic acid in foods by high-performance liquid chromatography with electrochemical detection. *J. Liq. Chromatogr.*, 15 (1992) 753-765.
- 4412 Biacs, P.A., Czinkotai, B. and Hoschke, A.: Factors affecting stability of colored substances in paprika powders. *J. Agric. Food Chem.*, 40 (1992) 363-367.
- 4413 Bories, G.F., Sutra, J.-F.P. and Tulliez, J.E.: Metabolism and disposition of [³H]zeranol implanted in the pig. *J. Agric. Food Chem.*, 40 (1992) 284-288.
- 4414 Carvalho, P.R.N., Collins, C.H. and Rodríguez-Amaya, D.B.: Comparison of provitamin A determination by normal-phase gravity-flow column chromatography and reversed-phase high performance liquid chromatography. *Chromatographia*, 33 (1992) 133-137.
- 4415 Deineka, V.I., Vysochin, A.P., Staroverov, V.M. and Ku'zmin, A.S.: (HPLC analysis of synthetic tocopheryl acetate (vitamin E)). *Zh. Anal. Khim.*, 46 (1991) 1206-1211; C.A., 116 (1992) 46387y.
- 4416 Fox, J.B., Jr., Ackerman, S.A. and Thayer, D.W.: Fluorometric determination of thiamine vitamers in chicken. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 346-354.
- 4417 Guchelaar, H.J., Wouda, S., Beukeveld, G.J., Mulder, N.H. and Oosterhuis, J.W.: Pharmacokinetics of parenteral 13-*cis*-retinoic acid formulations in rats. *J. Pharm. Sci.*, 81 (1992) 432-435.
- 4418 Kagan, V.E., Serbinova, E.A., Forte, T., Scita, G. and Packer, L.: Recycling of vitamin E in human low density lipoproteins. *J. Lipid Res.*, 33 (1992) 385-397.
- 4419 Khurana, A.L. and Ho, C.-T.: Evaluation of polymethacrylic acid for food packaging by examining interactions using HPLC. *J. Liq. Chromatogr.*, 15 (1992) 535-544.
- 4420 Kraft, J.C. and Juchau, M.R.: Correlations between conceptual concentrations of all-*trans*-retinoic acid and dysmorphogenesis after microinjections of all-*trans*-retinoic acid, 13-*cis*-retinoic acid, all-*trans*-retinoyl- β -glucuronide, or retinol in cultured whole rat embryos. *Drug Metab. Disp.*, 20 (1992) 218-225.
- 4421 Muniategui, S., Sancho, M.T., Lopez, J., Huidobro, J.F. and Simal, J.: Determination of carotenes from bee-collected pollen by high performance liquid chromatography. *J. Apic. Res.*, 29 (1990) 147-150; C.A., 116 (1992) 79594s.
- 4422 Ortiz, A. and Teruel, J.A.: Rapid determination of α -tocopherol in sarcoplasmic reticulum membranes by reverse phase HPLC. *Biochem. Int.*, 25 (1991) 429-435; C.A., 116 (1992) 102004k.
- 4423 Otles, S. and Hisil, Y.: Analysis of vitamin A in eggs by high-pressure liquid chromatography. *Nahrung*, 35 (1991) 391-394; C.A., 116 (1992) 19824g.
- 4424 Pikkariainen, S.A. and Parviainen, M.T.: Determination of retinyl palmitate and total vitamin A content in liver and liver-based ready-to-eat foods. *J. Chromatogr.*, 577 (1992) 163-166.
- 4425 Priest, D.G., Bunni, M.A., Mullin, R.J., Duch, D.S., Galivan, J. and Rhee, M.S.: A comparison of HPLC and ternary complex-based assays of tissue reduced folates. *Anal. Lett.*, 25 (1992) 219-230.
- 4426 Sagredos, A.N.: Zur Qualität und Kontamination von Fischölkapseln. *Fat Sci. Technol.*, 94 (1992) 101-111.
- 4427 Sauberlich, H.E., Wood, S.M., Tamura, T. and Freeberg, L.E.: Influence of dietary intakes of erythorbic acid on plasma vitamin C analyses. *Am. J. Clin. Nutr.*, 54 (1991) 1319S-1322S; C.A., 116 (1992) 82617g.
- 4428 Sliwiok, J. and Kocjan, B.: Chromatographische Untersuchungen der hydrophoben Eigenschaften von Tocopherolen. *Fat Sci. Technol.*, 94 (1992) 157-159.
- 4429 Stein, J., Hahn, A., Lembcke, B. and Rehner, G.: High-performance liquid chromatographic determination of biotin in biological materials after crown ether-catalyzed fluorescence derivatization with panacyl bromide. *Anal. Biochem.*, 200 (1992) 89-94.
- 4430 Ujje, T., Takeyama, T., Kondo, A., Hiroe, R. and Mori, M.: (Rapid and reproducible determination of tocopherols in foods using high performance liquid chromatography with ethyl acetate/n-hexane extraction). *Bitamin*, 65 (1991) 393-397; C.A., 116 (1992) 19839r.
- 4431 Ulberth, F., Reich, H. and Kneifel, W.: Zur Analytik von Tocopherolen - Ein Methodenvergleich zwischen HPLC und GC. *Fat Sci. Technol.*, 94 (1992) 51-54.
- 4432 Yoshida, H., Tatsumi, M. and Kajimoto, G.: Influence of fatty acids on the tocopherol stability in vegetable oils during microwave heating. *J. Am. Oil Chem. Soc.*, 69 (1992) 119-125.
- 4433 Ziegler, R.G., Subar, A.F., Craft, N.E., Ursin, G., Patterson, B.H. and Graubard, B.I.: Does β -carotene explain why reduced cancer risk is associated with vegetable and fruit intake? *Cancer Res.*, 52 (1992) 2060s-2066s.
- For additional information see C.A.:
116 (1992) 17869b, 17873y, 37503f, 51688b, 67310h, 102005m.
- See also 3680, 4524, 4662, 4678.
28. ANTIBIOTICS
- 4434 Abounassif, M.A., Abdel-Moety, E.M., Mohamed, M.E. and Gad-Kariem, E.-R.A.: Liquid chromatographic determination of amoxicillin and clavulanic acid in pharmaceutical preparations. *J. Pharm. Biomed. Anal.*, 9 (1991) 731-735.

- 4435 Asano, N., Kameda, Y. and Matsui, K.: All eight possible mono- β -D-glucosides of validoxyamine A. Preparation and structure determination. *J. Antibiot.*, 44 (1991) 1406-1416.
- 4436 Boison, J.O., Korsrud, G.O., MacNeil, J.D., Keng, L. and Papich, M.: Determination of penicillin G in bovine plasma by high-performance liquid chromatography after pre-column derivatization. *J. Chromatogr.*, 576 (1992) 315-320.
- 4437 Borghi, A., Ferrari, P., Gallo, G.G., Zanol, M., Zerilli, L.F. and Lancini, G.C.: Microbial de-mannosylation and mannosylation of teicoplanin derivatives. *J. Antibiot.*, 44 (1991) 1444-1451.
- 4438 Brewster, J.D., Lightfield, A.R. and Barford, R.A.: Evaluation of restricted access media for high-performance liquid chromatographic analysis of sulfonamide antibiotic residues in bovine serum. *J. Chromatogr.*, 598 (1992) 23-31.
- 4439 Brown, J.E., Patterson, L.H., Williamson, J. and Brown, J.R.: Method for analysis, and distribution profile, of covalently-linked ferritin-daunorubicin conjugate in the blood of trypanosome-infected mice. *J. Pharm. Pharmacol.*, 44 (1992) 48-51; *C.A.*, 116 (1992) 98806d.
- 4440 Cachet, T., Lannoo, P., Paesen, J., Janssen, G. and Hoogmartens, J.: Determination of erythromycin ethylsuccinate by liquid chromatography. *J. Chromatogr.*, 600 (1992) 99-108.
- 4441 Chen, T.S., Arison, B.H., Wicker, L.S., Inamine, E.S. and Monaghan, R.L.: Microbial transformation of immunosuppressive compounds. I. Desmethylation of FK506 and immunomycin (FR 900520) by *Actinoplanes* sp. ATCC 53771. *J. Antibiot.*, 45 (1992) 118-123.
- 4442 Christians, U., Sattler, M., Schiebel, H.M., Kruse, C., Radeke, H.H., Linck, A. and Sewing, K.-F.: Isolation of two immunosuppressive metabolites after *in vitro* metabolism of rapamycin. *Drug Metab. Disp.*, 20 (1992) 186-191.
- 4443 Copeland, K.R. and Yatscoff, R.W.: The isolation, structural characterization, and immunosuppressive activity of cyclosporin G (NVa²-cyclosporin) metabolites. *Ther. Drug Monit.*, 13 (1991) 281-288; *C.A.*, 116 (1992) 50783s.
- 4444 Dine, T., Luyckx, M., Brunet, C. and Cazin, M.: Pharmacokinetics of epirubicin after intravenous administration: experimental and clinical aspects. *Methods Find. Exp. Clin. Pharmacol.*, 13 (1991) 483-489; *C.A.*, 116 (1992) 33802e.
- 4445 Franco, C.M.M., Maurya, R., Vijayakumar, E.K.S., Chatterjee, S., Blumbach, J. and Ganguli, B.N.: Alisamycin, a new antibiotic of the manumycin group. I. Taxonomy, production, isolation and biological activity. *J. Antibiot.*, 44 (1991) 1289-1293.
- 4446 Freyder, C.P., Zhou, W., Doetsch, P.W. and Marzilli, L.G.: Bleomycin A₂ and B₂ purification flash chromatography for chemical and biochemical study. *Prep. Biochem.*, 21 (1991) 257-268. *C.A.*, 116 (1992) 46415f.
- 4447 Grabley, S., Granzer, E., Hütter, K., Ludwig, D., Mayer, M., Thiericke, R., Till, G., Wink, J., Phillips, S. and Zeeck, A.: Secondary metabolites by chemical screening. 8. Decarestrictines, a new family of inhibitors of cholesterol biosynthesis from *Penicillium*. I. Strain description, fermentation, isolation and properties. *J. Antibiot.*, 45 (1992) 56-65.
- 4448 Handa, M., Sugawara, K., Nishiyama, Y., Kamei, H., Hatori, M. and Konishi, M.: Protactin, a new antibiotic metabolite and a possible precursor of the actinomycins. *J. Antibiot.*, 45 (1992) 20-28.
- 4449 Hayakawa, Y., Takaku, K., Furihata, K., Nagai, K. and Seto, H.: Isolation and structural elucidation of new 18-membered macrolide antibiotics, viranamycins A and B. *J. Antibiot.*, 44 (1991) 1294-1299.
- 4450 Hochlowski, J.E., Mullally, M.M., Brill, G.M., Whittern, D.N., Buko, A.M., Hill, P. and McAlpine, J.B.: Dunaimycins, a new complex of spiroketal 24-membered macrolides with immunosuppressive activity. II. Isolation and elucidation of structures. *J. Antibiot.*, 44 (1991) 1318-1330.
- 4451 Hsu, M.-C. and Fann, Y.J.: Determination of dicloxacillin preparations by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 26-29.
- 4452 Hsu, M.-C. and Huang, W.F.: Collaborative study of the determination of cloxacillin by column liquid chromatography. *J. Chromatogr.*, 600 (1992) 333-336.
- 4453 Inui, K.-I., Yamamoto, M. and Saito, H.: Transepithelial transport of oral cephalosporins by monolayers of intestinal epithelial cell line Caco-2: specific transport systems in apical and basolateral membranes. *J. Pharmacol. Exp. Ther.*, 261 (1992) 195-201.
- 4454 Itazaki, H., Nagashima, K., Kawamura, Y., Matsumoto, K., Nakai, H. and Terui, Y.: Cinatrans, a novel family of phospholipase A₂ inhibitors. I. Taxonomy and fermentation of the producing culture; isolation and structures of cinatrans. *J. Antibiot.*, 45 (1992) 38-49.
- 4455 Katayama, N., Nozaki, Y., Tsubotani, S., Kondo, M., Harada, S. and Ono, H.: Sperabillins, new antibacterial antibiotics with potent *in vivo* activity. Taxonomy, fermentation, isolation and biological activity. *J. Antibiot.*, 45 (1992) 10-19.
- 4456 Kees, F., Raasch, W. and Grobecker, H.: Strukturelle Charakterisierung eines unbekanntenen Metaboliten von Ciprofloxacin. *Arzneim.-Forsch.*, 42 (1992) 570-575.
- 4457 Keukens, H.J., Aerts, M.M.L., Traag, W.A., Nouws, J.F.M., de Ruig, W.G., Beek, W.M.J. and den Hartog, J.M.P.: Analytical strategy for the regulatory control of residues of chloramphenicol in meat: preliminary studies in milk. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 245-256.
- 4458 Kinoshita, K., Takenaka, S., Suzuki, H., Morohoshi, T. and Hayashi, M.: Micinamycins, new macrolide antibiotics. XIII. Isolation and structures of novel formation products from *Microspora griseorubida* (FERM BP-705). *J. Antibiot.*, 45 (1992) 1-9.
- 4459 Konishi, M., Ohkuma, H., Matsumoto, K., Saitoh, K., Miyaki, T., Oki, T. and Kawaguchi, H.: Dynemicins, new antibiotics with the 1,5-diyne-3-ene and anthraquinone subunit. I. Production, isolation and physico-chemical properties. *J. Antibiot.*, 44 (1991) 1300-1305.
- 4460 Lombardi, F., Ardemagni, R., Colzani, V. and Visconti, M.: High-performance liquid chromatographic determination of rifloxacin and its main active metabolite in biological fluids. *J. Chromatogr.*, 576 (1992) 129-134.
- 4461 Matsukuma, S., Ohtsuka, T., Kotaki, H., Shirai, H., Sano, T., Watanabe, K., Nakayama, N., Itezo, Y., Fujiu, M., Shimma, N., Yokose, K. and Okuda, T.: A new series of natural antifungals that inhibit P450 lanosterol C-14 demethylase. I. Taxonomy, fermentation, isolation and structural elucidation. *J. Antibiot.*, 45 (1992) 151-159.
- 4462 Meier, R.-M. and Tamm, C.: Studies directed towards the biosynthesis of the C₇ N-unit of rifamycin B: incorporation of [¹⁴C(G)]quinic acid and [1,2-¹³C₂]glycerol. *J. Antibiot.*, 45 (1992) 400-410.

- 4463 Miyata, S., Hashimoto, M., Fujie, K., Nishikawa, M., Kiyoto, S., Okuhara, M. and Kohsaka, M.: WS-7338, new endothelin receptor antagonist isolated from *Streptomyces* sp. NO. 7338. II. Biological characterization and pharmacological characterization of WS-7338B. *J. Antibiot.*, 45 (1992) 83-87.
- 4464 Miyata, S., Hashimoto, M., Masui, Y., Ezaki, M., Takase, S., Nishikawa, M., Kiyoto, S., Okuhara, M. and Kohsaka, M.: WS-7338, New endothelin receptor antagonist isolated from *Streptomyces* sp. No. 7338. I. Taxonomy, fermentation, isolation, physico-chemical properties and biological activities. *J. Antibiot.*, 45 (1992) 74-82.
- 4465 Moats, W.A. and Malisch, R.: Determination of cloxacillin and penicillin V in milk using an automated liquid chromatography cleanup. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 257-260.
- 4466 Naidong, W., Hua, S., Verresen, K., Roets, E. and Hoogmartens, J.: Assay and purity control of metacycline by thin-layer chromatography combined with UV and fluorescence densitometry - a comparison with liquid chromatography. *J. Pharm. Biomed. Anal.*, 9 (1991) 717-723.
- 4467 Nakajima, S., Niyama, K., Ihara, M., Kojiri, K. and Suda, H.: Endothelin-binding inhibitors, BE-18257A and BE-18257B. II. Structure determination. *J. Antibiot.*, 44 (1991) 1348-1356.
- 4468 Nakanishi, S., Osawa, K., Saito, Y., Kawamoto, I., Kuroda, K. and Kase, H.: KS-505A, A novel inhibitor of bovine brain Ca²⁺ and calmodulin-dependent cyclic-nucleotide phosphodiesterase from *Streptomyces argenteolus*. *J. Antibiot.*, 45 (1992) 341-347.
- 4469 Nishida, F., Mori, Y., Suzuki, M., Meevootisom, V., Flegel, T.W., Thebtaranonth, Y. and Intararuangsorn, S.: Structure elucidation of glycosidic antibiotics, glykenins, from *Basidiomycetes* sp. IV. Structure of glykenin III. *Chem. Pharm. Bull.*, 39 (1991) 3044-3047.
- 4470 O'Sullivan, J., Phillipson, D.W., Kirsch, D.R., Fischer, S.M., Lai, M.H. and Trejo, W.H.: Lanomycin and glucolanomycin, antifungal agents produced by *Pycnidophora dispersa*. I. Discovery, isolation and biological activity. *J. Antibiot.*, 45 (1992) 306-312.
- 4471 Oka, H., Ikai, Y., Kawamura, N. and Hayakawa, J.: Limited survey of residual tetracyclines in tissues collected from diseased animals in Aichi prefecture, Japan. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 894-896.
- 4472 Otsuka, T., Shibata, T., Tsurumi, Y., Takase, S., Okuhara, M., Terano, H., Kohsaka, M. and Imanaka, H.: A new angiotensin inhibitor, FR-111142. *J. Antibiot.*, 45 (1992) 348-354.
- 4473 Riedel, K.-D., Wildfeuer, A., Laufen, H. and Zimmermann, T.: Equivalence of a high-performance liquid chromatographic assay and a bioassay of azithromycin in human serum samples. *J. Chromatogr.*, 576 (1992) 358-362.
- 4474 Rodewald, J.M., Moran, J.W., Donoho, A.L. and Coleman, M.R.: Determination of monensin in raw material, premix, and animal feeds by liquid chromatography with correlation to microbiological assay. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 272-279.
- 4475 Sanders, P., Moulin, G., Gaudiche, C., Delepine, B. and Mourot, D.: Comparison of automated liquid chromatographic and bioassay methods for determining spiramycin concentration in bovine plasma. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 912-917.
- 4476 Sawa, R., Takahashi, Y., Itoh, S., Shimanaka, K., Matsuda, N., Hamada, M., Sawa, T., Naganawa, H. and Takeuchi, T.: Aldecalmycin, a new antimicrobial antibiotic from *Streptomyces*. *J. Antibiot.*, 45 (1992) 136-139.
- 4477 Sweeney, G.: Antibiotics and therapeutic drug monitoring: an overview. *Anal. Proc. (London)*, 29 (1992) 71-73; C.A., 116 (1992) 120258a - a review with 24 refs.
- 4478 Takeuchi, M., Takahashi, S., Enokita, R., Sakaida, Y., Haruyama, H., Nakamura, T., Katayama, T. and Inukai, M.: Galacardins A and B, new glycopeptide antibiotics. *J. Antibiot.*, 45 (1992) 297-305.
- 4479 Tod, M., Biarez, O., Nicolas, P. and Petitjean, O.: Sensitive determination of josamycin and rokitamycin in plasma by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 575 (1992) 171-176.
- 4480 Toki, S., Ando, K., Yoshida, M., Kawamoto, I., Sano, H. and Matsuda, Y.: ES-242-1, A novel compound from *Verticillium* sp., binds to a site on N-methyl-D-aspartate receptor that is coupled to the channel domain. *J. Antibiot.*, 45 (1992) 88-93.
- 4481 Tsukanawa, M., Tenmyo, O., Tomita, K., Naruse, N., Kotake, C., Miyaki, T., Konishi, M. and Oki, T.: Quartromicin, a complex of novel antiviral antibiotics. I. Production, isolation, physico-chemical properties and antiviral activity. *J. Antibiot.*, 45 (1992) 180-188.
- 4482 Tyczkowska, K.L., Seay, S.S., Stoskopf, M.K. and Aucoin, D.P.: Determination of ceftazidime in dolphin serum by liquid chromatography with ultraviolet-visible detection and confirmation by thermospray liquid chromatography-mass spectrometry. *J. Chromatogr.*, 576 (1992) 305-313.
- 4483 Venkataramana, D. and Krishna, D.R.: High-performance liquid chromatographic determination of usnic acid in plasma. *J. Chromatogr.*, 575 (1992) 167-170.
- 4484 Walsh, J.R., Walker, L.V. and Webber, J.J.: Determination of tetracyclines in bovine and porcine muscle by high-performance liquid chromatography using solid-phase extraction. *J. Chromatogr.*, 596 (1992) 211-216.
- 4485 Wrigh, J.C., Durham, C.N. and Dunbar, J.R.: Determination of ticarcillin and clavulanic acid in serum by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 30-33.
- 4486 Yamashita, K., Motohashi, M. and Yashiki, T.: Automated high-performance liquid chromatographic method for the simultaneous determination of cefotiam and Δ^3 -cefotiam in human plasma using column switching. *J. Chromatogr.*, 577 (1992) 174-179.
- 4487 Yamazaki, M., Yamashita, T., Harada, T., Nishikiori, T., Saito, S., Shimada, N. and Fujii, A.: 44-Homooligomycins A and B, new antitumor antibiotics from *Streptomyces bottropensis*. Producing organism, fermentation, isolation, structure elucidation and biological properties. *J. Antibiot.*, 45 (1992) 171-179.
- 4488 Yoshimura, Y., Miyake, A., Nishimura, T., Kawai, T. and Yamaoka, M.: Studies on condensed-heterocyclic azolium cephalosporins. II. Synthesis and antibacterial activity of 7 β -[2-(2-aminothiazol-4-yl)-alkoxyiminoacetamido]-3(condensed-heterocyclic azolium)methyl-3-cephem-4-carboxylates. *J. Antibiot.*, 44 (1991) 1394-1405.
- 4489 Yu, G.: (Determination of chloramphenicol in meat by high-performance liquid chromatography). *Fenxi Ceshi Tongbao*, 10 (1991) 75-76; C.A., 116 (1992) 104591y.

For additional information see C.A.:

116 (1992) 46405c, 67341u, 113650u.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 4490 Scharf, J., Wiesiollek, R. and Bächmann, K.: Pesticides in the atmosphere. *Fresenius J. Anal. Chem.*, 342 (1992) 813-816.
- 4491 Tonogai, Y., Tsumura, Y., Nakamura, Y., Fujiwara, S., Fujii, Y. and Ito, Y.: (Comparison between GC and HPLC methods for determination of 9 kinds of herbicides containing nitrogen in agricultural products). *Eisei Kagaku*, 37 (1991) 480-488; *C.A.*, 116 (1992) 127148y.
- 4492 Van Zoonen, P., Hogendoorn, E.A., van der Hoff, G.R. and Baumann, R.A.: Selectivity and sensitivity in coupled chromatographic techniques as applied in pesticide residue analysis. *TrAC*, 11 (1992) 11-17 - a review with 18 refs.
- 4493 Voyksner, R.D.: Developments in mass spectrometric analysis of pesticide residues and metabolites: applications of liquid chromatography/mass spectrometry. In: Frehse, H. (Editor), *Pestic. Chem.: Adv. Int. Res., Dev., Legis., Proc. Int. Congr. Pestic. Chem., 7th 1990*, VCH, Weinheim, 1991, pp. 383-395; *C.A.*, 116 (1992) 2201d.
- 4494 Warren, N.: Analysis of carbamate, urea, and triazine pesticides using gradient HPLC. *Int. Lab.*, 22, No. 4 (1992) 22-24.

See also 3524, 4771.

29b. Chlorinated insecticides

- 4495 Cessna, A.J. and Grover, R.: Determination of the herbicide diclofop in human urine. *J. Chromatogr.*, 600 (1992) 327-332.
- 4496 Ribeiro, M.L. and Minelli, E.V.: On-line DDT determination in blood serum: experimental parameters. *Bull. Environ. Contam. Toxicol.*, 47 (1991) 804-810; *C.A.*, 116 (1992) 53039q.
- 4497 Wilson-Yang, K.M., Power, J.P., Chisholm, E.A. and Hallett, D.J.: The congener specific determination of PCBs: carbon column chromatography of potentially toxic congeners. *Chemosphere*, 23 (1991) 1139-1143; *C.A.*, 116 (1992) 122723x.

See also 3625.

29c. Phosphorus insecticides

- 4498 Krolski, M.E., Bosnak, L.L. and Murphy, J.J.: Application of nuclear magnetic resonance spectroscopy to the identification and quantitation of pesticide residues in soil. *J. Agric. Food Chem.*, 40 (1992) 458-461.

See also 3564, 4499, 4659.

29d. Carbamates

- 4499 Lino, Celeste de Matos and Noronha da Silveira, M.I.: (Pesticide residues in fruit juices and soft drinks: levels of azinphos-methyl and carbaryl). *Rev. Port. Farm.*, 41 (1991) 19-25; *C.A.*, 116 (1992) 5382z.

See also 3461, 4494.

29e. Herbicides

- 4500 Ayer, S.W., Isaac, B.G., Luchsinger, K., Makkar, N., Tran, M. and Stonard, R.J.: *Cis*-2-amino-1-hydroxycyclobutane-1-acetic acid, a herbicidal antimetabolite produced by *Streptomyces rochei* A13018. *J. Antibiot.*, 44 (1991) 1460-1462.
- 4501 Chichila, T.M. and Walters, S.M.: Liquid chromatographic determination of paraquat and diquat in crops using a silica column with aqueous ionic mobile phase. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 961-967.
- 4502 Engelhardt, H., Zapp, J. and Kolla, P.: Sample preparation by supercritical fluid extraction in environmental food and polymer analysis. *Chromatographia*, 32 (1991) 527-537.
- 4503 Falb, L.N., Bridges, D.C. and Smith, A.E.: Separation of clethodim herbicide from acid and photodegradation products by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 999-1002.
- 4504 Gratzfeld-Huesgen, A. and Schuster, R.: (Determination of phenoxycarboxylic herbicides and bentazone by HPLC with diode array detection). *Schweiz. Lab.-Z.*, 48 (1991) 247-250; *C.A.*, 116 (1992) 45910b.
- 4505 Hanks, A.R.: Liquid chromatographic method for determination of cyanazine in technical products and pesticide formulations: CIPAC collaborative study. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 66-68.
- 4506 Pepperman, A.B. and Kuan, J.W.: HPLC and GC/MS of metribuzin and its degradation products from alginate-linseed oil controlled release formulations. *J. Liq. Chromatogr.*, 15 (1992) 819-834.
- 4507 Shalaby, L.M., Bramble, F.Q., Jr. and Lee, P.W.: Application of thermospray LC/MS for residue analysis of sulfonyleurea herbicides and their degradation products. *J. Agric. Food Chem.*, 40 (1992) 513-517.

For additional information see *C.A.*:
116 (1992) 53488k.

See also 3461, 3583, 4494.

29f. Fungicides

- 4508 Bushway, R.J., Kugabalasooriar, J., Perkins, L.B., Harrison, R.O., Young, B.E.S. and Ferguson, B.S.: Determination of methyl 2-benzimidazolecarbamate in blueberries by competitive inhibitor enzyme immunoassay. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 323-327.
- 4509 Gomyo, T., Morishima, Y., Tachibana, T., Kobayashi, S. and Ono, S.: Analytical method for the residues of triflumizole fungicide and its main metabolite in crops by high-performance liquid and gas chromatography. *Anal. Sci.*, 7 (1991) 749-756; *C.A.*, 116 (1992) 53487j.

See also 4665.

29g. Other types of pesticides and various agrochemicals

- 4510 Kutter, J.P. and Class, T.J.: Diastereoselective and enantioselective chromatography of the pyrethroid insecticides allethrin and cypermethrin. *Chromatographia*, 33 (1992) 103-112.

- 4511 Smallwood, A.W., DeBord, K.E. and Lowry, L.K.: N,N'-Diethyl-*m*-toluamide (*m*-DET): analysis of an insect repellent in human urine and serum by high-performance liquid chromatography. *J. Anal. Toxicol.*, 16 (1992) 10-13; C.A., 116 (1992) 122720u.
- 4512 Van Zijtveeld, J., Pouwelse, A.V. and Groen, C.P.: Application of an internal surface reversed-phase column for the automated determination of flucycloxuron residues. *J. Chromatogr.*, 600 (1992) 211-218.

For additional information see C.A.:

116 (1992) 1828b, 17050c, 40295v, 78571v.

30. SYNTHETIC AND NATURAL DYES

30a. Synthetic dyes

- 4513 Newton, G.L., Aguilera, J.A., Fahey, R.C., Ward, J.F., Radkowsky, A.E. and Kosower, E.M.: Para-sulfobenzoyloxybromobimane: a new membrane-impermeable reagent useful for the analysis of thiols and their export from cells. *Anal. Biochem.*, 201 (1992) 30-42.

For additional information see C.A.:

116 (1992) 53076z.

See also 4396.

30b. Chloroplast and other natural pigments

- 4514 Brockmann, H. and Rische, N.: Preparative chromatography [of chlorophylls]. In: Scheer, H. (Editor), *Chlorophylls*, Boca Raton, CRC, 1991, pp. 103-114; C.A., 116 (1992) 54808b.
- 4515 Datzberger, K., Steiner, I., Washvetil, J. and Kroyer, G.: Methods for the fast analysis of anthocyanins and antocyanidins in red wine. *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 462-464; C.A., 116 (1992) 104612f.
- 4516 Fernandez-Lopez, J.A., Almela, L. and Lopez-Roca, J.M.: Determination of carotenoids, chlorophylls and pheophytins by normal-phase high-performance liquid chromatography. *Photosynthetica*, 25 (1991) 81-86; C.A., 116 (1992) 37312k.
- 4517 Gill, M., Qureshi, A. and Watling, R.: Pigments of fungi, part 27. New xanthorin derivatives from a fungus of the genus *Dermocybe*. *J. Natural Prod.*, 55 (1992) 517-520.
- 4518 Khachik, F., Goli, M.B., Beecher, G.R., Holden, J., Lusby, W.R., Tenorio, M.D. and Barrera, M.R.: Effect of food preparation on qualitative and quantitative distribution of major carotenoid constituents of tomatoes and several green vegetables. *J. Agric. Food Chem.*, 40 (1992) 390-398.
- 4519 Khalyfa, A., Kermasha, S. and Alli, I.: Extraction, purification and characterization of chlorophylls from spinach leaves. *J. Agric. Food Chem.*, 40 (1992) 215-220.
- 4520 Martinelli, E.M., Scilingo, A. and Pifferi, G.: Computer-aided evaluation of the relative stability of *Vaccinium myrtillus* anthocyanins. *Anal. Chim. Acta*, 259 (1992) 109-113.
- 4521 Roy, A.K., Banerjee, A.K. and Chakrabarti, J.: Separation of carotenoids, chlorophylls, and related pigments. *J. Inst. Chem. (India)*, 63 (1991) 79; C.A., 116 (1992) 127106h.

- 4522 Serani, A. and Piacenti, D.: Kinetics of pheophytin-photodecomposition in extra virgin olive oil. *J. Am. Oil Chem. Soc.*, 69 (1992) 469-470.
- 4523 Shioi, Y.: Analytical chromatography of chlorophylls. In: Scheer, H. (Editor), *Chlorophylls*, Boca Raton, CRC, 1991, pp. 59-88; C.A., 116 (1992) 54807a.
- 4524 Taylor, S.J. and McDowell, I.J.: Rapid classification by HPLC of plant pigments in fresh tea (*Camellia sinensis* L.) leaf. *J. Sci. Food Agric.*, 57 (1991) 287-291; C.A., 116 (1992) 82328p.

For additional information see C.A.:

116 (1992) 2994q.

See also 4418, 4421, 4728.

31. PLASTICS AND THEIR INTERMEDIATES

- 4525 Balke, S.T.: Characterization of complex polymers by size exclusion chromatography and high-performance liquid chromatography. *Chem. Anal. (N.Y.)*, 113 (1991) 1-66; C.A., 116 (1992) 42286s - a review with 133 refs.
- 4526 Bruessau, R.J., Goetz, N., Maechtle, W. and Stoelting, J.: Characterization of polyacrylate samples. *Tenside, Surfactants, Deterg.*, 28 (1991) 396-406; C.A., 116 (1992) 62076b.
- 4527 Cotts, P.M. and Siemens, R.: Characterization of random copolymers by size-exclusion chromatography with a light scattering detector. *Polymer*, 32 (1991) 3052-3056; C.A., 116 (1992) 42361n.
- 4528 Fedorov, E.K.: (Gradient reversed-phase high-performance liquid chromatography and size-exclusion chromatography studies of the statistical composition distribution of vinylpyridine-N-vinylpyrrolidone copolymers). *Zh. Fiz. Khim.*, 65 (1991) 2739-2744; C.A., 116 (1992) 60403g.
- 4529 Filippov, A.M., Lozovskaya, V.S. and Bochkarev, V.N.: Chromatographic method for determining siloxane monomers in arylalkyl siloxane polymers. U.S.S.R. SU 1,642,369 (Cl. G01N30/00), 15 Apr. 1991, Appl. 4,675,086, 06 Apr. 1989; C.A., 116 (1992) 84721k.
- 4530 Meira, G.R.: Data reduction in size exclusion chromatography of polymers. *Chem. Anal. (N.Y.)*, 113 (1991) 67-101; C.A., 116 (1992) 42287t - a review with 69 refs.
- 4531 Mikhail'skii, A.I., Tetenok, N.A., Miroshnikova, I.I. and Kurapova, T.Yu.: (Trifunctional methyl phenyl siloxane oligomer analysis in size-exclusion and adsorption regimes of high-performance liquid chromatography). *Zh. Fiz. Khim.*, 65 (1991) 2745-2749; C.A., 116 (1992) 84315f.
- 4532 Paseiro Losada, P., Lopez Mahia, P., Vazquez Oderiz, L., Simal Lozano, J. and Gandara, J.S.: Sensitive and rapid reversed-phase liquid chromatography-fluorescence method for determining bisphenol A diglycidyl ether in aqueous-based food stimulants. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 925-928.
- 4533 Piskareva, E.P. and Kartasheva, G.G.: (Combined gel-permeation chromatography and light scattering method for estimation of the degree of polymer branching). *Zh. Fiz. Khim.*, 65 (1991) 2763-2767; C.A., 116 (1992) 42360m.

- 4534 Podosenova, N.G. and Lebedev, Yu.Ya.: (Validity of using size exclusion chromatography in analysis of polymer weight distributions). *Zh. Fiz. Khim.*, 65 (1991) 2729-2735; C.A., 116 (1992) 60401e.
- 4535 Podzimek, S.: A review of the application of HPLC and GPC to the analysis of synthetic resins. *Chromatographia*, 33 (1992) 377-384 - a review with 60 refs.
- 4536 Radic, D., Gargallo, L., Leon, A. and Horta, A.: Size-exclusion chromatography of poly(n-alkyl itaconates): nonexclusive effects. *J. Macromol. Sci., Phys.*, 31 (1992) 215-225; C.A., 116 (1992) 42362p.
- 4537 Rudin, A.: Measurement of long-chain branch frequency in synthetic polymers. *Chem. Anal. (N.Y.)*, 113 (1991) 103-112; C.A., 116 (1992) 42288u - a review with 37 refs.
- 4538 Thoma, K. and Schlütermann, B.: Beziehungen zwischen Herstellungsparametern und pharmazeutisch-technologischen Anforderungen an biodegradierbare Mikropartikeln. 1. Mitteilung: Polymeranalytische Untersuchungen biodegradierbarer Polyester für die Herstellung injizierbarer Mikropartikeln. *Pharmazie*, 47 (1992) 30-34.
- 4539 Wang, A., Yan, J. and Xu, R.: The determination of the pore structural parameters of isoporous resins by inverse gel-permeation chromatography. *J. Appl. Polym. Sci.*, 44 (1992) 959-964; C.A., 116 (1992) 84861f.
- 4540 Yagoubi, N., Mur, C., Baillet, A. and Baylocq-Ferrier, D.: (Simultaneous determination of the molecular weight of plastic polymers and their additives: application to poly(vinyl chloride) and polystyrene materials). *Analisis*, 19 (1991) 252-256; C.A., 116 (1992) 84576s.

For additional information see C.A.:

116 (1992) 3004d, 60397h, 60398j, 60405j.

See also 3460, 3549, 3618, 4030.

32. DRUG ANALYSIS

See 3444.

32a. Drug analysis, general techniques

- 4541 Aboul-Enein, H.Y.: Application of cellulose-based chiral stationary phases in resolution of drug racemates. A mini review. *Anal. Lett.*, 25 (1992) 321-328.
- 4542 Bjorge, S.M. and Woolf, T.F.: Applications of liquid chromatography-photodiode-array detection-mass spectrometry in drug disposition studies. *LC-GC*, 9 (1991) 780-786; C.A., 116 (1992) 75570h.
- 4543 Caddy, B.: The use of high performance liquid chromatography for the detection and quantitation of abused drugs. *Anal. Drugs Abuse*, (1991) 121-173; C.A., 116 (1992) 77853b.
- 4544 Chi, S.C. and Jun, H.W.: Validation process of HPLC method for drugs in biological samples. *Yakche Hakhoechi*, 21 (1991) 179-188; C.A., 116 (1992) 120289m.
- 4545 Elder, R.C., Jones, W.B. and Tepperman, K.: Element-specific detection of metalloids and their metabolites. High-performance liquid chromatography-inductively coupled plasma mass spectrometry. *ACS Symp. Ser.*, 479 (1992) 309-325; C.A., 116 (1992) 75593t.

- 4546 Gawdzik, B.: Retention of basic drugs on porous polymers in high-performance liquid chromatography. *J. Chromatogr.*, 600 (1992) 115-121.
- 4547 Grdinic, V., Jaksevac-Miksa, M. and Briski, D.: (Computer-aided pharmaceutical quality control. IV. HPLC procedure). *Farm. Glas.*, 47 (1991) 279-285; C.A., 116 (1992) 46386x.
- 4548 Gupta, R.N.: Drug level monitoring: antidepressants. *J. Chromatogr.*, 576 (1992) 183-211 - a review with 101 refs.
- 4549 Haginaka, J.: (Direct serum injection assays of drugs with restricted access media by liquid chromatography). *Dojin News*, 58 (1991) 3-9; C.A., 116 (1992) 98764p - a review with 30 refs.
- 4550 Ohtsuki, A., Hasegawa, H., Takeda, H. and Oguchi, K.: High-performance liquid chromatography with multiple coulometric detector for analysis of active substance dynamics in central noradrenergic, dopaminergic and serotonergic nervous systems. *Showa Univ. J. Med. Sci.*, 3 (1991) 53-56; C.A., 116 (1992) 76483u.
- 4551 Serdan, A.A., Bogoslovskii, S.Yu. and Nesterenko, P.N.: (Retention dependence of some drugs on an amphiphilic sorbent and eluent pH and ionic strength). *Zh. Fiz. Khim.*, 65 (1991) 2638-2643; C.A., 116 (1992) 15233r.
- 4552 Van Bakergem, E., van der Hoeven, R.A.M., Niessen, W.M.A., Tjaden, U.R., van der Greef, J., Poon, G.K. and McCague, R.: On-line continuous-flow dialysis thermospray tandem mass spectrometry for quantitative screening of drugs in plasma: roletimide. *J. Chromatogr.*, 598 (1992) 189-194.

For additional information see C.A.:

116 (1992) 113636u, 113677h, 113678j.

See also 3484, 3532, 3587, 4368, 4632.

32b. Antirheumatics and antiinflammatory drugs

- 4553 Bendele, A.M., Ruterbories, K.J., Spaethe, S.M., Benslay, D.N., Lindstrom, T.D., Lee, S.J. and Naismith, R.W.: Correlation of anti-inflammatory activity with peak tissue rather than peak plasma levels of BF389. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1194-1198.
- 4554 Carlucci, G., Mazzeo, P., Palumbo, G.: Determination of tenoxicam in human plasma using solid-phase extraction and high-performance liquid chromatography with ultraviolet detection. *J. Liq. Chromatogr.*, 15 (1992) 683-695.
- 4555 Fu, C.J., Melethil, S. and Mason, D.: The pharmacokinetics of aspirin in rats and the effect of buffer. *J. Pharmacokin. Biopharm.*, 19 (1991) 157-173.
- 4556 Hochhaus, G., Derendorf, H., Möllmann, H. and Barth, J.: A selective LC/RIA for dexamethasone and its prodrug dexamethasone-21-isonicotinate in biological fluids. *J. Pharm. Biomed. Anal.*, 9 (1991) 761-767.
- 4557 Hopkins, N.K., Wagner, C.M., Brisson, J. and Addison, T.E.: Validation of the simultaneous determination of methylprednisolone and methylprednisolone acetate in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 87-93.
- 4558 Jamali, F., Mehvar, R., Russell, A.S., Sattari, S., Yakimets, W.W. and Koo, J.: Human pharmacokinetics of ibuprofen enantiomers following different doses and formulations: intestinal chiral inversion. *J. Pharm. Sci.*, 81 (1992) 221-225.

- 4559 Kubo, H., Umiguchi, Y. and Kinoshita, T.: Fluorometric determination of indomethacin in serum by high performance liquid chromatography with in-line alkaline hydrolysis. *Chromatographia*, 33 (1992) 321-324.
- 4560 Milligan, P.A.: Determination of piroxicam and its major metabolites in the plasma, urine and bile of humans by high-performance liquid chromatography. *J. Chromatogr.*, 576 (1992) 121-128.
- 4561 Moncrieff, J.: Extractionless determination of diclofenac sodium in serum using reversed-phase high-performance liquid chromatography with fluorimetric detection. *J. Chromatogr.*, 577 (1992) 185-189.
- 4562 Moreau, J., Palette, C., Cordonnier, P., Naline, E., Advenier, C. and Pays, M.: Separation and identification of the 4-hydroxyantipyrine sulfoconjugate. *J. Chromatogr.*, 576 (1992) 103-109.
- 4563 Nayak, V.G., Bhat, V.R., Purandare, S.M., Dikshit, P.M., Dhupal, S.N. and Gaitonde, C.D.: Rapid liquid chromatographic determination of paracetamol and diclofenac sodium in a combined pharmaceutical dosage. *Drug Dev. Ind. Pharm.*, 18 (1992) 369-374; *C.A.*, 116 (1992) 113662z.
- 4564 Nguyen Hung, Dixit, V. and Dixit, V.M.: Solid phase extraction and HPLC analysis of nonsteroidal anti-inflammatory drugs. *Am. Clin. Lab.*, 10 (1991) 14-16; *C.A.*, 116 (1992) 98814e.
- 4565 Wong, C.-Y., Yeh, M.-K. and Wang, D.-P.: High-performance liquid chromatographic determination of ketoprofen in pharmaceutical dosage forms and plasma. *J. Liq. Chromatogr.*, 15 (1992) 1215-1225.
- For additional information see *C.A.*:
116 (1992) 50756k.
- See also 3862, 4647, 4671.
- 32c. *Autonomic and cardiovascular drugs*
- 4566 Armstrong, D.W., Chen, S., Chang, C. and Chang, S.: A new approach for the direct resolution of racemic beta adrenergic blocking agents by HPLC. *J. Liq. Chromatogr.*, 15 (1992) 545-556.
- 4567 Azcona, T., Martin-Gonzalez, A., Zamorano, P., Pascual, C., Grau, C. and Garcia de Mirasierra, M.: New methods for the assay of 5-isosorbide mononitrate and its validation. *J. Pharm. Biomed. Anal.*, 9 (1991) 725-729.
- 4568 Carretero, I., Maldonado, M., Laserna, J.J., Bonet, E. and Ramos Ramos, G.: Detection of banned drugs in sport by micellar liquid chromatography. *Anal. Chim. Acta*, 259 (1992) 203-210.
- 4569 Chapman, C.B., Courage, P. and Huntington, P.J.: Detection of reserpine in horses by high-performance liquid chromatography. *Aust. Vet. J.*, 68 (1991) 296-298; *C.A.*, 116 (1992) 50730x.
- 4570 Chen, T.-M., Abdelhameed, M.H. and Chiou, W.L.: Erythrocytes as a total barrier for renal excretion of hydrochlorothiazide: slow influx and efflux across erythrocyte membranes. *J. Pharm. Sci.*, 81 (1992) 212-218.
- 4571 Desai, S.D. and Blanchard, J.: A simplified and rapid high-performance liquid chromatographic assay for pilocarpine hydrochloride. *J. Chromatogr. Sci.*, 30 (1992) 149-152.
- 4572 Dyas, A.M., Robinson, M.L. and Fell, A.F.: The desing of chiral separations for β -blocker drugs on Pirkle high-performance liquid chromatography phases using achiral derivatization. In: Stevenson, D. and Wilson, I.D. (Editors), *Recent Adv. Chiral Sep.*, (Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.), 2nd 1989, Plenum, New York, 1990, pp. 31-37; *C.A.*, 116 (1992) 46419k.
- 4573 Flinois, J.-P., Chabin, M., Dufour, A., Egros, F., de Waziers, I., Mas-Chamberlin, C. and Beaune, P.H.: Metabolism rate of oxodipine in rats and humans: comparison of *in vivo* and *in vitro* data. *J. Pharmacol. Exp. Ther.*, 261 (1992) 381-386.
- 4574 Gomita, Y., Eto, K., Furuno, K., Mimaki, Y. and Araki, Y.: Influences of exposure to cigarette smoke on concentration of nicotrandil in plasma of rats. *J. Pharm. Sci.*, 81 (1992) 228-231.
- 4575 Goubier, C., Girard, I. and Ferry, S.: High-performance liquid chromatographic assay of debrisoquine and its 4-hydroxy metabolite in human urine. *Chromatographia*, 32 (1991) 523-526.
- 4576 Haginaka, J., Seyama, C., Yasuda, H. and Takahashi, K.: Retention, enantioselectivity and enantiomeric elution order of propranolol and its ester derivatives on an α_1 -acid glycoprotein-bonded column. *Chromatographia*, 33 (1992) 127-132.
- 4577 Haginaka, J., Seyama, C., Yasuda, H. and Takahashi, K.: Investigation of enantioselectivity and enantiomeric elution order of propranolol and its ester derivatives on an ovomucoid-bonded column. *J. Chromatogr.*, 598 (1992) 67-72.
- 4578 Herraez-Hernandez, R., Campins-Falco, P. and Sevillano-Cabeza, A.: Estimation of diuretic drugs in biological fluids by HPLC. *Chromatographia*, 33 (1992) 177-185 - a review with 85 refs.
- 4579 Järvinen, T., Suhonen, P., Naumanen, H., Urtti, A. and Peura, P.: Determination of physicochemical properties, stability in aqueous solutions and serum hydrolysis of pilocarpic acid diesters. *J. Pharm. Biomed. Anal.*, 9 (1991) 737-745.
- 4580 Jensen, B.H. and Larsen, C.: Quantitation of diltiazem in human plasma by HPLC using an end-capped reversed-phase column. *Acta Pharm. Nord.*, 3 (1991) 179-180; *C.A.*, 116 (1992) 50719a.
- 4581 Kamiyama, T., Umino, T., Nakayama, N., Itezo, Y., Satoh, T., Yamashita, Y., Yamaguchi, A. and Yokose, K.: Ro 09-1679, a novel thrombin inhibitor. *J. Antibiot.*, 45 (1992) 424-427.
- 4582 Kingston, G.A. and Stevenson, D.: An evaluation of some chiral stationary phases for the separation of β -blocker drugs. In: Stevenson, D. and Wilson, I.D. (Editors), *Recent Adv. Chiral Sep.*, (Proc. Chromatogr. Soc. Int. Symp. Chiral Sep.), 2nd 1989, Plenum, New York, 1990, pp. 67-76; *C.A.*, 115 (1991) 263601x.
- 4583 Kroemer, H.K., Echizen, H., Heidemann, H. and Eichelbaum, M.: Predictability of the *in vivo* metabolism of verapamil from *in vitro* data: contribution of individual metabolic pathways and stereoselective aspects. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1052-1057.
- 4584 Köppel, C., Wagemann, A., Hansen, G.R. and Müller, C.: Monitoring of ajmaline in plasma with high-performance liquid chromatography. *J. Chromatogr.*, 575 (1992) 87-91.
- 4585 Leloux, M.S.: Rapid chiral separation of metoprolol in plasma - application to the pharmacokinetics/pharmacodynamics of metoprolol enantiomers in the conscious goat. *Biomed. Chromatogr.*, 6 (1992) 99-105.
- 4586 Maiza, A. and Daley-Yates, P.T.: Prediction of the renal clearance of cimetidine using endogenous N-1-methylnicotinamide. *J. Pharmacokin. Biopharm.*, 19 (1991) 175-188.

- 4587 Mancinelli, A., Pace, S., Marzo, A., Martelli, E.A. and Passetti, G.: Determination of pentoxifylline and its metabolites in human plasma by high-performance liquid chromatography with solid-phase extraction. *J. Chromatogr.*, 575 (1992) 101-107.
- 4588 Mariot, R., Zangirolami, L., Bellato, P., Chen, S., Pieraccini, G. and Moneti, G.: Determination of the coumarin derivative cloridromene acid in rabbit plasma and platelets. *J. Chromatogr.*, 576 (1992) 143-148.
- 4589 Miller, R.B. and Guertin, Y.: High-performance liquid chromatographic assay for the derivatized enantiomers of atenolol in whole blood. *J. Liq. Chromatogr.*, 15 (1992) 1289-1302.
- 4590 Nakano, M. and Kawahara, S.: Stereoselective renal tubular secretion of a new uricosuric diuretic, 6,7-dichloro-5-(N,N-dimethylsulfamoyl)-2,3-dihydro-2-benzofurancarboxylic acid (S-8666), in cynomolgus monkeys. *Drug Metab. Disp.*, 20 (1992) 179-185.
- 4591 Neugebauer, G. and Neubert, P.: Metabolism of carvedilol in man. *Eur. J. Drug Metab.*, 16 (1991) 257-260.
- 4592 Obach, R.S., Spink, D.C., Chen, N. and Kaminsky, L.S.: Azido-warfarin photoaffinity probes of purified rat liver cytochrome P4501A1. *Arch. Biochem. Biophys.*, 294 (1992) 215-222.
- 4593 Ohkubo, T., Uno, T. and Sugawara, K.: Enantiomer separation of dihydropyridine derivatives by liquid chromatography with chiral stationary phase. *Chromatographia*, 33 (1992) 287-288.
- 4594 Ramis, J., Mis, R. and Forn, J.: Pharmacokinetics of triflusal and its main metabolite in rats and dogs. *Eur. J. Drug Metab.*, 16 (1991) 261-268.
- 4595 Sakata, T., Matsuura, A. and Kitagawa, T.: Determination of trichlormethiazide in human plasma and urine by high-performance liquid chromatography. *Chromatographia*, 33 (1992) 339-343.
- 4596 Sallustio, B.C., Morris, R.G. and Horowitz, J.D.: High-performance liquid chromatographic determination of sotalol in plasma. I. Application to the disposition of sotalol enantiomers in humans. *J. Chromatogr.*, 576 (1992) 321-327.
- 4597 Schaefer, W.H.: Formation of a carbamoyl glucuronide conjugate of carvedilol *in vitro* using dog and rat liver microsomes. *Drug Metab. Disp.*, 20 (1992) 130-133.
- 4598 Singh, S., Epemolu, R.O., Dobbin, P.S., Tilbrook, G.S., Ellis, B.L., Damani, L.A. and Hider, R.C.: Urinary metabolic profiles in human and rat of 1,2-dimethyl- and 1,2-diethyl-substituted 3-hydroxypyridin-4-ones. *Drug Metab. Disp.*, 20 (1992) 256-261.
- 4599 Spahn-Langguth, H., Podkowik, B., Stahl, E., Martin, E. and Mutschler, E.: Improved enantiospecific RP-HPLC assays for propranolol in plasma and urine with pronethalol as internal standard. *J. Anal. Toxicol.*, 15 (1991) 327-331; *C.A.*, 116 (1992) 98821e.
- 4600 Spurlock, C.H.: Cl-906 and Cl-925 cyclization in rodent chow using liquid chromatography for detection and assay. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 34-38.
- 4601 Stearns, R.A., Miller, R.R., Doss, G.A., Chakravarty, P.K., Rosegay, A., Gatto, G.J. and Chiu, S.-H.L.: The metabolism of DuP 753, a nonpeptide angiotensin II receptor antagonist, by rat, monkey, and human liver slices. *Drug Metab. Disp.*, 20 (1992) 281-287.
- 4602 Terhaag, B., Richter, K. and Feller, K.: Untersuchungen zum pharmakokinetischen Verhalten von AWD 26-06 am Menschen nach ein- und mehrmaliger Gabe. *Pharmazie*, 47 (1992) 43-45.
- 4603 Théoret, Y. and Varin, F.: Simple, rapid and selective method using high-performance liquid chromatography for the determination of bretylium in plasma. *J. Chromatogr.*, 575 (1992) 162-166.
- 4604 Tipnis, H.P. and Modak, M.M.: Bioequivalence study of salbutamol formulations on healthy human volunteers, using HPLC - electrochemical detector. Part II. *Indian Drugs*, 29 (1991) 110-113; *C.A.*, 116 (1992) 50782r.
- 4605 Ueno, K., Fujitomo, H., Nishino, I. and Umeda, T.: Simultaneous determination of a new dihydropyridine column blocker and its pyridine metabolite in dog plasma by column switching high-performance liquid chromatography with electrochemical and ultraviolet detection. *Anal. Sci.*, 7 (1991) 727-731; *C.A.*, 116 (1992) 67t.
- 4606 Yamada, Y., Endo, M., Kohno, M., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 6th Communication: Interspecies comparison of pharmacokinetics and excretion of imidapril metabolites in rats, dogs, and monkeys. *Arzneim.-Forsch.*, 42 (1992) 499-506.
- 4607 Yamada, Y., Endo, M., Kohno, M., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 2nd Communication: Tissue distribution and whole-body autoradiography of imidapril in rats. *Arzneim.-Forsch.*, 42 (1992) 466-474.
- 4608 Yamada, Y., Endo, M., Kohno, M., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 1st Communication: Absorption, pharmacokinetics, and excretion in rats and dogs. *Arzneim.-Forsch.*, 42 (1992) 457-465.
- 4609 Yamada, Y., Endo, M., Kohno, M., Suzuki, T., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 3rd Communication: Tissue accumulation after consecutive oral administration of [N-methyl-¹⁴C]-imidapril in rats. *Arzneim.-Forsch.*, 42 (1992) 475-482.
- 4610 Yamada, Y., Ohashi, R., Sugawara, Y., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 5th Communication: Isolation and identification of metabolites of imidapril in rats, dogs, and monkeys. *Arzneim.-Forsch.*, 42 (1992) 490-498.
- 4611 Yamada, Y., Otsuka, M. and Takaiti, O.: Metabolic fate of the new angiotensin-converting enzyme inhibitor imidapril in animals. 7th Communication: *In vitro* metabolism. *Arzneim.-Forsch.*, 42 (1992) 507-512.
- 4612 Yamaguchi, M., Yamashita, K., Aoki, I., Tabata, T., Hirai, S.-I. and Yashiki, Y.: Determination of manidipine enantiomers in human serum using chiral chromatography and column-switching liquid chromatography. *J. Chromatogr.*, 575 (1992) 123-129.
- 4613 Yeung, P.K.F., Mosher, S.J., Klassen, G.A. and McGilveray, I.J.: Stability of diltiazem and its metabolites in plasma during storage. *Ther. Drug Monit.*, 13 (1991) 369-374; *C.A.*, 116 (1992) 50707v.
- 4614 Zoest, A.R., Hung, C.T. and Wanwimolruk, S.: Diltiazem: a sensitive HPLC assay and application to pharmacokinetic study. *J. Liq. Chromatogr.*, 15 (1992) 1277-1287.

For additional information see *C.A.*:

116 (1992) 75569q.

See also 3643, 3974, 4374, 4544.

32d. Central nervous system drugs

- 4615 Abounassif, M.A., Abdel-Moety, E.M. and Gad-Kariem, R.A.: HPLC-quantification of diethylamine salicylate and methyl nicotinate in ointments. *J. Liq. Chromatogr.*, 15 (1992) 625-636.
- 4616 Bargo, E.S.: Liquid chromatographic determination of flurazepam hydrochloride in bulk drug and dosage forms: collaborative study. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 240-244.
- 4617 Betto, P., Meneguz, A., Ricciarello, G. and Pichini, S.: Simultaneous high-performance liquid chromatographic analysis of buspirone and its metabolite 1-(2-pyrimidinyl)-piperazine in plasma using electrochemical detection. *J. Chromatogr.*, 575 (1992) 117-121.
- 4618 Boukhabza, A., Lugnier, A.A.J., Kintz, P. and Mangin, P.: Simultaneous HPLC analysis of the hypnotic benzodiazepines nitrazepam, estazolam, flunitrazepam, and triazolam in plasma. *J. Anal. Toxicol.*, 15 (1991) 319-322; *C.A.*, 116 (1992) 98820d.
- 4619 Boyer, C.S. and Petersen, D.R.: Enzymatic basis for the transesterification of cocaine in the presence of ethanol: evidence for the participation of microsomal carboxylesterases. *J. Pharmacol. Exp. Ther.*, 260 (1992) 939-946.
- 4620 Chetty, M. and Miller, R.: Effect of storage on the plasma concentration of chlorpromazine and six of its metabolites. *Ther. Drug Monit.*, 13 (1991) 350-355; *C.A.*, 116 (1992) 50706u.
- 4621 Choma, I., Dawidowicz, A.L. and Lodkowski, R.: High-performance liquid chromatography of benzodiazepines using sorbents with thermally immobilized Carbowax 20M. *J. Chromatogr.*, 600 (1992) 109-113.
- 4622 Delhotel Landes, B., Miscoria, G. and Flouvat, B.: Determination of lansoprazole and its metabolites in plasma by high-performance liquid chromatography using a loop column. *J. Chromatogr.*, 577 (1992) 117-122.
- 4623 El Walily, A.F.M.: Determination of salbutamol sulphate in its pharmaceutical formulations using derivative UV spectrophotometry and high-performance liquid chromatography. *Bull. Fac. Pharm. (Cairo Univ.)*, 29 (1991) 13-17; *C.A.*, 116 (1992) 67334u.
- 4624 Fischer, V., Vogels, B., Maurer, G. and Tynes, R.E.: The antipsychotic clozapine is metabolized by the polymorphic human microsomal and recombinant cytochrome P450 2D6. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1355-1360.
- 4625 Haginaka, J. and Seyama, C.: Determination of enantiomers of 1-benzyl-4-[(5,6-dimethoxy-1-indanon)-2-yl]methylpiperidine hydrochloride (E2020), a centrally acting acetylcholine esterase inhibitor, in plasma by liquid chromatography with fluorometric detection. *J. Chromatogr.*, 577 (1992) 95-102.
- 4626 Hsieh, C.-Y. and Huang, J.-d.: Two-dimensional high-performance liquid chromatographic method to assay *p*-hydroxyphenylphenylhydantoin enantiomers in biological fluids and stereoselectivity of enzyme induction in phenytoin metabolism. *J. Chromatogr.*, 575 (1992) 109-115.
- 4627 Iqbal, N., Ahmad, B., Janbaz, K.H., Ijaz, A.S. and Raniha, N.M.: Reverse-phase high-performance liquid chromatographic method for the determination of paracetamol in human serum. *Sci. Int. (Lahore)*, 3 (1991) 221-222; *C.A.*, 116 (1992) 120291f.
- 4628 Jones, R.D. and Bowen, J.M.: Determination of metoclopramide in the serum and urine of cattle. *Vet. Hum. Toxicol.*, 33 (1991) 551-553; *C.A.*, 116 (1992) 75583q.
- 4629 Kajbaf, M., Jahanshahi, M., Pattichis, K., Gorrod, J.W. and Naylor, S.: Rapid and efficient purification of cimetropium bromide and mifentidine drug metabolite mixtures derived from microsomal incubates for analysis by mass spectrometry. *J. Chromatogr.*, 575 (1992) 75-85.
- 4630 Kastrissios, H., Hung, M.-F. and Triggs, E.J.: High-performance liquid chromatographic method for the quantitation of bupivacaine, 2,6-pipecoloxylidide and 4'-hydroxybupivacaine in plasma and urine. *J. Chromatogr.*, 577 (1992) 103-107.
- 4631 Laipanov, A.Kh. and Slanskii, V.E.: (Chromatographic separation of local anesthetics with toxicological characteristics). *Zh. Fiz. Khim.*, 65 (1991) 3359-3363; *C.A.*, 116 (1992) 91545j.
- 4632 Leung, P.Y. and Tsao, C.S.: Preparation of an optimum mobile phase for the simultaneous determination of neurochemicals in mouse brain tissues by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 576 (1992) 245-254.
- 4633 Liu, H., Forman, L.J., Montoya, J., Eggers, C., Barham, C. and Delgado, M.: Determination of valproic acid by high-performance liquid chromatography with photodiode-array and fluorescence detection. *J. Chromatogr.*, 576 (1992) 163-169.
- 4634 Lucarelli, C., Villa, P., Lombaradi, E., Prandini, P. and Brega, A.: HPLC method for the simultaneous analysis of valproic acid and other common anticonvulsant drugs in human plasma or serum. *Chromatographia*, 33 (1992) 37-40.
- 4635 Luo, S., Zhang, X., Cai, H. and Pan, S.: (The determination of serum concentration of phenytoin in intractable epileptics by HPLC). *Zhongguo Yiyuan Yaoxue Zazhi*, 11 (1991) 346-348; *C.A.*, 116 (1992) 98813d.
- 4636 Lurie, I.S., Cooper, D.A. and Klein, R.F.X.: High-performance liquid chromatographic analysis of benzodiazepines using diode array, electrochemical and thermospray mass spectrometric detection. *J. Chromatogr.*, 598 (1992) 59-66.
- 4637 Magdalou, J., Herber, R., Bidault, R. and Siest, G.: *In vitro* N-glucuronidation of a novel antiepileptic drug, lamotrigine, by human liver microsomes. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1166-1173.
- 4638 Millipore Corp.: (Determination of tricyclic antidepressants in blood serum by means of HPLC). *Bioforum*, 14 (1991) 257; *C.A.*, 116 (1992) 33816n.
- 4639 Misztal, G. and Przyborowski, L.: HPLC-Methode zur Bestimmung von Pimozid in Tabletten. *Pharmazie*, 47 (1992) 232.
- 4640 Nagai, T. and Kamiyama, S.: Simultaneous HPLC analysis of optical isomers of methamphetamine and its metabolites, and stereoselective metabolism of racemic methamphetamine in rat urine. *J. Anal. Toxicol.*, 15 (1991) 299-304; *C.A.*, 116 (1992) 120288k.
- 4641 Peyton, A.L., Carpenter, R. and Rutkowski, K.: The stereospecific determination of fluoxetine and norfluoxetine enantiomers in human plasma by high-pressure liquid chromatography (HPLC) with fluorescence detection. *Pharm. Res.*, 8 (1991) 1528-1532; *C.A.*, 116 (1992) 75577r.
- 4642 Potts, B.D. and Parli, C.J.: Analysis of the enantiomers of fluoxetine and norfluoxetine in plasma and tissue using chiral derivatization and normal-phase liquid chromatography. *J. Liq. Chromatogr.*, 15 (1992) 665-681.
- 4643 Pradas, T.N.V. and Sivakumar, M.: HPLC quantification of a tricomponent psychiatric formulation containing chlorpromazine, trifluoperazine and trihexyphenidyl. *Pharmazie*, 47 (1992) 231.

- 4644 Pramara, Y., Das Gupta, V. and Bethea, C.: Quantitation of fluoxetine hydrochloride in capsules using high-performance liquid chromatography. *Drug Dev. Ind. Pharm.*, 18 (1992) 257-264; C.A., 116 (1992) 91552j.
- 4645 Sagar, K.A., Kelly, M.T. and Smyth, M.R.: Analysis of terbutaline in human plasma by high-performance liquid chromatography with electrochemical detection using a micro-electrochemical flow cell. *J. Chromatogr.*, 577 (1992) 109-116.
- 4646 Soine, W.H., Soine, P.J. and England, T.M.: Barbitol N-glucoside is not detected as a urinary excretion product of barbitol in humans. *J. Pharm. Biomed. Anal.*, 9 (1991) 747-752.
- 4647 Sweeny, D.J., Bouska, J., Machinist, J., Bell, R., Carter, G., Cepa, S. and Nellans, H.N.: Glucuronidation of zileuton (A-64077) by human hepatic microsomes. *Drug Metab. Disp.*, 20 (1992) 328-329.
- 4648 Takahara, E., Fukuoka, H., Takagi, T., Nagata, O. and Kato, H.: Simultaneous determination of a new gastrointestinal prokinetic agent (HSR-803) and its metabolites in human serum and urine by high-performance liquid chromatography using automated column-switching. *J. Chromatogr.*, 576 (1992) 174-178.
- 4649 Tracqui, A., Kintz, P., Kreissig, P. and Mangin, P.: Simple and rapid screening procedure for 27 neuroleptics using HPLC/DAD. *J. Liq. Chromatogr.*, 15 (1992) 1381-1396.
- 4650 Tsaprounis, C.K., Kajbaf, M. and Gorrod, J.W.: Simultaneous determination of carbamazepine and its major metabolites in human plasma and urine by HPLC. *J. Clin. Pharm. Ther.*, 16 (1991) 257-262; C.A., 116 (1992) 15230n.
- 4651 Wood, S.A., Rees, S.A. and Simmonds, R.J.: A sensitive high performance liquid chromatographic method for U-80,278A, a substituted aminotetralin, in rat plasma, whole blood, and brain tissue. *J. Liq. Chromatogr.*, 15 (1992) 1227-1248.
- 4652 Yang, J.T., Morris, M., Wong, K.K., Kucharczyk, N. and Sofia, R.D.: Felbamate metabolism in pediatric and adult beagle dogs. *Drug Metab. Disp.*, 20 (1992) 84-88.
- For additional information see C.A.:
116 (1992) 83t, 1851d, 15240r, 33815m, 33832q, 50709x, 50755j, 113671b.
- See also 3465, 3872, 4357, 4369, 4375, 4543, 4563, 4604, 4659.
- 32e. *Chemotherapeutics (exc. cytostatics and antibiotics)*
- 4653 Abuirjeie, M.A., Irshaid, Y.M., Al-Hadidi, H.F. and Rawashdeh, N.M.: Simultaneous high performance liquid chromatographic determination of dapson and monoacetyldapson in human plasma and urine. *J. Clin. Pharm. Ther.*, 16 (1991) 247-255; C.A., 116 (1992) 15229u.
- 4654 Alvinerie, M., Sutra, J.F. and Galtier, P.: (A high-performance liquid-chromatographic assay for two basic drugs, trimethoprim and thiabendazole, using a silanol-deactivated column). *Analisis*, 19 (1991) 244-248; C.A., 116 (1992) 98797b.
- 4655 Benakis, A., Schopfer, C., Paris, M., Plessas, C.T., Karayannakos, P.E., Dondas, L., Kotsarelis, D., Plessas, S.T. and Skalkas, G.: Pharmacokinetics of arteether in dog. *Eur. J. Drug Metab.*, 16 (1991) 325-328.
- 4656 Carignan, G., Larocque, L. and Sved, S.: Assay of oxolinic acid residues in salmon muscle by liquid chromatography with fluorescence detection: interlaboratory study. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 906-909.
- 4657 Elrod, L., Jr., Golich, T.G., Shaffer, D.I. and Shelat, B.P.: Determination of 6,7-difluoro-1-(2,4-difluorophenyl)-1,4-dihydro-4-oxo-3-quinolinecarboxylic acid and related compounds by high performance liquid chromatography. *J. Liq. Chromatogr.*, 15 (1992) 451-466.
- 4658 Gaspari, F., Taiocchi, L. and Pochobradsky, M.G.: Determination of brodimoprim and its hydroxy metabolite in human plasma, blood and urine by high-performance liquid chromatography. *J. Chromatogr.*, 577 (1992) 123-128.
- 4659 Guey, C.R. and Roulph, C.: (Identification of thermal decomposition products of dichlorvos by GC/FTIR and GC/MS). *Analisis*, 19 (1991) 359-362; C.A., 116 (1992) 78421w.
- 4660 Khazanchi, R., Walia, S. and Handa, S.K.: Simultaneous liquid chromatographic determination of fenamiphos and its metabolites in soil. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 62-65.
- 4661 Lewis, R.C., Hatfield, N.Z. and Narang, P.K.: A sensitive method for quantitation of rifabutin and its desacetyl metabolite in human biological fluids by high-performance liquid chromatography (HPLC). *Pharm. Res.*, 8 (1991) 1434-1440; C.A., 116 (1992) 33807k.
- 4662 Matusik, J.E., Leadbetter, M.G., Barnes, C.J. and Sphon, J.A.: Identification of dimetridazole, ipronidazole and their alcohol metabolites in turkey tissue by thermospray tandem mass spectrometry. *J. Agric. Food Chem.*, 40 (1992) 439-443.
- 4663 Negro, A., Alvarez-Bujidos, M.L., Ortiz, A.I., Cubría, J.C., Méndez, R. and Ordóñez, D.: Reversed-phase ion-pair high-performance liquid chromatographic determination of triclabendazole metabolites in serum and urine. *J. Chromatogr.*, 576 (1992) 135-141.
- 4664 Parks, O.W. and Kubena, L.F.: Liquid chromatographic determination of incurred nitrofurazone residues in chicken tissues. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 261-262.
- 4665 Patel, R. and Sugden, J.K.: Photodegradation of aqueous solutions of dequalinium chloride. *Pharmazie*, 47 (1992) 113-115.
- 4666 Shibl, A.M., Tawfik, A.-K.F., El-Houfy, S. and Al-Shammary, F.J.: Determination of lomefloxacin in biological fluids by high-performance liquid chromatography and a microbiological method. *J. Clin. Pharm. Ther.*, 16 (1991) 353-359; C.A., 116 (1992) 50733a.
- 4667 Takeba, K., Matsumoto, M. and Nakazawa, H.: Determination of nitroxynil in cow milk by reversed-phase high-performance liquid chromatography with dual-electrode coulometric detection. *J. Chromatogr.*, 596 (1992) 67-71.
- 4668 Talwar, N., Karajgi, J.S. and Jain, N.K.: Estimation of tinidazole in tablets and plasma by high-performance liquid chromatography. *India Drugs*, 29 (1991) 55-56; C.A., 116 (1992) 11286n.
- 4669 Tatsumi, K., Kitamura, S., Kato, M. and Hiraoka, K.: Metabolism of sodium nifurstyrenate, a veterinary antimicrobial nitrofurantoin, in animals and fish. *Drug Metab. Disp.*, 20 (1992) 226-233.
- 4670 Zimmerman, C.L., Rimmel, R.P., Ibrahim, S.S., Beers, S.A. and Vince, R.: Pharmacokinetic evaluation of (-)-6-aminocarbvir as a prodrug for (-)-carbvir in rats. *Drug Metab. Disp.*, 20 (1992) 47-51.
- See also 4481, 4483, 4704.

32f. *Cytostatics*

- 4671 Beck, O., Seideman, P., Wennberg, M. and Peterson, C.: Trace analysis of methotrexate and 7-hydroxymethotrexate in human plasma and urine by a novel high-performance liquid chromatographic method. *Ther. Drug Monit.*, 13 (1991) 528-532; C.A., 116 (1992) 50767q.
- 4672 Brandsteterova, E., Chovancova, V. and Halko, J.: Application of micro HPLC for the determination of methotrexate in clinical samples. *J. High Resolut. Chromatogr.*, 15 (1992) 49-51.
- 4673 Fleming, R.A., Evans, W.E., Arbuck, S.G. and Stewart, C.F.: Factors affecting *in vitro* protein binding of etoposide in humans. *J. Pharm. Sci.*, 81 (1992) 259-264.
- 4674 Graham, M.A., Newell, D.R., Foster, B.J., Gumbrell, L.A., Jenks, K.E. and Calvert, A.H.: Clinical pharmacokinetics of the anthrapyrazole CI-941: factors compromising the implementation of a pharmacokinetically guided dose escalation scheme. *Cancer Res.*, 52 (1992) 603-609.
- 4675 Guenther, T.M., Whalen, R. and Jevtovic-Todorovic, V.: Direct measurement of melphalan conjugation with glutathione: studies with human melanoma cells and mammalian liver. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1331-1336.
- 4676 Martino, R., Crasnier, F., Chouini-Lalanne, N., Gilard, V., Niemeyer, U., de Forni, M. and Malet-Martino, M.-C.: A new approach to the study of ifosfamide metabolism by the analysis of human body fluids with ³¹P nuclear magnetic resonance. *J. Pharmacol. Exp. Ther.*, 260 (1992) 1133-1144.
- 4677 Stiff, D.D., Schwinghammer, T.L. and Corey, S.E.: High-performance liquid chromatographic analysis of etoposide in plasma using fluorescence detection. *J. Liq. Chromatogr.*, 15 (1992) 863-873.
- 4678 Van Tellingen, O., Sips, J.H.M., Beijnen, J.H., Schornagel, J.H. and Nooyen, W.J.: Bioanalysis of the investigational anti-tumour drug 5,10-dideaza-5,6,7,8-tetrahydrofolic acid by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr.*, 576 (1992) 158-162.
- 4679 Zhang, R., Soong, S.-J., Liu, T., Barnes, S. and Diasio, R.B.: Pharmacokinetics and tissue distribution of 2-fluoro- β -alanine in rats. Potential relevance to toxicity pattern of 5-fluorouracil. *Drug Metab. Disp.*, 20 (1992) 113-119.

See also 4417, 4444, 4483, 4552, 4690.

32g. *Other drug categories*

- 4680 Andresen, A.T., Jacobsen, P.B. and Rasmussen, K.E.: Automated high-performance liquid chromatography of iopentol in human plasma and whole blood using on-line dialysis as sample preparation. *J. Chromatogr.*, 575 (1992) 93-99.
- 4681 Bazant, L., Snopek, J., Jelinek, I. and Smolkova-Keulemansova, E.: Analytical study ketotifen and some of its synthesis intermediates using cyclodextrin selectors in HPLC and isotachopheresis (ITP). In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins, 5th*, Ed. Sante, Paris, 1990, pp. 634-637; C.A., 115 (1991) 287331k.
- 4682 Centrich Escarpenter, F. and Rubio Hernandez, D.: Analysis of thyrostatics in the thyroid glands by thin layer chromatography and HPLC-UV. *An. Bromatol.*, 42 (1990) 337-344; C.A., 116 (1992) 82304c.
- 4683 Chen, I.-W., Lin, J.H. and Dorley, J.: Quantitation of a new cholecystokinin and gastrin receptor antagonist (L-365,260) in dog and rat plasma by high-performance liquid chromatography. *J. Chromatogr.*, 576 (1992) 363-367.
- 4684 Chen, T.K., Erhard, K.F., Last, T., Eggleston, D.S. and Ho, M.Y.K.: Direct high-performance liquid chromatographic separation of enantiomeric peptidoleukotriene antagonists. *J. Chromatogr.*, 596 (1992) 123-126.
- 4685 El-Gizawy, S.: Anion exchange column for chromatographic study of some sulphonylureas using β -cyclodextrin as mobile phase. *Bull. Fac. Sci., Assiut Univ.*, 20 (1991) 65-72; C.A., 116 (1992) 46439s.
- 4686 Lewis, R.C., Phillips, B.A., Baldwin, J.R., Rossi, D.T. and Narang, P.K.: A sensitive and specific procedure for quantitation of ADR-529 in biological fluids by high-performance liquid chromatography (HPLC) with column switching and amperometric detection. *Pharm. Res.*, 9 (1992) 101-108; C.A., 116 (1992) 75599z.
- 4687 Mao, L., Millington, D.S. and Schulz, H.: Formation of a free acyl adenylate during the activation of 2-propylpentanoic acid. Valproyl-AMP: a novel cellular metabolite of valproic acid. *J. Biol. Chem.*, 267 (1992) 3143-3146.
- 4688 Picerno, N.: Determination of sunscreens in cosmetics by HPLC. *Toiletries, Ed. Ital.*, 12 (1991) 67-69; C.A., 116 (1992) 66890k.
- 4689 Shimada, M., Murayama, N. and Kato, R.: Effect of repeated oral doses of a novel immunosuppressive macrolide lactone on a hepatic mixed-function oxidase system in the rat. Comparative study with cyclosporin. *Arzneim.-Forsch.*, 42 (1992) 340-344.
- 4690 Tsai, E.W., Ip, D.P. and Brooks, M.A.: Determination of alendronate in pharmaceutical dosage formulations by ion chromatography with conductivity detection. *J. Chromatogr.*, 596 (1992) 217-224.
- 4691 Usansky, J.I. and Damani, L.A.: The urinary metabolic profile of metyrapone in the rat. Identification of two novel isomeric metyrapone N-oxide metabolites. *Drug Metab. Disp.*, 20 (1992) 64-69.
- 4692 Weidolf, L., Karlsson, K.-E. and Nilsson, I.: A metabolic route of omeprazole involving conjugation with glutathione identified in the rat. *Drug Metab. Disp.*, 20 (1992) 262-267.
- 4693 Woolf, E. and Matuszewski, B.: High-performance liquid chromatographic procedure for the determination of a non-nucleoside HIV-1 reverse transcriptase inhibitor in human plasma. *J. Chromatogr.*, 577 (1992) 129-134.
- 4694 Wyss, R. and Bucheli, F.: Quantitative analysis of retinoids in biological fluids by high-performance liquid chromatography using column switching. III. Determination of the arotinoid sumerotene and its Z-isomer in human and animal plasma. *J. Chromatogr.*, 576 (1992) 111-120.

For additional information see C.A.:

116 (1992) 46394y, 91540d, 113670a.

See also 3643, 3850, 3853, 4337, 4441, 4443, 4450, 4568.

32h. *Toxicological and forensic applications*

- 4695 Browne, S.P., Tebbett, I.R., Moore, C.M., Dusick, A., Covert, R. and Yee, G.T.: Analysis of meconium for cocaine in neonates. *J. Chromatogr.*, 575 (1992) 158-161.

- 4696 Shintani, H.: Solid-phase extraction and high-performance liquid chromatographic analysis of a toxic compound from γ -irradiated polyurethane. *J. Chromatogr.*, 600 (1992) 93-97.
- 4697 Shintani, H.: Solid-phase extraction (SPE) and HPLC analysis of toxic compounds and comparison of SPE and liquid-liquid extraction. I. Analysis of 4,4'-methylenedianiline in serum. II. Analysis of the components of dental materials. *J. Liq. Chromatogr.*, 15 (1992) 1315-1335.

For additional information see C.A.:
116 (1992) 1819z, 101935c.

See also 3613, 3632, 3663, 3682, 4375, 4511, 4683.

32i. Plant extracts

- 4698 Blechschmidt, M. and Becker, H.: Ent-labdanes and furanoditerpenes from the liver wort *Jamesoniella autumnalis*. *J. Nat. Prod.*, 55 (1992) 111-121.
- 4699 Calis, I., Ersöz, T., Chulia, A.J. and Rüedi, P.: Septemfioside: a new bis-iridoid diglucoside from *Gentiana septemfida*. *J. Nat. Prod.*, 55 (1992) 385-388.
- 4700 Elujoba, A.A., Fell, A.F. and Linley, P.A.: Chromatographic and spectroscopic analysis of bound and unbound phenolic acids in *Lageneria breviflora* fruit. *J. Pharm. Biomed. Anal.*, 9 (1991) 711-715.
- 4701 Fukamiya, N., Okano, M., Miyamoto, M., Tagahara, K. and Lee, K.-H.: Antitumor agents, 127. Bruceoside, a new cytotoxic quassinoid glucoside, and related compounds from *Brucea javanica*. *J. Natural Prod.*, 55 (1992) 468-475.
- 4702 Herweck, U., Zimmerman, H. and Reichling, J.: Suitable chiral packing material for the high-performance liquid chromatographic separation of derivatives of 1'-hydroxyeugenol. *J. Chromatogr.*, 600 (1992) 312-315.
- 4703 Homma, M., Oka, K., Yamada, T., Niitsuma, T., Ihto, H. and Takahashi, N.: A strategy for discovering biologically active compounds with high probability in traditional Chinese herb remedies: an application of Saiboku-To in bronchial asthma. *Anal. Biochem.*, 202 (1992) 179-187.
- 4704 Monde, K. and Takasugi, M.: Studies on stress metabolites. XVI. High-performance liquid chromatographic analysis of cruciferous phytoalexins using complex ternary mobile phase gradients. *J. Chromatogr.*, 598 (1992) 147-152.
- 4705 Pietta, P., Gardana, C. and Mauri, P.: Application of HPLC and MECC for the detection of flavonol aglycones in plant extracts. *J. High Resolut. Chromatogr.*, 15 (1992) 136-139.
- 4706 Rey, J.-P., Levesque, J., Pousset, J.-L. and Roblot, F.: Analytical studies of isorhoeadine and rhoeagenine in petal extracts of *Papaver rhoeas* L. using high-performance liquid chromatography. *J. Chromatogr.*, 596 (1992) 276-280.
- 4707 Samara, E., Bialer, M. and Harvey, D.J.: Metabolism of cannabidiol by the rat. *Eur. J. Drug Metab.*, 16 (1991) 305-313.
- 4708 Schmidt, P.C. and Vogel, K.: Kamille. Untersuchungen zur Stabilität von Kamillenhandelspräparaten. *Dtsch. Apoth.-Ztg.*, 132 (1992) 462-468.
- 4709 Tsai, T.-H. and Chen, C.-F.: Determination of glycyrrhizin in rabbit plasma by high-performance liquid chromatography with photodiode-array ultraviolet detection and its pharmacokinetic application. *J. Chromatogr.*, 576 (1992) 170-173.
- 4710 Tsai, T.-H. and Chen, C.-F.: Identification and determination of honokiol and magnolol from *Magnolia officinalis* by high-performance liquid chromatography with photodiode-array UV detection. *J. Chromatogr.*, 598 (1992) 143-146.
- 4711 Wysokinska, H., Skrzypek, Z. and Kunert-Radek, J.: Studies on iridoids of tissue cultures of *Penstemon serrulatus*: isolation and their antiproliferative properties. *J. Nat. Prod.*, 55 (1992) 58-63.

For additional information see C.A.:

116 (1992) 46390u, 91519d, 101986v.

See also 3643, 3651, 3652, 3668, 3687.

33. CLINICO-CHEMICAL APPLICATIONS

33a. General papers and reviews

See 4205.

33b. Complex mixtures and profiling (single compounds by cross-reference only)

See 3680, 3681, 3693, 3705, 3707, 3750, 3753, 3771, 3834, 3837, 3845, 3854, 3861, 3864, 3900, 3905, 3914, 3938, 3939, 3941, 3996, 4081, 4082, 4090, 4092, 4132, 4134, 4154, 4195, 4232, 4250, 4255, 4313, 4332, 4340, 4346, 4376, 4377, 4392, 4401, 4418, 4687, 4726.

34. FOOD ANALYSIS

34a. General papers and reviews

4712 Gilbert, S.G. and Roshdy, T.H.: The use of inverse chromatography in food science research. *Dev. Food Sci.*, 24 (Flavors Off-Flavors '89) 439-452; C.A., 116 (1992) 5342m - a review with 34 refs.

4713 Marshall, M.R., Schmidt, R.H. and Walker, B.L.: Ion chromatography for the food industry. *Food Sci. Technol.*, 45 (Instrum. Methods Qual. Assur. Foods) (1991) 39-66; C.A., 116 (1992) 39810c - a review with 25 refs.

4714 Umile, C.: (Ion chromatography in the food and food supplement industries). *Lebensm.-Biotechnol.*, 8 (1991) 228-230; C.A., 116 (1992) 104562q - a review with no refs.

34b. Complex mixtures (single compounds by cross-reference only)

See 3475, 3612, 3616, 3636, 3654, 3655, 3659, 3664, 3666, 3669, 3675, 3687, 3701, 3715, 3720, 3767, 3788, 3833, 3893, 3901, 3907, 3915, 3930, 3940, 4017, 4073, 4362, 4382, 4397, 4411, 4419, 4423, 4424, 4430, 4432, 4457, 4465, 4489, 4499, 4502, 4515, 4518, 4667, 4751, 4774, 4775.

34c. Organoleptically important compounds (flavors, odors, volatiles)

- 4715 Barron, D.: HPLC with diol-bonded silica: an alternative to silica gel in the prefractionation of aroma extracts. *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 454-459; *C.A.*, 116 (1992) 104611e.
- 4716 Oi, Y., Kawada, T., Watanabe, T. and Iwai, K.: Induction of capsaicin-hydrolyzing enzyme activity in rat liver by continuous oral administration of capsaicin. *J. Agric. Food Chem.*, 40 (1992) 467-470.

35. ENVIRONMENTAL ANALYSIS**35a. General papers and reviews**

- 4717 Debets, A.J.J., Hupe, K.-P., Kok, K.-P. and Brinkman, U.A.T.: Electrolytic sample treatment coupled on-line with column liquid chromatography for the determination of basic and acidic compounds in environmental samples. *J. Chromatogr.*, 600 (1992) 163-173.
- 4718 Murr, J.: (Development of a rapid and reliable analytical method for reliable identification of petroleum contamination in environmental samples (water and soil)). *Gewaesserschutz, Wasser, Abwasser*, 121, 1990, 137 p.; *C.A.*, 116 (1992) 15114c.
- 4719 Ong, C.P., Khan, M.R., Li, S.F.Y. and Lee, H.K.: An optimization procedure for the isocratic high-performance liquid chromatographic separations of environmental pollutants. *Environ. Monit. Assess.*, 19 (1991) 35-46; *C.A.*, 116 (1992) 120122b.

See also 3583, 4405, 4407, 4492.

35b. Air pollution (complex mixtures; single compounds by cross-reference only)

See 3670, 4490.

35c. Water pollution (complex mixtures; single compounds by cross-reference only)

See 3617, 3630, 4736, 4750, 4766.

35d. Soil pollution (complex mixtures; single compounds by cross-reference only)

See 3617, 4498, 4502, 4660, 4739, 4750, 4769, 4771.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES**36a. Surfactants**

- 4720 Austad, T. and Fjelde, I.: A chromatographic analysis of commercial products of ethoxylated sulfonates. *Anal. Lett.*, 25 (1992) 957-971.
- 4721 Danielson, N.D., Shamsi, S.A. and Maki, S.A.: Comparison of fluorocarbon and hydrocarbon weak anion exchange columns for the separation of surfactants with indirect detection. *J. High Resolut. Chromatogr.*, 15 (1992) 343-346.

- 4722 Maki, S.A., Wangsa, J. and Danielson, N.D.: Separation and detection of aliphatic anionic surfactants using a weak anion exchange column with indirect photometric and indirect conductivity detection. *Anal. Chem.*, 64 (1992) 583-589.

- 4723 Nitschke, L., Müller, R., Metzner, G. and Haber, L.: Trace analysis of cationic surfactants in water using HPLC with conductometric detection. *Fresenius J. Anal. Chem.*, 342 (1992) 711-713.

For additional information see *C.A.*:

116 (1992) 98636y.

36b. Antioxidants and preservatives

- 4724 Egsgaard, H., Larsen, E., Pedersen, W.B. and Carlsen, L.: Analysis of antioxidants in polymer material by a strategy employing tandem mass spectrometry and liquid chromatography. *TRAC*, 11 (1992) 164-168.

- 4725 Gao, S., Bao, Q., Tian, Y. and Wang, J.: Study of the reaction of antioxidant 1010 of one-step synthesis by RP-HPLC with gradient elution. *J. Liq. Chromatogr.*, 15 (1992) 657-664.

- 4726 Schäfer-Elidner, L. and Walldius, G.: Simultaneous measurement of serum probucol and lipid-soluble antioxidants. *J. Lipid Res.*, 33 (1992) 131-137.

See also 3557.

36c. Complex mixtures, technical products and unidentified compounds

- 4727 Amano, R.: Rapid and sensitive determination of pertechnetate in molybdenum-99/metastable technetium-99 generator eluates by reversed-phase high-performance liquid chromatography. *J. Radioanal. Nucl. Chem.*, 152 (1991) 81-86; *C.A.*, 116 (1992) 98499f.

- 4728 Berger, G., Andrianambinintsoa, S., Kleo, J., Grison, S., Dejonghe, D. and Breton, J.: Dissociation and reconstitution studies by high performance liquid chromatography of the light harvesting complex of *Rhodospirillum rubrum*. *J. Liq. Chromatogr.*, 15 (1992) 585-602.

- 4729 Černý, J., Šebor, G. and Blažek, J.: Use of basic alumina in fractionation of fossil fuels. *J. Chromatogr.*, 600 (1992) 243-249.

- 4730 Fujita, M.: (Separation and analysis of lubricating oil additives). *JETI*, 39 (1991) 28-34; *C.A.*, 116 (1992) 109620s - a review with 6 refs.

- 4731 Koerner, W.: (Process assurance for copper electroplating). *Metalloberflaeche*, 45 (1991) 474-478; *C.A.*, 116 (1992) 115428b - a review with 5 refs.

- 4732 Tang, T., Miller, D.M. and Teppen, B.: Quantitation and measurement of equivalent conductance of unidentified analytes by suppressed ion chromatography using conductivity detection. *Microchem. J.*, 45 (1992) 58-61; *C.A.*, 116 (1992) 120145m.

- 4733 Verillon, F. and Qian, F.: (Coupling of dialysis with liquid chromatography for automated analysis of complex samples). *Analusis*, 19 (1991) 271-277; *C.A.*, 116 (1992) 98591e.

For additional information see *C.A.*:

116 (1992) 60553f, 87312p, 89469u.

See also 4502, 4737.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- 4734 Bigelow, J.C., Nabeshima, Y., Kataoka, K. and Giddings, J.C.: Separation of cells and measurement of surface adhesion forces. Using a hybrid of field-flow fractionation and adhesion chromatography. *ACS Symp. Ser.*, 464 (1991) 146-158; *C.A.*, 116 (1992) 17888g.
- 4735 Itokazu, M., Tan, A. and Tanaka, S.: (Separation of osteoblasts by lectin affinity chromatography). *Nippon Seikeigeka Gakkai Zasshi*, 65 (1991) 762-766; *C.A.*, 116 (1992) 79605w.
- For additional information see *C.A.*:
116 (1992) 55081w, 79853a.
38. INORGANIC COMPOUNDS
- 38a. Cations
- 4736 Chambaz, D. and Haerdi, W.: Determination of divalent trace metals in natural waters by preconcentration on N,N,N',N'-tetra(2-aminoethyl)ethylenediamine-silica followed by on-line ion chromatography. *J. Chromatogr.*, 600 (1992) 203-210.
- 4737 De Beer, H. and Coetzee, P.P.: Ion chromatographic separation of chromium(III) and chromium(IV) and spectrophotometric detection of Cr^{III}-EDTA and Cr^{VI}-DCP species. *S. Afr. J. Chem.*, 44 (1991) 105-109; *C.A.*, 116 (1992) 113215f.
- 4738 Ghosh, D.K. and Ray, U.S.: Extraction chromatographic studies of zirconium(IV) with high molecular weight carboxylic acid on silica gel. *J. Indian Chem. Soc.*, 68 (1991) 344-346; *C.A.*, 116 (1992) 75071w.
- 4739 Gibson, J.A.E. and Willett, I.R.: The application of fluorescence detection to the determination and speciation of aluminum in soil solutions by ion chromatography. *Commun. Soil Sci. Plant Anal.*, 22 (1991) 1303-1313; *C.A.*, 116 (1992) 40292s.
- 4740 Günther, K. and Waldner, H.: Speziesanalytik von Zink und Cadmium in handelsüblichen pflanzlichen Lebensmitteln. *Anal. Chim. Acta*, 259 (1992) 165-173.
- 4741 Hagashita, T., Lee, J.H., Hankins, M.G., Lee, J.C., Kim, J.S., Knobloch, J.M. and Bartsch, R.A.: Selective sorption and column concentration of alkali-metal cations by carboxylic resins with dibenzo-14-crown-4 subunits and their acyclic polyether analogues. *Anal. Chem.*, 64 (1992) 815-819.
- 4742 Horwitz, E.P. and Dietz, M.L.: Liquid-chromatographic method for extraction of strontium from acid solutions. *PCT Int. Appl. WO 91 15,280 (Cl. B01D15/08)*, 17 Oct. 1991, US Appl. 507,419, 09 Apr. 1990; 23 p.; *C.A.*, 116 (1992) 50524h.
- 4743 Hradil, J., Orlov, V.I., Aratskova, A.A., Semenii, V.Ya. and Yashin, Ya.I.: (Ion-pair chromatography of metals on methacrylate polymers). *Zh. Fiz. Khim.*, 65 (1991) 2823-2827; *C.A.*, 116 (1992) 50456n.
- 4744 Huhn, G., Schwedt, G. and Müller, H.: Polymer coated cation exchanger in ion chromatography: preparation, properties and applications. *Fresenius J. Anal. Chem.*, 342 (1992) 678-683.
- 4745 Janos, P., Stulik, K. and Pacakova, V.: An ion-exchange separation of copper(2+), cadmium(2+), lead(2+) and thallium(1+) on silica gel with polarographic detection. *Talanta*, 38 (1991) 1145-1152; *C.A.*, 116 (1992) 119866r.
- 4746 Khuhawar, M.Y. and Soomro, A.I.: High performance liquid chromatographic determination of copper(II), nickel(II), palladium(II), and platinum(II) using solvent extraction and bis(isovalerylaceton)ethylenediamine as complexing reagent. *J. Liq. Chromatogr.*, 15 (1992) 647-656.
- 4747 Kobayashi, S.: Chromatographic separation and inductively coupled plasma atomic emission spectrometric determination of the rare earth metals contained in terbium. *Anal. Chim. Acta*, 262 (1992) 161-166.
- 4748 Komarova, T.V., Obrezkov, O.N. and Shpigun, O.A.: (Ion chromatographic determination of vanadium(IV) and vanadium(V) in the form of EDTA complexes). *Zh. Anal. Khim.*, 46 (1991) 1991-1996; *C.A.*, 116 (1992) 75169j.
- 4749 Kuban, V., Jancarova, I. and Sulova, R.: Determination of traces of lanthanides in cerium oxide by liquid chromatography with on-column preconcentration. *Fresenius J. Anal. Chem.*, 342 (1992) 706-710.
- 4750 Kuroda, R., Oguma, K., Mori, Y., Okabe, H. and Takizawa, T.: Anion-exchange preconcentration and determination of bismuth in environmental materials. *Chromatographia*, 32 (1991) 583-585.
- 4751 Liu, S., Deng, C. and Zhao, M.: (Reversed-phase liquid chromatographic separation and determination of copper(II), cobalt(II), and nickel(II) with 2-(2-thienylazo)-5-diethylaminophenol). *Fenxi Huaxue*, 19 (1991) 655-658; *C.A.*, 116 (1992) 19831g.
- 4752 Liu, S., Zhao, M. and Deng, C.: Separation and determination of trace amounts of vanadium(V), chromium(III) and iron(III) with 2-(2-thienylazo)-5-diethylaminophenol chelates by high-performance liquid chromatography. *J. Chromatogr.*, 598 (1992) 298-302.
- 4753 Ming, X.Y., Wu, Y.H. and Schwedt, G.: HPLC analysis of V, Co, Fe and Ni by 4-(2-pyridylazo)-resorcinol, PAR, and H₂O₂ and studies on complex properties influencing reaction. *Fresenius J. Anal. Chem.*, 342 (1992) 556-559.
- 4754 Nesterenko, P.N., Smirnov, I.P., Brykina, G.D. and Bol'shova, T.A.: (High-performance liquid chromatography of metals on sorbents with grafted molecules of thiazolylazo compounds). *Vestn. Mosk. Univ., Ser. 2: Khim.*, 32 (1991) 358-362; *C.A.*, 116 (1992) 119862m.
- 4755 Okada, T.: Interpretation of retention behaviors of transition-metal cations in micellar chromatography using an ion-exchange model. *Anal. Chem.*, 64 (1992) 589-594.
- 4756 Pietra, R., Alimonti, A., Gallorini, M., Tanet, G., Caroli, S. and Sabbioni, E.: Recent developments of pre-separation procedures for trace elements analysis of biological specimens. *Acta Chim. Hung.*, 128 (1991) 725-734; *C.A.*, 116 (1992) 3016j.
- 4757 Puri, B.K. and Balani, S.: Column chromatographic preconcentration of copper in alloys and complex materials using 9,10-phenanthrenequinone monoxime supported on naphthalene. *Anal. Lett.*, 25 (1992) 593-606.
- 4758 Purohit, R. and Devi, S.: Determination of trace amounts of lead by chelating ion exchange and on-line preconcentration in flow-injection atomic absorption spectrometry. *Anal. Chim. Acta*, 259 (1992) 53-60.
- 4759 Rosenberg, R.J., Forsbacka, A.M. and Gras, N.: Separation of metallic impurities from uranium by anion exchange on Dowex 1 x 8 resin. *J. Radioanal. Nucl. Chem.*, 152 (1991) 117-126; *C.A.*, 116 (1992) 98381m.

- 4760 Toma, H.E. and Silva, D.O.: Elution behavior of N-heterocyclic derivatives of mixed ruthenium(II)-sulfoxide complexes in reversed-phase high-performance liquid chromatography. *Chromatographia*, 32 (1991) 546-548.
- 4761 Vera-Avila, L.E. and Camacho, E.: RP-IPC with a lactic acid modified eluent for separation and determination of lanthanide ions. *J. Liq. Chromatogr.*, 15 (1992) 835-850.
- 4762 Wang, E. and Liu, A.: *In situ* electrochemical complex formation for selected metal ions based on controlled release of the pyrrolidine dithiocarbamate ligand from polypyrrole polymer. *Microchem. J.*, 44 (1991) 327-334; *C.A.*, 116 (1992) 74990h.
- 4763 Williams, T. and Barnett, N.W.: Determination of magnesium and calcium by ion chromatography with post-column reaction fluorescence detection. *Anal. Chim. Acta*, 259 (1992) 19-23.
- 4764 Yasui, T., Yuchi, A., Wada, H. and Nakagawa, G.: Reversed-phase high-performance liquid chromatography of several metal-8-quinolinethiol complexes. *J. Chromatogr.*, 596 (1992) 73-78.

For additional information see C.A.:

- 115 (1991) 293915v, 293974p;
116 (1992) 50401r, 75066y, 75268r, 98456q, 98479z, 119921e.

See also 3522, 3525, 3566, 3583, 4767, 4776, 4778, 4779.

38b. Anions

- 4765 Daignault, L.G. and Rillema, D.P.: Retention behavior of ions in high performance ion chromatography: III Effect of the nature of the cation on anion retention. *J. High Resolut. Chromatogr.*, 15 (1992) 293-294.
- 4766 Dietrich, A.M., Ledder, T.D., Gallagher, D.L., Grabeel, M.N. and Hoehn, R.C.: Determination of chlorite and chlorate in chlorinated and chloraminated drinking water by flow injection analysis and ion chromatography. *Anal. Chem.*, 64 (1992) 496-502.
- 4767 Hayakawa, K., Nomura, K. and Miyazaki, M.: On-line removal of interfering alkaline earth metals for simultaneous determination of hydrogen carbonate, chlorid nitrate and sulphate by direct photometric detection ion chromatography. *Anal. Sci.*, 7 (1991) 967-969; *C.A.*, 116 (1992) 75219a.
- 4768 Ito, K., Ariyoshi, Y. and Sunahara, H.: Determination of inorganic anions in salt solutions by ion chromatography using C₁₈ reversed-phase columns coated with cetyltrimethylammonium. *J. Chromatogr.*, 598 (1992) 237-241.
- 4769 Karmarkar, S.V. and Tabatabai, M.A.: Ion chromatographic method for determination of oxyanions in solutions equilibrated with soils. *Commun. Soil Sci. Plant Anal.*, 22 (1991) 1383-1395; *C.A.*, 116 (1992) 40293t.

- 4770 Maki, S.A. and Danielson, N.D.: Comparison study between indirect photometric and direct conductivity detection for anion exchange chromatography using naphthalene-sulfonate derivatives as mobile phases. *Chromatographia*, 33 (1992) 25-31.
- 4771 Nkedi-Kizza, P. and Owusu-Yaw, J.: Simultaneous high-performance liquid chromatographic determination of nitrate, nitrite, and organic pesticides in soil solution using a multidimensional column with ultraviolet detection. *J. Environ. Sci. Health, Part A*, A27 (1992) 245-259; *C.A.*, 116 (1992) 123184j.
- 4772 Nondak, L. and Kuzilek, V.: Liquid chromatography of carbon clusters. *Chromatographia*, 33 (1992) 344-346.
- 4773 Tsikas, D., Fauler, J. and Frölich, J.C.: Determination of chloride in biological fluids as pentafluorobenzylchloride by reversed-phase high-performance liquid chromatography and UV detection. *Chromatographia*, 33 (1992) 317-320.
- 4774 Wagner, H.P. and McGarrity, M.J.: Determination of sulfite in beer using ion-exclusion chromatography and pulsed amperometric detection. *J. Am. Soc. Brew. Chem.*, 50 (1992) 1-3; *C.A.*, 116 (1992) 127151u.
- 4775 Zhu, Y., Yue, W. and Zhu, L.: (Determination of nitrite and nitrate in bacon by ion chromatography with spectrophotometric detection). *Sepu*, 9 (1991) 392-394; *C.A.*, 116 (1992) 104599g.

38c. Permanent and rare gases

For additional information see C.A.:

- 116 (1992) 120043b.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 4776 Lee, E.D., Snyder, T.S. and Lahoda, E.J.: Chromatographic separation of zirconium isotopes. *Eur. Pat. Appl. EP 453,908* (Cl. B01D59/30), 30 Oct. 1991, US Appl. 515,965, 27 Apr. 1990; 12 p.; *C.A.*, 116 (1992) 47858q.
- 4777 Obermoller, H.R. and White, D.A.: Isotope separation by chemical exchange: a computer simulation. *Nucl. Technol.*, 96 (1991) 337-345; *C.A.*, 116 (1992) 115196z.
- 4778 Oi, T., Ogino, H., Hosoe, M. and Kakahana, H.: Fractionation of strontium isotopes in cation-exchange chromatography. *Sep. Sci. Technol.*, 27 (1992) 631-643; *C.A.*, 116 (1992) 69933n.
- 4779 Snyder, T.S. and Lee, E.D.: Chromatographic separation of zirconium isotopes with reduced waste liquor. *Eur. Pat. Appl. EP 464,783* (Cl. B01D59/30), 08 Jan. 1992, US Appl. 546,982, 02 Jul. 1990; 14 p.; *C.A.*, 116 (1992) 115406t.

For additional information see C.A.:

- 116 (1992) 120058k.

See also 3609, 4759.

Gas Chromatography

1. REVIEWS AND BOOKS

1572 Blum, W. and Aichholz, R.: *Hochtemperatur Gas-Chromatographie*. Hüthig, Heidelberg, 1991, 166 p.

1573 Eitre, L.S.: 1941-1951: The golden decade of chromatography. *Analyst (London)*, 116 (1991) 1231-1235 - a review with 21 refs.

See also 1590, 1604, 1620, 1622, 1630, 1632, 1637, 1640, 1662, 1666, 1669, 1674, 1688, 1694, 1703, 1712, 1847, 1929, 1933, 1964.

2. FUNDAMENTALS, THEORY AND GENERAL

2b. Thermodynamics and theoretical relationships

1574 Gaspar, G.: The performance concept: a contribution to the modern theory of capillary GC. *J. High Resolut. Chromatogr.*, 15 (1992) 295-301.

1575 Jones, L.A., Glennon, J.J. and Reiss, W.H.: Critical capillary column examination of the relationship between separation number and height equivalent to a theoretical plate and their dependence on temperature. *J. Chromatogr.*, 595 (1992) 209-219.

1576 Kollie, T.O., Poole, C.F., Abraham, M.H. and Whiting, G.S.: Comparison of two free energy of solvation models for characterizing selectivity of stationary phases used in gas-liquid chromatography. *Anal. Chim. Acta*, 259 (1992) 1-13.

1577 Zheng, G., Zhou, X., Wang, L., Cai, H. and Liu, P.: (Thermodynamic study of associated solutions of alcohols in aromatics by gas-liquid chromatography.) *Huaxue Xuebao*, 50 (1992) 5-10; *C.A.*, 116 (1992) 160075v.

See also 1658.

2c. Relationship between structure and chromatographic behaviour

1578 Hassani, A. and Meklati, B.Y.: Gas chromatographic behaviour of monosubstituted benzenes, benzaldehydes and acetophenones on OV polymethylphenylsilicone stationary phases. *Chromatographia*, 33 (1992) 267-271.

See also 1715, 1719, 1748, 1749, 1767, 1858, 1888.

2d. Measurement of physico-chemical and related values

1579 Afzal, M., Khan, M. and Ahmad, H.: Heats of adsorption of chromatographic silica gel. *J. Chem. Soc. Pak.*, 13 (1991) 157-160; *C.A.*, 116 (1992) 114158b.

1580 Bryanskaya, E.K., Mysak, A.E., Krupskaya, A.P. and Loichenko, T.L.: (Evaluation of solubility in lithium stearate and 12-hydroxystearate using reversed-phase gas chromatography.) *Neftepererab. Neftekhim.*, 40 (1991) 50-53; *C.A.*, 116 (1992) 87321r.

1581 Castells, R.C. and Castells, C.B.: Thermodynamics of tetra-*n*-octyltin+hydrocarbon systems by gas-liquid chromatography. *J. Solution Chem.*, 21 (1992) 129-146; *C.A.*, 116 (1992) 160151s.

1582 Donnet, J.B., Park, S.J. and Brendle, M.: The effect of microwave plasma treatment on the surface energy of graphite as measured by inverse gas chromatography. *Carbon*, 30 (1992) 263-268; *C.A.*, 116 (1992) 182025f.

1583 Grate, J.W., Klusty, M., McGill, R.A., Abraham, M.H., Whiting, G. and Andonian-Haftvan, J.: The predominant role of swelling-induced modulus changes of the sorbent phase in determining the responses of polymer-coated surface acoustic wave vapor sensors. *Anal. Chem.*, 64 (1992) 610-624.

1584 Huang, J., Ke, K. and Zhang, F.: (Determination of carbon deposited on catalysts by gas chromatography.) *Xiamen Daxue Xuebao, Ziran Kexueban*, 30 (1991) 112-114; *C.A.*, 116 (1992) 187006k.

1585 Jagiello, J., Bandosz, T.J. and Schwarz, J.A.: Application of inverse gas chromatography at infinite dilution to study the effects of oxidation of activated carbons. *Carbon*, 30 (1992) 63-69; *C.A.*, 116 (1992) 87065k.

1586 Knox, J. and Ceylan, H.: Relationship between ethylene adsorption isotherms and GC retention on Carbowax-coated porous graphite. *Chromatographia*, 33 (1992) 237-243.

1587 Koliadima, A., Karaiskakis, G., Katsanos, N.A. and Roth, M.: Activity coefficients in binary liquid mixtures measured by reversed-flow gas chromatography. *J. Chromatogr.*, 595 (1992) 237-246.

1588 Liu, H., Wang, W. and Lu, H.: (A new model for the gas chromatographic measurements of vapor-liquid equilibrium of dilute solutions.) *Beijing Huagong Xueyuan Xuebao, Ziran Kexueban*, 18 (1991) 1-12; *C.A.*, 116 (1992) 159924q.

1589 Liu, H., Wang, W. and Lu, H.: (Revised models for gas chromatographic measurements of vapor-liquid equilibria of dilute solutions.) *Shiyou Huagong*, 20 (1991) 477-481; *C.A.*, 116 (1992) 182433n.

1590 Liu, P., Zheng, G. and Zhou, X.: (Study on hydrogen bonding association constants of chloroform with some Lewis bases by gas-liquid chromatography.) *Huaxue Tongbao*, No. 8 (1991) 52-55; *C.A.*, 116 (1992) 159054f - a review with 6 refs.

1591 Liu, Y., Chen, Q., Li, Y. and Cao, S.: (Study on camphene esterification catalyzed by natural zeolite. II. Study on impurities and mechanisms.) *Linchan Huaxue Yu Gongye*, 11 (1991) 143-148; *C.A.*, 116 (1992) 129261d.

1592 Loukakis, G.K., Sideris, E.G., Kalfas, C.A., Mazomenos, B.E. and Anagnostopoulou-Konsta, A.: Measurements of structural characteristics of damaged DNA, through the use of inverse gas chromatography. *Top. Mol. Organ. Eng.*, 8 (1991) 45-53; *C.A.*, 116 (1992) 123955m.

1593 Papierer, E., Perrin, J.M., Siffert, B. and Philipponneau, G.: Surface characteristics of colloidal aluminas and barium titanates determined by inverse gas chromatography. *Prog. Colloid Polym. Sci.*, 84 (1991) 257-261; *C.A.*, 116 (1992) 179397y.

- 1594 Rybolt, T.R., Zhang, X., Wall, M.D., Thomas, H.E., Mullinax, L.E. and Lee, J.R.: Gas-solid chromatography and virial analysis of chlorofluorocarbon adsorption on a microporous carbon. *J. Colloid Interface Sci.*, 149 (1992) 359-366; *C.A.*, 116 (1992) 136898v.
- 1595 Singliar, M. and Gornerova, T.: (Effect of the molecular weight of the stationary phase in gas chromatography on retention values. Study of solubility parameters.) *Petrochemia*, 30 (1990) 94-103; *C.A.*, 116 (1992) 160131k.
- 1596 Takahashi, K.: Measurement of the leaching rates of tributyltin and triphenyltin compounds from antifouling paint by gas chromatography. *Surf. Coat. Int.*, 74 (1991) 331-338; *C.A.*, 116 (1992) 131198g.
- 1597 Thede, R., Nohmie, F., Pscheidl, H. and Haberland, D.: Determination of rate constants of irreversible non-first-order reactions by means of reaction gas chromatography. III. Second-order rate constants for the reaction type A+B-P (pulse overlay method). *Z. Phys. Chem. (Munich)*, 173 (1991) 87-94; *C.A.*, 116 (1992) 151043f.
- 1598 Xu, K., Wang, G. and Ling, Y.: (Determination of the surface polarity of the macroporous resin adsorbent by inverse gas chromatography.) *Sepu*, 9 (1991) 386-387.

See also 1723, 1920, 1921, 1922.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 1599 Arutyunov, Yu.I., Khalitov, D.M., Zhirnov, V.O., Vigdergauz, M.S. and Ruban, P.P.: (Gas chromatograph.) *U.S.S.R. SU* 1,658,081 (Cl. G01N30/08), 23 Jun. 1991, Appl. 4,658,789, 06 Mar. 1989; *C.A.*, 116 (1992) 120160n.
- 1600 Bicchi, C., D'Amato, A., Semeraro, I., Galli, A. and Galli, M.: Cold on-column-solvent split injection with a three-way press-fit device. *J. High Resolut. Chromatogr.*, 15 (1992) 155-159.
- 1601 Clark, J. and Jones, B.A.: Fused quartz couplings for capillary columns and restrictors in SFC. *J. High Resolut. Chromatogr.*, 15 (1992) 341-343.
- 1602 Grob, K. and de Martin, M.: Sample evaporation in conventional split/splitless GC injectors: Part 2: Use of perylene for visual observation of three different scenarios in empty injector inserts. *J. High Resolut. Chromatogr.*, 15 (1992) 335-340.
- 1603 Grob, K.: Sample evaporation in conventional GC split/splitless injectors. Part 1: Some quantitative estimates concerning heat consumption during evaporation. *J. High Resolut. Chromatogr.*, 15 (1992) 190-194.
- 1604 Hurrell, R.A.: European gas chromatography instrumentation. *J. Chromatogr. Sci.*, 30 (1992) 86-92 - a review with 33 refs.
- 1605 Kachi, H., Akiyama, K. and Sakamoto, K.: (Evaluation of automatic sampling system for a gas chromatograph and measurement of automotive emissions.) *Taiki Osen Gakkaishi*, 26 (1991) 392-404; *C.A.*, 116 (1992) 157738h.
- 1606 Kimura, H. and Miyamoto, S.: (Sample injection apparatus of gas chromatograph.) *Jpn. Kokai Tokkyo Koho JP* 03,142,357 [91,142,357] (Cl. G01N30/08), 18 Jun. 1991, Appl. 89/280,150, 28 Oct. 1989; 7 pp.; *C.A.*, 116 (1992) 187294c.
- 1607 Koski, I.J.: Sample introduction methods for open tubular column supercritical fluid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9131552, 1991, 275 p.; *C.A.*, 116 (1992) 98322t.
- 1608 Liang, B. and Yu, W.: (Application of a multifunctional concentrator in GC analysis.) *Fenxi Ceshi Tongbao*, 10, No. 5 (1991) 59-63; *C.A.*, 116 (1992) 187210x.
- 1609 Lin, B., Luo, C., Li, H. and Lu, P.: (Performance study of HS-6 headspace chromatography and its applications.) *Fenxi Ceshi Tongbao*, 10, No. 5 (1991) 17-22; *C.A.*, 116 (1992) 187237m.
- 1610 Lu, N. and Zhang, S.: (Application and maintenance of the Model GC6 industrial gas chromatograph in a synthetic ammonia plant.) *Huagong Zidonghua Ji Yibiao*, 18, No. 3 (1991) 64-65; *C.A.*, 116 (1992) 127574j.
- 1611 Maeda, T., Tatematsu, H. and Morishita, F.: Capillary gas chromatography using carbon dioxide as the carrier gas. *Anal. Sci.*, 7 (1991) 219-222.
- 1612 Mueller, H. and Schulz, H.: (Wastewater monitoring using automatic analyzer systems.) *Umwelt-Technol. Aktuell*, 2, No. 2 (1991) 33-34; *C.A.*, 116 (1992) 180736q.
- 1613 Nakagawa, K.: (Splitter for gas chromatographs.) *Jpn. Kokai Tokkyo Koho JP* 03,115,972 [91,115,972] (Cl. G01N30/10), 16 May 1991, Appl. 89/256,093, 29 Sep. 1989; 5 pp.; *C.A.*, 116 (1992) 120154p.
- 1614 Raal, J.D.: (Piston device for preparing calibrating-gas mixtures for gas chromatographs.) *Ger. Offen. DE* 4,032,337 (Cl. G01N1/28), 18 Apr. 1991, ZA Appl. 89/7,655, 09 Oct. 1989; 14 pp.; *C.A.*, 116 (1992) 15139q.
- 1615 Rounveher, D.P. and Lieb, D.P.: Selective, high-speed detection of vapors with analysis of multiple GC-separated portions. *Eur. Pat. Appl. EP* 459,677 (Cl. G01N30/46), 04 Dec. 1991, US Appl. 529,813, 29 May 1990; 18 pp.; *C.A.*, 116 (1992) 100976e.
- 1616 Shibata, S.: (Gas chromatograph using flame photometric detector for determination of sulfur compounds.) *Jpn. Kokai Tokkyo Koho JP* 03,108,660 [91,108,660] (Cl. G01N30/74), 08 May 1991, Appl. 89/246,931, 22 Sep. 1989; 3 pp.; *C.A.*, 116 (1992) 120152m.
- 1617 Tomberg, W.L., Dick-Hennes, E. and Büning-Pfaue, H.: Vacuum-assisted solvent elimination at the exit of GC capillary columns. *J. High Resolut. Chromatogr.*, 15 (1992) 279-280.
- 1618 White, D.C. and Mittelman, M.W.: Method and apparatus for detection of endotoxins of Gram-negative bacteria. *U.S. US* 5,059,527 (Cl. 435-29; C12Q1/02), 22 Oct. 1991, Appl. 448,071, 08 Dec. 1989; 7 pp.; *C.A.*, 116 (1992) 3201r.

3b. Detectors and detection reagents

- 1619 Alvarez-Bolainez, R.M., Dziewiatkoski, M.P. and Boss, C.B.: Sensitivity comparison in a microwave-induced plasma gas chromatographic detector: Effect of plasma torch design. *Anal. Chem.*, 64 (1992) 541-544.
- 1620 Barry, E.F., Colon, L.A. and Costanzo, R.B.: Alternating-current plasma detection for gas chromatography and high-performance liquid chromatography. *ACS Symp. Ser.*, 479 (1992) 170-188 - a review with 34 refs.
- 1621 Bornhop, D.J., Hlousek, L., Hackett, M., Wang, H. and Miller, G.C.: Remote scanning ultraviolet detection for capillary gas chromatography. *Rev. Sci. Instrum.*, 63 (1992) 191-201.

- 1622 Busch, M.A. and Busch, K.W.: Analytical applications of flame/furnace infrared emission spectrometry. *Spectrochim. Acta Rev.*, 14 (1991) 303-306; C.A., 116 (1992) 119782k - a review with 106 refs.
- 1623 Cammann, K., Faust, M. and Huebner, K.: Optical-system developments for plasma emission detection in high-resolution gas chromatography. *ACS Symp. Ser.*, 479 (1992) 105-116.
- 1624 Chan, C.-Y. and Ling, Y.-C.: Optimizing electron-capture detector performance for gas chromatographic analysis of polychlorinated biphenyls. *Chromatographia*, 33 (1992) 272-278.
- 1625 Coulombe, S., Tran, K.C. and Hubert, J.: Helium surface-wave plasmas as atomic emission detectors in gas chromatography. *ACS Symp. Ser.*, 479 (1992) 189-204.
- 1626 Gassmann, G. and Dahlke, S.: Flame-photometric detection of nitrous oxide in addition to phosphine. *J. Chromatogr.*, 598 (1992) 313-315.
- 1627 Goodman, K.J. and Brenna, J.T.: High sensitivity tracer detection using high-precision gas chromatography-combustion isotope ratio mass spectrometry and highly enriched [$U-^{13}C$]-labeled precursors. *Anal. Chem.*, 64 (1992) 1088-1095.
- 1628 Helmig, D., Schwarzer, N. and Steinhanes, J.: (Circuit arrangement for operational monitoring of flame-ionization detectors and a method for this arrangement.) *Ger. Offen.* DE 4,011,301 (Cl. G01N30/68), 17 Oct. 1991, Appl. 06 Apr. 1990; 6 pp.; C.A., 116 (1992) 142990k.
- 1629 Herrmann, F.P., Popp, P., Mothes, S. and Budovich, V.: (Combination ionization detector.) *Ger. (East)* DD 290,268 (Cl. G01N27/62), 23 May 1991, Appl. 334,720, 21 Nov. 1989; 5 pp.; C.A., 116 (1992) 98662d.
- 1630 Hooker, D.B. and DeZwaan, J.: Analytical problem solving with simultaneous atomic emission-mass spectrometric detection for gas chromatography. *ACS Symp. Ser.*, 479 (1992) 132-151 - a review with 18 refs.
- 1631 Huston, G.C.: Gas-amplified ionization detector for gas chromatographs. *U.S. Pat. Appl.* US 441,582, 15 Nov. 1991, Appl. 27 Nov. 1989; 15 pp.; C.A., 116 (1992) 120165t.
- 1632 Imasaka, T.: Supersonic jet spectrometry and its application to chromatograph detectors. *Spectrochim. Acta Rev.*, 14 (1991) 261-274; C.A., 116 (1992) 120071j - a review with 39 refs.
- 1633 Klomp, M., Puig, L., Trivedi, K. and Sacks, R.: Characterization of a low-pressure microvolume plasma emission detector for gas chromatography. *J. Chromatogr. Sci.*, 30 (1992) 136-141.
- 1634 Lafosse, M., Elfakir, C., Morin-Alloy, L. and Dreux, M.: The advantages of evaporative light scattering detection in pharmaceutical analysis by high performance liquid chromatography and supercritical fluid chromatography. *J. High Resolut. Chromatogr.*, 15 (1992) 312-318.
- 1635 Lagomarsino, R.J. and Latner, N.: Wide dynamic range electron-capture detection using the electron-capture detector pulse frequency signal. *J. Chromatogr.*, 595 (1992) 359-363.
- 1636 Long, G.L., Motley, C.B. and Perkins, L.D.: Helium high-efficiency microwave-induced plasma as an element-selective detector for packed-column supercritical-fluid chromatography. *ACS Symp. Ser.*, 479 (1992) 242-256.
- 1637 Marhveka, J.S., Hagen, D.F. and Miller, J.W.: Atomic emission detectors for gas chromatography. Twelve years of industrial experience. *ACS Symp. Ser.*, 479 (1992) 117-131 - a review with 10 refs.
- 1638 Platzer, B., Gross, R., Leitner, E., Schalk, A., Sinabell, H., Zach, H. and Knapp, G.: An element-specific detector for gas chromatography based on a novel capacitively coupled plasma. *ACS Symp. Ser.*, 479 (1992) 152-169.
- 1639 Puig, L.I.: High-speed vacuum outlet capillary gas chromatography with selective detection. Avail. *Univ. Microfilms Int.*, Order No. DA9116276, 1990, 244 p.; C.A., 116 (1992) 14930d.
- 1640 Rice, G.W.: Helium discharge detector for gas chromatography. *ACS Symp. Ser.*, 479 (1992) 205-217 - a review with 15 refs.
- 1641 Tao, L.: (Ion trap detector (ITD) and its application in pollutant analysis in petrochemical plant.) *Sepu*, 9 (1991) 325-327.
- 1642 Verga, G.R.: Improvements in flame photometric detector design and operation. Determination of organophosphorus pesticide residues at low picogram levels. *J. High Resolut. Chromatogr.*, 15 (1992) 235-237.
- 1643 Webster, G.H., Doggett, W.O. and Boss, C.B.: A new surface wave launched plasma and its application as a gas chromatography detector. *Anal. Chim. Acta*, 257 (1992) 309-315.
- 1644 Yu, W., Huang, Y. and Ou, Q.: Quantitative characteristics of gas chromatography with microwave-induced plasma detection. *ACS Symp. Ser.*, 479 (1992) 44-61.
- See also 1616, 1673, 1701, 1702, 1774, 1835, 1872, 1874, 1875, 1939, 1950, 2022.
- 3c. *Sorbents and columns, packing procedures*
- 1645 Cocks, S. and Smith, R.M.: Dynamic modification of silica by ternary mobile phases in supercritical fluid chromatography. *Anal. Proc.*, 29 (1992) 93-94.
- 1646 Damasceno, L.M.P., Cardoso, J.N. and Coelho, R.B.: High temperature gas chromatography on narrow bore capillary columns. *J. High Resolut. Chromatogr.*, 15 (1992) 256-259.
- 1647 Kominar, R.J.: The preparation and testing of a fused-silica gas chromatography capillary column: an experiment for a senior undergraduate laboratory module. *J. Chem. Educ.*, 68 (1991) A249-A255.
- 1648 Langguth, H., Kruass, K.H., Engewald, E. and Maurer, T.: (Method for producing immobilized separation phases for gas chromatography.) *Ger. (East)* DD 289,548 (Cl. C08J3/28), 02 May 1991, Appl. 332,549, 12 Sep. 1989; 3 pp.; C.A., 116 (1992) 143128x.
- 1649 Mayer, S., Schmalzing, D., Jung, M. and Schleimer, M.: A chiral test mixture for permethylated β -cyclodextrin-polysiloxane gas-liquid chromatography phases: The Schurig test mixture. *LC-GC Int.*, 5, No. 4 (1992) 58-59.
- 1650 Polanuer, B.: Direct aqueous injection gas chromatographic analysis of polar compounds using sorbents containing potassium fluoride dihydrate. *Chromatographia*, 33 (1992) 279-283.
- 1651 Shu, J., Zhang, B., Li, C., Li, T. and Li, B.: (Oligomeric ethylene glycol di(*p*-hydroxyphenyl) ethers and their use as stationary phase for gas chromatography.) *Yingyong Huaxue*, 8, No. 6 (1991) 37-42; C.A., 116 (1992) 143084e.
- 1652 Vigdergauz, M.S. and Kozhikhova, O.M.: (Method of preparing a sorbent for gas-chromatographic determination of organic peroxides and hydroperoxides.) *U.S.S.R.* SU 1,665,236 (Cl. G01N30/48), 23 Jul. 1991, Appl. 4,631,889, 04 Jan. 1989; C.A., 116 (1992) 120173u.

- 1653 Xu, B. and Dong, S.: An easy-to-make ozone generator for the immobilization of stationary phases in GC capillary columns. *Chin. Chem. Lett.*, 2 (1991) 793-796; C.A., 116 (1992) 183470j.
- 1654 Yang, H. and Lu, W.: The investigation and application of the packed glass capillary column with a core. *J. High Resolut. Chromatogr.*, 15 (1992) 180-183.
- 1655 Yun, X., Kou, D., Li, Y. and Lu, X.: (Study of the gradient effect of retention time on the gradient coated GC column.) *Gaodeng Xuexiao Huaxue Xuebao*, 12 (1991) 590-593; C.A., 116 (1992) 11498h.
- 1656 Yun, X., Kou, D., Li, Y. and Lu, X.: (Study of the gradient effect on column efficiency on the gradient loaded GC column.) *Gaodeng Xuexiao Huaxue Xuebao*, 12 (1991) 1025-1027; C.A., 116 (1992) 181815b.
- 1657 Zhou, L., Lou, X., Sheng, Y., Wang, Q. and Zhu, D.: A cross-linked chiral stationary phase for the separation of enantiomers by gas and supercritical fluid chromatography. *Chin. J. Chem.*, 9 (1991) 322-326; C.A., 116 (1992) 120107a.
- See also 1574, 1575, 1576, 1583, 1595, 1601, 1658, 1691, 1701, 1702, 1717, 1734, 2011.
- 3d. *Quantitative analysis*
- See 1614.
- 3f. *Programmed temperature, pressure, vapors, gradients*
- 1658 Jones, L.A., Reiss, W.H., Glennon, J.J. and Gerig, T.M.: Van Deemter-type relationship for determining the optimum initial flow-rate and optimum pressure programming rate in temperature/pressure-programmed capillary column gas chromatography utilizing separation numbers. *J. Chromatogr.*, 595 (1992) 221-236.
- See also 1583.
4. SPECIAL TECHNIQUES
- 4a. *Automation*
- See 1912.
- 4b. *Computerization and modelling*
- 1659 Hou, J. and Liang, L.: (Application of fuzzy cluster analysis in data processing of adsorption-wire/GC oil gas geochemical exploration.) *Jisuanji Yu Yingyong Huaxue*, 8 (1991) 199-202; C.A., 116 (1992) 87223k.
- See also 1723, 1741.
- 4c. *Combination with other physico-chemical techniques (MS, IR etc.)*
- 1660 Allgood, C., Orlando, R. and Munson, B.: Correlations of relative sensitivities in gas chromatography electron ionization mass spectrometry with molecular parameters. *J. Am. Soc. Mass Spectrom.*, 1 (1990) 397-404; C.A., 116 (1992) 98617t.
- 1661 Fujii, T.: Quadrupole mass spectrometry in combination with lithium ion attachment for sampling at atmospheric pressure: possible coupling to supercritical fluid chromatography. *Anal. Chem.*, 64 (1992) 775-778.
- 1662 Fujimoto, C. and Jinno, K.: Chromatography/FT-IR spectrometry approaches to analysis. *Anal. Chem.*, 64 (1992) 476A-481A.
- 1663 Grange, A.H. and Brumley, W.C.: Plotting mass-peak profiles from selected-ion recording data. *Rapid Commun. Mass Spectrom.*, 6 (1992) 68-70; C.A., 116 (1992) 98387t.
- 1664 Gross, R., Platzer, B., Leitner, E., Schalk, A., Sinabell, H., Zach, H. and Knapp, G.: Atomic emission gas chromatographic detection-chemical and spectral interferences in the stabilized capacitive plasma (SPC). *Spectrochim. Acta*, 47B (1992) 95-106; C.A., 116 (1992) 98635x.
- 1665 Hasenoehrl, E.J., Perkins, J.H. and Griffiths, P.R.: Rapid functional group characterization of gas chromatography/Fourier transform infrared spectra by a principal components analysis based expert system. *Anal. Chem.*, 64 (1992) 705-710.
- 1666 Jinno, K., Yoshida, H., Mae, H. and Fujimoto, C.: Inductively coupled plasma atomic emission spectrometry and packed-microcolumn supercritical-fluid chromatography. *ACS Symp. Ser.*, 479 (1992) 218-241 - a review with 34 refs.
- 1667 Karjalainen, E.J.: Mathematical isolation of component spectra in HPLC/UV-vis and GC-MS. How unique are the resolved spectra? *J. Pharm. Biomed. Anal.*, 9 (1991) 637-641; C.A., 116 (1992) 143053u.
- 1668 Kleintop, B.L., Yost, R.A. and Abolin, C.R.: Alternating RF/d.c. isolations for quantitation with coeluting internal standards in gas chromatography/ion trap mass spectrometry. *J. Am. Soc. Mass Spectrom.*, 3 (1992) 85-88; C.A., 116 (1992) 165543f.
- 1669 Krull, I.S. and Childress, W.: Interfacing of GC/HPLC with direct current plasma (DCP) emission spectroscopic detection for trace metal analysis and speciation. *J. Chromatogr. Libr.*, Vol. 47 Elsevier, Amsterdam, 1991 pp. 239-287; C.A., 116 (1992) 165207z - a review with 76 refs.
- 1670 Liang, T., Cai, G., Gao, Y., Xu, G. and Zhou, Y.: (Study on microcomputer-based on-line coupled DTA/EGD/GC technique.) *Huadong Huagong Xueyuan Xuebao*, 17 (1991) 481-486; C.A., 116 (1992) 142848v.
- 1671 Lu, X., Wang, B. and Zhang, L.: The calculation of Kovats retention indexes in GC/FT-IR. *Chim. Oggi*, 9, No. 6 (1991) 65-71; C.A., 116 (1992) 15110y.
- 1672 Mihara, S., Harada, K. and Tsuda, T.: (Analysis using gas chromatography-mass spectrometry (GC/MS).) *Jpn. Kokai Tokkyo Koho JP 03,142,358 [91,142,358] (Cl. G01N30/86)*, 18 Jun. 1991, Appl. 89/279,936, 30 Oct. 1989; 6 pp.; C.A., 116 (1992) 187318p.
- 1673 Olson, L.K., Heitkemper, D.T. and Caruso, J.A.: Chromatographic detection by plasma mass spectrometry. *ACS Symp. Ser.*, 479 (1992) 288-308.
- 1674 Sullivan, J.J. and Quimby, B.D.: Characterization of interferences affecting selectivity in gas chromatography-atomic emission spectrometry. *ACS Symp. Ser.*, 479 (1992) 62-89 -, a review with 37 refs.
- 1675 Thomas, L.C. and Weichmann, W.: Relative response ratios for dual-isotope measurements via coelution and GC/MS. *Talanta*, 39 (1992) 201-206.
- 1676 Webster, G.K. and Carnahan, J.W.: Atomic emission spectrometry with helium plasmas for liquid and supercritical-fluid chromatography. *ACS Symp. Ser.*, 479 (1992) 25-43.

- 1677 Werther, W., Lohninger, H. and Varmuza, K.: Development of chemometric detectors for gas chromatography/mass spectrometry by the use of a linear mapping method. In: Gmehling, J. (Editor), *Software Dev. Chem.* 5, Springer, Berlin, 1991, pp. 103-111; C.A., 116 (1992) 186780w.
- 1678 Xiong, T., Yu, C., Tan, H., Luok, J. and Shi, H.: (Application of the off-line gas chromatography and nuclear magnetic resonance. I. Identification of two components of chlorinated acetone.) *Fenxi Huaxue*, 19 (1991) 1439-1441; C.A., 116 (1992) 165529f.
- See also 1627, 1632, 1644, 1720, 1812, 1885, 1894, 1904, 2017.
- 4e. *Functional analysis*
- 1679 Nagao, H., Hirai, H. and Yoshino, N.: (A new method of quantitative analysis for estimation of functional groups on carbon fibers.) *Kobunshi Ronbunshu*, 49 (1992) 75-77; C.A., 116 (1992) 85676m.
- See also 1693, 1770.
- 4f. *Trace analysis and pre-separation techniques*
- 1680 Bartle, K.D.: Supercritical fluids in analysis: European optimism. *LC-GC Int.*, 5, No. 4 (1992) 66-67.
- 1681 Baykut, G. and Voigt, A.: Spray extraction of volatile organic compounds from aqueous systems into the gas phase for gas chromatography/mass spectrometry. *Anal. Chem.*, 64 (1992) 677-681.
- 1682 Hedrick, J.L. and Taylor, L.T.: Direct supercritical fluid extraction of nitrogenous bases from aqueous solution. *J. High Resolut. Chromatogr.*, 15 (1992) 151-154.
- 1683 Höfler, F.: Überkritische Fluidextraktion (SFE) I. Grundlagen und Instrumentierung. *LaborPraxis*, 16 (1992) 350-355.
- 1684 Isaeva, S.S., Kravchenko, T.I., Kruglyak, T.I. and Korol, A.N.: (Use of ampullae made of irradiated polyethylene for the production of calibration gas mixtures.) *Gig. Sanit.*, No. 11 (1990) 90-91; C.A., 116 (1992) 130618g.
- 1685 Liu, H. and Wehmeyer, K.R.: Solid-phase extraction with supercritical fluid elution as a sample preparation technique for the ultratrace analysis of flavone in blood plasma. *J. Chromatogr.*, 577 (1992) 61-67.
- 1686 Liu, H., Cooper, L.M., Raynie, D.E., Pinkston, J.D. and Wehmeyer, K.R.: Combined supercritical fluid extraction/solid-phase extraction with octadecylsilane cartridges as a sample preparation technique for the ultratrace analysis of a drug metabolite in plasma. *Anal. Chem.*, 64 (1992) 802-806.
- 1687 Messer, D.C. and Taylor, L.T.: Development of analytical SFE of a polar drug from an animal food matrix. *J. High Resolut. Chromatogr.*, 15 (1992) 238-241.
- 1688 Parashar, D.C.: Determination of trace impurities in materials. *Proc. Indian Natl. Sci. Acad., Part A*, 57 (1991) 251-258; C.A., 116 (1992) 119769m - a review with 19 refs.
- 1689 Toth, M. and Buser, H.-R.: Simple method for collecting volatile compounds from single insects and other point sources for gas chromatographic analysis. *J. Chromatogr.*, 598 (1992) 303-308.
- See also 1574, 1714, 1726, 1740, 1773, 1901, 1912, 1983, 1985, 1995, 2006, 2022.
- 4g. *Enantiomers, separation*
- 1690 Askari, C., Kreis, P., Mosandl, A. and Schmarr, H.G.: Chiral compounds of essential oils. VII. Quality evaluation of mentha oils, using enantioselective CGC-analysis of monoterpene constituents. *Arch. Pharm.*, 325 (1992) 35-39; C.A., 116 (1992) 129275m.
- 1691 Berthod, A., Li, W. and Armstrong, D.W.: Multiple enantioselective retention mechanisms on derivatized cyclodextrin gas chromatographic chiral stationary phases. *Anal. Chem.*, 64 (1992) 873-879.
- 1692 Bruche, G., Schmarr, H.G., Bauer, A., Mosandl, A., Rapp, A. and Engel, L.: (Stereoisomeric flavor compounds. Part 51. Enantioselective capillary gas chromatographic analysis and origin assignment of chiral furanones: scope and limitations.) *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 115-118; C.A., 116 (1992) 5381y.
- 1693 Fischer, P., Gloeckler, R., Hilker, A. and Boelz, U.: (Chiral recognition in gas chromatography. 4. Single-stage derivatization of α -hydroxy carboxylic acids with *N*-sulfonyl amines. Capillary gas chromatographic enantiomer separation on amide phases.) *Chem.-Ztg.*, 115 (1991) 317-319; C.A., 116 (1992) 128281y.
- 1694 Juvancz, Z. and Markides, K.E.: Enantiomer separation using supercritical fluid chromatography. A promising possibility. *LC-GC Int.*, 5, No. 4 (1992) 44-56 - a review with 41 refs.
- 1695 Lin, B., Bayer, E., Muschalek, V. and Koppenhoefer, B.: Thermodynamic analysis of the enantiomer resolution of TFA-Ala-OMe, TFA-Ala-Ala-OMe, and TFA-Ala-Ala-Ala-OMe by gas chromatography on Chirasil-Val. *Sci. China, Ser. B.*, 34 (1991) 769-776; C.A., 116 (1992) 129547b.
- 1696 Reiher, T. and Hamann, H.-J.: Enantioselective separation of epoxides and alcohols with perpentylated α -cyclodextrin. *J. High Resolut. Chromatogr.*, 15 (1992) 346-349.
- 1697 Rettinger, K., Karl, V., Schmarr, H.G., Dettmar, F., Hener, U. and Mosandl, A.: Chiroselective analysis of 2-alkyl-branched alcohols, acids, and esters: chirality evaluation of 2-methylbutanoates from apples and pineapples. *Phytochem. Anal.*, 2 (1991) 184-188; C.A., 116 (1992) 127108k.
- 1698 Rimmer, D.A. and Rose, M.E.: Some novel homochiral derivatizing agents for the gas chromatographic analysis of enantiomeric secondary alcohols. *J. Chromatogr.*, 598 (1992) 251-265.
- See also 1649, 1657, 1737, 1771, 1792, 1827, 1840, 1845, 1892, 1934, 1947, 1976, 1978.
- 4i. *Supercritical fluid chromatography*
- 1699 Nishikawa, Y., Nakazawa, H. and Takahashi, K.: (Supercritical fluid chromatography.) *Sumimoto Kagaku*, No. 2 (1991) 91-105; C.A., 116 (1992) 165472g.
- 1700 Tchaplá, A., Heron, S. and Lesellier, E.: (The extrapolation of nonaqueous reversed phase liquid chromatography results to supercritical fluid chromatography.) *Spectra 2000*, 158 (1991) 42-46; C.A., 116 (1992) 15102x.
- 1701 Upmooor, D. and Brunner, G.: Packed column supercritical fluid chromatography with light-scattering detection. I. Optimization of parameters with a carbon dioxide/methanol mobile phase. *Chromatographia*, 33 (1992) 255-260.

- 1702 Upmoor, D. and Brunner, G.: Packed column supercritical fluid chromatography with light-scattering detection. II. Retention behaviour of squalane and glucose with mixed mobile phase. *Chromatographia*, 33 (1992) 261-266.
- 1703 Xie, L.Q., Markides, K.E. and Lee, M.L.: Biomedical applications of analytical supercritical fluid separation techniques. *Anal. Biochem.*, 200 (1992) 7-19 - a review with 73 refs.
- 1704 Yan, C. and Martire, D.E.: Determination and theoretical analysis of supercritical fluid chromatographic retention of polycyclic aromatic hydrocarbons in a polymeric smectic phase. *J. Phys. Chem.*, 96 (1992) 3505-3512; *C.A.*, 116 (1992) 181900a.
- 1705 Yeo, S.K., Ong, C.P., Lee, H.K. and Li, S.F.Y.: Some applications of Freon-22 in supercritical fluid chromatographic fluid chromatographic analysis of environmental pollutants. *Environ. Monit. Assess.*, 19 (1991) 47-53; *C.A.*, 116 (1992) 120100t.

See also 1607, 1634, 1636, 1645, 1657, 1661, 1662, 1666, 1676, 1680, 1683, 1685, 1686, 1694, 1713, 1715, 1729, 1740, 1811, 1834, 1872, 1881, 1925, 1937, 1958.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. Aliphatic hydrocarbons

- 1706 Bjoroev, M., Hall, K., Hall, P.B., Leplat, P. and Loeberg, R.: Biomarker analysis of oils and source rocks using a thermal extraction-GC-MS. *Chem. Geol.*, 93 (1991) 1-11; *C.A.*, 116 (1992) 87224m.
- 1707 Matsumoto, G.I., Friedmann, E.I., Watanuki, K. and Ocampo-Friedmann, R.: Novel long-chain *anteiso*-alkanes and *anteiso*-alkanoic acids in Antarctic rocks colonized by living and fossil cryptoendolithic microorganisms. *J. Chromatogr.*, 598 (1992) 267-276.
- 1708 Seabra, L., Braganza, J.M. and Jones, M.F.: A system for the quantitative determination of hydrocarbons in human breath. *J. Pharm. Biomed. Anal.*, 9 (1991) 693-697; *C.A.*, 116 (1992) 167929k.

See also 1610, 1994, 2003, 2021.

5b. Cyclic hydrocarbons

- 1709 Arey, J., Atkinson, R., Zielinska, B.: GC/MS analysis of polycyclic aromatic hydrocarbons (PAH) and nitro-PAH in ambient air samples using high resolution GC/MS. In: Jennings, W.G. and Nikelly, J.G. (Editors), *Capillary Chromatography*, Hüthig, Heidelberg, 1991, pp. 95-107; *C.A.*, 116 (1992) 26895j.
- 1710 Bemgard, A., Colmsjö, A. and Lundmark, B.-O.: Gas chromatographic analysis of high-molecular-weight polynuclear aromatic hydrocarbons. I. Molecular weight 328. *J. Chromatogr.*, 595 (1992) 247-258.
- 1711 Geahchan, A., le Gren, I., Chambon, P. and Chambon, R.: Improved method for determination of polynuclear aromatic hydrocarbons in pharmacopoeial paraffin and mineral oils. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 968-973.
- 1712 Matisova, E.: High resolution capillary gas chromatography of aromatic compounds in multicomponent hydrocarbon mixtures. *J. High Resolut. Chromatogr.*, 15 (1992) 213-218 - a review with 88 refs.

- 1713 Ong, C.P., Lee, H.K. and Li, S.F.Y.: Direct coupling of supercritical fluid extraction-supercritical fluid chromatography for the determination of selected polycyclic aromatic hydrocarbons in aqueous environmental samples. *Environ. Monit. Assess.*, 19 (1991) 63-71; *C.A.*, 116 (1992) 135877a.
- 1714 Page, B.D., Conacher, H.B.S., Weber, D. and Lacroix, G.: A survey of benzene in fruits and retail fruit juices, fruit drinks, and soft drinks. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 334-340.
- 1715 Zhou, L. and Shen, Y.: (Retention behavior of normal hydrocarbons in capillary supercritical fluid chromatography.) *Fenxi Huaxue*, 19 (1991) 1122-1127; *C.A.*, 116 (1992) 92054k.

See also 1578, 1704, 2026.

5c. Halogen derivatives

- 1716 Andronikashvili, T.G., Eprikashvili, L.G., Pirtskhalava, N.V. and Adolashvili, M.G.: (Chromatographic separation of xylene and monochlorotoluene isomers.) *Izv. Akad. Nauk Gruz., Ser. Khim.*, 17, No. 2 (1991) 87-92; *C.A.*, 116 (1992) 15106b.
- 1717 Arystanbekova, S.A., Zhukova, A.I., Taresevich, Yu.I., Bondarenko, S.V., Rivina, Z.M. and Rozhkov, V.I.: (Use of organosubstituted montmorillonite for gas-chromatographic analysis of technical 1,2-dichloroethane.) *Ukr. Khim. Zh.*, 57 (1991) 719-722; *C.A.*, 116 (1992) 120099z.
- 1718 Brown, R.S., Pettit, K., Price, D. and Jones, P.W.: Thermal desorption gas chromatography: a quick screening technique for polychlorinated biphenyls. *Chemosphere*, 23 (1991) 1145-1150.
- 1719 De Boer, J., Dao, Q.T. and van Dortmond, R.: Retention times of fifty one chlorobiphenyl congeners on seven narrow bore capillary columns coated with different stationary phases. *J. High Resolut. Chromatogr.*, 15 (1992) 249-255.
- 1720 Doumenq, P., Guiliano, M. and Mille, G.: Polychlorobiphenyls differentiation and identification by gas chromatography/Fourier transform infrared spectroscopy. *Talanta*, 39 (1992) 149-154.
- 1721 Hamill, J. and Kee, T.G.: The detection of aerosol propellants in body fluids and tissue by gas chromatography-mass spectrometry. *J. Forensic Sci. Soc.*, 31 (1991) 301-307; *C.A.*, 116 (1992) 1844d.
- 1722 Hong, C.-S., Bush, B., Xiao, J. and Fitzgerald, E.F.: Isolation and determination of mono-ortho and non-ortho substituted PCBs (coplanar PCBs) in human milk by HPLC porous graphitic carbon and GC/ECD. *Chemosphere*, 24 (1992) 465-473.
- 1723 Klappa, S.A. and Long, G.R.: Computer assisted determination of the biological activity of polychlorinated biphenyls using gas chromatographic retention indices as molecular descriptors. *Anal. Chim. Acta*, 259 (1992) 89-93.
- 1724 Kozlowski, E., Gorecki, T. and Sienkowska-Zyskowska, E.: Continuous flow thin-layer headspace (TLHS) analysis. Part VI. Comparison of the results of the determination of volatile organohalogen compounds in tap water in the form of a group parameter (VOX) with partial speciation by DAI-ECD capillary gas chromatography (GC). *Fresenius. J. Anal. Chem.*, 342 (1992) 401-404.
- 1725 Long, Y., Lu, M., Hoffman, R.V. and Eiceman, G.A.: Gas chromatographic separation and determination of chloroanthracene isomers on fly ash. *J. Environ. Sci. (China)*, 3, No. 3 (1991) 81-90; *C.A.*, 116 (1992) 112930y.

- 1726 Lépine, L. and Archambault, J.-F.: Parts-per-trillion determination of trihalomethanes in water by purge-and-trap gas chromatography with electron capture detection. *Anal. Chem.*, 64 (1992) 810-814.
- 1727 Rastogi, S.C.: Investigation of isomer specific polychlorinated biphenyls in printing inks. *Bull. Environ. Contam. Toxicol.*, 48 (1992) 567-571; C.A., 116 (1992) 153909s.
- 1728 Sharp, G.J., Yokouchi, Y. and Akimoto, H.: Trace analysis of organobromine compounds in air by adsorbent trapping and capillary gas chromatography/mass spectroscopy. *Environ. Sci. Technol.*, 26 (1992) 815-816; C.A., 116 (1992) 180000v.

See also 1624, 1644, 1746, 1862, 1895, 1912, 1984.

5d. *Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)*

- 1729 Andersson, P.E., Demirbükler, M. and Blomberg, L.G.: Quantitative hydrocarbon group analysis of gasoline and diesel fuel by supercritical fluid chromatography. *J. Chromatogr.*, 595 (1992) 301-311.
- 1730 Grob, K., Artho, A., Biedermann, M. and Egli, J.: Food contamination by hydrocarbons from lubricating oils and release agents: determination by coupled LC-GC. *Food Addit. Contam.*, 8 (1991) 437-446; C.A., 116 (1992) 82368b.
- 1731 Lavine, B.K., Carlson, D.A. and Calkins, C.O.: Classification of tephritid fruit fly larvae by gas chromatography/pattern recognition techniques. *Microchem. J.*, 45 (1992) 50-57.
- 1732 Misharina, T.A. and Golovnya, R.V.: Hydrocarbon contaminants of boiled shrimp and crab meat. *J. High Resolut. Chromatogr.*, 15 (1992) 332-334.
- 1733 Newton, J.M., Rothman, B.S. and Walker, F.A.: Separation and determination of diesel contaminants in various fish products by capillary gas chromatography. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 986-990.
- 1734 Roshchina, T.M.: (Gas chromatographic properties of cubic inorganic salts.) *Vestn. Mosk. Univ., Ser. 2: Khim.*, 32, No. 3 (1991) 241-245; C.A., 116 (1992) 6091r.

See also 1659, 1712, 2001, 2002.

6. ALCOHOLS

- 1735 Bonetti, G., Pibarot, P., Chaintreau, A. and Marion, J.P.: Quantitation of diethylene glycol monoethyl ether in citrus oils. *J. High Resolut. Chromatogr.*, 15 (1992) 305-306.
- 1736 Geahchan, A., Khalife, C., Chambon, P. and Chambon, R.: Analysis of anisated fermented grape distillates by gas-liquid chromatography. *J. Food Compos. Anal.*, 4 (1991) 304-314; C.A., 116 (1992) 82329q.
- 1737 Oehlschläger, A.C., Pierce, H.D., Jr., Morgan, B., Wimalaratne, P.D.C., Slessor, K.N., King, G.G.S., Gries, G., Gries, R., Borden, J.H., Jiron, L.F. et al.: Chirality and field activity of rhynchophorol, the aggregation pheromone of the American palm weevil. *Naturwissenschaften*, 79 (1992) 134-135.
- 1738 Orłowska, N.: (Chromatographic method for determination of methanol and methyl *tert.*-butyl ether in gasoline.) *Przem. Chem.*, 70 (1991) 270-271; C.A., 115 (1991) 139277g.

- 1739 Wittmann, R.: (Determination of dichloropropanols and monochloropropanediols in seasonings and in foods containing seasonings.) *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 224-229; C.A., 116 (1992) 127119q.

See also 1696, 1698, 1836.

7. PHENOLS

- 1740 Thomson, C.A. and Chesney, D.J.: Supercritical carbon dioxide extraction of 2,4-dichlorophenol from food crop tissues. *Anal. Chem.*, 64 (1992) 848-853.
- 1741 Vasilic, Z., Finger, S. and Drevenkar, V.: Trace enrichment of chlorophenols in human urine by C₁₈ reversed-phase adsorption and by *n*-hexane extraction. *Fresenius. J. Anal. Chem.*, 341 (1991) 732-737.
- 1742 Wagner, S.L., Durand, L.R., Inman, R.D., Kiigemagi, U. and Deiner, M.L.: Residues of pentachlorophenol and other chlorinated contaminants in human tissues: analysis by electron capture gas chromatography and electron capture negative ion mass spectrometry. *Arch. Environ. Contam. Toxicol.*, 21 (1991) 596-606; C.A., 116 (1992) 10640m.

See also 1697, 1807, 1998, 2015.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. *Flavonoids*

- 1743 Cai, J., Xu, G., Jin, R., Xu, L., Yu, P. and Sheng, L.: (Analysis of coumarin constituents in *Cnidii fructus* by capillary gas chromatography.) *Zhongguo Yaoke Daxue Xuebao*, 22 (1991) 345-349; C.A., 116 (1992) 159024w.

See also 1685, 1762.

8b. *Aflatoxins and other mycotoxins*

- 1744 Jiao, Y., Blaas, W., Rühl, C. and Weber, R.: Identification of ochratoxin A in food samples by chemical derivatization and gas chromatography-mass spectrometry. *J. Chromatogr.*, 595 (1992) 364-367.
- 1745 Schwardorf, K. and Müller, H.-M.: Determination of α - and β -zearalenol and zearalenone in cereals by gas chromatography with ion-trap detection. *J. Chromatogr.*, 595 (1992) 259-267.

See also 1618.

8c. *Other compounds with heterocyclic oxygen (incl. tannins)*

- 1746 Ballschmiter, K., Bacher, R., Mennel, A., Fischer, R., Riehle, U. and Swerev, M.: The determination of chlorinated biphenyls, chlorinated dibenzodioxins, and chlorinated dibenzofurans by GC-MS. *J. High Resolut. Chromatogr.*, 15 (1992) 260-270.

- 1747 Huang, L.Q., Tong, H. and Donnelly, J.R.: Characterization of dibromopolychlorodibenzo-*p*-dioxins and -dibenzofurans in municipal waste incinerator fly ash using gas chromatography/mass spectrometry. *Anal. Chem.*, 64 (1992) 1034-1040.
- 1748 Needham, M.D. and Jurs, P.C.: Quantitative structure-retention studies of polychlorinated dibenzodioxins on gas chromatographic stationary phases of varying polarity. *Anal. Chim. Acta*, 258 (1992) 183-198.
- 1749 Needham, M.D., Adams, K.C. and Jurs, P.C.: Quantitative structure-retention studies of polychlorinated dibenzodioxins on gas chromatographic stationary phases of varying polarity. *Anal. Chim. Acta*, 258 (1992) 199-218.
- 1750 Norstrom, R.J. and Simon, M.: Determination of specific polychlorinated dibenzo-*p*-dioxins and dibenzofurans in biological matrices by gel-permeation-carbon chromatography and gas chromatography-mass spectrometry. *IARC Sci. Publ.*, 108 (1991) 281-297; *C.A.*, 116 (1992) 167909d.
- 1751 Pettit, K., Brown, R.S. and Jones, P.W.: The DB5 capillary column: the search for sensitivity. *Chemosphere*, 23 (1991) 1117-1123.
- 1752 Rakhmanova, T.V., Samsonov, D.P., Pervunina, R.I. and Kiryukhin, V.P.: (Determination of 2,3,7,8-tetrachloro-*p*-dioxin in pesticides.) *Agrokhimiya*, No. 7 (1991) 114-117; *C.A.*, 116 (1992) 146027z.
- 1753 Schimmel, H., Riehle, U., Reuter, U. and Ballschmiter, K.: Selective losses of polychlorinated dibenzofurans (Cl_xDF, x=1-4) and of monohalogenated dibenzodioxins (Hal₁DD, Hal=Br,Cl) during matrix separation. *Chemosphere*, 24 (1992) 413-420.
- 1754 Van Rhijn, J.A., Traag, W.A., Kulik, W. and Tuinstra, L.G.M.T.: Automated clean-up procedure for the gas chromatographic-high-resolution mass spectrometric determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans in milk. *J. Chromatogr.*, 595 (1992) 289-299.

See also 1692, 1759, 1978, 2026.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 1755 Cai, X., Liu, F., Lu, J. and Hu, G.: (The determination of vicinal diketones in beer by gas chromatography.) *Shipin Yu Fajiao Gongye*, No. 4 (1991) 46-51; *C.A.*, 116 (1992) 150257s.
- 1756 Leskovsek, H., Grm, A. and Marsel, J.: Head space gas-chromatographic determination of residual ethylene oxide in cosmetic products. *Fresenius. J. Anal. Chem.*, 341 (1991) 720-722.
- 1757 Muntuta-Kinyanta, C. and Hardy, J.K.: Permeation-solid adsorbent sampling and GC analysis for formaldehyde. *Talanta*, 38 (1991) 1381-1386.
- 1758 Richardson, S.D., Thruston, A.D., Jr., Collette, T.W. and McGuire, J.M.: Application of multispectral techniques to the precise identification of aldehydes in the environment. *Environ. Toxicol. Chem.*, 10 (1991) 991-997; *C.A.*, 115 (1991) 141892x.
- 1759 Shara, M.A., Dickson, P.H., Bagchi, D. and Stohs, S.J.: Excretion of formaldehyde, malondialdehyde, acetaldehyde and acetone in the urine of rats in response to 2,3,7,8-tetrachloro-dibenzo-*p*-dioxin, paraquat, endrin and carbon tetrachloride. *J. Chromatogr.*, 576 (1992) 221-233.
- 1760 Shibamoto, T.: A new analytical method for low-molecular-weight aldehydes. *Dev. Food Sci.*, 24 (1990) 471-484; *C.A.*, 116 (1992) 5360r.

See also 1578, 1678, 1696, 1735, 1738, 1833, 1957.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 1761 Cherniak, R., Morris, L.C. and Turner, S.H.: Glucuronoxylomanan of *Cryptococcus neoformans* serotype D: structural analysis by gas-liquid chromatography-mass spectrometry and by ¹³C-nuclear magnetic resonance spectroscopy. *Carbohydr. Res.*, 223 (1992) 263-269; *C.A.*, 116 (1992) 147689d.
- 1762 Glässgen, W.E., Hofmann, R., Emmerling, M., Neumann, G.D. and Seitz, H.U.: Structure elucidation of saccharides in anthocyanins and flavonols by means of methylation analysis and gas chromatography. *J. Chromatogr.*, 598 (1992) 81-87.
- 1763 Hama, J. and Handa, N.: Diel photosynthetic production of cellular organic matter in natural phytoplankton populations, measured with carbon-13 and gas chromatography/mass spectrometry. I. Monosaccharides. *Mar. Biol.*, 112 (1992) 175-181; *C.A.*, 116 (1992) 169859m.
- 1764 Hansson, G.C., Bouhours, J.F., Karlsson, H. and Carlstedt, I.: Analysis of sialic acid-containing mucin oligosaccharides from porcine small intestine by high-temperature gas chromatography-mass spectrometry of their dimethylamides. *Carbohydr. Res.*, 221 (1991) 179-189; *C.A.*, 116 (1992) 152245k.
- 1765 Shippee, R.L., Johnson, A.A., Cioffi, W.G., Lasko, J., LeVoyer, T.E. and Jordan, B.J.: Simultaneous determination of lactulose and mannitol in urine of burn patients by gas/liquid chromatography. *Clin. Chem. (Winston-Salem)*, 38 (1992) 343-345.
- 1766 Wang, J.: (Determination of glucose and mannitol in sorbitol by GC.) *Riyong Huaxue Gongye*, No. 3 (1991) 152-154; *C.A.*, 116 (1992) 82305d.
- 1767 Yang, Z.C. and Cashman, J.R.: Structure-retention index relationships for derivatized monosaccharides on non-polar gas chromatography columns. *J. Chromatogr.*, 596 (1992) 79-84.
- 1768 Zhu, X., Zhang, S., Xia, X., Tang, X., Zhang, H. and Song, D.: (Virus monosaccharides. I. Analysis of monosaccharides of granulosis virus by gas chromatography.) *Bingduxue Zazhi*, 6 (1991) 159-164; *C.A.*, 116 (1992) 2997t.

See also 1968, 1982, 1997, 2008.

10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 1769 Yabe, Y., Ninomiya, T., Tatsuno, T. and Okada, T.: Simple colorimetric determination of carrageenan in jellies and salad dressings. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 1019-1022.

11. ORGANIC ACIDS AND LIPIDS

- 1770 Goosens, E.C., Broekman, M.H., Wolters, M.H., Strijker, R.E., de Jong, D., de Jong, G.J. and Brinkman, U.A.T.: A continuous two-phase reaction system coupled on-line with capillary chromatography for the determination of polar solutes in water. *J. High Resolut. Chromatogr.*, 15 (1992) 242-248.
- 11a. *Organic acids and simple esters*
- 1771 Barbeni, M., Guarda, P.A., Cabella, P., Allegrone, G. and Cisero, M.: GLC enantiomer separation of alpha-substituted aliphatic acids via diastereomeric esterification with (R)-pantolactone. In: Bessiere, Y. and Thomas, A.F. (Editors), *Flavour Sci. Technol.*, Wiley, Chichester, 1990, pp. 37-40; *C.A.*, 115 (1991) 135824k.
- 1772 Belke, C.J. and Irwin, A.J.: Determination of organic acids in beer after extraction with an anion-exchange resin. *J. Am. Soc. Brew. Chem.*, 50 (1992) 26-29; *C.A.*, 116 (1992) 127152v.
- 1773 Both, D.A. and Jemal, M.: Determination of parts per million levels of trifluoroacetic acid in ceronapril bulk substance by headspace capillary gas chromatography. *J. Chromatogr.*, 596 (1992) 85-90.
- 1774 Brill, J.H., Narayanan, B.A. and McCormick, J.P.: Selective determination of pentafluorobenzyl ester derivatives of carboxylic acids by GC using microwave plasma and mass selective detection. *Appl. Spectroscopy*, 45 (1991) 1617-1620.
- 1775 Brondz, I. and Olsen, I.: Intra-injector methylation of free fatty acids from aerobically and anaerobically cultured *Actinobacillus actinomycetemcomitans* and *Haemophilus aphrophilus*. *J. Chromatogr.*, 576 (1992) 328-333.
- 1776 Bryuzgina, T.S., Kravchenko, E.Ya. and Donish, A.V.: (Gas chromatographic measurement of phospholipid fatty acids and free cholesterol in a single sample.) *Lab. Delo*, No. 9 (1991) 18-20; *C.A.*, 116 (1992) 101980p.
- 1777 Chiang, L., Magee, R.J. and James, B.D.: Chromatographic determination of 2,4,5-trichlorophenoxyacetic acid by simultaneous extraction/methylation and application to soil analysis. *Sci. Int.*, 3 (1991) 199-202; *C.A.*, 116 (1992) 168257b.
- 1778 Emel'yanov, S.L. and Tsyganov, A.R.: (Determination of the content of fatty acids in rapeseed by gas chromatography.) *Vestsi Akad. Navuk BSSR, Ser. Khim. Navuk*, No. 5 (1991) 6-8; *C.A.*, 116 (1992) 5386d.
- 1779 Fomina, E.I.: (Gas-chromatographic method of determination of monochloroacetic acid and its sodium salt in air, leather washing, special clothing extracts, and urine.) *Gig. Tr. Prof. Zabol.*, No. 12 (1991) 39-41; *C.A.*, 116 (1992) 187277z.
- 1780 Gallagher, I.H.C., Hancock, E.M. and Sissons, C.H.: Isopropanol as an alternative to ethers in the extraction of C₂-C₄ fermentation acids for gas liquid chromatography. *Lett. Appl. Microbiol.*, 13 (1991) 230-231; *C.A.*, 116 (1992) 150038w.
- 1781 Gibson, R.A., Lines, D.R. and Neumann, M.A.: γ -Linoleic acid (GLA) content of encapsulated evening primrose oil products. *Lipids*, 27 (1992) 82-84.
- 1782 Hama, J. and Handa, N.: Diel photosynthetic production of cellular organic matter in natural phytoplankton populations, measured with carbon-13 and gas chromatography/mass spectrometry. II. Fatty acids and amino acids. *Mar. Biol.*, 112 (1992) 183-190; *C.A.*, 116 (1992) 169860e.
- 1783 Hansen, W., Freney, J., Labbe, M., Renaud, F., Yaourassowsky, E. and Fleurette, J.: Gas-liquid chromatographic analysis of cellular fatty acid methyl esters in *Aeromonas* species. *Zentralbl. Bakteriol.*, 275 (1991) 1-10; *C.A.*, 116 (1992) 147666u.
- 1784 Heikes, D.L.: Mass spectral identification and gas chromatographic determination of chlorinated bleaching adducts in flour-containing food items. *J. Agric. Food Chem.*, 40 (1992) 489-491.
- 1785 Imbs, A.B., Kuklev, D.V., Vereshchagin, A.D. and Latyshev, N.A.: Application of an analytical modification of the iodolactonization reaction to selective detection of Δ^5 (Δ^4) unsaturated fatty acids. *Chem. Phys. Lipids*, 60 (1991) 71-76; *C.A.*, 116 (1992) 124317s.
- 1786 Juarez, M., de la Fuente, M.A. and Fontecha, J.: Improved gas chromatographic method for the determination of the individual free fatty acids in cheese using a capillary column and PTV injector. *Chromatographia*, 33 (1992) 351-355.
- 1787 Kataoka, H., Manabe, K., Nakase, S. and Makita, M.: Determination of hippuric acid and *o*-, *m*- and *p*-methylhippuric acids in urine by capillary gas chromatography. *J. Pharm. Biomed. Anal.*, 9 (1991) 699-704; *C.A.*, 116 (1992) 167930d.
- 1788 Kuznetsova, L.V., Komrakova, E.A. and Tikhomirov, Yu.P.: (Gas-chromatography assays of methyl and butyl esters of acrylic and methacrylic acids and their metabolites in biological media.) *Gig. Tr. Prof. Zabol.*, No. 12 (1991) 28-30; *C.A.*, 116 (1992) 100689p.
- 1789 Liu, X., Hou, W., Miao, J., Liu, L. and Wang, H.: (Quantitative determination of free fatty acids in body fluids by GC-MS.) *Fenxi Ceshi Tongbao*, 10, No. 4 (1991) 31-35; *C.A.*, 116 (1992) 102176t.
- 1790 Mayatepek, E., Herz, A., Leichsenring, M. and Kappe, R.: Fatty acid analysis of different *Candida* species by capillary column gas-liquid chromatography. *Mycoses*, 34 (1991) 53-57; *C.A.*, 116 (1992) 147915z.
- 1791 Rozes, N. and Lonvaud-Funel, A.: (Differentiation of the principal yeast species in wine by analysis of total free fatty acids by gas chromatography.) *J. Int. Sci. Vigne Vin*, 25 (1991) 85-97; *C.A.*, 116 (1992) 82491m.
- 1792 Saiki, K. and Matsuoka, M.: (Analysis of optical isomers of organic acids in human body fluids by gas chromatography/mass spectrometry as diastereoisomeric derivatives.) *Shitsuryo Bunseki*, 39 (1991) 113-121; *C.A.*, 116 (1992) 147165e.
- 1793 Shi, M., Wang, G. and Hu, Z.: (Chromatographic determination of trace phthalate esters in drinking water.) *Fenxi Ceshi Tongbao*, 10 (1991) 1-4; *C.A.*, 115 (1991) 141865r.
- 1794 Stephanou, E.G.: α,ω -Dicarboxylic acid salts and α,ω -dicarboxylic acids. Photooxidation products of unsaturated fatty acids, present in marine aerosols and marine sediments. *Naturwissenschaften*, 79 (1992) 128-131.
- 1795 Stewart, D., Robertson, G.W. and Morrison, I.M.: Identification of cyclobutane-type dimers of substituted cinnamic acids by gas chromatography/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 6 (1992) 46-53; *C.A.*, 116 (1992) 128489x.
- 1796 Stoakes, L., Kelly, T., Schieven, B., Harley, D., Ramos, M., Lannigan, R., Groves, D. and Hussain, Z.: Gas-liquid chromatographic analysis of cellular fatty acids for identification of gram-negative anaerobic bacilli. *J. Clin. Microbiol.*, 29 (1991) 2636-2638; *C.A.*, 116 (1992) 79600r.

- 1797 Uchiyama, N., Kagami, Y., Saito, Y., Abe, S., Ohtawa, M. and Hata, S.: Metabolic fate of 2,2-dimethylbutyryl moiety of simvastatin in rats: identification of metabolites by gas chromatography/mass spectrometry. *Eur. J. Drug Metab. Pharmacokinet.*, 16 (1991) 189-196; C.A., 116 (1992) 165720m.
- 1798 Wu, H. and Cheng, Z.: (Determination of fatty acids in seeds of *Citrus nobilis* by capillary GC/MS/MSD.) *Fenxi Ceshi Tongbao*, 10 (1991) 48-50; C.A., 115 (1991) 134534d.
- 1799 Xiong, Y., Ma, S., Zhao, A. and Liu, B.: (Gas-chromatographic analysis of oxalic acid in food.) *Shanxi Daxue Xuebao, Ziran Kexueban*, 13 (1990) 56-60; C.A., 116 (1992) 5375z.
- 1800 Xu, R.M., Han, C., Xie, J.X. and Song, Z.Y.: (Use of ²H-labeled compound and GC-MS in the isolation and identification of a metabolite of biphenyldimethyldicarboxylate in rat urine.) *Yaoxue Xuebao*, 25 (1991) 777-779; C.A., 116 (1992) 143192p.
- 1801 Yamamoto, K., Shibahara, A., Nakayama, T. and Kajimoto, G.: Determination of double-bond positions in methylene-interrupted dienoic fatty acids by GC-MS as their dimethyl disulfide adducts. *Chem. Phys. Lipids*, 60 (1991) 39-50; C.A., 116 (1992) 169545f.
- 1802 Zhang, W. and Wu, S.: (Estimation of component fatty acids in fat emulsions.) *Zhongguo Yiyuan Yaoxue Zazhi*, 11 (1991) 404-405; C.A., 116 (1992) 113649a.
- 1803 Zou, Z.: (Gas chromatography for trace-moisture determination in pyromellitic acid dianhydride.) *Nanjing Huagong Xueyuan Xuebao*, 13, No. 4 (1991) 81-84; C.A., 116 (1992) 187279b.
- See also 1618, 1693, 1697, 1707, 2000.
- 11b. *Prostaglandins*
- 1804 Ishibashi, M., Watanabe, K., Ishizaki, F., Ohshima, Y., Nishikawa, M., Mizugaki, M. and Harima, N.: Dimethylisopropylsilyl ether derivative in gas chromatography/mass spectrometry of 2,3-dinor-11-dehydrothromboxane B₂. *Biol. Mass Spectrom.*, 20 (1991) 399-407; C.A., 116 (1992) 76481s.
- 1805 Weber, C., Beetens, J., de Clerck, F. and Tegtmeier, F.: Gas chromatographic-mass spectrometric determination of 11-dehydrothromboxane B₂ in human urine. *J. Chromatogr.*, 577 (1992) 1-7.
- 11c. *Lipids and their constituents*
- 1806 Frega, N., Bocci, F., Capozzi, F., Luchinat, C., Capella, P. and Lercker, C.: A new lipid component identified in avocado pear by GC-MS and NMR spectroscopy. *Chem. Phys. Lipids*, 60 (1991) 133-142; C.A., 116 (1992) 124025p.
- 1807 Greenaway, W., Gumudere, I. and Whatley, F.R.: Analysis of phenolics of bud exudate of *Populus euphratica* by GC-MS. *Phytochemistry*, 30 (1991) 1883-1885; C.A., 115 (1991) 89156u.
- 1808 Lu, Y.: (Determination of triacetin by gas chromatography.) *Fenxi Ceshi Tongbao*, 10, No. 5 (1991) 77-79; C.A., 116 (1992) 120138m.
- 1809 Ruiz-Gutierrez, V., Cert, A. and Rios, J.J.: Determination of phospholipid fatty acid and triacylglycerol composition of rat caecal mucosa. *J. Chromatogr.*, 575 (1992) 1-6.
- 1810 Schulte, E. and Weber, N.: (Detection of refining/bleaching of fats and oils. Determination of disteryl ethers.) *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 230-233; C.A., 116 (1992) 5384b.
- 1811 Shen, Y., Zhou, Y., Lou, X., Wang, Q. and Zhou, L.: (Separation and determination of glycerides by supercritical fluid chromatography.) *Sepu*, 9 (1991) 379-382.
- See also 1776, 1966, 2009.
- 11d. *Lipoproteins and their constituents*
- 1812 Turk, J., Bohrer, A., Stump, W.T., Ramanadham, S. and Mangino, M.J.: Quantification of distinct molecular species of the 2-lyso metabolite of platelet-activating factor by gas chromatography-negative-ion chemical ionization mass spectrometry. *J. Chromatogr.*, 575 (1992) 183-196.
12. ORGANIC PEROXIDES
- See 1652.
13. STEROIDS
- 13b. *Pregnane and androstane derivatives*
- 1813 Brooks, C.J.W., Cole, W.J., Zakhari, N.A., Rizk, M.S., Walsh, M.I. and Tubar, S.S.: Gas chromatographic determination of steroids in oral contraceptive preparations. *Alexandria J. Pharm. Sci.*, 5 (1991) 205-208; C.A., 116 (1992) 136380v.
- 1814 De Boer, D., de Jong, E.G. and Maes, R.A.A.: The detection of danazol and its significance in doping analysis. *J. Anal. Toxicol.*, 16 (1992) 14-18; C.A., 116 (1992) 100718x.
- 1815 Liu, C.S., Zhang, J. and Zhou, T.H.: (GC-MS analysis of norethandrolone and its metabolites in man.) *Yaoxue Xuebao*, 26 (1991) 777-781; C.A., 116 (1992) 99436v.
- 1816 Rizk, M.S., Zakhari, N.A., Walsh, M.I., Toubar, S.S., Brooks, C.J.W. and Anderson, R.: Gas chromatography and mass spectrometry of dimethylethylsilyl ether derivatives of norethisterone metabolites in plasma. *Acta Pharm. Nord.*, 3 (1991) 205-210; C.A., 116 (1992) 166411y.
- 1817 Schaezner, W. and Donike, M.: Metabolism of boldenone in man: gas chromatographic/mass spectrometric identification of urinary excreted metabolites and determination of excretion rates. *Biol. Mass Spectrom.*, 21 (1992) 3-16; C.A., 116 (1992) 166480v.
- 1818 Schneider, M.A. and Honour, J.W.: Adrenal cortex, tumor, and peripheral production of deoxycorticosterone. *Steroids*, 57 (1992) 7-12; C.A., 116 (1992) 76500x.
- 1819 Shibasaki, H., Arai, I., Furuta, T. and Kasuya, Y.: Simultaneous determination of cortisol and cortisone in human plasma by stable-isotope dilution mass spectrometry. *J. Chromatogr.*, 576 (1992) 47-52.
- 1820 Zhang, C., Zhang, Y., Lin, Q., Ye, L., Yang, T., Zhang, J., Liu, C., Wang, M., Zhou, T. and Yang, Z.: (Comparison of the hydrolyzed activity of β -glucuronidases from different sources during testosterone level determination in drug control.) *Gaodeng Xuexiao Huaxue Xuebao*, 12 (1991) 918-920; C.A., 116 (1992) 100715u.

- 1821 Zhang, J., Liu, C.S., Bi, H.G., Zhang, Y.Z., Ye, L. and Zhou, T.H.: (The chromatographic-mass spectrometric analysis and detection of anabolic steroids in human urines and a metabolic study.) *Yaoxue Xuebao*, 26 (1991) 598-605; C.A., 116 (1992) 782v.
- 13c. *Estrogens*
- See 1813.
- 13d. *Sterols*
- 1822 Son, K.C., Severson, R.F. and Kays, S.J.: A rapid method for screening sweet potato genotypes for oviposition stimulants to the sweet potato weevil. *HortScience*, 26 (1991) 409-410; C.A., 115 (1991) 178431x.
- 1823 Ulberth, F. and Reich, H.: Gas chromatographic determination of cholesterol in processed foods. *Food Chem.*, 43 (1992) 387-391; C.A., 116 (1992) 172554p.
- 1824 Wasilchuk, B.A., le Quesne, P.W. and Vouros, P.: Monitoring cholesterol autoxidation process using multideuterated cholesterol. *Anal. Chem.*, 64 (1992) 1077-1087.
- See also 1776.
- 13f. *Ecdysones and other insect steroid hormones*
- See 1822.
- 13g. *Other steroids*
- 1825 Sancho, M.T., Muniategui, S., Huidobro, J.F. and Simal, J.: (Determination of fluvalinate residues in honey by GC/ECD.) *Rev. Agroquim. Tecnol. Aliment.*, 31 (1991) 417-422; C.A., 116 (1992) 172534g.
- 1826 Tao, L., Da, H. and Da, S.: (Determination of diosgenin in pelate yam (*Dioscorea zingiberensis*) by GC.) *Zhongcaoyao*, 22 (1991) 252-253; C.A., 115 (1991) 179380s.
15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS
- 15a. *Terpenes*
- 1827 König, W.A., Krüger, A., Icheln, D. and Runge, T.: Enantiomeric composition of the chiral constituents in essential oils. Part 1: Monoterpene hydrocarbons. *J. High Resolut. Chromatogr.*, 15 (1992) 184-189.
- See also 1591, 1982.
- 15b. *Essential oils*
- 1828 Clavijo, J., Vasquez, H. and Mestres, R.: (Modification of the components of essential lemon oil subjected to extreme conditions of storage. I. Analysis by gas chromatography.) *Bol. Soc. Quim. Peru*, 57 (1991) 111-116; C.A., 116 (1992) 113309q.
- 1829 Liu, W. and Shi, X.: (Determination of carvone in spearmint oil.) *Huaxue Shijie*, 32 (1991) 319-321; C.A., 116 (1992) 91116v.
- 1830 Sattar, A., Gilani, A.M. and Saeed, M.A.: Gas chromatographic examination of the essential oil of *Cinnamomum camphora*. *Pak. J. Sci. Ind. Res.*, 34 (1991) 135-136; C.A., 116 (1992) 113306m.
- See also 1690, 1735, 1827, 1976.
- 15c. *Bitter substances*
- 1831 Silva, J., Suarez, M. and Duque, C.: (Preparation of lulo (*Solanum vestissimum*) essence from the study on the contribution of volatile components to fruit aroma.) *Rev. Columb. Quim.*, 19, No. 2 (1990) 47-54; C.A., 116 (1992) 172609k.
- See also 1822.
16. NITRO AND NITROSO COMPOUNDS
- 1832 Jorgensen, M., Andersen, M.P. and Hansen, S.H.: Simultaneous determination of nitroglycerin and its dinitrate metabolites by capillary gas chromatography with electron-capture detection. *J. Chromatogr.*, 577 (1992) 167-170.
- 1833 Lopez-Avila, V., Benedicto, J., Baldin, E. and Beckert, W.F.: Analysis of compounds of environmental concern: II. Diphenyl ethers. *J. High Resolut. Chromatogr.*, 15 (1992) 160-164.
- 1834 Via, J.A. and Taylor, L.T.: Chromatographic analysis of non-polymeric single base propellant components. *J. Chromatogr. Sci.*, 30 (1992) 106-110.
- See also 1709, 1991.
17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17a. *Amines and polyamines*
- 1835 Arimoto, H. and Kamae, R.: (Selective detection of primary and secondary amines using alkyl halides with high sensitivity.) *Jpn. Kokai Tokkyo Koho* JP 03,262,963 [91,262,963] (Cl. G01N30/06), 22 Nov. 1991, Appl. 90/61,790, 13 Mar. 1990; 4 pp.; C.A., 116 (1992) 98677n.
- 1836 Gaidn, V.S., Jedrzejczak, K., Chai, F. and Guldner, B.: Gas chromatographic determination of airborne monoethanolamine using reagent-coated adsorbent tubes. *Fresenius. J. Anal. Chem.*, 342 (1992) 591-596.
- See also 1991, 2015.
- 17d. *Other amine derivatives and amides (excl. peptides)*
- 1837 Hara, K., Kageura, M., Hieda, Y. and Kashimura, S.: Identification of Schiff bases in putrefied cadaver specimens. *Hochu-doku*, 9 (1991) 34-40; C.A., 116 (1992) 100711q.
- 1838 Wang, M., Zhang, R., Qu, J., Xue, S., Lu, P., Wang, P. and Shi, X.: (Gas chromatographic determination of chlorphenamide and its major metabolite *p*-chloro-*o*-toluidine in urine.) *Gongye Weiheng Yu Zhiyebing*, 17 (1991) 233-235; C.A., 116 (1992) 122709x.

See also 1770, 1834.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. Amino acids and their derivatives

- 1839 Furuta, T., Katayama, M., Shibasaki, H. and Kasuya, Y.: Simultaneous determination of stable isotopically labelled L-histidine and urocanic acid in human plasma by stable isotope dilution mass spectrometry. *J. Chromatogr.*, 576 (1992) 213-219.
- 1840 Ketting, D., Wadman, S.K., Spaapen, L.J.M., van der Meer, S.B. and Duran, M.: Gas chromatography method for the separation of amino acids enantiomers in plasma and urine. Application in a case of short bowel syndrome. *Clin. Chim. Acta*, 204 (1991) 79-86.
- 1841 Michalczyk, L., Bialek, K. and Cohen, J.D.: Rapid determination of free tryptophan in plant samples by gas chromatography-selected ion monitoring mass spectrometry. *J. Chromatogr.*, 596 (1992) 294-298.
- 1842 Pirini, A., Conte, L.S., Francioso, O. and Lercker, G.: Capillary gas chromatographic determination of free amino acids in honey as a means of discrimination between different botanical sources. *J. High Resolut. Chromatogr.*, 15 (1992) 165-170.
- 1843 Shi, J., Hu, Y., Yue, F. and Mang, L.: (Capillary gas chromatographic determination of amino acids in non-alcoholic beverages produced by multi-bacterial species zymolysis.) *Fenxi Ceshi Tongbao*, 10, No. 4 (1991) 81-83; *C.A.*, 116 (1992) 82318k.
- 1844 Sumitani, H., Suekane, S., Sakai, Y. and Tatsuka, K.: FPD-GC determination of S-methylmethioninesulfonium in Satsuma mandarin juice. *Agric. Biol. Chem.*, 55 (1991) 2899-2900; *C.A.*, 116 (1992) 82320e.
- 1845 Yasuhara, F., Takeda, M., Ochiai, Y., Miyano, S. and Yamaguchi, S.: α -Methoxy- α -(trifluoromethyl)propionic acid (MTP α). A new chiral derivatizing reagent for GC separation of enantiomeric amino acids. *Chem. Lett.*, No. 2 (1992) 251-252; *C.A.*, 116 (1992) 152324k.

See also 1695, 1782, 1846, 2004.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

20a. Oxidoreductases

See 1797.

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

- 1846 Tamvakopoulos, C.S. and Anderson, V.E.: Detection of acyl-coenzyme A thioester intermediates of fatty acid β -oxidation as the N-acylglycines by negative-ion chemical ionization gas chromatography mass spectrometry. *Anal. Biochem.*, 200 (1992) 381-387.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

- 1847 Dizdaroglu, M.: Measurement of radiation-induced damage to DNA at the molecular level. *Int. J. Radiat. Biol.*, 61 (1992) 175-183; *C.A.*, 116 (1992) 146842m - a review with 81 refs.

21a. Purines, pyrimidines, nucleosides, nucleotides

- 1848 Sato, J., Watanabe, K., Takahama, S. and Makita, T.: Quantification of 5-fluoro-2'-deoxyuridine in plasma by gas chromatography and negative-ion chemical ionization mass spectrometry. *J. Chromatogr.*, 575 (1992) 63-67.
- 1849 Shuker, D.E.G., Friesen, M.D., Garren, L. and Prevost, V.: A rapid gas chromatography-mass spectrometry method for the determination of urinary 3-methyladenine: application in human subjects. *IARC Sci. Publ.*, 105 (1991) 102-106; *C.A.*, 116 (1992) 124288h.

21c. Nucleic acids, DNA

See 1592.

22. ALKALOIDS

- 1850 Chen, J.: (Gas chromatographic determination of alkaloids in cocoa food products.) *Shipin Kexue*, 137 (1991) 40-43; *C.A.*, 116 (1992) 104573u.
- 1851 Cui, J.F., Niu, C.Q. and Zhang, J.S.: (Determination of Ephedra alkaloids in Chinese Ephedra (Mahuang) by gas chromatography.) *Yaoxue Xuebao*, 26 (1991) 852-857; *C.A.*, 116 (1992) 136346p.
- 1852 Feng, N., Minder, E.I., Grampp, T. and Vonderschmitt, D.J.: Identification and quantification of ergotamine in human plasma by gas chromatography-mass spectrometry. *J. Chromatogr.*, 575 (1992) 289-294.
- 1853 Grinstead, G.F.: A closer look at acetyl and pentafluoropropionyl derivatives for quantitative analysis of morphine and codeine by gas chromatography/mass spectrometry. *J. Anal. Toxicol.*, 15 (1991) 293-298; *C.A.*, 116 (1992) 167939p.
- 1854 Martinsen, A., Naaranlahti, T., Turkia, M.L., Lehtola, T., Oksanen, J. and Ylinen, M.: Comparison of radioimmunoassay and capillary gas chromatography in the analysis of 1-hyoscyamine from plant material. *Phytochem. Anal.*, 2 (1991) 163-166; *C.A.*, 116 (1992) 113640r.
- 1855 Shealy, D.B., Hill, R.H., Jr., Orti, D.L., Bailey, S.L., Miller, B.B. and Turner, W.E.: Automated sample preparation of serum cotinine for GC/MS analysis. *Adv. Lab. Autom. Rob.*, 7 (1991) 533-544; *C.A.*, 115 (1991) 129328k.
- 1856 Yamada, H., Ogurin K., Yoshimura, H. and Wada, S.: (Analysis of cocaine in hair by gas chromatography-mass spectrometry.) *Hochudoku*, 9 (1991) 106-107; *C.A.*, 116 (1992) 1849j.

See also 1959, 1961.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23d. Pyridine derivatives

- 1857 Kamiura, T. and Nakadoi, T.: (Determination of pyridine and 2-vinylpyridine in air by capillary gas chromatography/mass spectrometry.) *Kankyo Kagaku*, 1 (1991) 567-570; *C.A.*, 116 (1992) 180015d.
- 1858 Nabivach, V.M.: (Calculation of chromatographic retention indexes of heterocyclic nitrogen bases.) *Koks Khim.*, No. 8 (1990) 28-31; *C.A.*, 116 (1992) 6079t.

See also 1682.

23e. Other N-heterocyclic compounds

- 1859 Kamata, K., Motohashi, N., Meyer, R. and Yamamoto, Y.: Determination of 7-methylbenz[*c*]acridines by capillary gas chromatography with electron-capture detection. *J. Chromatogr.*, 596 (1992) 233-239.
- 1860 Misharina, T.A., Golovnya, R.V., Yakovleva, V.N. and Vitt, S.V.: (Pyrazines formed in model systems in glycerine-water medium.) *Izv. Acad. Sci., Ser. Khim.*, (1991) 1972-1979.

See also 1682.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 1861 Andersson, J.T. and Bobinger, S.: Polycyclic aromatic sulfur heterocycles. II. Photochemical oxidation of benzo[*b*]thiophene in aqueous solution. *Chemosphere*, 24 (1992) 383-389.
- 1862 Buser, H.-R., Zook, D.R. and Rappe, C.: Determination of methylsulfone-substituted polychlorobiphenyls by mass spectrometric techniques with application to environmental samples. *Anal. Chem.*, 64 (1992) 1176-1183.
- 1863 Cessna, A.J.: Residues of triallate in garlic (*Allium sativum* L.) cloves following preplant incorporation. *Can. J. Plant Sci.*, 71 (1991) 1257-1261; *C.A.*, 116 (1992) 150271s.
- 1864 Hsieh, L.L. and Lo, J.G.: (Analysis of mercaptans in ambient air by a cold trap technique with gas chromatography.) *Huaxue*, 49 (1991) 201-206; *C.A.*, 116 (1992) 157746j.
- 1865 Huwe, J.K.: Artifact formation during gas chromatographic-mass spectrometric analysis of a methylsulfinyl-containing metabolite. *J. Chromatogr.*, 575 (1992) 287-288.
- 1866 Orilisi, S. and Benetti, E.: (Presence of bis(methylthio)methane in truffle-flavored oils: determination by GC/MS.) *Ind. Aliment.*, 30 (1991) 1062-1065; *C.A.*, 116 (1992) 172531d.
- 1867 Ridgeway, R.G.: Development of an analytical method based on isotope dilution gas chromatography-mass spectrometry for the determination of trace quantities of aqueous dimethyl sulfide and dimethyl sulfoxide: application to rain and sea water. Avail. *Univ. Microfilms Int.*, Order No. DA9128535, 1991, 175 p.; *C.A.*, 116 (1992) 90987t.
- 1868 Sherbina, V.E., Kashinskii, V.N., Grunval'd, V.R., Vakulin, V.I., Nasteka, V.I., Borodin, B.P., Kapralova, N.Ya. and Kirillova, G.V.: (Gas-chromatographic method for analysis of sulfur-containing substances.) *U.S.S.R. SU 1,665,297* (Cl. G01N30/02), 23 Jul. 1991, Appl. 4,360,378, 07 Jan. 1988; *C.A.*, 116 (1992) 120183x.

See also 1616, 1917, 1978, 1984, 2026.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 1869 D'Agostino, P.A. and Provost, L.R.: Mass spectrometric identification of products formed during degradation of ethyl dimethylphosphoramidocyanidate (tabun). *J. Chromatogr.*, 598 (1992) 89-95.
- 1870 Tieffova, P. and Matousek, M.: (A method for routine determination of ethephon residues in plant material.) *Agrochimia*, 31 (1991) 251-254; *C.A.*, 116 (1992) 146022u.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. Organometallic compounds

- 1871 Aggrawal, S.K., Kinter, M. and Herold, D.A.: Determination of selenium in urine by isotope dilution gas chromatography-mass spectrometry using 4-nitro-*o*-phenylenediamine, 3,5-dibromo-*o*-phenylenediamine, and trifluoromethyl-*o*-phenylenediamine as derivatizing reagents. *Anal. Biochem.*, 202 (1992) 367-374.
- 1872 Dowling, T.M., Seeley, J.A., Feuerbacher, H. and Uden, P.C.: Microwave-induced plasma-atomic emission detection for organometallic gas and supercritical-fluid chromatography. Sample handling and instrument comparisons. *ACS Symp. Ser.*, 479 (1992) 90-104.
- 1873 Jiang, G., Gu, X., Ni, Z., Wang, S. and Han, H.: (Determination of organomercury compounds in biological samples by capillary gas chromatography-atomic absorption spectrometry.) *Sepu*, 9 (1991) 350-352.
- 1874 Kato, T., Uehiro, T., Yasuhara, A. and Morita, M.: Determination of methylmercury species by capillary column gas chromatography with axially viewed inductively coupled plasma atomic emission spectrometric detection. *J. Anal. At. Spectrom.*, 7 (1992) 15-18; *C.A.*, 116 (1992) 119990b.
- 1875 Lansens, P., Leermakers, M. and Baeyens, W.: Determination of methylmercury in fish by headspace-gas chromatography with microwave-induced plasma detection. *Water, Air, Soil Pollut.*, 56 (1991) 103-115; *C.A.*, 116 (1992) 1820t.
- 1876 Martin-Landa, I., Pablos, F. and Marr, I.L.: Speciation of butyltins in fish and sediment by means of gas chromatography with flame photometric detection. *Appl. Organomet. Chem.*, 5 (1991) 399-407; *C.A.*, 116 (1992) 1830w.
- 1877 Michel, P. and Averty, B.: Tributyltin analysis in seawater by GC PFD after direct aqueous-phase ethylation using sodium tetraethylborate. *Appl. Organomet. Chem.*, 5 (1991) 393-397; *C.A.*, 116 (1992) 10953r.
- 1878 Ombaba, J.M. and Barry, E.F.: Determination of organotin species by capillary gas chromatography with alternating current plasma emission detection. *J. Chromatogr.*, 598 (1992) 97-103.

See also 1581, 1596.

26b. *Boranes, silanes and related non-metallic compounds*

- 1879 Johansson, K. and Olin, A.: Determination of selenium by capillary gas chromatography after high-temperature derivatization with 1,2-diamino-3,5-dibromobenzene. *J. Chromatogr.*, 598 (1992) 105-114.

See also 1992.

26c. *Coordination compounds*

- 1880 Aggarwal, S.K., Kinter, M. and Herold, D.A.: Determination of cobalt in urine by gas chromatography-mass spectrometry employing nickel as an internal standard. *J. Chromatogr.*, 576 (1992) 297-304.
- 1881 Laintz, K.E., Shieh, G.M. and Wai, C.M.: Simultaneous determination of arsenic and antimony species in environmental samples using bis(trifluoroethyl)dithiocarbamate chelation and supercritical fluid chromatography. *J. Chromatogr. Sci.*, 30 (1992) 120-123.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. *General techniques*

- 1882 France, J.E. and King, J.W.: Supercritical fluid extraction/enzyme assay: a novel technique to screen for pesticide residues in meat products. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 1013-1016.
- 1883 Fujimori, K., Oki, N., Nakano, T., Tsuji, M. and Okuno, T.: (Analysis of pesticides in air by collection method using ODS cartridge.) *Kankyo Kagaku*, 1 (1991) 575-581; *C.A.*, 116 (1992) 180016e.
- 1884 Shen, Z. and Qian, C.: (Multiresidue analysis of 20 pesticides in crops.) *Huanjing Kexue Xuebao*, 11 (1991) 223-230; *C.A.*, 116 (1992) 172513z.
- 1885 Suzuki, S.: (Simultaneous determination of airborne pesticides by GC/MS.) *Bunseki Kagaku*, 41 (1992) 115-124.

29b. *Chlorinated insecticides*

- 1886 Bacon, C.E., Jarman, W.M. and Costa, D.P.: Organochlorine and polychlorinated biphenyl levels in pinniped milk from the Arctic, Antarctic, California and Australia. *Chemosphere*, 24 (1992) 779-791.
- 1887 Galaktionova, M.A. and Nevinnaya, L.V.: (Rapid gas-chromatographic method for determination of organochlorine insecticides in water.) *Khim. Tekhnol. Vody*, 13 (1991) 987-991; *C.A.*, 116 (1992) 91010f.
- 1888 Heinzen, V.E.F. and Yunes, R.A.: Relationship between gas chromatographic retention indices and molecular connectivity indices of chlorinated pesticides and structurally related compounds. *J. Chromatogr.*, 598 (1992) 243-250.
- 1889 Hopper, M.L.: Analysis of organochlorine pesticide residues using simultaneous injection of two capillary columns with electron capture and electrolytic conductivity detectors. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 974-981.

- 1890 Lopez-Avila, V., Benedicto, J., Baldin, E. and Beckert, W.F.: Analysis of classes of compounds of environmental concern: III. Organochlorine pesticides. *J. High Resolut. Chromatogr.*, 15 (1992) 319-328.
- 1891 Mattern, G.C., Louis, J.B. and Rosen, J.D.: Multipesticide determination in surface water by gas chromatography/chemical ionization/mass spectrometry/ion trap detection. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 982-986.
- 1892 Mueller, M.D., Schlabach, M. and Oehme, M.: Fast and precise determination of α -hexachlorocyclohexane enantiomers in environmental samples using chiral high-resolution gas chromatography. *Environ. Sci. Technol.*, 26 (1992) 566-569; *C.A.*, 116 (1992) 98641w.
- 1893 Spielszaski, W. and Niemczyk, H.D.: Improved gas chromatographic method for analysis of trichlorfon insecticide in soil and turfgrass thatch. *J. Environ. Sci. Health*, B26 (1991) 575-588; *C.A.*, 116 (1992) 78412u.
- 1894 Ting, K.-C. and Kho, P.: GC/MIP/AED method for pesticide residue determination in fruits and vegetables. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 991-998.
- 1895 Wilson-Yang, K.M., Power, J.P., Chisholm, E.A. and Hallett, D.J.: The congener specific determination of PCBs: carbon column chromatography of potentially toxic congeners. *Chemosphere*, 23 (1991) 1139-1143.

29c. *Phosphorus insecticides*

- 1896 Bartels, M.J., Kastl, P.E.: Analysis of 3,5,6-trichloropyridinol in human urine using negative-ion chemical ionization gas chromatography-mass spectrometry. *J. Chromatogr.*, 575 (1992) 69-74.
- 1897 Guo, J. and Wang, R.: (Gas chromatographic determination of dimethoate, methylparathion and parathion in water.) *Fenxi Huaxue*, 19 (1991) 1186-1188; *C.A.*, 116 (1992) 90982n.
- 1898 Hanks, A.R.: Determination of pirimiphos-methyl in technical materials and pesticides formulations by gas chromatography: CIPAC collaborative study. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 71-73.
- 1899 Masud, S.Y. and Parveen, Z.: Persistence of permethrin, pirimiphos methyl and chlorpyrifos methyl insecticides in wheat stored under simulated environmental conditions. *Pak. J. Sci. Ind. Res.*, 34 (1991) 240-246; *C.A.*, 116 (1992) 150245m.
- 1900 Tonogai, Y., Hasegawa, Y., Nakamura, Y., Shibata, T., Tsuji, S., Ito, Y. and Kato, S.: (Analysis of disulfoton and trichlorfon in agricultural products by FPD-GC.) *Shokuhin Eiseigaku Zasshi*, 32 (1991) 328-335; *C.A.*, 116 (1992) 82314f.
- 1901 Watanabe, T.: (Determination of various pesticides in the atmosphere by using silica gel cartridge column.) *Bunseki Kagaku*, 41 (1992) 221-229.
- 1902 Yang, H.: (Determination of trace organophosphorus pesticide in water by organochlorine column chromatography.) *Shanghai Huanjing Kexue*, 10, No. 4 (1991) 26; *C.A.*, 116 (1992) 113202z.
- 1903 Zhang, H.: (Gas chromatographic analysis of trace nerve agents and organophosphorus pesticides in blood.) *Sepu*, 9 (1991) 397, 368.

See also 1642, 1759, 1891, 1986.

29d. Carbamates

- 1904 Fahl, C. and Wittkowski, R.: Determination of ethyl carbamate in wine by GC-SIM-MS after continuous extraction with diethyl ether. *J. High Resolut. Chromatogr.*, 15 (1992) 203-205.

See also 1901.

29e. Herbicides

- 1905 Beernaert, H. and Hucorne, P.: A simple and quick gas chromatographic method for the determination of propham and chlorpropham in potatoes. *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 433-435; *C.A.*, 116 (1992) 104609k.
- 1906 Brondz, I. and Olsen, I.: Intra-injector formation of methyl esters from phenoxy acid pesticides. *J. Chromatogr.*, 598 (1992) 309-312.
- 1907 Nesterova, T.L., Babkina, E.I., Mal'tsev, G.N. and Shraimer, G.A.: (Determination of pesticide residues in soil. Part 3. Gas chromatographic determination of the herbicides molinate, Saturn, and propanil and its metabolite 3,4-dichloroaniline.) *Agrokhimiya*, No. 4 (1991) 121-127; *C.A.*, 116 (1992) 146028a.
- 1908 Pachinger, A., Eisner, E., Tertsch, C., Begutter, H. and Klus, H.: Analysis of deethyl- and deisopropylatrazine residues in drinking and ground water by chemical derivatization. *J. High Resolut. Chromatogr.*, 15 (1992) 302-304.
- 1909 Pelizzetti, E., Minero, C., Carlin, V., Vincenti, M., Pramauro, E. and Dolci, M.: Identification of photocatalytic degradation pathways of 2-Cl-s-triazine herbicides and detection of their decomposition intermediates. *Chemosphere*, 24 (1992) 891-910.
- 1910 Tonogai, Y., Tsumura, Y., Nakamura, Y., Fujiwara, S., Fujii, Y. and Ito, Y.: (Comparison between GC and HPLC methods for determination of 9 kinds of herbicides containing nitrogen in agricultural products.) *Eisei Kagaku*, 37 (1991) 480-488; *C.A.*, 116 (1992) 127148y.
- 1911 Vogelgesang, J.: (Application of a modified quality control chart in the monitoring of herbicides in drinking water.) *Dtsch. Lebensm.-Rundsch.*, 87 (1991) 239-242; *C.A.*, 116 (1992) 90966k.

29f. Fungicides

- 1912 Ford, J.H., Legendre, M.G., Ladner, D.L., Dawson, J.A. and Raymond, C.: Automated closed-system headspace determination of methyl bromide in a variety of raw and processed nuts. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 328-333.

See also 1740.

29g. Other types of pesticides and various agrochemicals

- 1913 Junting, L. and Chuichang, F.: Solid-phase extraction method for rapid isolation and clean-up of some synthetic pyrethroid insecticides from human urine and plasma. *Forensic Sci. Int.*, 51 (1991) 89-93; *C.A.*, 116 (1992) 122746g.
- 1914 Mizuno, M.: (Determination of agrochemicals in environmental samples by gas chromatography/mass spectrometry.) *Kankyo Kagaku*, 1 (1991) 543-548; *C.A.*, 116 (1992) 146031w.
- 1915 Wei, L.Y.: Determination of bifenthrin in pumpkins by gas chromatography and mass spectrometry. *Pestic. Sci.*, 32 (1991) 141-145; *C.A.*, 115 (1991) 134350q.

31. PLASTICS AND THEIR INTERMEDIATES

- 1916 Bovadt, S. and Larsen, B.: Rapid screening of chlorobiphenyl congeners by GC-ECD on a carborane-polydimethylsiloxane copolymer. *J. High Resolut. Chromatogr.*, 15 (1992) 350-351.
- 1917 Haken, J.K. and Camamo, M.: Degradation of polysulphones by alkali fusion. *J. Chromatogr.*, 595 (1992) 283-287.
- 1918 Hiltz, J.A.: Pyrolysis-gas chromatography/mass spectrometry identification of styrene cross-linked polyester and vinyl ester resins. *J. Anal. Appl. Pyrolysis*, 22 (1991) 113-128.
- 1919 Lavrov, N.A., Bocharova, T.S. and Avdonina, E.D.: (Gas-liquid chromatography for study of the copolymerization kinetics of 2-hydroxyethyl methacrylate with acrylic acid.) In: Nikolaev, A.F. (Editor), *Khim. Tekhnol., Svoistva Primen. Plastmass*, Leningr. Tekhnol. Inst., Leningrad, 1990, pp. 136-139; *C.A.*, 116 (1992) 152455d.
- 1920 Mao, Y. and Wang, H.: (Inverse gas chromatographic determination of the solubility parameter of hydroxyl-terminated polybutadiene.) *Fenxi Ceshi Tongbao*, 10, No. 3 (1991) 46-50; *C.A.*, 116 (1992) 60516w.
- 1921 Ozdemir, E., Acikses, A. and Coskun, M.: (Estimation of glass transition temperature of polystyrene and the heat of adsorption by inverse gas chromatography.) *Doga Turk Kim. Derg.*, 15 (1991) 197-205; *C.A.*, 116 (1992) 107171x.
- 1922 Ozdemir, E., Coskun, M. and Acikses, A.: Estimation of thermodynamic parameters of polystyrene-*n*-hydrocarbon systems using inverse gas chromatography. *Macromol. Rep.*, A28, Suppl. 2 (1991) 129-136; *C.A.*, 116 (1992) 107179f.
- 1923 Satoh, S.: (Investigation of the derivatization method for the identification of copolyester by the pyrolysis-GC.) *Bunseki Kagaku*, 41 (1992) 173-178.
- 1924 Tanaka, T.: (Study on chemical analysis. (8). Qualitative and quantitative analysis of polymers using pyrolysis gas chromatography with a fused silica capillary column.) *Giho Meiji Gomu Kasei*, 13, No. 1 (1991) 33-41; *C.A.*, 116 (1992) 108045w.
- 1925 Thomson, J.S. and Rynaski, A.F.: Simulated distillation of wax samples using supercritical fluid and high temperature gas chromatography. *J. High Resolut. Chromatogr.*, 15 (1992) 227-234.
- 1926 Weber, D., Fulop, G. and Hummel, D.O.: Pyrolysis-gas chromatography/Fourier-transform infrared spectrometry of poly(ester urethane) elastomers. *Makromol. Chem., Macromol. Symp.*, 52 (1991) 151-160; *C.A.*, 116 (1992) 108046x.
- 1927 Xu, Z., Yang, J. and Pang, S.: Characterization of cyclized polybutadiene by pyrolysis gas chromatography. *Gaofenzi Cailiao Kexue Yu Gongcheng*, 7 (1991) 102-105; *C.A.*, 116 (1992) 130055w.
- 1928 Yoshitake, N., Furukawa, M. and Yokoyama, T.: (Analyses of polymer glycol components in polyurethanes by pyrolysis gas chromatography.) *Nippon Gomu Kyokaishi*, 64 (1991) 386-394; *C.A.*, 116 (1992) 175264e.

See also 1993.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 1929 Gupta, R.N.: Drug level monitoring: antidepressants. *J. Chromatogr.*, 576 (1992) 183-211 - a review with 101 refs.
- 1930 Hida, Y., Nagata, T. and Kudo, K.: (Elimination of interfering components in old blood for drug screening). *Hochudoku*, 9 (1991) 47-56; C.A., 116 (1992) 77950f.
- 1931 Kersten, B.S.: Drug matrix effect on the determination of residual solvents in bulk pharmaceuticals by wide-bore capillary gas chromatography. *J. Chromatogr. Sci.*, 30 (1992) 115-119.

See also 1634, 1687, 1694, 2010.

32b. Antirheumatics and antiinflammatory drugs

See 1942.

32c. Autonomic and cardiovascular drugs

- 1932 Ackermann, R., Kaiser, G., Schueller, F. and Dieterle, W.: Determination of the antidepressant levoprotiline and its N-desmethyl metabolite in biological fluids by gas chromatography/mass spectrometry. *Biol. Mass Spectrom.*, 20 (1991) 709-716; C.A., 116 (1992) 72p.
- 1933 Du, Q.: (Determination of nifedipine and metabolites in body fluids by GC and HPLC.) *Zhongguo Yiyuan Yaoxue Zazhi*, 11 (1991) 265-266; C.A., 116 (1992) 48k - a review with 18 refs.
- 1934 Pittai, G.K. and McErlane, K.M.: Multidimensional gas chromatography of tocainide enantiomers in uremic plasma by coupled fused silica capillary columns and electron capture detection. *Indian Drugs*, 29 (1991) 37-41; C.A., 116 (1992) 98774s.
- 1935 Sadana, G.S. and Ghogare, A.B.: Quantitative gas liquid chromatographic determination of pentoxifylline in bulk drug and pharmaceutical preparations. *Indian J. Pharm. Sci.*, 53 (1991) 159-161; C.A., 116 (1992) 113658c.
- 1936 Shioya, H., Shimojo, M. and Kawahara, Y.: Determination of enalapril and its active metabolite enalaprilat in plasma and urine by gas chromatography/mass spectrometry. *Biomed. Chromatogr.*, 6 (1992) 59-62.
- 1937 Xie, L.Q.: Determination of a digitalis-like factor in biological fluids using supercritical fluid separation techniques. *Avail. Univ. Microfilms Int.*, Order No. DA9122375, 1991, 198 p.; C.A., 116 (1992) 76486x.

See also 1832, 1942.

32d. Central nervous system drugs

- 1938 Andriollo, O., Lartigue-Mattei, C., Chabard, J.L., Bargnoux, H., Petit, J., Berger, J.A. and Pognat, J.F.: Measurement of trazodone in plasma and brain of rat by capillary gas chromatography with a nitrogen-selective detector. *J. Chromatogr.*, 575 (1992) 301-305.
- 1939 Arimoto, H., Noda, J. and Koide, M.: Sensitive determination of midazolam in human plasma by capillary gas chromatography with surface ionization detection. *J. High Resolut. Chromatogr.*, 15 (1992) 195-198.

- 1940 Cui, K., Zhou, Y., Zhang, C. and Yang, Z.: (Separation and determination of five ephedrine drugs in urine by capillary gas chromatography.) *Gaodeng Xuexiao Huaxue Xuebao*, 12 (1991) 1061-1062; C.A., 116 (1992) 122750d.
- 1941 Duncan, C.C. and Ruth, J.A.: Correlation of sedative effects with brain levels of barbiturates in LS and SS mice. *Alcohol*, 8 (1991) 461-466; C.A., 116 (1992) 76299p.
- 1942 Foti, S., Musumarra, G., Saletti, R. and Romano, G.: Determination of the "chromatographic pattern" for the identification of dipyrone urinary metabolites. *Farmaco*, 46 (1991) 1081-1089; C.A., 116 (1992) 75589w.
- 1943 Gaillard, Y., Gay-Montchamp, J.P. and Ollagnier, M.: Gas chromatographic determination of meprobamate in serum or plasma after solid-phase extraction. *J. Chromatogr.*, 577 (1992) 171-173.
- 1944 Gomez, L.E. and Lehmann F., P.A.: Plasma determination of the novel anticonvulsant D,L-3-hydroxy-3-ethyl-3-phenylpropionamide and preliminary pharmacokinetic studies in the rat. *J. Chromatogr.*, 575 (1992) 306-310.
- 1945 Katagi, M., Tatsuno, M. and Tsuchihashi, H.: (Determination of 1,4-benzodiazepine hypnotics in urine as their benzophenones by ECD (electron capture detector)-gas chromatography.) *Hochudoku*, 9 (1991) 116-117; C.A., 116 (1992) 1825y.
- 1946 Kim, T.-J., Park, J.-S. and Shin, H.-S.: Identification of new urinary metabolites of trimepazine in rats by gas chromatography-mass spectrometry. *J. Chromatogr.*, 575 (1992) 295-300.
- 1947 Nakahara, Y., Takahashi, K., Ishigami, A., Kikura, R. and Shimamine, M.: (Studies on comparison of metabolites in urine between deprenyl and methamphetamine administration. II. Enantiomeric composition analysis of metabolites in mouse urine administered with deprenyl and methamphetamines by GC-MS using chiral reagent.) *Eisei Kagaku*, 37 (1991) 473-479; C.A., 116 (1992) 165673y.
- 1948 Poggi, R., Dixit, V. and Dixit, V.M.: Solid-phase extraction and GC/MS confirmation of barbiturates from human urine. *J. Anal. Toxicol.*, 16 (1992) 45-47; C.A., 116 (1992) 75618e.
- 1949 Rollmann, B. and Tilquin, B.: (Gas chromatography/FTIR application to the analysis of drugs.) *J. Pharm. Belg.*, 46 (1991) 357-362; C.A., 116 (1992) 136373v.
- 1950 Terada, M.: (Simultaneous determination of drugs by gas chromatography with nitrogen-phosphorus detection and its application for various poisoning cases.) *Hochudoku*, 9 (1991) 82-85; C.A., 116 (1992) 1848h.
- 1951 Xu, Y., Xu, Y. and Fang, H.: (Determination of dextromoramide and its metabolite in human urine by gas chromatography-mass spectrometry.) *Fenxi Huaxue*, 19 (1991) 751-754; C.A., 116 (1992) 78v.
- 1952 Xu, Y.Q., Fang, H.J., Xu, Y.X., Duan, H.J. and Wu, Y.: (Analysis of anileridine, levorphanol, nalbuphine, and ethamivan in urine.) *Yaoxue Xuebao*, 26 (1991) 606-611; C.A., 116 (1992) 75567n.
- 1953 Yamamoto, S., Hattori, H., Suzuki, O. and Yamada, T.: (Determination of procaine, benoxinate and dibucaine in body fluids by gas chromatography-surface ionization detection.) *Hochudoku*, 9 (1991) 41-46; C.A., 116 (1992) 77949n.

See also 1929.

32a. *Chemotherapeutics (exc. cytostatics and antibiotics)*

- 1954 Goromaru, T., Ikejiri, H., Hashimoto, K. and Matsuki, Y.: (Isotopic fractionation of iproniazid and isopropylhydrazine from their deuterated analogs and application for isotope dilution analysis by capillary gas chromatography.) *Yakugaku Zasshi*, 111 (1991) 612-616; C.A., 116 (1992) 98779x.
- 1955 Hattori, H., Yamamoto, S., Yamada, T. and Suzuki, O.: (Sensitive detection of phenothiazines in blood by gas chromatography with a surface ionization detector.) *Hochudoku*, 9 (1991) 120-121; C.A., 116 (1992) 1827a.

32g. *Other drug categories*

- 1956 Adeishvili, L.V. and Klyuev, N.A.: (Chromatographic mass spectrometric determination of impurities in acephen.) *Khim.-Farm. Zh.*, 25, No. 12 (1991) 65-67; C.A., 116 (1992) 113653x.
- 1957 Li, D., Zhu, M., Yang, X., Cheng, W., Mo, G. and Wang, X.: Pharmacokinetics of methyl *tert*-butyl ether (MTBE) in rats. *Zhongguo Yaolixue Yu Dulixue Zazhi*, 5 (1991) 287-290; C.A., 116 (1992) 75669x.
- 1958 Li, Y., Li, X., Hong, I., Liu, J. and Zhang, M.-Y.: Determination of panaxadiol and panaxatriol in ginseng and its preparations by capillary supercritical fluid chromatography (SFC). *Biomed. Chromatogr.*, 6 (1992) 88-90.

32h. *Toxicological and forensic applications*

- 1959 Browne, S.P., Tebbett, I.R., Moore, C.M., Dusick, A., Covert, R. and Yee, G.T.: Analysis of meconium for cocaine in neonates. *J. Chromatogr.*, 575 (1992) 158-161.
- 1960 De Giovanni, N. and Fucci, N.: Gas chromatographic-mass spectrometric analysis of bufloxedil hydrochloride in biological samples after acute intoxication. *Forensic Sci. Int.*, 51 (1991) 125-129; C.A., 116 (1992) 122748j.
- 1961 Gjerde, H., Fongen, U., Gundersen, H. and Christophersen, A.S.: Evaluation of a method for simultaneous quantification of codeine, ethylmorphine and morphine in blood. *Forensic Sci. Int.*, 51 (1991) 105-110; C.A., 116 (1992) 122747h.
- 1962 Thurman, E.M., Pedersen, M.J., Stout, R.L. and Martin, T.: Distinguishing sympathomimetic amines from amphetamine and methamphetamine in urine by gas chromatography/mass spectrometry. *J. Anal. Toxicol.*, 16 (1992) 19-27; C.A., 116 (1992) 100719y.
- 1963 Yoshida, T., Hirata, M., Tabuchi, T. and Miyajima, K.: (Identification of urinary metabolites in a patient of acute poisoning by *p*-chloroaniline.) *Sangyo Igaku*, 33 (1991) 501-508; C.A., 116 (1992) 122718z.

See also 1721, 1853.

33. CLINICO-CHEMICAL APPLICATIONS

33b. *Complex mixtures and profiling (single compounds by cross-reference only)*

- 1964 Angerer, J., Koenig, W.A., Machata, G., Muffler, H., Schaller, K.H. and Schulte, E.: Gas chromatographic methods for the determination of organic substances in biological material. *Anal. Hazard. Subst. Biol. Mater.*, 3 (1991) 1-44; C.A., 116 (1992) 77832u - a review with 40 refs.
- 1965 Ashley, D.L., Bonin, M.A., Cardinali, F.L., McCraw, J.M., Holler, J.S., Needham, L.L. and Patterson, D.G., Jr.: Determining volatile organic compounds in human blood from a large sample population by using purge and trap gas chromatography/mass spectrometry. *Anal. Chem.*, 64 (1992) 1021-1029.
- 1966 Miao, T.: (Gas chromatography-mass spectrometry for hypertension diagnosis based on changes in erythrocyte membrane lipids.) *Jpn. Kokai Tokkyo Koho* JP 03,252,559 [91,252,559] (Cl. G01N33/92), 11 Nov. 1991, Appl. 90/51,150, 02 Mar. 1990; 7 pp.; C.A., 116 (1992) 102225h.
- 1967 Phillips, M. and Greenberg, J.: Ion-trap detection of volatile organic compounds in alveolar breath. *Clin. Chem. (Winston-Salem)*, 38 (1992) 60-65.
- 1968 Roboz, J. and Katz, R.N.: Diagnosis of disseminated candidiasis based on serum D/L-arabinitol ratios using negative chemical ionization mass spectrometry. *J. Chromatogr.*, 575 (1992) 281-286.
- 1969 Watson, D.G., McGhee, C.N.J., Midgley, J.M., Zhou, P. and Doig, W.M.: Determination of acidic metabolites of biogenic amines in human aqueous humor by gas chromatography-negative ion chemical ionization mass spectrometry. *J. Neurochem.*, 58 (1992) 116-120; C.A., 116 (1992) 99886s.

See also 1708, 1759, 1765, 1787, 1789, 1792, 1814, 1818, 1820, 1840, 1855.

34. FOOD ANALYSIS

34a. *General papers and reviews*

- 1970 Gilbert, S.G. and Roshdy, T.H.: The use of inverse chromatography in food science research. *Dev. Food Sci.*, 24 (1990) 439-452; C.A., 116 (1992) 5342m.

34b. *Complex mixtures (single compounds by cross-reference only)*

- 1971 Grob, K., Biedermann, M., Artho, A. and Egli, J.: Food contamination by hydrocarbons from packaging materials determined by coupled liquid and gas chromatographies. *Z. Lebensm.-Unters. Forsch.*, 193 (1991) 213-219; C.A., 116 (1992) 5442u.
- 1972 Sanz, J., de Frutos, M. and Martinez-Castro, I.: Design and evaluation of a mixed-phase capillary column for the gas chromatographic separation of the volatile compounds of cheese. *Chromatographia*, 33 (1992) 213-217.
- 1973 Singh, H., Kremers, W., Barresi, F., George, I., Delaney, S. and Marsman, K.: GC/MS analysis of some volatile compounds from irradiated and unirradiated, cooked and uncooked bacon. *Dev. Food Sci.*, 24 (1990) 925-937; C.A., 115 (1991) 134467j.

See also 1687, 1692, 1697, 1714, 1722, 1732, 1733, 1736, 1739, 1740, 1743, 1744, 1754, 1755, 1760, 1769, 1772, 1778, 1784, 1786, 1791, 1799, 1810, 1823, 1825, 1826, 1842, 1844, 1850, 1882, 1894, 1899, 1904, 1905, 1910, 1912, 1975, 2001.

34c. *Organoleptically important compounds (flavors, odors, volatiles)*

1974 Angerosa, F., di Giacinto, L. and Solinas, M.: (Effect of bulk storage of olives on the flavor of the oil: estimation of the "fusty" defect by means of HPLC and GLC of the volatile components.) *R.v. Merceol.*, 29 (1990) 275-294; *C.A.*, 116 (1992) 5492k.

1975 Barcarolo, R., Casson, P. and Tutta, C.: Analysis of the volatile constituents of food by headspace GC-MS with reversal of the carrier gas flow during sampling. *J. High Resolut. Chromatogr.*, 15 (1992) 307-311.

1976 Bernreuther, A. and Schreier, P.: Multidimensional gas chromatography/mass spectrometry: a powerful tool for the direct chiral evaluation of aroma compounds in plant tissues. II. Linalool in essential oils and fruits. *Phytochem. Anal.*, 2 (1991) 167-170; *C.A.*, 116 (1992) 11012v.

1977 Braunsdorf, R., Hener, U., Lehmann, D. and Mosandl, A.: (Analytical differentiation of natural, fermented, and synthetic (nature-identical) aromas. Part 1. Origin-specific analysis of (E)- α (β -ionones.) *Dtsch. Lebensm.-Rundsch.*, 87 (1991) 277-280; *C.A.*, 116 (1992) 127117n.

1978 Dietrich, A., Maas, B., Karl, V., Kreis, P., Lehmann, D., Weber, B. and Mosandl, A.: Stereoisomeric flavor compounds. Part LV: Stereodifferentiation of some chiral volatiles on heptakis(2,3-di-O-acetyl-6-O-tert.-butyldimethylsilyl)- β -cyclodextrin. *J. High Resolut. Chromatogr.*, 15 (1992) 176-179.

1979 Mandeville, S., Yaylayan, V.A., Simpson, B. and Pare, J.R.J.: Gas chromatography-mass spectrometry analysis of flavor-active compounds from raw commercial shrimp waste. *Spectroscopy (Ottawa)*, 9 (1991) 61-72; *C.A.*, 116 (1992) 150265t.

1980 Pfannhauser, W., Kellner, R. and Fischboeck, G.: GC/FTIR and GC/MS analysis of kiwi flavors. *Dev. Food Sci.*, 24 (1990) 357-373; *C.A.*, 116 (1992) 5358w.

1981 Vernin, G., Vernin, E., Vernin, C., Metzger, J. and Soliman, A.: Extraction and GC-MS-SPECMA data bank analysis of the aroma of *Psidium guajava* L. fruit from Egypt. *J. Flavour Fragrance J.*, 6 (1991) 143-148; *C.A.*, 116 (1992) 5504r.

1982 Voirin, S.G., Baumes, R.L., Sapis, J.-C. and Bayonove, C.L.: Analytical methods for monoterpene glycosides in grape and wine. II. Qualitative and quantitative determination of monoterpene glycosides in grape. *J. Chromatogr.*, 595 (1992) 269-281.

See also 1735, 1831, 1866, 1972.

35. ENVIRONMENTAL ANALYSIS

35a. *General papers and reviews*

See 1881, 1892.

35b. *Air pollution (complex mixtures; single compounds by cross-reference only)*

1983 Kawata, K. and Kifune, I.: Thermal desorption of toxic volatile organic compounds using 2,6-diphenyl-p-phenylene oxide polymer (Tenax GC). *Eisei Kagaku*, 37 (1991) 281-287; *C.A.*, 115 (1991) 238595r.

1984 Van den Berg, F., Leistra, M., Roos, A.H. and Tuinstra, L.G.M.T.: Sampling and analysis of the soil fumigants 1,3-dichloropropene and methyl isothiocyanate in the air. *Water, Air, Soil Pollut.*, 61 (1992) 385-396; *C.A.*, 116 (1992) 135285f.

1985 Zhou, S., Ma, J., Wang, S. and Chen, Z.: (Qualitative analysis of organic compounds in enclosed air by gas chromatography/mass spectrometry.) *Fenxi Huaxue*, 19 (1991) 1115-1121; *C.A.*, 116 (1992) 135267b.

See also 1641, 1709, 1728, 1760, 1794, 1864, 1883.

35c. *Water pollution (complex mixtures; single compounds by cross-reference only)*

1986 Murata, T. and Takahashi, S.: Identification of residual pesticides in water by GC/QPMS. *Environ. Monit. Assess.*, 19 (1991) 55-62; *C.A.*, 116 (1992) 135876z.

1987 Ohno, H. and Aoyama, T.: (Determination of oxine-copper in water by gas chromatography.) *Eisei Kagaku*, 37 (1991) 522-528; *C.A.*, 116 (1992) 113220d.

1988 Rudenko, A.B. and Khromchenko, Ya.L.: (Determination of total organic impurities in water.) *Khim. Tekhnol. Vody*, 13 (1991) 1097-1102; *C.A.*, 116 (1992) 135883z.

1989 Rudenko, A.B. and Khromchenko, Ya.L.: (Gas-chromatographic determination of total organic carbon in waters.) *Khim. Tekhnol. Vody*, 13 (1991) 1091-1097; *C.A.*, 116 (1992) 135882y.

1990 Takahashi, K., Kido, K. and Shirachi, R.: (Analysis of off-flavors in water source used for drinking.) *Yosui to Haisui*, 34 (1992) 127-135; *C.A.*, 116 (1992) 158436v.

1991 Zaitseva, N.V., Ulanova, T.S., Malkov, V.Yu. and Nurislamova, T.V.: (Gas chromatographic determination of nitro and amino compounds of the aromatic series.) *Gig. Sanit.*, No. 12 (1991) 82-84; *C.A.*, 116 (1992) 158416p.

See also 1612, 1682, 1713, 1724, 1726, 1758, 1770, 1793, 1867, 1877, 1887, 1891, 1902, 1908, 1911.

35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*

1992 Ge, X., Zhong, L. and Su, D.: (Determination of selenium in mineral spring sediments of Wuadalian Chi lakes by GC.) *Huaxue Yu Zhanhe*, No. 3 (1991) 159-160; *C.A.*, 116 (1992) 158411h.

See also 1706, 1747, 1777, 1794, 1833, 1890, 1893, 1907.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36b. *Antioxidants and preservatives*
- 1993 Smith, I.D. and Waters, D.G.: Determination of topanol antioxidants in methacrylates using capillary gas-liquid chromatography. *J. Chromatogr.*, 596 (1992) 290-293.
- 36c. *Complex mixtures, technical products and unidentified compounds*
- 1994 Bray, C.J. and Spooner, E.T.C.: Fluid inclusion volatile analysis by gas chromatography with photoionization/micro-thermal conductivity detectors: applications to magmatic molybdenum sulfide and other water-carbon dioxide and water-methane fluids. *Geochim. Cosmochim. Acta*, 56 (1992) 261-272; *C.A.*, 116 (1992) 155547w.
- 1995 Carr, M.J., Wurzbach, R. and LaRue, J.A.: Determination of trace solvents in hydraulic fluid by equilibrium headspace analysis. *J. Chromatogr. Sci.*, 30 (1992) 147-148.
- 1996 Dzhandzhapanyan, A.N.: (Gas chromatographic vapor-phase detection of some organic solvents in water and model systems.) *Gig. Sanit.*, No. 9 (1991) 88-89; *C.A.*, 116 (1992) 77912v.
- 1997 Faix, O., Fortmann, I., Bremer, J. and Meier, D.: Thermal degradation products of wood: gas chromatographic separation and mass spectrometric characterization of polysaccharide derived products. *Holz Roh-Werkst.*, 49 (1991) 213-219; *C.A.*, 116 (1992) 8059k.
- 1998 Folke, J. and Guerra, M.: Control of effluent from the manufacturing of bleached pulp and paper from bagasse. *Chemosphere*, 24 (1992) 371-382.
- 1999 Gilbert, J., Ingram, J.M., Scott, M.P. and Underhill, M.: The analysis of clingfilms by infrared spectroscopy and thermal desorption capillary gas chromatography. *J. Forensic Sci. Soc.*, 31 (1991) 337-347; *C.A.*, 116 (1992) 1845e.
- 2000 Greene, R.J., Brashear, W.T., Auten, K.L. and Mahle, D.A.: Confirmation of a carboxylic acid metabolite of polychlorotrifluoroethylene and a method of its GC-ECD analysis in biological matrices. *J. Anal. Toxicol.*, 16 (1992) 28-32; *C.A.*, 116 (1992) 100693k.
- 2001 Grob, K., Artho, A., Biedermann, M., Caramaschi, A. and Mikle, H.: Batching oils on sisal bags used for packaging foods: analysis by coupled LC/GC. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 283-287.
- 2002 Iwata, H., Gnji, N., Mametsuka, H. and Suzuki, E.: (Gas chromatograph-Fourier transform infrared spectrometry for analysis of aromatic isomers.) *Tetsu to Hagane*, 77 (1991) 2203-2210; *C.A.*, 116 (1992) 87402t.
- 2003 Kapoor, V.B., Chopra, S.K. and Vishnoi, S.C.: Normal paraffins and linear terminal olefins in coker kerosene. Estimation by capillary gas chromatography. *Erdoel Kohle, Erdgas, Petrochem.*, 44 (1991) 480-482; *C.A.*, 116 (1992) 109782w.
- 2004 Kenndler, E., Schmidt-Beiwil, K., Mairinger, F. and Pöhm, M.: Identification of proteinaceous binding media of easel paintings by gas chromatography of the amino acid derivatives after catalytic hydrolysis by a protonated cation exchanger. *Fresenius. J. Anal. Chem.*, 342 (1992) 135-141.
- 2005 Kleen, M. and Gellerstedt, G.: Characterization of chemical and mechanical pulps by pyrolysis-gas chromatography/mass spectrometry. *J. Anal. Appl. Pyrolysis*, 19 (1991) 139-152; *C.A.*, 116 (1992) 8081m.
- 2006 Lebeau, B. and Hammers, W.E.: Estimation of tobacco blend compositions using closed-loop stripping analysis and stepwise multiple linear regression and partial least-squares techniques. *J. Chromatogr.*, 596 (1992) 285-289.
- 2007 Lin, J., Hu, B. and Chen, W.: (Distillation and GC-MS-DS determination of cashew nutshell liquid.) *Linchan Huaxue Yu Gongye*, 11 (1991) 33-39; *C.A.*, 116 (1992) 154153c.
- 2008 Lomax, J.A., Commandeur, J.M., Arisz, P.W. and Boon, J.J.: Characterization of oligomers and sugar ring-cleavage products in the pyrolyzate of cellulose. *J. Anal. Appl. Pyrolysis*, 19 (1991) 65-79; *C.A.*, 116 (1992) 8071h.
- 2009 Mariani, C., Bondioli, P., Venturini, S. and Fedeli, E.: Vegetable oil derivatives as diesel fuel substitutes. Analytical aspects. Note 1: determination of methyl esters, mono-, di- and triglycerides. *Riv. Ital. Sostanze Grasse*, 68 (1991) 549-551.
- 2010 Penton, Z.: Determination of residual solvent in pharmaceutical preparations by static headspace GC. *J. High Resolut. Chromatogr.*, 15 (1992) 329-331.
- 2011 Polanuer, B.M.: Direct aqueous injection gas chromatography on a potassium fluoride crystal hydrate-containing sorbent. Determination of volatile organic solvents in the fermentation broth of *Clostridium* strains. *J. Chromatogr.*, 596 (1992) 138-140.
- 2012 Rose, W.P.: Determining volatile extractives from microwave susceptor food packaging. *ACS Symp. Ser.*, 473 (1991) 67-78; *C.A.*, 116 (1992) 127110e.
- 2013 Samukawa, K., Akimori, N., Nakata, T. and Komai, Y.: (Chemical characterization of soil organic matter by Curie-point pyrolysis-gas chromatography-mass spectrometry.) *Nippon Dojo Hiryougaku Zasshi*, 62 (1991) 599-605; *C.A.*, 116 (1992) 150626m.
- 2014 Sebok, D.: (Quality control of acetochlor with modern analytical methods.) *Magy. Kem. Lapja*, 46 (1991) 422-425; *C.A.*, 116 (1992) 123179m.
- 2015 Tanada, N., Kageura, M., Hara, K., Hieda, Y., Takamoto, M. and Kashimura, S.: Identification of human hair stained with oxidation hair dyes by gas chromatographic-mass spectrometric analysis. *Forensic Sci. Int.*, 52 (1991) 5-11; *C.A.*, 116 (1992) 122756k.
- 2016 Welch, K.J. and Hoffman, N.E.: Analysis of fossil-fuel fractions by on-line coupled microcolumn HPLC capillary column GC-MS. *J. High Resolut. Chromatogr.*, 15 (1992) 171-175.
- See also 1659, 1689, 1711, 1727, 1729, 1730, 1731, 1738, 1756, 1779, 1802, 1808, 1834, 1893, 1898, 2022.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- See 1763, 1782, 1783.

38. INORGANIC COMPOUNDS

38b. Anions

2017 Gutzki, F.M., Tsikas, D., Alheid, U. and Froelich, J.C.: Determination of endothelium-derived nitrite/nitrate by gas chromatography/tandem mass spectrometry using (¹⁵N)sodium nitrite as internal standard. *Biol. Mass Spectrom.*, 21 (1992) 97-102; *C.A.*, 116 (1992) 169594w.

38c. Permanent and rare gases

2018 Oziashvili, E.D., Pertaya, N.V. and Esakiya, K.E.: (Chromatographic determination of oxygen and nitrogen in boron halides.) *Izv. Akad. Nauk Gruz., Ser. Khim.*, 17, No. 1 (1991) 14-17; *C.A.*, 116 (1992) 14955r.

2019 Rodinkov, O.V. and Gumerov, M.F.: (Chromatographic method for analysis of gases dissolved in a liquid.) *U.S.S.R. SU* 1,545,767 (Cl. G01N30/02), 30 Apr. 1991, Appl. 4,453,105, 30 Jun. 1988; *C.A.*, 116 (1992) 15082r.

2020 Talasek, R.T. and Daugherty, K.E.: The analysis of nitrogen and sulfur oxides by gas chromatography-mass spectrometry. *J. Chromatogr. Sci.*, 30 (1992) 131-135.

See also 1610, 1989, 1994, 2021.

38d. Volatile inorganic compounds

2021 Bray, C.J., Spooner, E.T.C. and Thomas, A.V.: Fluid inclusion volatile analysis by heated crushing, on-line gas chromatography; applications to Archean fluids. *J. Geochem. Explor.*, 42 (1991) 167-193; *C.A.*, 116 (1992) 110293u.

2022 Frisina, G. and Testoni, F.: Gas chromatographic analysis of arsine in propylene at levels lower than 50 ppb using a helium ionization detector. *LC-GC Int.*, 5, No. 5 (1992) 48-49.

2023 Gardini, F., Antisari, L.V., Guerzoni, M.E. and Sequi, P.: A simple gas chromatographic approach to evaluate carbon dioxide release, nitrous oxide evolution, and oxygen uptake from soil. *Biol. Fertil. Soils*, 12, No. 1 (1991) 1-4; *C.A.*, 116 (1992) 127572g.

2024 Saitoh, H.: (Study on analysis of ultratrace impurities in gases. 1. Analysis of arsine, phosphine, and silane in gases from detoxication apparatus.) *Koatsu Gasu*, 29, No. 1 (1992) 36-42; *C.A.*, 116 (1992) 112445u.

2025 Saraba, D.N. and Dogovic, N.P.: (Gas-chromatographic determination of methylphosphonyl dichloride and its impurities thionyl chloride and phosphoryl chloride.) *Naucno-Teh. Pregl.*, 41, No. 2 (1991) 20-25; *C.A.*, 116 (1992) 120128h.

See also 1626, 1994, 2020.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

2026 Mikaya, A.I., Romanov, G.D. and Zaikin, V.G.: (Gas-phase H/D exchange in fluorenes, furans, and thiophenes in the inlet system of a gas chromatograph/mass spectrometer.) *Izv. Akad. Nauk SSSR, Ser. Khim.*, (1991) 739-740; *C.A.*, 116 (1992) 127808p.

See also 1675, 1800, 1824, 1839, 1871, 1954.

Planar Chromatography

1. REVIEWS AND BOOKS

- 542 Imasaka, T.: Supersonic jet spectrometry and its application to chromatograph detectors. *Spectrochim. Acta Rev.*, 14 (1991) 261-274; C.A., 116 (1992) 120071j - a review with 39 refs.
- 543 Poole, C.F. and Belay, M.T.: Progress in automated multiple development. *J. Planar Chromatogr.*, 4 (1991) 345-359 - a review with 72 refs.
- 544 Sherma, J. and Fried, B.: (Preparative thin-layer chromatography). *Preparativ. Zhidkost. Khromatogr., M.*, (1990) 131-154; C.A., 116 (1992) 105270e.

See also 590, 763.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 545 Oros, F.J. and Davis, J.M.: Comparison of statistical theories of spot overlap in two-dimensional separations and verification of means for estimating the number of zones. *J. Chromatogr.*, 591 (1992) 1-18.
- 546 Xie, P.: Trivial, but not negligible. *J. Planar Chromatogr.*, 4 (1991) 411-412.

See also 543.

2b. Thermodynamics and theoretical relationships

- 547 Kowalska, T., Witkowska, B. and Mrozek, T.: The influence of the length of the bonded alkyl chain on solute retention in reversed phase liquid chromatography with methanol - water mobile phases. *J. Planar Chromatogr.*, 4 (1991) 385-391.
- 548 Litvinova, L.S. and Kurenbin, O.I.: An equation expressing the effect of sorbent characteristics on eluent flow velocity in thin layer chromatography. *J. Planar Chromatogr.*, 4 (1991) 402-405.
- 549 Walters, F.H.: The application of a three factor central composite experimental design to the paper chromatographic separation of several amino acids. *Anal. Lett.*, 25 (1992) 353-362.

See also 545, 577.

2c. Relationship between structure and chromatographic behaviour

- 550 Cserháti, T. and Illés, Z.: Comparison of two principal component analysis methods to evaluate reversed-phase retention data. *J. Pharm. Biomed. Anal.*, 9 (1991) 685-691.

See also 611, 705, 779.

3. GENERAL TECHNIQUES

3b. Detectors and detection reagents

- 551 Kurantz, M.J., Maxwell, R.J. and Cygnarowicz-Provost, M.: A new reagent for the analysis of lipids by high performance thin layer chromatography and fluorodensitometry. *J. Planar Chromatogr.*, 5 (1992) 41-44.
- 552 Levinson, F.S., Evgen'ev, M.L., Sharnin, G.P., Akimova, S.A., Evgen'eva, I.I. and Moskva, N.A.: (Developing reagent for thin-layer chromatography of aromatic amines). U.S.S.R. SU 1,642,372 (Cl. G01N30/90), 15 Apr. 1991, Appl. 4,643,867, 30 Jan. 1989; C.A., 116 (1992) 50575a.
- 553 Maxwell, R.J. and Unruh, J.: Comparison of induced vapor phase fluorescent responses of four polycyclic ether antibiotics and several lipid classes on RP-18 and silica gel HPTLC plates. *J. Planar Chromatogr.*, 5 (1992) 35-40.

See also 542, 721, 761, 799.

3c. Sorbents and columns, packing procedures

- 554 Fernando, W.P.N. and Poole, C.F.: Determination of the pore size distribution of precoated silica gel layers by size exclusion chromatography and forced flow development. *J. Planar Chromatogr.*, 5 (1992) 50-56.
- 555 Gumprecht, D.L.: Comparison of commercially available thin-layer chromatography plates with mixtures of dyes, analgesics and phenols. *J. Chromatogr.*, 595 (1992) 368-374.
- 556 Hahn-Deinstrop, E.: Stationary phases, sorbents. *J. Planar Chromatogr.*, 5 (1992) 57-61.
- 557 Ostrovskaya, V.M., Fomin, N.A., Aksenova, M.S., Kazakova, T.S., Popova, T.D. and Prishchep, E.T.: (Method of producing epoxidized chromatography paper). U.S.S.R. SU 1,651,204 (Cl. G01N31/22), 23 May 1991, Appl. 4,691,720, 15 May 1989; C.A., 116 (1992) 33714c.

See also 547, 705, 824.

3d. Quantitative analysis

See 791.

3e. Preparative scale chromatography

See 544.

3g. High performance procedures

See 763.

4. SPECIAL TECHNIQUES

4a. Automation

See 543, 789.

4b. Computerization and modelling

See 549.

4c. Combination with other physico-chemical techniques (MS, IR etc.)

558 Busch, K.L., Mullis, J.O. and Chakel, J.A.: High resolution imaging of samples in thin layer chromatograms using a time-of-flight secondary ion mass spectrometer. *J. Planar Chromatogr.*, 5 (1992) 9-15.

559 Harada, K., Murata, H., Mayumi, T., Masuda, K., Suzuki, M., Ikai, Y., Kondo, F. and Oka, H.: (Effective application of chromatography/mass spectrometry to structural characterization of natural products). *Tennen Yuki Kagobotsu Toronkai Koen Yoshishu*, (1991) 683-690; C.A., 116 (1992) 190565x.

560 Kovar, K.A. and Hoffmann, V.: Possibilities and limits of the online TLC-FTIR coupling. *GIT Fachz. Lab.*, 35 (1991) 1197-1201; C.A., 116 (1992) 120088v.

561 Kovar, K.A., Ensslin, H.K., Frey, O.R., Rienas, S. and Wolff, S.C.: Identification and estimation of complex mixtures by direct-TLC-IR online coupling. *GIT Spez. Chromatogr.*, 11 (1991) 95-101; C.A., 116 (1992) 120085s.

562 Zhang, Y., Hu, S. and Li, Q.: (TLC-UV spectrophotometry of fast-acting syrup for cold). *Zhongguo Yiyao Gongye Zazhi*, 22 (1991) 506-507; C.A., 116 (1992) 136375c.

See also 617, 621, 788, 797.

4g. Enantiomers, separation

563 Lübber, S., Martens, J. and Roder, B.: Enantiomerenreine Arzneistoffe. Nachweis mittels DC. *Dtsch. Apoth.-Ztg.*, 132 (1992) 947-952.

See also 684, 687.

4h. Other special techniques

See 637.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5b. Cyclic hydrocarbons

564 Geahchan, A., le Gren, I., Chambon, P. and Chambon, R.: Improved method for determination of polynuclear aromatic hydrocarbons in pharmacopoeial paraffin and mineral oils. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 968-973.

See also 566.

5c. Halogen derivatives

565 Jayakrishnan, A. and Thanoo, B.C.: Synthesis and polymerization of some iodine-containing monomers for biomedical applications. *J. Appl. Polym. Sci.*, 44 (1992) 743-788; C.A., 116 (1992) 136108n.

5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)

566 Nomura, H. and Koike, T.: (Reversed-phase high-performance thin layer chromatographic behavior of polycyclic aromatic hydrocarbons and coal tar pitch). *Tetsu to Hagane*, 77 (1991) 2196-2202; C.A., 116 (1992) 24460q.

See also 564.

6. ALCOHOLS

567 Frega, N., Bocci, F. and Lercker, G.: Direct gas chromatographic analysis of unsaponifiable fraction of different oils with a polar capillary column. *J. Am. Oil Chem. Soc.*, 69 (1992) 447-450.

7. PHENOLS

568 Davydkina, L.E., Fedotov, N.S. and Aseev, N.V.: (Method for determination of phenol using chromatography paper and spectrophotometry). U.S.S.R. SU 1,659,803 (Cl. G01N21/78), 30 Jun. 1991, Appl. 4,689,415, 10 May 1989; C.A., 116 (1992) 120181v.

569 Mahmud, Z., Khan, M.N., Lajis, N.H. and Toia, R.F.: Perakensol: a phenanthrenoid isolated from *Alseodaphne perakensis*. *J. Natural Prod.*, 55 (1992) 533-535.

570 Numánov, I.U., Potapova, I.M., Alihodzhaev, A.Kh. and Yusupov, M.: (Developing agent for determination of Sevin and α -naphthol in thin-layer chromatography). U.S.S.R. SU 1,642,374 (Cl. G01N31/00), 15 Apr. 1991, Appl. 4,493,976, 13 Oct. 1988; C.A., 116 (1992) 75433r.

See also 555.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

571 Heimler, D., Pieron, A., Tattini, M. and Cimato, A.: Determination of flavonoids, flavonoid glycosides and biflavonoids in *Olea europaea* L. leaves. *Chromatographia*, 33 (1992) 369-373.

572 Lakshmi, S. and Krishnamoorthy, T.V.: Flavonoids in the leaves of *Datura stramonium* Linn. *Indian J. Pharm. Sci.*, 53 (1991) 94-95; C.A., 116 (1992) 27907b.

573 Lu, Y.-L., Ho, D.K., Cassady, J.M., Cook, V.M. and Baird, W.M.: Isolation of potential cancer chemopreventive agents from *Eriodictyon californicum*. *J. Nat. Prod.*, 55 (1992) 357-363.

- 574 Reynaud, J., Couble, A. and Reynaud, J.: La chimie flavonique de *Centaurea macrocephala* Muss. Puschk. ex Willd. (Compositae). *Pharmazie*, 47 (1992) 51-52.
- See also 809, 810.
- 8b. *Aflatoxins and other mycotoxins*
- 575 Hongyo, K.-i., Itoh, Y., Hifumi, E., Takeyasu, A. and Uda, T.: Comparison of monoclonal antibody-based enzyme-linked immunosorbent assay with thin-layer chromatography and liquid chromatography for aflatoxin B₁ determination in naturally contaminated corn and mixed feed. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 307-312.
- 8c. *Other compounds with heterocyclic oxygen (incl. tannins)*
- 576 Cholerton, S., Idle, M.E., Vas, A., Gonzales, F.J. and Idle, J.R.: Comparison of a novel thin-layer chromatographic-fluorescence detection method with a spectrofluorometric method for the determination of 7-hydroxycoumarin in human urine. *J. Chromatogr.*, 575 (1992) 325-330.
- 577 Hirmälä, P., Vuorela, H., Rahko, E.-L. and Hiltunen, R.: Retention behaviour of closely related coumarins in thin-layer chromatographic preassays for high-performance liquid chromatography according to the "PRISMA". *J. Chromatogr.*, 593 (1992) 329-337.
- See also 678, 803, 808, 812.
9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES
- 578 Blatter, E.E., Abriola, D.P. and Pietruszko, R.: Aldehyde dehydrogenase. Covalent intermediate in aldehyde dehydrogenation and ester hydrolysis. *Biochem. J.*, 282 (1992) 353-360.
- 579 Tikhonova, T.Z. and Petrakova, E.A.: (Three thin-layer chromatography regimes for oligoethers and oligoesters). *Zh. Fiz. Khim.*, 65 (1991) 2759-2762; *C.A.*, 116 (1992) 60404h.
- See also 591, 596, 769.
10. CARBOHYDRATES
- 10a. *Mono and oligosaccharides. Structural studies*
- 580 Avila, M.A., Clemente, R. and Varela-Nieto, I.: A phosphatidylinositol-linkage-deficient T-cell mutant contains insulin-sensitive glycosyl-phosphatidylinositol. *Biochem. J.*, 282 (1992) 681-686.
- 581 Cosio, E.G., Frey, T. and Ebel, J.: Identification of a high-affinity binding protein for a hepta- β -glucoside phytoalexin elicitor in soybean. *Eur. J. Biochem.*, 204 (1992) 1115-1123.
- 582 Crawford, T.J. and Crawford, B.J.: Characterization and localization of large sulfated glycoproteins in the extracellular matrix of the developing asteroid *Pisaster ochraceus*. *Biochem. Cell Biol.*, 70 (1992) 91-98.
- 583 Freeman, C. and Hopwood, J.J.: Human glucosamine-6-sulphatase deficiency. Diagnostic enzymology towards heparin-derived trisaccharide substrates. *Biochem. J.*, 282 (1992) 605-614.
- 584 Ishihara, M., Tyrrell, D.J., Kiefer, M.C., Barr, P.J. and Swiedler, S.J.: A cell-based assay for evaluating the interaction of heparin-like molecules and basic fibroblast growth factor. *Anal. Biochem.*, 202 (1992) 310-315.
- 585 Izumi, K., Yamamoto, K., Tochikura, T. and Hirabayashi, Y.: Serological study using α -N-acetylgalactosaminidase from *Acremonium* sp. *Biochim. Biophys. Acta*, 1116 (1992) 72-74.
- 586 Kitazume, S., Kitajima, K., Inoue, S. and Inoue, Y.: Detection, isolation, and characterization of oligo/poly(sialic acid) and oligo/poly(deaminoneuraminic acid) units in glycoconjugates. *Anal. Biochem.*, 202 (1992) 25-34.
- 587 Lawson, A.M., Housell, E.F., Stoll, M.S., Feeney, J., Chai, W., Rosankiewicz, J.R. and Feizi, T.: Characterization of minor tetra- to heptasaccharides O-linked to human meconium glycoprotein by TLC-MS microsequencing of neoglycolipid derivatives in conjunction with conventional MS and proton NMR spectroscopy. *Carbohydr. Res.*, 221 (1991) 191-208; *C.A.*, 116 (1992) 152193s.
- 588 Renkonen, O., Leppänen, A., Niemelä, R., Viikman, A., Helin, J., Penttilä, L., Maaheimo, H., Seppo, A. and Suopanki, J.: Enzymatic *in vitro* synthesis of radiolabeled pentasaccharides GlcNAc β 1-3(Gal β 1-4GlcNAc β 1-6)Gal β 1-4GlcNAc/Glc and the isomeric Gal β 1-4GlcNAc β 1-3(GlcNAc β 1-6)Gal β 1-4GlcNAc/Glc. *Biochem. Cell Biol.*, 70 (1992) 86-89.
- 589 Zeidler, R., Giannis, A., Danneschewski, S., Henk, E., Henk, T., Bauer, C., Rutter, W. and Sandhoff, K.: Inhibition of N-acetylglucosamine kinase and N-acetylmannosamine kinase by 3-O-methyl-N-acetyl-D-glucosamine *in vitro*. *Eur. J. Biochem.*, 204 (1992) 1165-1168.
- See also 614, 617, 682.
11. ORGANIC ACIDS AND LIPIDS
- 11a. *Organic acids and simple esters*
- 590 Alvarez, J.G. and Touchstone, J.C.: *Practical Manual on Lipid Analysis. A Series of Monographs. I. Fatty Acids*. Norell Press, Mays Landing, 1991, 106 p.
- 591 Blee, E. and Schuber, F.: Occurrence of fatty acid epoxide hydrolases in soybean (*Glycine max*). Purification and characterization of the soluble form. *Biochem. J.*, 282 (1992) 711-714.
- 592 Ghushray, S. and Bhattacharya, D.K.: Enzymatic preparation of ricinoleic acid esters of long-chain monohydric alcohols and properties of the esters. *J. Am. Oil Chem. Soc.*, 69 (1992) 85-88.
- 593 Joly, F., Breton, M., Wolf, C., Ninio, E. and Colard, O.: Heterogeneity of arachidonate and paf-acether precursor pools in mast cells. *Biochim. Biophys. Acta*, 1125 (1992) 305-312.
- 594 Koch, J. and Fuchs, G.: Enzymatic reduction of benzoyl-CoA to alicyclic compounds, a key reaction in anaerobic aromatic metabolism. *Eur. J. Biochem.*, 205 (1992) 195-202.
- 595 Link, W. and Spittler, G.: Produkte der Dimerisierung ungesättigter Fettsäuren VI: Untersuchungen zur Kinetik der Bildung dimerer Fettsäuren. *Fat Sci. Technol.*, 94 (1992) 9-13.

- 596 Pinot, F., Salaün, J.-P., Bosch, H., Lesot, A., Mioskowski, C. and Durst, F.: ω -Hydroxylation of Z9-octadecenoic, Z9,10-epoxy-stearic and 9,10-dihydroxystearic acids by microsomal cytochrome P450 systems from *Vicia sativa*. *Biochem. Biophys. Res. Commun.*, 184 (1992) 183-193.
- 597 Ratnayake, W.M.N. and Pelletier, G.: Positional and geometrical isomers of linoleic acid in partially hydrogenated oils. *J. Am. Oil Chem. Soc.*, 69 (1992) 95-105.
- 598 Riehl, T., Turk, J. and Stenson, W.F.: Metabolism of oxygenated derivatives of arachidonic acid by Caco-2 cells. *J. Lipid Res.*, 33 (1992) 323-331.
- 599 Teng, J.L., Chen, X. and Guerrero, S.: Fatty acid group separation: polyunsaturated from saturated and monounsaturated by thin layer chromatography. *J. Planar Chromatogr.*, 5 (1992) 64-66.
- 600 Wolff, R.L.: *trans*-Polyunsaturated fatty acids in French edible rapeseed and soybean oils. *J. Am. Oil Chem. Soc.*, 69 (1992) 106-110.
- 601 Yu, D. and Sun, G.: (Analysis of microimpurities in refined phthalic anhydride). *Fenxi Ceshi Tongbao*, 10 (1991) 67-70; C.A., 116 (1992) 143086g.
- See also 579, 615, 681, 803, 812.
- 11c. *Lipids and their constituents*
- 602 Ackman, R.G., Orozco, V.R. and Ratnayake, W.M.N.: Aspects of positional distribution of fatty acids in triacyl-glycerols of skin, white and dark muscle of mackerel *Scomber scombrus* in relation to hypertension. *Fat Sci. Technol.*, 93 (1991) 447-450.
- 603 Anderson, J.E.: Myotube phospholipid synthesis and sarcolomal ATPase activity in dystrophic (mdx) mouse muscle. *Biochem. Cell Biol.*, 69 (1991) 835-841.
- 604 Ando, S., Hirabayashi, Y., Kon, K., Inagaki, F., Tate, S.-i. and Whittaker, V.P.: A trisialoganglioside containing a sialyl α -2-6 N-acetylgalactosamine residue is a cholinergic-specific antigen, Chol-1a. *J. Biochem. (Tokyo)*, 111 (1992) 287-290.
- 605 Ando, Y., Nishimura, K., Aoyanagi, N. and Takagi, T.: Stereo-specific analysis of fish oil triacyl-*sn*-glycerols. *J. Am. Oil Chem. Soc.*, 69 (1992) 417-424.
- 606 Aridor-Piterman, O., Lavie, Y. and Liscovitch, M.: Bimodal distribution of phosphatidic acid phosphohydrolase in NG108-15 cells. Modulation of the amphiphilic lipids oleic acid and sphingosine. *Eur. J. Biochem.*, 204 (1992) 561-568.
- 607 Ashida, H., Yamamoto, K., Kumagai, H. and Tochikura, T.: Purification and characterization of membrane-bound endoglycoce-ramidase from *Corynebacterium* sp. *Eur. J. Biochem.*, 205 (1992) 729-735.
- 608 Aveldano, M.I., Rotstein, N.P. and Vermouth, N.T.: Lipid-remodelling during epididymal maturation of rat spermatozoa. Enrichment in plasmenylcholines containing long-chain polyenoic fatty acids of the n-9 series. *Biochem. J.*, 283 (1992) 235-241.
- 609 Cagen, L.M., Fungwe, T.V., Wilcox, H.G. and Heimberg, M.: Bi-phasic effect of oleic acid on hepatic cholesterologenesis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 21-26.
- 610 Chobanov, D., Amidzhin, B. and Nikolova-Damyanova, B.: Den-sitometric determination of triglycerides separated by reversed phase thin-layer chromatography. *Riv. Ital. Sostanze Grasse*, 68 (1991) 357-362; C.A., 116 (1992) 104578z.
- 611 Cserhati, T. and Szögyi, M.: Anomalous retention behavior of some synthetic phospholipids in reversed phase chroma-tography. *J. High Resolut. Chromatogr.*, 15 (1992) 277-278.
- 612 Cubitt, A.B. and Firtel, R.A.: Characterization of phospholipase activity in *Dictyostelium discoideum*. Identification of a Ca²⁺-de-pendent polyphosphoinositidase-specific phospholipase C. *Biochem. J.*, 283 (1992) 371-378.
- 613 Dhanesar, S.C., Peeler, T.R. and Engel, B.S.: Evaluation of phospholipids in liposomes by HPTLC. *J. Planar Chromatogr.*, 5 (1992) 45-49.
- 614 Dieckmann-Schuppert, A., Bender, S., Odenthal-Schnittler, M., Bause, E. and Schwarz, R.T.: Apparent lack of N-glycosylation in the asexual intraerythrocytic stage of *Plasmodium falciparum*. *Eur. J. Biochem.*, 205 (1992) 815-825.
- 615 Fungwe, T.V., Cagen, L., Wilcox, H.G. and Heimberg, M.: Regu-lation of hepatic secretion of very low density lipoprotein by dietary cholesterol. *J. Lipid Res.*, 33 (1992) 179-191.
- 616 Ghosh, S.S. and Franson, R.C.: Use of [¹⁻¹⁴C]oleate labelled autoclaved *Escherichia coli* as a membranous substrate for mea-surement of *in vitro* phospholipase D activity. *Biochem. Cell Biol.*, 70 (1992) 43-48.
- 617 Hanisch, F.-G. and Peter-Katalinic, J.: Structural studies on fetal mucins from human amniotic fluid. Core typing of short-chain O-linked glycans. *Eur. J. Biochem.*, 205 (1992) 527-535.
- 618 Hattori, H., Uemura, K.-i., Ishihara, H. and Ogata, H.: Glycolipid of human pancreatic cancer; the appearance of neolacto-series (type 2 chain) glycolipid and the presence of incompatible blood group antigen in tumor tissues. *Biochim. Biophys. Acta*, 1125 (1992) 21-27.
- 619 Helander, I.M., Hirvas, L., Tuominen, J. and Vaara, M.: Preferential synthesis of heptaacyl lipopolysaccharide by the ssc permeability mutant of *Salmonella typhimurium*. *Eur. J. Biochem.*, 204 (1992) 1101-1106.
- 620 Hong, N.D., Won, D.H., Kim, N.J., Chang, S.Y., Young, W.G. and Kim, N.S.: (Studies on the analysis of constituents of deer horn. (I). Assay of trace elements and TLC pattern analysis of gangliosides). *Saengyak Hakhochechi*, 22 (1991) 171-182; C.A., 116 (1992) 46413d.
- 621 Karlsson, K.A., Lanne, B., Pimlott, W. and Teneberg, S.: The resolution into molecular species on desorption of glycolipids from thin-layer chromatograms, using combined thin-layer chro-matography and fast-atom-bombardment mass spectrometry. *Carbohydr. Res.*, (1991) 49-61; C.A., 116 (1992) 129403b.
- 622 Krasil'nikov, M.A., Bezrukov, V.M. and Shatskaya, V.A.: Gluco-corticoid regulation of phospholipid turnover and protein kinase C activity in mouse hepatoma 22 cells. *Biochim. Biophys. Acta*, 1135 (1992) 91-96.
- 623 Kubushiro, K., Tsukazaki, K., Tanaka, J., Takamatsu, K., Kiguchi, K., Mikami, M., Nozawa, S., Nagai, Y. and Iwamori, M.: Human uterine endometrial adenocarcinoma: characteristic acquirement of synthetic potentials for ¹¹³SO₃-LacCer and ganglio series sul-foglycophingolipids after transfer of the cancer cells to culture. *Cancer Res.*, 52 (1992) 803-809.
- 624 Ladisch, S., Becker, H. and Ullsh, L.: Immunosuppression by human gangliosides: I. Relationship of carbohydrate structure to the inhibition of T cell responses. *Biochim. Biophys. Acta*, 1125 (1992) 180-188.

- 625 Lindström, K., Breimer, M.E., Jovall, P.-A., Lanne, B., Pimlott, W. and Samuelsson, B.E.: Non-acid glycosphingolipid expression in plasma of an A₁ Le(a-b+) secretor human individual: identification of an ALe^b heptaglycosylceramide as major blood group component. *J. Biochem. (Tokyo)*, 111 (1992) 337-345.
- 626 Matsuo, N., Nomura, T. and Imokawa, G.: A rapid and simple assay method for UDP-glucose:ceramide glucosyltransferase. *Biochim. Biophys. Acta*, 1116 (1992) 97-103.
- 627 Maurin, R., Fellat-Zarrouk, K. and Ksir, M.: Positional analysis and determination of triacylglycerol structure of *Argania spinosa* seed oil. *J. Am. Oil Chem. Soc.*, 69 (1992) 141-145.
- 628 Mayor, S., Menon, A.K. and Cross, G.A.M.: Galactose-containing glycosylphosphatidylinositols in *Trypanosoma brucei*. *J. Biol. Chem.*, 267 (1992) 754-761.
- 629 Mikami, M., Tuzakaki, K., Nozawa, S., Iwamori, M. and Nagai, Y.: Menstrual cycle-associated expression of 2-hydroxy fatty acyl phytosphingosine-containing GlcCer, LacCer and Gb₃Cer in human uterine endometrium. *Biochim. Biophys. Acta*, 1125 (1992) 104-109.
- 630 Neff, W.E., Selke, E., Mounts, T.L., Rinsch, W., Frenkl, E.N. and Zeitoun, M.A.M.: Effect of triacylglycerol composition and structures on oxidative stability of oils from selected soybean germplasm. *J. Am. Oil Chem. Soc.*, 69 (1992) 111-118.
- 631 Nikolova-Damyanova, B. and Amidzhin, B.: Densitometric quantitation of triglycerides. *J. Planar Chromatogr.*, 4 (1991) 397-401.
- 632 Ozawa, H., Kawashima, I. and Tai, T.: Generation of murine monoclonal antibodies specific for N-glycolylneuraminic acid-containing gangliosides. *Arch. Biochem. Biophys.*, 294 (1992) 427-433.
- 633 Pal, S., Saito, M., Ariga, T. and Yu, R.K.: UDP-galactose:globotriaosylceramide α -galactosyltransferase activity in rat pheochromocytoma (PC 12h) cells. *J. Lipid Res.*, 33 (1992) 411-417.
- 634 Pelassy, C., Cattan, N. and Aussel, C.: Changes in phospholipid metabolism induced by quinine, 4-aminopyridine and tetraethylammonium in the monocytic cell line THP1. *Biochem. J.*, 282 (1992) 443-446.
- 635 Prieto, J.A., Ebrí, A. and Collar, C.: Optimized separation of nonpolar and polar lipid classes from wheat flour by solid-phase extraction. *J. Am. Oil Chem. Soc.*, 69 (1992) 387-391.
- 636 Randell, E., Mulye, H., Mookerjee, S. and Nagpurkar, A.: Evidence for phosphatidylcholine hydrolysis by phospholipase C in rat platelets. *Biochim. Biophys. Acta*, 1124 (1992) 273-278.
- 637 Ritter, K., Schaade, L., Thomssen, R. and Grunow, E.: Combined application of analytical high performance thin layer chromatography and electroblotting for the detection of anti-ganglioside antibodies in human sera. *Biomed. Chromatogr.*, 6 (1992) 67-71. *C.A.*, 116 (1992) 212459v.
- 638 Rüstow, B., Schlame, M., Haupt, R., Wilhelm, D. and Kunze, D.: Studies on the formation of dipalmitoyl species of phosphatidylcholine and phosphatidylethanolamine in pulmonary type II cells. *Biochem. J.*, 282 (1992) 453-458.
- 639 Senn, H.-J., Sellin, S., Fitzke, E., Stehle, T., Häussinger, D., Wieland, H. and Gerok, W.: Biosynthesis and excretion of gangliosides by the isolated perfused rat liver. *Eur. J. Biochem.*, 205 (1992) 809-814.
- 640 Shi, Y., Li, Y., Sun, L., Feng, Q. and Li, Z.: (Analysis of soybean lecithin injection by phosphorus-31 nuclear magnetic resonance and thin-layer chromatographic scanning). *Fenxi Huaxue*, 19 (1991) 733-736; *C.A.*, 116 (1992) 46398c.
- 641 Squier, C.A., Wertz, P.W. and Cox, P.: Thin-layer chromatographic analyses of lipids in different layers of porcine epidermis and oral epithelium. *Arch. Oral Biol.*, 36 (1991) 647-653; *C.A.*, 116 (1992) 101970k.
- 642 Stals, H.K., Mannaerts, G.P. and Declercq, P.E.: Factors influencing triacylglycerol synthesis in permeabilized rat hepatocytes. *Biochem. J.*, 283 (1992) 719-725.
- 643 Stinson, A.M., Wiegand, R.D. and Anderson, R.E.: Recycling of docosahexaenoic acid in rat retinas during n-3 fatty acid deficiency. *J. Lipid Res.*, 32 (1991) 2009-2017.
- 644 Sztajer, H., Lünsdorf, H., Erdmann, H., Menge, U. and Schmid, R.: Purification and properties of lipase from *Penicillium simplicissimum*. *Biochim. Biophys. Acta*, 1124 (1992) 253-261.
- 645 Turk, J., Bohrer, A., Stump, W.T., Ramanadham, S. and Mangino, M.J.: Quantification of distinct molecular species of the 2-lyso metabolite of platelet-activating factor by gas chromatography-negative-ion chemical ionization mass spectrometry. *J. Chromatogr.*, 575 (1992) 183-196.
- 646 Valentino, L.A. and Ladisch, S.: Localization of shed human tumor gangliosides: association with serum lipoproteins. *Cancer Res.*, 52 (1992) 810-814.
- 647 Vance, J.E.: Secretion of VLDL, but not HDL, by rat hepatocytes is inhibited by the ethanolamine analogue N-monomethylethanolamine. *J. Lipid Res.*, 32 (1991) 1971-1982.
- 648 Wang, Y., Wang, J., Zhang, J., Zhang, Z. and Song, Q.: (Analysis of vegetable oil by thin-layer chromatography-fluorometry). *Fenxi Huaxue*, 19 (1991) 1176-1178; *C.A.*, 116 (1992) 127125p.
- 649 Weeres, P.M.M., van der Horst, J., van Marrewijk, W.J.A., van den Eijnden, M., van Doorn, J.M. and Beenackers, A.M.T.: Biosynthesis and secretion of insect lipoprotein. *J. Lipid Res.*, 33 (1992) 485-491.
- 650 Williams, M.L., Menon, G.K. and Hanley, K.P.: HMG-CoA reductase inhibitors perturb fatty acid metabolism and induce peroxisomes in keratinocytes. *J. Lipid Res.*, 33 (1992) 193-208.
- 651 Xin, Y. and Aitzetmüller, K.: AgNO₃-TLC/HPLC Untersuchungen zur Struktur des chinesischen Talkbaumfettes. *Fat Sci. Technol.*, 94 (1992) 123-130.
- 652 Yiu, S.C.K. and Lingwood, C.A.: Polyisobutylmethacrylate modifies glycolipid binding specificity of verotoxin 1 in thin-layer chromatogram overlay procedures. *Anal. Biochem.*, 202 (1992) 188-192.
- 653 Zhang, J.Y., Prakash, C., Yamashita, K. and Blair, I.A.: Regio-specific and enantioselective metabolism of 8,9-epoxyicosatrienoic acid by cyclooxygenase. *Biochem. Biophys. Res. Commun.*, 183 (1992) 138-143.
- 654 Zhov, Q.H., Klekner, V. and Kosaric, N.: Production of sophorose lipids by *Torulopsis bombicola* from safflower oil and glucose. *J. Am. Oil Chem. Soc.*, 69 (1992) 90-92.

See also 551, 553, 593.

12. ORGANIC PEROXIDES

- 655 Perkel, A.L., Voronina, S.G. and Perkel, R.L.: (Micromethod for determination of individual peroxide compounds). *Zh. Anal. Khim.*, 46 (1991) 2283-2286; *C.A.*, 116 (1992) 143095j.

13. STEROIDS

13a. General techniques

See 658.

13b. Pregnane and androstane derivatives

- 656 Carlin, J.R., Höflund, P., Eriksson, L.O., Christofalo, P., Gregoire, S.L., Taylor, A.M. and Andersson, K.-E.: Disposition and pharmacokinetics of [^{14}C]finasteride after oral administration in humans. *Drug Metab. Disp.*, 20 (1992) 148-155.
- 657 Deyashiki, Y., Taniguchi, H., Amano, T., Nakayama, T., Hara, A. and Sawada, H.: Structural and functional comparison of two human liver dihydrodiol dehydrogenases associated with 3α -hydroxysteroid dehydrogenase activity. *Biochem. J.*, 282 (1992) 741-746.
- 658 Tomsova, Z. and Juzova, Z.: (Group measurement of 17-oxosteroids by thin layer chromatography). *Sb. Lek.*, 93 (1991) 232-238; C.A., 116 (1992) 121063v.
- 659 Wu, S.M., Chen, S.H. and Wu, H.L.: Thin-layer chromatographic detection of glucocorticoids. *Gaoxiong Yixue Kexue Zazhi*, 7 (1991) 545-549; C.A., 116 (1992) 166419g.

13c. Estrogens

- 660 Poole, S.K., Belay, M.T. and Poole, C.F.: Effective systems for the separation of pharmaceutically important estrogens by thin layer chromatography. *J. Planar Chromatogr.*, 5 (1992) 16-27.

13d. Sterols

- 661 Aoki, Y., Yamazaki, T., Kondoh, M., Sudoh, Y., Nakayama, N., Sekine, Y., Shimada, H. and Arisawa, M.: A new series of natural antifungals the inhibit P450 lanosterol C-14 demethylase. II. Mode of action. *J. Antibiot.*, 45 (1992) 160-170.
- 662 Herz, J.E., Swaminathan, S., Pinkerton, F.D., Wilson, W.K. and Schroeffer, G.J., Jr.: Inhibitors of sterol synthesis. A highly efficient and specific side-chain oxidation of 3α -acetoxy- 5α -cholest-8(14)-en-15-one for construction of metabolites and analogs of the 15-ketosterol. *J. Lipid Res.*, 33 (1992) 579-598.
- 663 Salmon, S., Maziere, C., Auclair, M., Theron, L., Santus, R. and Maziere, J.-C.: Malondialdehyde modification and copper-induced autooxidation of high-density lipoprotein decrease cholesterol efflux from human cultured fibroblasts. *Biochim. Biophys. Acta*, 1125 (1992) 230-235.

See also 567, 609, 615, 751.

13e. Bile acids and alcohols

- 664 Little, J.M., Pyrek, J.S., Radomska, A., Shattuck, K.E. and Lester, R.: Hepatic metabolism of short-chain bile acids. Inversion of the 3-hydroxyl group of isoetianic acid (3α -hydroxy- 5α -androstane- 17β -carboxylic acid) by the adult rat. *J. Lipid Res.*, 32 (1991) 1949-1957.
- 665 Takhtaev, F.Kh. and Izatullaev, E.A.: Method for thin-layer chromatography analysis of conjugated bile acids. U.S.S.R. SU 1,672,353 (Cl. G01N30/90), 23 Aug. 1991, Appl. 4,393,983, 17 Mar. 1988; C.A., 116 (1992) 169630e.

- 666 Zhang, J., Po, S., Xu, H., Chen, Z.: (Quantitative determination of taurocholic acid and hydoxycholic acid in Qingkailing injection by TLC-densitometry). *Zhongguo Yiyuan Yaoxue Zazhi*, 11 (1991) 260-262; C.A., 116 (1992) 46399d.

13g. Other steroids

- 667 Waxman, D.J.: P450-Catalyzed steroid hydroxylation: assay and product identification by thin-layer chromatography. *Methods Enzymol.*, 206 (1991) 462-476; C.A., 116 (1992) 146517j.
- 668 Zhang, Z., Gao, L. and Lu, Q.: (Separation of constituents in the dried venom of toads and determination of the resibufogenin by RPTLC-scanning method). *Tianran Chanwu Yanjiu Yu Kaifa*, 3, No. 3 (1991) 65-69; C.A., 116 (1992) 91514y.

See also 814.

14. STEROID GLYCOSIDES AND SAPONINS

- 669 Tran Van Sung and Adam, G.: An acetylated bidesmosidic saponin from *Schefflera octophylla*. *J. Natural Prod.*, 55 (1992) 503-505.
- 670 Uniyal, S.K., Badoni, V. and Sati, O.P.: A new triterpenoidal saponin from *Acacia auriculiformis*. *J. Natural Prod.*, 55 (1992) 500-502.

See also 800, 806.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 671 Bentley, M.D., Gaul, F., Rajab, M.S. and Hassanali, A.: Tetranortriterpenes from *Turraea robusta*. *J. Nat. Prod.*, 55 (1992) 84-87.
- 672 Cohen, H., Charrier, C., Ricard, L. and Perreau, M.: Isolation and characterization of a secondary metabolite produced by *Fusarium graminearum*. 2,6,6,9-Tetramethyltricyclo[5.4.0.0]undecane-5,8,11-triol (5-hydroxyculmorin). *J. Nat. Prod.*, 55 (1992) 326-332.
- 673 Hufford, C.D., Oguntimein, B. and Muhammad, I.: New stemodane diterpenes from *Stemodia maritima*. *J. Nat. Prod.*, 55 (1992) 48-52.
- 674 Kohli, J.C. and Kumar, S.: Novel procedure for the thin-layer chromatography of terpenoids on platinum ion-silica gel layers. *Natl. Acad. Sci. Lett. (India)*, 14 (1991) 325-329; C.A., 116 (1992) 143066a.
- 675 Madyastha, K.M. and Raj, C.P.: Metabolic fate of menthofuran in rats. Novel oxidative pathways. *Drug Metab. Disp.*, 20 (1992) 295-301.
- 676 Moulis, C., Fouraste, I. and Bon, M.: Levatin, an 18-norclerodane diterpene from *Croton levatii*. *J. Natural Prod.*, 55 (1992) 445-449.

See also 670.

15b. *Essential oils*

- 677 Betti, A., Lodi, G., Fuzzati, N., Coppi, S. and Benedetti, S.: On the role of planar multiple development in a multidimensional approach to TLC-GC. *J. Planar Chromatogr.*, 4 (1991) 360-384.

See also 807, 809.

16. NITRO AND NITROSO COMPOUNDS

- 678 Posyniak, A., Kozak, A. and Semeniuk, S.: (Determination of residues of 5-nitrofurans derivatives in biological samples). *Chem. Anal. (Warsaw)*, 36 (1991) 197-200; *C.A.*, 116 (1992) 172521a.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. *Amines and polyamines*

- 679 Müller, S. and Walter, R.D.: Purification and characterization of polyamine oxidase from *Ascaris suum*. *Biochem. J.*, 283 (1992) 75-80.
- 680 Shiraki, K., Kobayashi, Y. and Tanahashi, N.: (Determination of tetramine by thin layer chromatography and densitometry). *Gifu-ken Eisei Kenkyushoho*, 36 (1991) 50-52; *C.A.*, 116 (1992) 172535h.

See also 552, 578.

17d. *Other amine derivatives and amides (excl. peptides)*

- 681 Bilyk, A., Bistline, R.G., Jr., Piazza, G.J., Fearheller, S.M. and Haas, M.J.: The novel technique for the preparation of secondary fatty amides. *J. Am. Oil Chem. Soc.*, 69 (1992) 488-491.
- 682 Kimura, K., Murota, A. and Yoshihiro, Y.: Determination of the mode of hydrolysis of chitooligosaccharides by chitosanase derived from *Aspergillus oryzae* by thin layer chromatography. *Chem. Lett.*, (1992) 223-226; *C.A.*, 116 (1992) 174592y.
- 683 Orelli, L., Reverdito, A.M., Perillo, I.A. and Fernandez, B.M.: HPTLC: a valuable tool for elucidating the mechanism of intramolecular N→N' acyl transfer in N-acylalkylenediamine derivatives. *J. Planar Chromatogr.*, 4 (1991) 406-409.

See also 636, 779.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. *Amino acids and their derivatives*

- 684 Bouvrette, P. and Ziomek, E.: Use of δ -(α -amino adipoyl) chromogenic amides in screening for amino adipoyl aminohydro-lases. *Anal. Biochem.*, 200 (1992) 315-220.
- 685 Huber, J.L.A. and Huber, S.C.: Site-specific serine phosphorylation of spinach leaf sucrose-phosphate synthase. *Biochem. J.*, 283 (1992) 877-882.

- 686 Kinuta, M., Ubuka, T., Yao, K., Futani, S., Fujiwara, M. and Kurozumi, Y.: Isolation of S-[2-carboxy-1-(1H-imidazol-4-yl)ethyl]cysteine from human urine. *Biochem. J.*, 283 (1992) 39-40.
- 687 Nagata, Y., Yamamoto, K., Shimoji, T.: Determination of D- and L-amino acids in mouse kidney by high-performance liquid chromatography. *J. Chromatogr.*, 575 (1992) 147-152.
- 688 Pietruszewski, J., Marszal, E. and Bujniewicz, E.: Chromatographic analysis of amino acids in children's tears. *J. Planar Chromatogr.*, 4 (1991) 417.
- 689 Schwecke, T., Aharonowitz, Y., Palissa, H., von Döhren, H., Kleinkauf, H. and van Liempt, H.: Enzymatic characterisation of the multifunctional enzyme δ -(L- α -amino adipyl)-L-cysteinyl-D-valine synthetase from *Streptomyces clavuligerus*. *Eur. J. Biochem.*, 205 (1992) 687-694.
- 690 Wang, J., Yao, Y., Shao, S., Liang, L. and Li, H.: (Thin layer chromatographic separation and colorimetric determination of methylhippuric acid and hippuric acid coexisting in urine). *Gongye Weisheng Yu Zhiyebing*, 17 (1991) 96-98; *C.A.*, 116 (1992) 77907x.
- 691 Wu, Y.: (Detection of homocystinuria on micro-scale two dimensional thin layer chromatography). *Zhonghua Yixue Jianyan Zazhi*, 14 (1991) 211-214; *C.A.*, 116 (1992) 79607y.
- 692 Yannoukakos, D., Vasseur, C., Piau, J.-P., Wajzman, H. and Bursaux, E.: Phosphorylation sites in human erythrocyte band 3 protein. *Biochim. Biophys. Acta*, 1061 (1991) 253-266.

See also 549, 563, 696, 720.

18b. *Peptides, peptidic and proteinous hormones, growth factors*

- 693 Bramucci, M., Miano, A. and Amici, D.: Epidermal inhibitory pentapeptide phosphorylated *in vitro* by calf thymus protein kinase NII is protected from serum enzyme hydrolysis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 474-480.
- 694 Budde, R.J.A., McMurray, J.S. and Tinker, D.A.: An assay for acidic peptide substrates of protein kinases. *Anal. Biochem.*, 200 (1992) 347-351.
- 695 Diggle, T.A. and Denton, R.M.: Comparison of the effects of insulin and adrenergic agonists on the phosphorylation of an acid-soluble 22 kDa protein in rat epididymal fat-pads and isolated fat-cells. *Biochem. J.*, 282 (1992) 729-736.
- 696 Purushotham, K.R., Bologna, J., Nakagawa, Y. and Humphreys-Beher, M.G.: Isolation and characterization of a new Ca^{2+} /calmodulin-dependent protein kinase for isoproterenol-stimulated proliferating rat parotid acinar cells. *Biochem. Cell Biol.*, 70 (1992) 250-255.

See also 685.

18c. *Elucidation of structure of proteins and enzymes*

See 692.

19. PROTEINS

19n. Other proteins (incl. proteinous inhibitors of enzymic activity)

- 697 Teno, N., Wanaka, K., Okada, Y., Tsuda, Y., Okamoto, U., Hijikata-Okunomiya, A., Naito, T. and Okamoto, S.: Development of selective inhibitors against plasma kallikrein. *Chem. Pharm. Bull.*, 39 (1991) 2930-2936.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

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

- 698 Hipps, D.S. and Perham, R.N.: Expression in *Escherichia coli* of a sub-gene encoding the lipoyl and peripheral subunit-binding domains of the dihydrolipoamide acetyltransferase component of the pyruvate dehydrogenase complex of *Bacillus stearothermophilus*. *Biochem. J.*, 283 (1992) 665-671.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

21a. Purines, pyrimidines, nucleosides, nucleotides

- 699 Aparicio, J.F., Freije, J.M.P., Lopez-Otin, C., Cal, S. and Sanchez, J.: A *Streptomyces glaucescens* endodeoxyribonuclease which shows a strong preference for CC dinucleotide. *Eur. J. Biochem.*, 205 (1992) 695-699.
- 700 Hartman, H.A., Edmondson, D.E. and McCormick, D.B.: Riboflavin 5'-pyrophosphate: a contaminant of commercial FAD, a coenzyme for FAD-dependent oxidase, and an inhibitor of FAD synthetase. *Anal. Biochem.*, 202 (1992) 348-355.
- 701 Idriss, S.D., Pilz, R.B., Sharma, V.S. and Boss, G.R.: Studies on cytosolic guanylate cyclase from human placenta. *Biochem. Biophys. Res. Commun.*, 183 (1992) 312-320.
- 702 Lutgerink, J.T., de Graaf, E., Hoebee, B., Stavenuitez, H.F.C., Westra, J.G. and Kriek, E.: Detection of 8-hydroxyguanine in small amounts of DNA by ³²P postlabeling. *Anal. Biochem.*, 201 (1992) 127-133.

See also 711.

22. ALKALOIDS

- 703 Antipova, E.A. and Nikolaeva, L.A.: (Determination of ajmaline in raw materials). *Khim. Prir. Soedin.*, No. 1 (1991) 147; *C.A.*, 116 (1992) 67316q.
- 704 Berlinck, R.G.S., Braekman, J.C., Daloz, D., Bruno, I., Riccio, R., Rogeau, D. and Amade, P.: Crambines C1 and C2: two further ichthyotoxic guanidine alkaloids from the sponge *Crambe crambe*. *J. Natural Prod.*, 55 (1992) 528-532.
- 705 Glavac, D.: R_M values of some colchicines and colchicine-amides determined by reversed-phase thin-layer chromatography. *J. Chromatogr.*, 591 (1992) 367-370.

- 706 Köppel, C., Wagemann, A., Hansen, G.R. and Müller, C.: Monitoring of ajmaline in plasma with high-performance liquid chromatography. *J. Chromatogr.*, 575 (1992) 87-91.

- 707 Li, P., Yu, W., Xu, S. and Zhou, Y.: (Application of photodiode array detector in analysis of vincamine by HPLC). *Fenxi Ceshi Tongbao*, 10, No. 4 (1991) 42-45; *C.A.*, 116 (1992) 67304j.

- 708 Pang, Z., Wang, B. and Shen, W.: (Determination of aconitine in *Aconitum kongboense* by thin-layer chromatography fluorometry). *Zhongguo Zhongyao Zazhi*, 16 (1991) 485-486; *C.A.*, 116 (1992) 28261y.

- 709 Pothier, J., Galand, N. and Viel, C.: Separation of alkaloids in plant extracts by overpressured layer chromatography with ethyl acetate as mobile phase. *J. Planar Chromatogr.*, 4 (1991) 392-396.

- 710 Tálas, E., Botz, L., Margittai, J., Sticher, O. and Baiker, A.: Planar chromatographic separation of *Cinchona* alkaloids formed during enantioselective hydrogenation of ethyl pyruvate. *J. Planar Chromatogr.*, 5 (1992) 28-34.

- 711 Wang, S., Sun, H., Duanmu, X. and Zhang, H.: (The compatibility of troxerutin and citicoline in dextran-40 injections). *Zhongguo Yaoxue Zazhi*, 26 (1991) 538-539; *C.A.*, 116 (1992) 113446g.

See also 555, 562, 716, 786.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23a. Porphyrins and other pyrroles

- 712 Liu, S. and Zhang, N.: (Identification of biliverdin reduction products). *Zhongguo Yaoxue Zazhi*, 26 (1991) 605-606; *C.A.*, 116 (1992) 136355r.

- 713 Wells, D.A., Hawi, A.A. and Digenis, G.A.: Isolation and identification of the major urinary metabolite of N-methylpyrrolidinone in the rat. *Drug Metab. Disp.*, 20 (1992) 124-126.

23b. Bile pigments

- 714 Sierra, E.E. and Nutter, L.M.: A microassay for heme oxygenase activity using thin-layer chromatography. *Anal. Biochem.*, 200 (1992) 27-30.

23c. Indole derivatives and plant hormones (gibberellins)

- 715 Luo, H., Zhu, B. and Zhou, J.: (Following the phase-transfer catalytic syntheses of N-alkylated indoles by TLC (thin layer chromatography)). *Zhejiang Daxue Xuebao, Ziran Kexueban*, 25 (1991) 403-410; *C.A.*, 116 (1992) 106016p.

- 716 Wurst, M., Kysilka, R. and Koza, T.: Analysis and isolation of indole alkaloids of fungi by high-performance liquid chromatography. *J. Chromatogr.*, 583 (1992) 201-208.

23e. Other N-heterocyclic compounds

- 717 Nayak, A. and Mishra, S.B.: Thin-layer chromatographic separation of isomeric arylidenebis(2-pyrazolin-5-ones). *Acta Cienc. Indica, Chem.*, 16C, No.3 (1990) 237-240; *C.A.*, 116 (1992) 98620p.

- 718 Yang, W. and Davis, P.J.: Microbial models of mammalian metabolism. Biotransformations of N-methylcarbazole using the fungus *Cunninghamella echinulata*. *Drug Metab. Disp.*, 20 (1992) 38-46.

See also 686.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 719 Lian, H., Mao, L., Xu, X. and Zhang, Z.: (Chromatographic behavior of arylthioacetates and their oxidation products. I. Their behavior in thin-layer chromatography). *Sepu*, 9 (1991) 377-379; *C.A.*, 116 (1992) 120113z.
- 720 Patti, A., Morrone, R., Chillemi, R., Piattelli, M. and Sciuto, S.: Biosynthetic relationship between sulfonium and N-methylated compounds in the red alga *Vidalia volubilis*. *J. Nat. Prod.*, 55 (1992) 53-57.

See also 768, 773.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 721 Mazurek, M. and Witkewicz, Z.: The analysis of organophosphorus warfare agents in the presence of pesticides by overpressured thin layer chromatography. *J. Planar Chromatogr.*, 4 (1991) 379-384.

See also 636, 692.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26c. Coordination compounds

- 722 Janjić, T.J., Milojkovic, D.M., Vuckovic, G.N. and Celap, M.B.: Thin-layer chromatography on polyacrylonitrile. IV. Investigation of the separation mechanisms for this(alkylxanthato)cobalt(III) complexes. *J. Chromatogr.*, 596 (1992) 91-94.

27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)

- 723 Dickinson, F.M. and Wadforth, C.: Purification and some properties of alcohol oxidase from alkane-grown *Candida tropicalis*. *Biochem. J.*, 282 (1992) 325-331.
- 724 Hachula, U. and Buhl, F.: Determination of α -tocopherol in capsules and soybean oil after chromatographic separation. *J. Planar Chromatogr.*, 4 (1991) 416.
- 725 Sliwiok, J. and Kocjan, B.: Chromatographische Untersuchungen der hydrophoben Eigenschaften von Tocopherolen. *Fat Sci. Technol.*, 94 (1992) 157-159.
- 726 Stals, H.K. and Declercq, P.E.: A specific and inexpensive assay of radiolabeled long-chain acyl-coenzyme A in isolated hepatocytes. *Anal. Biochem.*, 202 (1992) 117-119.

- 727 Stein, J., Hahn, A., Lembcke, B. and Rehner, G.: High-performance liquid chromatographic determination of biotin in biological materials after crown ether-catalyzed fluorescence derivatization with panacyl bromide. *Anal. Biochem.*, 200 (1992) 89-94.

28. ANTIBIOTICS

- 728 Asano, N., Kameda, Y. and Matsui, K.: All eight possible mono- β -D-glucosides of validoxylamine A. Preparation and structure determination. *J. Antibiot.*, 44 (1991) 1406-1416.
- 729 Brickner, S.J., Gaikema, J.J., Zurenko, G.E., Greenfield, L.J., Manninen, P.R. and Ulanowicz, D.A.: N-Acyl 3-alkylidene- and 3-alkyl azetidin-2-ones: a new class of monocyclic β -lactam antibacterial agents. 1. Structure-activity relationships of 3-isopropylidene and 3-isopropyl analogs. *J. Antibiot.*, 45 (1992) 213-226.
- 730 Corti, P., Corbini, G., Dreassi, E., Politi, N. and Montecchi, L.: Thin-layer chromatography in the quantitative analysis of drugs. Determination of rifaximin and its oxidation products. *Analisis*, 19 (1991) 257-261; *C.A.*, 116 (1992) 91549p.
- 731 Davis, A.S., Davey, M.R., Clothier, R.C. and Cocking, E.C.: Quantification and comparison of chloramphenicol acetyltransferase activity in transformed plant protoplasts using high-performance liquid chromatography- and radioisotope-based assays. *Anal. Biochem.*, 201 (1992) 87-93.
- 732 Dunn, M. and Hahn, D.A.: Aqueous high-performance size-exclusion chromatographic assay for high-molecular-weight impurities in ceftiofur sodium. *J. Chromatogr.*, 595 (1992) 185-192.
- 733 Franco, C.M.M., Maurya, R., Vijayakumar, E.K.S., Chatterjee, S., Blumbach, J. and Ganguli, B.N.: Alisamycin, a new antibiotic of the manumycin group. I. Taxonomy, production, isolation and biological activity. *J. Antibiot.*, 44 (1991) 1289-1293.
- 734 Freyder, C.P., Zhou, W., Doetsch, P.W. and Marzilli, L.G.: Bleomycin A₂ and B₂ purification by flash chromatography for chemical and biochemical studies. *Prep. Biochem.*, 21 (1991) 257-268; *C.A.*, 116 (1992) 46415f.
- 735 Grabley, S., Granzer, E., Hütter, K., Ludwig, D., Mayer, M., Thiericke, R., Till, G., Wink, J., Phillips, S. and Zeeck, A.: Secondary metabolites by chemical screening. 8. Decarestrictines, a new family of inhibitors of cholesterol biosynthesis from *Penicillium*. I. Strain description, fermentation, isolation and properties. *J. Antibiot.*, 45 (1992) 56-65.
- 736 Hanada, M., Sugawara, K., Nishiyama, Y., Kamei, H., Hatori, M. and Konishi, M.: Protactin, a new antibiotic metabolite and a possible precursor of the actinomycins. *J. Antibiot.*, 45 (1992) 20-28.
- 737 Hatsu, M., Sasaki, T., Gomi, S., Kodama, Y., Sezaki, M., Inouye, S. and Kondo, S.: A new tetracycline antibiotic with antitumor activity. II. The structural elucidation of SF2575. *J. Antibiot.*, 45 (1992) 325-330.
- 738 Hatsu, M., Sasaki, T., Watabe, H.-O., Miyadoh, S., Nagasawa, M., Shomura, T., Sezaki, M., Inouye, S. and Kondo, S.: A new tetracycline antibiotic with antitumor activity. I. Taxonomy and fermentation of the producing strain, isolation and characterization of SF2575. *J. Antibiot.*, 45 (1992) 320-324.

- 739 Hayakawa, Y., Takaku, K., Furihata, K., Nagai, K. and Seto, H.: Isolation and structural elucidation of new 18-membered macrolide antibiotics, viranamycins A and B. *J. Antibiot.*, 44 (1991) 1294-1299.
- 740 Hochlowski, J.E., Mullally, M.M., Brill, G.M., Whittern, D.N., Buko, A.M., Hill, P. and McAlpine, J.B.: Dunaimycins, a new complex of spiroketal 24-membered macrolides with immunosuppressive activity. II. Isolation and elucidation of structures. *J. Antibiot.*, 44 (1991) 1318-1330.
- 741 Itazeki, H., Nagashima, K., Kawamura, Y., Matsumoto, K., Nakai, H. and Terui, Y.: Cinatrans, a novel family of phospholipase A₂ inhibitors. I. Taxonomy and fermentation of the producing culture; isolation and structures of cinatrans. *J. Antibiot.*, 45 (1992) 38-49.
- 742 Karadzic, I.M., Gojgic, G.D. and Vucetic, J.I.: Hexaene H-85, a hexaene macrolide complex. *J. Antibiot.*, 44 (1991) 1452-1453.
- 743 Kinoshita, K., Takenaka, S., Suzuki, H., Morohoshi, T. and Hayashi, M.: Mycinamycins, new macrolide antibiotics. XIII. Isolation and structures of novel formation products from *Micromonospora griseorubida* (FERM BP-705). *J. Antibiot.*, 45 (1992) 1-9.
- 744 Miyata, M., Ohkuma, H., Matsumoto, K., Saitoh, K., Miyaki, T., Oki, T. and Kawaguchi, H.: Dynemicins, new antibiotics with the 1,5-diyne-3-ene and anthraquinone subunit. I. Production, isolation and physico-chemical properties. *J. Antibiot.*, 44 (1991) 130C-130S.
- 745 Meier, R.-M. and Tamm, C.: Studies directed towards the biosynthesis of the C7 N-unit of rifamycin B: incorporation of [¹⁴C(G)]quinic acid and [1,2-¹³C₂]glycerol. *J. Antibiot.*, 45 (1992) 400-410.
- 746 Miyata, S., Hashimoto, M., Masui, Y., Ezaki, M., Takase, S., Nishikawa, M., Kiyoto, S., Okuhara, M. and Kohsaka, M.: WS-7338, New endothelin receptor antagonist isolated from *Streptomyces* sp. No. 7338. I. Taxonomy, fermentation, isolation, physico-chemical properties and biological activities. *J. Antibiot.*, 45 (1992) 74-82.
- 747 Naidong, W., Hua, S., Verresen, K., Roets, E. and Hoogmartens, J.: Assay and purity control of metacycline by thin-layer chromatography combined with UV and fluorescence densitometry - a comparison with liquid chromatography. *J. Pharm. Biomed. Anal.*, 9 (1991) 717-723.
- 748 Nakejima, S., Niiyama, K., Ihara, M., Kojiri, K. and Suda, H.: Endothelin-binding inhibitors, BE-18257A and BE-18257B. II. Structure determination. *J. Antibiot.*, 44 (1991) 1348-1356.
- 749 Nakenishi, S., Osawa, K., Saito, Y., Kawamoto, I., Kuroda, K. and Kase, H.: KS-505a, A novel inhibitor of bovine brain Ca²⁺ and calmodulin-dependent cyclic-nucleotide phosphodiesterase from *Streptomyces argenteolus*. *J. Antibiot.*, 45 (1992) 341-347.
- 750 Ni, K., He, H. and Wang, H.: (Determination of ribostamycin and neamine by TLC). *Zhongguo Yaoke Daxue Xuebao*, 22 (1991) 241-243; *C.A.*, 116 (1992) 28276g.
- 751 O'Sullivan, J., Phillipson, D.W., Kirsch, D.R., Fisher, S.M., Lai, M.H. and Trejo, W.H.: Lanomycin and glucolanomycin, antifungal agents produced by *Pycnidiothophora dispersa*. I. Discovery, isolation and biological activity. *J. Antibiot.*, 45 (1992) 306-312.
- 752 Otsuka, T., Shibata, T., Tsurumi, Y., Takase, S., Okuhara, M., Terano, H., Kohsaka, M. and Imanaka, H.: A new angiotensin inhibitor, FR-111142. *J. Antibiot.*, 45 (1992) 348-354.
- 753 Pachaly, P.: DC in der Apotheke. Doxycyclinhyclat. *Dtsch. Apoth.-Ztg.*, 132 (1992) 514-515.
- 754 Phillipson, D.W., O'Sullivan, J., Johnson, J.H., Bolgar, M.S. and Kahle, A.D.: Lanomycin and glucolanomycin, antifungal agents produced by *Pycnidiothophora dispersa*. II. Structure elucidation. *J. Antibiot.*, 45 (1992) 313-319.
- 755 Preobrazhenskaya, M.N., Holpne-Kozlova, N.V. and Lazhko, E.I.: Transformation of streptonigrin into streptonigrone; synthesis and biological evaluation of antibiotics streptonigrin and streptonigrone alkyl ethers. *J. Antibiot.*, 45 (1992) 227-234.
- 756 Priebe, W., Neamati, N. and Perez-Soler, R.: 3'-Hydroxyesorubicin halogenated at C-2'. *J. Antibiot.*, 45 (1992) 386-393.
- 757 Sawa, R., Takahashi, Y., Itoh, S., Shimanaka, K., Matsuda, N., Hamada, M., Sawa, T., Naganawa, H. and Takeuchi, T.: Aldecalmycin, a new antimicrobial antibiotic from *Streptomyces*. *J. Antibiot.*, 45 (1992) 136-139.
- 758 Toki, S., Ando, K., Yoshida, M., Kawamoto, I., Sano, H. and Matsuda, Y.: ES-242-1, A novel compound from *Verticillium* sp., binds to a site on N-methyl-D-aspartate receptor that is coupled to the channel domain. *J. Antibiot.*, 45 (1992) 88-93.
- 759 Tsukanawa, M., Tenmyo, O., Tomita, K., Naruse, N., Kotake, C., Miyaki, T., Konishi, M. and Oki, T.: Quartromicin, a complex of novel antiviral antibiotics. I. Production, isolation, physico-chemical properties and antiviral activity. *J. Antibiot.*, 45 (1992) 180-188.
- 760 Ueda, T., Kiyohara, K., Lee, S., Aoyagi, H. and Izumiya, N.: Four diastereoisomers of cyclo(-Asp-Val-): inconsistency of their properties with the proposed structure of cairomyacin A. *J. Antibiot.*, 45 (1992) 235-239.
- 761 Vega, M.H., Garcia, G.M., Gesche, E.R. and Saelzer, R.F.: Analysis of streptomycin and neomycin in biological samples as dansyl derivatives. Detection, identification, and quantitation by HPTLC. *J. Planar Chromatogr.*, 5 (1992) 62-63.
- 762 Yamazaki, M., Yamashita, T., Harada, T., Nishikiori, T., Saito, S., Shimada, N. and Fujii, A.: 44-Homooligomycins A and B, new antitumor antibiotics from *Streptomyces bottropensis*. Producing organism, fermentation, isolation, structure elucidation and biological properties. *J. Antibiot.*, 45 (1992) 171-179.
- See also 553, 559, 684.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 763 Sherma, J.: Modern thin-layer chromatographic pesticide analysis using multiple development. *J. AOAC Int.*, 75 (1992) 15-17; *C.A.*, 116 (1992) 168246x - a review with 13 refs.

See also 721.

29c. Phosphorus insecticides

- 764 Simon, L., Spittler, M. and Wallhöfer, P.R.: Metabolism of fenamiphos in 16 soils originating from different geographic areas. *J. Agric. Food Chem.*, 40 (1992) 312-317.

29e. Herbicides

See 550.

29f. Fungicides

See 788.

30. SYNTHETIC AND NATURAL DYES

30a. Synthetic dyes

- 765 Gupta, V.K., Ali, I. and Joshi, A.: TLC Separation of some synthetic dyes on silica gel layers impregnated with nickel(II) ion. *J. Indian Chem. Soc.*, 68 (1991) 311-312; *C.A.*, 116 (1992) 61537r.
- 766 Kaur, N., Jasuja, O.P. and Singla, A.K.: Thin layer chromatography of computer printer ribbon inks. *Forensic Sci. Int.*, 53 (1992) 51-60; *C.A.*, 116 (1992) 229724a.
- 767 Miyamoto, F., Saeki, M., Kamijo, M., Kanda, H., Nakaoka, T., Nishijima, M., Ito, Y. and Takeshita, R.: (Systematic separation of artificial and natural dyes in foods and their qualitative determination by thin-layer chromatography). *Eisei Kagaku*, 37 (1991) 542-551; *C.A.*, 116 (1992) 213083e.
- 768 Wall, P.E.: Thin layer chromatographic separation of thiazins: problems and solutions. *J. Planar Chromatogr.*, 4 (1991) 365-369.

See also 555.

30b. Chloroplast and other natural pigments

- 769 Gill, M., Qureshi, A. and Watling, R.: Pigments of fungi, part 27. New xanthorin derivatives from a fungus of the genus *Dermocybe*. *J. Natural Prod.*, 55 (1992) 517-520.
- 770 Li, Z., Wu, J. and Gao, Y.: (Determination of lycopene in tomato ketchup). *Shipin Yu Fajiao Gongye*, (1991) 82-84; *C.A.*, 116 (1992) 104572t.
- 771 Nagaraj, R.H. and Monnier, V.M.: Isolation and characterization of a blue fluorophore from human eye lens crystallins: *In vitro* formation from Maillard reaction with ascorbate and ribose. *Biochim. Biophys. Acta*, 1116 (1992) 34-42.

See also 767.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

See 785.

32b. Antirheumatics and antiinflammatory drugs

- 772 Chyla, A. and Kaniewska, T.: (Simple methods to determine drug release from tablets). *Biul. Inst. Lekow.*, 37, No. 1-3 (1990) 37-43; *C.A.*, 116 (1992) 46166a.
- 773 Yoshioka, M., Yamamoto, T. and Okai, K.: (Chemical structure and physico-chemical properties of zaltoprofen). *Iyakuin Kenkyu*, 22 (1991) 836-844; *C.A.*, 116 (1992) 67029y.

See also 555, 786.

32c. Autonomic and cardiovascular drugs

- 774 Azcona, T., Martin-Gonzalez, A., Zamorano, P., Pascual, C., Grau, C. and Garcia de Mirasierra, M.: New methods for the assay of 5-isosorbide mononitrate and its validation. *J. Pharm. Biomed. Anal.*, 9 (1991) 725-729.
- 775 Bezakova, Z., Bachrata, M. and Csollej, J.: (Analytical evaluation of N-propyl-3-[2-(butoxyformylamine)phenoxy]-2-hydroxypropylamine hydrochloride - compound BL 4211. II). *Farm. Obz.*, 60 (1991) 387-406; *C.A.*, 116 (1992) 67320m.
- 776 Flinois, J.-P., Chabin, M., Dufour, A., Egros, F., de Waziers, I., Mas-Chamberlin, C. and Beaune, P.H.: Metabolism rate of oxodipine in rats and humans: comparison of *in vivo* and *in vitro* data. *J. Pharmacol. Exp. Ther.*, 261 (1992) 381-386.
- 777 Nakano, M. and Kawahara, S.: Stereoselective renal tubular secretion of a new uricosuric diuretic, 6,7-dichloro-5-(N,N-dimethylsulfamoyl)-2,3-dihydro-2-benzofurancarboxylic acid (S-8666) in cynomolgus monkeys. *Drug Metab. Disp.*, 20 (1992) 179-185.
- 778 Neugebauer, G. and Neubert, P.: Metabolism of carvedilol in man. *Eur. J. Drug Metab.*, 16 (1991) 257-260.

32d. Central nervous system drugs

- 779 Cserhati, T. and Magyar, K.: Lipophilicity determination of some monoamine oxidase inhibitors: the effect of methanol and ammonium chloride. *J. Chromatogr.*, 575 (1992) 57-62.
- 780 Foti, S., Musumarra, G., Saletti, R. and Romano, G.: Determination of the "chromatographic pattern" for the identification of dipyrone urinary metabolites. *Farmaco*, 46 (1991) 1081-1089; *C.A.*, 116 (1992) 75589w.
- 781 Krumholz, B. and Wenz, K.: Identification and determination of polidocanol in a suppository formulation. *J. Planar Chromatogr.*, 4 (1991) 370-372.
- 782 Laudszun, M. and Kovar, K.A.: Colored salts of benzodiazepines. Part III. Rapid testing method and mechanism of the reaction with 4-dimethylaminocinnamaldehyde (DMAC). *Pharm. Acta Helv.*, 66 (1991) 268-273; *C.A.*, 116 (1992) 28284h.
- 783 Narimatsu, S., Watanabe, K., Matsunaga, T., Yamamoto, I., Imooka, S., Funae, Y. and Yoshimura, H.: Cytochrome P-450 isozymes involved in the oxidative metabolism of Δ^9 -tetrahydrocannabinol by liver microsomes of adult female rats. *Drug Metab. Disp.*, 20 (1992) 79-83.
- 784 White, D.J., Stewart, J.T. and Honigberg, I.L.: Quantitative analysis of dizepam and related compounds in drug substance and tablet dosage form by HPTLC and scanning densitometry. *J. Planar Chromatogr.*, 4 (1991) 413-415.

See also 562.

32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 785 Corti, P., Dreassi, E., Politi, N. and Valoti, M.: Thin layer chromatography in the quantitative analysis of pharmaceuticals: comparison of layers in the analysis of a complex mixture of phenothiazine derivatives. *Pharm. Acta Helv.*, 66 (1991) 329-334; *C.A.*, 116 (1992) 75579t.

- 786 Fatova, E.Yu., Evtushenko, N.S. and Pakhomova, I.V.: (Simultaneous determination of analgin, amidopyrine, phenobarbital, codeine and caffeine in Pentalgin tablets by thin-layer chromatography and spectrophotometric densitometry). *Farmatsiya (Moscow)*, 40 (1991) 31-35; C.A., 116 (1992) 28300k.
- 787 Khazanchi, R., Walia, S. and Handa, S.K.: Simultaneous liquid chromatographic determination of fenamiphos and its metabolites in soil. *J. Assoc. Off. Anal. Chem.*, 75 (1992) 62-65.
- 788 Patel, R. and Sugden, J.K.: Photodegradation of aqueous solutions of dequalinium chloride. *Pharmazie*, 47 (1992) 113-115.
- 789 Schneider, G.: HPTLC determination of pentachlorophenol in leather. *Int. Lab.*, 22, No. 4 (1992) 26-29.
- 790 Tatsumi, K., Kitamura, S., Kato, M. and Hiraoka, K.: Metabolism of sodium nifurstyrenate, a veterinary antimicrobial nitrofurantoin, in animals and fish. *Drug Metab. Disp.*, 20 (1992) 226-233.
- See also 759, 772, 794.
- 32f. *Cytostatics*
- 791 Boddy, A.V. and Idle, J.R.: Combined thin-layer chromatography-photography-densitometry for the quantification of ifosfamide and its principal metabolites in urine, cerebrospinal fluid and plasma. *J. Chromatogr.*, 575 (1992) 137-142.
- 792 Centrich, E.F. and Rubio, H.D.: (Analysis of thyrostatics in the thyroid glands by thin layer chromatography and HPLC-UV). *An. Bromatol.*, 42 (1990) 337-344; C.A., 116 (1992) 82304c.
- 793 Zimak, J., Zimakova, M. and Volke, J.: Electrochemical determination of small amounts of mitoxantrone in urine. *Pharmazie*, 46 (1991) 605-606; C.A., 116 (1992) 143189t.
- See also 707.
- 32g. *Other drug categories*
- 794 He, S., Du, Z., Lu, Z., Zhu, X. and Qu, F.: (Experimental investigation on the compatible stability of metronidazole with amoxicillin). *Zhongguo Yiyuan Yaoxue Zazhi*, 11 (1991) 366-370; C.A., 116 (1992) 113447h.
- 795 Kamimura, H., Ogata, H. and Takahara, H.: α -Glucoside formation of xenobiotics by rat liver α -glycosidases. *Drug Metab. Disp.*, 20 (1992) 309-315.
- 796 Kurbanova, M.M. and Khaibabev, K.K.: (Purity control of anti-hepatitis B by thin-layer chromatography). *Khim. Prir. Soedin.*, (1991) 296-297; C.A., 116 (1992) 113655z.
- 797 Usansky, J.I. and Damani, L.A.: The urinary metabolic profile of metyrapone in the rat. Identification of two novel isomeric metyrapone N-oxide metabolites. *Drug Metab. Disp.*, 20 (1992) 64-69.
- 798 Zarpakar, S.S. and Salunkhe, B.B.: Determination of domperidone by high-performance thin-layer chromatography in pharmaceutical preparations. *Indian Drugs*, 27 (1990) 537-540; C.A., 116 (1992) 28304q.
- See also 656, 740, 772, 804, 829.
- 32h. *Toxicological and forensic applications*
- 799 Ojanperä, I., Lillsunde, P., Vartiavaara, J. and Vuori, E.: Screening for amphetamines with a combination of normal and reversed phase thin layer chromatography and visualization with Fast Black K salt. *J. Planar Chromatogr.*, 4 (1991) 373-378.
- See also 783, 808.
- 32i. *Plant extracts*
- 800 Bui, T.B.: (Semimicrometric determination of diosgenin in *Dioscorea composita* for strain selection purposes). *Tap Chi Duoc Hoc.*, No. 4 (1991) 28-30; C.A., 116 (1992) 67303h.
- 801 Calis, I., Ersöz, T., Chulia, A.J. and Rüedi, P.: Septemfidoside: a new bis-iridoid diglucoside from *Gentiana septemfida*. *J. Nat. Prod.*, 55 (1992) 385-388.
- 802 Feng, Y. and Gao, G.: (Quality evaluation of Chinese licorice). *Yaowu Fenxi Zazhi*, 11 (1991) 269-271; C.A., 116 (1992) 28263a.
- 803 Fukamiya, N., Okano, M., Miyamoto, M., Tagahara, K. and Lee, K.-H.: Antitumor agents, 127. Bruceoside, a new cytotoxic quassinoid glucoside, and related compounds from *Buceca javanica*. *J. Natural Prod.*, 55 (1992) 468-475.
- 804 Gromek, D., Kisiel, W., Stojakowska, A. and Kohlmunzer, S.: Attempts of chemical standardizing of *Chrysanthemum parthenicum* as a prospective antimigraine drug. *Pol. J. Pharmacol. Pharm.*, 43 (1991) 213-217; C.A., 116 (1992) 28264b.
- 805 Jiao, Q. and Yu, R.: (Determination of the main components in Nantong Health Baby Pill by TLC). *Yaowu Fenxi Zazhi*, 11 (1991) 326-329; C.A., 116 (1992) 91522z.
- 806 Kir'yanov, A.A., Bondarenko, L.T., Kurkin, V.A., Zapesochayna, G.G., Dubichev, A.A. and Vorontsov, E.D.: (Determination of biologically active constituents of *Rhodiola rosea* rhizome). *Khim. Prir. Soedin.*, (1991) 320-323; C.A., 116 (1992) 67317r.
- 807 Pachaly, P.: DC in der Apotheke. Kummelöl. *Dtsch. Apoth.-Ztg.*, 132 (1992) 415-416.
- 808 Sayed, H.M. and Backheet, E.Y.: Improved thin-layer chromatography(TLC)-colorimetric analysis of xanthotoxin and bergapten in plant extracts and some formulations. *Bull. Fac. Sci., Assiut Univ.*, 20, No. 1 (1991) 23-30; C.A., 116 (1992) 46414e.
- 809 Schmidt, P.C. and Vogel, K.: Kamille. Untersuchungen zur Stabilität von Kamillenhandelspräparaten. *Dtsch. Apoth.-Ztg.*, 132 (1992) 462-468.
- 810 Segiet-Kujawa, E. and Michalowska, A.: Determination of flavonoids in *Hb. origani*. *Herba Pol.*, 36 (1990) 79-82; C.A., 116 (1992) 136343k.
- 811 Su, X., Wang, B. and Che, M.: (Quantitative analysis for notopterin and isoimperatorin in the Chinese drug *Notopterygium*). *Zhongguo Yao*, 22 (1991) 450-451; C.A., 116 (1992) 91519x.
- 812 Venkatasubbaiah, P. and Chilton, W.S.: Phytotoxins of *Ascochyta hyalospora*, causal agent of lambsquarters leaf spot. *J. Natural Prod.*, 55 (1992) 461-467.
- 813 Yang, J., Han, G. and Feng, L.: (Quality standard of Kaixiongshungji pills). *Zhongguo Zhongyao Zazhi*, 16 (1991) 668-670; C.A., 116 (1992) 136352n.
- 814 Yen, M.H., Lin, C.C., Chuang, C.H. and Liu, S.Y.: Evaluation of root quality of *Bupleurum* species by TLC scanner and the liver protective effects of Xiaochaihutang prepared using three different *Bupleurum* species. *J. Ethnopharmacol.*, 34 (1991) 155-165; C.A., 116 (1992) 99260h.
- 815 Yuan, S., Wang, Z. and Cheng, M.: (The effect of processing on toxic constituents in radix *Phytolaceae*). *Zhongguo Zhongyao Zazhi*, 16 (1991) 659-662; C.A., 116 (1992) 136091b.
- 816 Zhang, Q. and Wang, B.: (Determination of paeoniflorin in white peony root and Fufangbaishao tablets). *Zhongguo Zhongyao Zazhi*, 16 (1991) 542-543; C.A., 116 (1992) 46391v.

- 817 Zhu, M. and Xiao, P.: Quantitative analysis of the active constituents in green tea. *Phytother. Res.*, 5 (1991) 239-240; *C.A.*, 116 (1992) 28267e.

See also 572, 574, 703, 707, 708, 783.

33. CLINICO-CHEMICAL APPLICATIONS

- 33b. *Complex mixtures and profiling (single compounds by cross-reference only)*

See 637, 688.

34. FOOD ANALYSIS

- 34b. *Complex mixtures (single compounds by cross-reference only)*

See 575, 610, 648, 678, 680, 767, 770, 792.

35. ENVIRONMENTAL ANALYSIS

- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*

See 764, 787.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

36a. Surfactants

- 818 Chen, K.M. and Wang, H.R.: Synthesis and surface activity of self-sequestering surfactants. *J. Am. Oil Chem. Soc.*, 69 (1992) 60-63.

See also 654.

- 36c. *Complex mixtures, technical products and unidentified compounds*

- 819 Petrakova, E.A., Okuneva, A.G. and Balkova, E.V.: (Determination of monofunctional impurities in linear aliphatic polycarbonates by supercritical thin-layer chromatography). *Zh. Fiz. Khim.*, 65 (1991) 2736-2738; *C.A.*, 116 (1992) 60402f.

38. INORGANIC COMPOUNDS

38a. Cations

- 820 De la Torre Boronat, M. del C. and Lewkowycz, K.R.: (Mercurochrome quality. Quantitative analysis of its components). *Circ. Farm.*, 48 (1990) 331-340; *C.A.*, 116 (1992) 46416g.

- 821 Medanic, Z., Turina, S. and Stefanac, Z.: (Determination of aluminum and magnesium by means of thin layer chromatography using frontal detection). *Kem. Ind.*, 40, No. 1 (1991) 1-4; *C.A.*, 116 (1992) 75202q.

- 822 Miller, T.E., Jr. and Poon, M.C.: Indirect-detection thin-layer chromatography of cations. *U.S. US 5,077,221 (Cl. 436-79; G01N30/90)*, 31 Dec. 1991, Appl. 557,889, 25 Jul. 1990; 5 pp.; *C.A.*, 116 (1992) 98579g.

- 823 Mokhov, A.A., Leont'eva, L.B., Bardin, V.V. and Gritsal, G.I.: (Method for determination of metal ions by paper chromatography). *U.S.S.R. SU 1,651,201 (Cl. G01N30/90)*, 23 May 1991, Appl. 4,647,689, 07 Feb. 1989; *C.A.*, 116 (1992) 75277t.

- 824 Sharma, D.S. and Misra, S.: Quantitative separation of Cr^{3+} from Mo^{6+} , W^{6+} , Hg^{2+} , Cu^{2+} and Pb^{2+} . Chromatographic behaviour of 51 cations of papers impregnated with Sn(IV)-based inorganic ion exchangers in complex-forming acid systems. *J. Chromatogr.*, 594 (1992) 379-385.

See also 620, 722.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 825 Alexoff, D.L., Fowler, J.S. and Gatley, S.J.: Removal of the 2.2.2 cryptated (Kryptofix 2.2.2) from fluorine-18 labeled 2-deoxy-2-[^{18}F]fluoro-D-glucose. *Appl. Radiat. Isot.*, 42 (1991) 1189-1193; *C.A.*, 116 (1992) 67152h.

- 826 Gattavecchia, E. and Tonelli, D.: Determination of strontium-90 by thin layer chromatography. *J. Radioanal. Nucl. Chem.*, 152 (1991) 391-399; *C.A.*, 116 (1992) 50484v.

- 827 Hammes, R., Kies, S., Koblenski, D. and Julin, C.: A better method of quality control for technetium-99m-sestamibi. *J. Nucl. Med. Technol.*, 19 (1991) 232-235; *C.A.*, 116 (1992) 46438r.

- 828 Hung, J.C., Wilson, M.E., Brown, M.L. and Gibbons, R.J.: Rapid preparation and quality control method for technetium-99m-2-methoxy isobutyl isonitrile (technetium-99m-sestamibi). *J. Nucl. Med.*, 32 (1991) 2162-2168; *C.A.*, 116 (1992) 91344t.

- 829 Zimmer, A.M. and Spies, S.M.: Quality control procedures for newer radiopharmaceuticals. *J. Nucl. Med. Technol.*, 19 (1991) 210-215; *C.A.*, 116 (1992) 46382t.

Electrophoresis

1. REVIEWS AND BOOKS

- 1415 Campos, C.C. and Simpson, C.F.: Capillary electrophoresis. *J. Chromatogr. Sci.*, 30 (1992) 53-58 - a review with 58 refs.
- 1416 Larskii, E.G.: (Advances in electrophoresis). *Itogi, Nauki, Tekh., Ser.: Biol. Khim.*, 39 (1991) 1-100; C.A., 116 (1992) 2945z - a review with 221 refs.
- 1417 Nishigaki, K.: (Progress in denaturing gradient gel electrophoresis as a methodology of structural analysis and separation of biomacromolecules). *Tanpakushitsu Kakusan Koso*, 36 (1991) 1747-1755; C.A., 116 (1992) 1330h - a review with 49 refs.
- 1418 Satoh, C. and Takahashi, N.: (Denaturing gradient gel electrophoresis). *Taisha*, 28 (1991) 731-739; C.A., 116 (1992) 77256j - a review with 41 refs.
- 1419 Shiba, K.: (Basic study and application of the optimum electrophoretic conditions for high-voltage isoelectric focusing on cellulose acetate membrane). *Seibutsu Butsuri Kagaku*, 35 (1991) 175-182. C.A., 116 (1992) 2952z - a review with 7 refs.
- 1420 Wagner, H. and Heinrich, J.: Free flow electrophoresis for the separation and purification of biopolymers. In: Tschesche, H. (Editor), *Mod. Methods Protein-Nucleic Acid Res.*, de Gruyter, Berlin, 1990, pp. 69-97; C.A., 116 (1992) 37142n - a review with 28 refs.

See also 1455, 1463, 1476, 1483, 1486, 1488, 1491, 1601, 1630, 1720, 1905, 1906, 1922, 1923, 1930, 1932, 1966, 1970, 1989, 1999.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 1421 Burgaud, C., Clifton, M.J. and Sanchez, V.: The relative importance of transport phenomena in recycling isoelectric focusing. *Electrophoresis (Weinheim)*, 13 (1992) 128-135.
- 1422 Chiari, M. and Righetti, P.G.: The Immobililine family: from 'vacuum' to 'plenum' chemistry. *Electrophoresis (Weinheim)*, 13 (1992) 187-191.
- 1423 Imai, S., Hayashi, K. and Hayashi, Y.: (Paper electrophoresis with phosphomolybdate ion). *Kagaku to Kyoiku*, 39 (1991) 448-449; C.A., 116 (1992) 40486h.
- 1424 Knisley, K.A. and Rodkey, L.S.: Direct detection of carrier ampholytes in immobilized pH gradients using picric acid precipitation. *Electrophoresis (Weinheim)*, 13 (1992) 220-224.
- 1425 Mang, V., Hannig, K., Zimmermann, U., Kowalski, M. and Kloeck, G.: Free flow electrophoresis experiment TEPE 3 on Texus 24. *Eur. Space Agency, [Spec. Publ.] ESA SP 1990, ESA SP-307*; C.A., 116 (1992) 37327b.
- 1426 Michaels, S.D. and Ford, J.C.: Inexpensive method for air-drying polyacrylamide electrophoresis gel. *BioTechniques*, 11 (1991) 466-467; C.A., 116 (1992) 79700g.

- 1427 Parker, M.: Working in harmony. *Lab. Pract.*, 40 (1991) 13-17; C.A., 116 (1992) 3087h.
- 1428 Simons, M.J.: Internal standard for electrophoretic separations. *Eur. Pat. Appl. EP 466,479* (Cl. G01N27/26), 15 Jan. 1992, US Appl. 550,940, 11 Jul. 1990; 7 p.; C.A., 116 (1992) 102244p.
- 1429 Smutzer, G., Bayley, D., Kalinoski, D.L. and Chamberlin, L.: A simplified method for drying agarose gels. *BioTechniques*, 11 (1991) 468-470; C.A., 116 (1992) 79701z.
- 1430 Stevenson, R.: Chromatography currents. ISPPP '91: a glimpse into the future. *Int. Lab.*, 22, No. 5 (1992) P4-P8.
- 1431 Synder, R.S. and Rhodes, P.H.: A new approach to electrophoresis in space. *Eur. Space Agency, [Spec. Publ.] ESA SP, 1990, ESA SP-307*; C.A., 116 (1992) 37326a.
- 1432 Taslimi, P.M.: A gel sample block. *J. Chem. Educ.*, 69 (1992) 61; C.A., 116 (1992) 127761t.
- 1433 Wiedbrauk, D.L., Zielinski, S.A. and Nehls, S.: An inexpensive gel-drying system. *BioTechniques*, 11 (1991) 470-472; C.A., 116 (1992) 79702a.

See also 1917.

2b. Thermodynamics and theoretical relationships

- 1434 Demana, T., Guhathakurta, U. and Morris, M.D.: Effects of analyte velocity modulation on the electroosmotic flow in capillary electrophoresis. *Anal. Chem.*, 64 (1992) 390-394.
- 1435 Righetti, P.G. and Bello, M.S.: Steady-state heat transfer and thermal zone spreading in gel isoelectric focusing. *Electrophoresis (Weinheim)*, 13 (1992) 275-279.

See also 1436, 1474, 1482, 1483, 1489, 1497, 1603, 1895, 1921.

2d. Measurement of physico-chemical and related values

- 1436 Cai, J., Smith, J.T. and El Rassi, Z.: Determination of the ionization constants of weak electrolytes by capillary zone electrophoresis. *J. High Resolut. Chromatogr.*, 15 (1992) 30-32.
- 1437 Coveney, F.M., Strange, J.H. and Smith, E.G.: The measurement of electrophoretic mobility in surfactant systems using NMR. *Mol. Phys.*, 75 (1992) 127-137; C.A., 116 (1992) 114087c.
- 1438 Morris, K.F. and Johnson, C.S., Jr.: Mobility ordered 2D-NMR spectroscopy. *J. Am. Chem. Soc.*, 114 (1992) 776-777; C.A., 116 (1992) 74616r.

See also 1517, 1971, 2000.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 1439 DiSanto, F.J., Krusos, D.A. and Schubert, F.E.: Method of fabricating dual-anode, flat-panel electrophoretic displays. *U.S. US* 5,077,157 (Cl. 430-20; C09K19/00), 31 Dec. 1991, Appl. 440,787, 24 Nov. 1989; 8 p.; C.A., 116 (1992) 95983y.
- 1440 Fuchs, M. and Merion, M.: Process and apparatus for effecting capillary electrophoresis. *Eur. Pat. Appl. EP* 459,241 (Cl. G01N27/447), 04 Dec. 1991, US Appl. 530,121, 29 May 1990; 12 p.; C.A., 116 (1992) 120164s.
- 1441 Hattori, A., Hitomi, T., Kato, T., Takahashi, H. and Imaeda, K.: Method and apparatus for cleaning. *Jpn. Kokai Tokkyo Koho JP* 03,171,032 (91,171,032) (Cl. G02C13/00), 24 Jul. 1991, Appl. 89/310,938, 30 Nov. 1989; 5 p.; C.A., 116 (1992) 48068u.
- 1442 Ivory, C.F.: High-resolution continuous-flow electrophoresis and apparatus. *U.S. US* 5,071,536 (Cl. 204-299R; G01N27/26), 10 Dec. 1991, Appl. 801,580, 25 Nov. 1985; 11 p.; C.A., 116 (1992) 79842w.
- 1443 Kitamori, T., Go, I., Sawada, S., Imai, K. and Koga, T.: Apparatus and method for detecting sample movement in separatory capillary column chromatography and capillary electrophoresis. *Jpn. Kokai Tokkyo Koho JP* 03,252,547 [91,252,547] (Cl. G01N25/00), 11 Nov. 1991, Appl. 90/49,315, 02 Mar. 1990; 7 p.; C.A., 116 (1992) 79843x.
- 1444 Shain, D.H., Yoo, J., Slaughter, R.G., Hayes, S.E. and Ji, T.H.: Electrofractionation: a technique for detecting and recovering biomolecules. *Anal. Biochem.*, 200 (1992) 47-51.
- 1445 Yamaguchi, M., Matsuoka, H., Matsuzawa, J. and Suzuki, K.: Electrophoretic display apparatus. *Jpn. Kokai Tokkyo Koho JP* 03 89,217 (91 89,217) (Cl. G02F1/19), 15 Apr. 1991, Appl. 89/225,960, 31 Aug. 1989; 4 p.; C.A., 116 (1992) 72463q.

See also 1480, 1484, 1495, 1825, 1875.

3b. Detectors and detection procedures

- 1446 Christiansen, J. and Houen, G.: Comparison of different staining methods for polyvinylidene difluoride membranes. *Electrophoresis (Weinheim)*, 13 (1992) 179-183.
- 1447 Cunningham, M.W., Durrant, I., Fowler, S.J., Guilford, J.A., Moore, M. and Macdonald, R.M.: ECL: Nonradioactive detection of nucleic acids and proteins with light. *Int. Lab.*, 22, No. 4 (1992) 36-40.
- 1448 Dadoo, R., Colon, L.A. and Zare, R.N.: Chemiluminescence detection in capillary electrophoresis. *J. High Resolut. Chromatogr.*, 15 (1992) 133-135.
- 1449 De Bokx, P.K., Gillissen, E.E.A., van de Weijer, P., Bekkers, M.H.J. and Janssen, H.-G.: Fluorescence detector cell for use in an integrated electrically driven separation system. *J. Chromatogr.*, 598 (1992) 115-121.
- 1450 Fujii, H.: Fluorescence-detection gel electrophoresis. *Eur. Pat. Appl. EP* 459,214 (Cl. G01N27/447), 04 Dec. 1991, JP Appl. 90/143,797, 31 May 1990; 17 p.; C.A., 116 (1992) 98686q.

- 1451 Fujimiya, H., Mishima, H., Ishikawa, T., Yuda, K. and Nasu, H.: Fluorescent pattern-reading apparatus for electrophoresis gels. *Eur. Pat. Appl. EP* 459,278 (Cl. G01N27/447), 04 Dec. 1991, JP Appl. 90/132,048, 22 May 1990; 23 p.; C.A., 116 (1992) 124360a.
- 1452 Iqbal, K., Braak, E., Braak, H., Zaidi, T. and Grundke-Iqbal, I.: A silver impregnation method for labeling both Alzheimer paired helical filaments and their polypeptides separated by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. *Neurobiol. Aging*, 12 (1991) 357-361; C.A., 116 (1992) 54843j.
- 1453 Pryor, J.L., Xu, W. and Hamilton, D.W.: Immunodetection after complete destaining of Coomassie Blue-stained proteins on Immobilon-PVDF. *Anal. Biochem.*, 202 (1992) 100-104.
- 1454 Rabilloud, T., Brodard, V., Peltre, G., Righetti, P.G. and Ettori, C.: Modified silver staining for immobilized pH gradients. *Electrophoresis (Weinheim)*, 13 (1992) 264-266.
- 1455 Sepaniak, M.J.: Laser fluorometric detection in capillary electrophoresis. *Anal. Proc. (London)*, 28 (1991) 359-360; C.A., 116 (1992) 98587h - a review with no refs.
- 1456 Tice, G., Jr. and Amorese, D.A.: Neutral and positively-charged dyes for electrophoresis sample loading solutions. *U.S. US* 5,064,519 (Cl. 204-182.8; C25B1/00), 12 Nov. 1991, Appl. 546,186, 29 Jun. 1990; 4 p.; C.A., 116 (1992) 55106h.
- 1457 Xi, X.: Instrumental development of novel detection methods for liquid chromatography and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9126271, 1991, 166 p.; C.A., 116 (1992) 98354e.

See also 1443, 1469, 1479, 1492, 1503, 1573, 1580, 1696, 1908, 1929.

3c. Stabilization media for electrophoresis

- 1458 Dubrow, R.S.: High-viscosity polymer matrix and use in separation of proteins or nucleic acids by electrophoresis or isoelectric focusing. *PCT Int. Appl. WO* 91,11,709 (Cl. G01N27/26), 08 Aug. 1991, US Appl. 472,045, 29 Jan. 1990; 57 pp.; C.A., 116 (1992) 3205v.
- 1459 Fassett, J.R. and Moritz, J.R.: Electrophoresis system with electrode baffles. *U.S. US* 5,080,769 (Cl. 204-180.1; B01D57/02), 14 Jan. 1992, Appl. 581,607, 12 Sep. 1990; 11 p.; C.A., 116 (1992) 98674j.
- 1460 Frangioni, J.V.: Electrophoretic gel-forming system. *U.S. US* 5,069,773 (Cl. 204-299R; B01D61/42), 03 Dec. 1991, Appl. 651,204, 06 Feb. 1991; 6 p.; C.A., 116 (1992) 55108k.
- 1461 Gersten, D.M. and Bijwaard, K.E.: Polyacrylamide gel electrophoresis in vertical, inverse and double-crossing gradients of soluble polymers. *Electrophoresis (Weinheim)*, 13 (1992) 282-286.
- 1462 Gombocz, E.A., Clappier, R.A., Kerth, W., Rammer, D.H. and Roth, A.: Gel electrophoresis system. *Eur. Pat. Appl. EP* 457,526 (Cl. G01N27/447), 21 Nov. 1991, US Appl. 522,325, 14 May 1990; 20 p.; C.A., 116 (1992) 55085a.
- 1463 Kirkpatrick, F.H.: Overview of agarose gel properties. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 9-22; C.A., 116 (1992) 17832j - a review with 27 refs.

- 1464 Schomburg, G. and Lux, J.A.: γ -Irradiation in method for the production of gel-filled capillaries for capillary gel electrophoresis. *Eur. Pat. Appl.* EP 455,841 (Cl. G01N27/447), 13 Nov. 1991, Appl. 90/108,487, 05 May 1990, 6 p.; C.A., 116 (1992) 79867h.
- 1465 Shima, K.: (Electrophoresis using wedge-shaped agarose gel). *Seibutsu Butsuri Kagaku*, 35 (1991) 279-283; C.A., 116 (1991) 101974g.
- 1466 Shorr, R.: Polymers for electrophoretic media. *PCT Int. Appl.* WO 91 14,489 (Cl. B01D15/08), 03 Oct. 1991, US Appl. 496,338, 20 Mar. 1990; 23 p.; C.A., 116 (1992) 79866g.
- 1467 Swedberg, S.A.: Surfaces with decreased protein interactions for implants or electrophoresis. *Eur. Pat. Appl.* EP 452,055 (Cl. G01N27/26), 16 Oct. 1991, US Appl. 507,937, 11 Apr. 1990; 9 p.; C.A., 116 (1992) 98664f.

See also 1426, 1429, 1433, 1917.

3d. Quantitative analysis

See 1644.

3e. Preparative scale electrophoresis

See 1480.

3f. Programmed voltage and buffer gradients

- 1468 Tsuda, T.: pH Gradient capillary zone electrophoresis using a solvent program delivery system. *Anal. Chem.*, 64 (1992) 386-390.

See also 1493, 1825.

4. SPECIAL TECHNIQUES

4a. Automation

- 1469 Koutny, L.B. and Yeung, E.S.: Automated image analysis for distortion compensation in sequencing gel electrophoresis. *Appl. Spectrosc.*, 46 (1992) 136-141; C.A., 116 (1992) 122068n.

4b. Computerization and modelling

- 1470 Jouve, N. and Clifton, M.J.: Three-dimensional modeling of the coupled flow field and heat transfer in continuous-flow electrophoresis. *Int. J. Heat Mass Transfer*, 34 (1991) 2461-2474; C.A., 116 (1992) 62491h.
- 1471 Widom, B., Viovy, J.L. and Defontaine, A.D.: Repton model of gel electrophoresis and diffusion. *J. Phys. I*, 1 (1991) 1759-1784; C.A., 116 (1992) 79709h.

See also 1933.

4c. Combination with other physicochemical techniques, (MS, IR etc.)

- 1472 Bayer, E.: Capillary electrophoresis and ion spray mass spectrometry. New powerful methods for separation and characterization of proteins and nucleotides. In: Tschesche, H. (Editor), *Mod. Methods Protein-Nucleic Acid Res.*, de Gruyter, Berlin, 1990, pp. 133-148; C.A., 116 (1992) 37143p.
- 1473 Smith, R.D., Loo, J.A., Edmonds, C.G. and Udseth, H.R.: Combined capillary electrophoresis and electrospray ionization mass spectrometry. In: Davies, A.M.C. and Creaser, C.S. (Editors), *Anal. Appl. Spectrosc. 2*, [Proc. Int. Conf. Spectrosc. Spectrum], 2nd 1990, Royal Soc. Chem., Cambridge, 1991, pp. 149-164; C.A., 116 (1992) 37442k.

See also 1582, 1980.

4d. Affinity electrophoresis

- 1474 Takeo, K., Fujimoto, M., Suzuki, I., Tanaka, T., Nakamura, K. and Kashiwagi, S.: (Thermodynamic analysis of biospecific interaction by means of affinity electrophoresis). *Seibutsu Butsuri Kagaku*, 35 (1991) 291-296; C.A., 116 (1992) 101975r.

See also 1524.

4e. Capillary zone electrophoresis and electrokinetic chromatography

- 1475 Ahuja, E.S., Little, E.L. and Foley, J.P.: Selected organic solvents as electroosmotic velocity markers in micellar electrokinetic capillary chromatography. *J. Liq. Chromatogr.*, 15 (1992) 1099-1113.
- 1476 Bondoux, G.: (Capillary electrophoresis analysis (capillary ion analysis)). *Analysis*, 19 (1991) M30-M33; C.A., 116 (1992) 98296n - a review with 5 refs.
- 1477 Burgi, D.S. and Chien, R.-L.: Improvement in the method of sample stacking for gravity injection in capillary zone electrophoresis. *Anal. Biochem.*, 202 (1992) 306-309.
- 1478 Chen, Y. and Zhu, A.: (Sample introduction with diffusion method in high performance electrophoresis). *Sepu*, 9 (1991) 353-356; C.A., 116 (1992) 98626v.
- 1479 Curry, P.D., Jr.: Separation and detection in capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9127310, 1991, 150 p.; C.A., 116 (1992) 75355s.
- 1480 Eriksson, K.-O., Palm, A. and Hjertén, S.: Preparative capillary electrophoresis based on adsorption of the solutes (proteins) onto a moving blotting membrane as they migrate out of the capillary. *Anal. Biochem.*, 201 (1992) 211-215.
- 1481 Ghowsi, K.: Studies in the electrochemistry of insulators and ion transport; anodization oscillometry, electro-osmosis, and capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9123191, 1990, 175 p.; C.A., 115 (1991) 289658w.
- 1482 Hayes, M.A. and Ewing, A.G.: Electroosmotic flow control and monitoring with an applied radial voltage for capillary zone electrophoresis. *Anal. Chem.*, 64 (1992) 512-516.
- 1483 Janini, G.M. and Issaq, H.J.: Micellar electrokinetic capillary chromatography: basic considerations and current trends. *J. Liq. Chromatogr.*, 15 (1992) 927-260 - a review with 123 refs.

- 1484 Karger, B.L., Cohen, A.S. and Heiger, D.N.: Pulsed field capillary electrophoresis method and apparatus. *Eur. Pat. Appl. EP 457,748* (Cl. G01N27/447), 21 Nov. 1991, US Appl. 525,532, 18 May 1990; 17 p.; C.A., 116 (1992) 55110e.
- 1485 Kuhn, R., Stoecklin, F. and Erni, F.: Chiral separations by host-guest complexation with cyclodextrin and crown ether in capillary zone electrophoresis. *Chromatographia*, 33 (1992) 32-36.
- 1486 Ligorati, M.: (Capillary electrophoresis). *Boll. Chim. Farm.*, 129 (1990) 326-327; C.A., 116 (1992) 98582c - a review with 10 refs.
- 1487 Northrop, D.M. and Mac Crehan, W.A.: Sample collection, preparation, and quantitation in the micellar electrokinetic capillary electrophoresis of gunshot residues. *J. Liq. Chromatogr.*, 15 (1992) 1041-1063.
- 1488 Perrett, D. and Ross, G.: Capillary electrophoresis: a powerful tool for biomedical analysis and research? *TrAC*, 11 (1992) 156-163 - a review with 39 refs.
- 1489 Schwer, C. and Kenndler, E.: Peak broadening in capillary zone electrophoresis with electroosmotic flow: dependence of plate number and resolution on charge number. *Chromatographia*, 33 (1992) 331-335.
- 1490 Sepaniak, M.J., Cole, R.O. and Clark, B.K.: Use of native and chemically modified cyclodextrins for the capillary electrophoretic separation of enantiomers. *J. Liq. Chromatogr.*, 15 (1992) 1023-1040.
- 1491 Terabe, S.: (Capillary electrophoresis). *Bunseki*, (1991) 599-606; C.A., 116 (1992) 75297z - a review with 19 refs.
- 1492 Vorndran, A.E., Oefner, P.J., Scherz, H. and Bonn, G.H.: Indirect UV detection of carbohydrates in capillary zone electrophoresis. *Chromatographia*, 33 (1992) 163-168.
- 1493 Whang, C.-W. and Yeung, E.S.: Temperature programming in capillary zone electrophoresis. *Anal. Chem.*, 64 (1992) 502-506.
- 1494 Wu, Q., Claessens, H.A. and Cramiers, C.A.: The influence of surface treatment on the electroosmotic flow in micellar electrokinetic capillary chromatography. *Chromatographia*, 33 (1992) 303-308.
- 1495 Zare, R.N., Sweedler, J.V.S. and Tsuda, T.: Rectangular capillaries for capillary electrophoresis. *Eur. Pat. Appl. EP 454,286* (Cl. G01N27/447), 30 Oct. 1991, US Appl. 470,390, 26 Jan. 1990; 11 p.; C.A., 116 (1992) 75413j.
- 1496 Zhu, M.D., Rodriguez, R. and Wehr, C.T.: Suppression of electroendosmosis in capillary electrophoresis. *U.S. US 5,069,766* (Cl. 204-180.1; B01D57/02), 03 Dec. 1991, Appl. 631,804, 20 Dec. 1990; 11 p.; C.A., 116 (1992) 50584c.

See also 1415, 1430, 1434, 1436, 1440, 1443, 1448, 1449, 1455, 1457, 1467, 1468, 1472, 1498, 1505, 1507, 1561, 1564, 1565, 1567, 1573, 1574, 1578, 1582, 1584, 1596, 1597, 1598, 1600, 1603, 1606, 1662, 1676, 1698, 1784, 1788, 1909, 1915, 1924, 1935, 1939, 1959, 1978, 1979, 1980, 1981, 1983, 1984, 1986, 1987, 1988, 1991, 1993, 1995, 2003, 2007.

4f. Isotachophoresis

- 1497 Troitskii, G.V. and Atamas, S.P.: (Formation of the Kohlrausch zones and isotachophoresis in the borate-polyol systems). *Dokl. Akad. Nauk Ukr. SSR*, (1991) 165-167; C.A., 116 (1992) 75335k.

See also 1527, 1711, 1982, 1990.

4g. Enantiomers, separation

- 1498 Mayer, S. and Schurig, V.: Enantiomer separation by electrochromatography on capillaries coated with Chirasil-Dex. *J. High Resolut. Chromatogr.*, 15 (1992) 129-131.
- 1499 Smolkova-Keulemansova, E., Felt, L. and Snopek, J.: Cyclodextrins and their derivatives in modern analytical high-performance separation methods. In: Duchene, D. (Editor), *Minutes Int. Symp. Cyclodextrins, 5th*, Ed. Sante, Paris, 1990, pp. 617-622; C.A., 116 (1992) 33678u.

See also 1485, 1490.

4h. Two dimensional electrophoresis

- 1500 Pollak, V.A., Doelemeyer, A., Winkler, W. and Schulze-Clewing, J.: Important design features of a system for the densitometric analysis of two-dimensional flat-bed separations. *J. Chromatogr.*, 596 (1992) 241-249.
- 1501 Sinha, P., Kottgen, E., Westermeier, R. and Righetti, P.G.: Immobilized pH 2.5-11 gradients for two-dimensional electrophoresis. *Electrophoresis (Weinheim)*, 13 (1992) 210-214.

See also 1594, 1614, 1615, 1622, 1623, 1626, 1642, 1643, 1681, 1686, 1691, 1709, 1716, 1724, 1731, 1752, 1929.

4i. Other special techniques

- 1502 Chmelik, J. and Thormann, W.: Isoelectric focusing field-flow fractionation. III. Investigation of the influence of different experimental parameters on focusing of cytochrome c in the trapezoidal cross-section channel. *J. Chromatogr.*, 600 (1992) 297-304.
- 1503 Warren, B.M., Sanford, J.R.M., Neely, E.F. and Sarrine, R.J.: Press and its use in immunofixation electrophoresis. *Eur. Pat. Appl. EP 454,928* (Cl. G01N27/447), 06 Nov. 1991, US Appl. 523,709, 01 May 1990; 8 p.; C.A., 116 (1992) 55082x.

See also 1434, 1465, 1470, 1477, 1478, 1599, 1900, 1914, 1941.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5d. Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)

- 1504 Gundyrev, A.A., Krylov, I.F., Mukhin, M.L., Sokolova, G.I. and Baboyarov, A.: (Effect of antistatic additives on electrophoresis of ceresin particles in toluene). *Khim. Tekhnol. Topl. Masel*, (1991) 24-25; C.A., 115 (1991) 283261q.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

See 1995.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 1505 Sakodinskaya, I.K., Desiderio, C., Nardi, A. and Fanali, S.: Micellar electrokinetic chromatographic study of hydroquinone and some of its ethers. Determination of hydroquinone in skin-toning cream. *J. Chromatogr.*, 596 (1992) 95-100.

See also 1982.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 1506 Brandley, B.K. and Stack, R.J.: Two-dimensional electrophoretic separation of carbohydrates using fluorescent labeling groups as charge carriers. *PCT Int.*, Appl. WO 91 12,275 (Cl. C08B37/00), 22 Aug. 1991, US Appl. 481,361, 16 Feb. 1990; 24 p.; *C.A.*, 115 (1991) 282423g.
- 1507 Nashabeh, W. and El Rassi, Z.: Capillary zone electrophoresis of linear and branched oligosaccharides. *J. Chromatogr.*, 600 (1992) 279-287.

See also 1492, 1812.

10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 1508 Audy, P. and Asselin, A.: Gel electrophoretic analysis of chitosan hydrolysis products. *Electrophoresis (Weinheim)*, 13 (1992) 334-337.
- 1509 Zimmermann, U., Klöck, G., Federlin, K., Hannig, K., Kowalski, M., Bretzel, R.G., Horcher, A., Entenmann, H., Sieber, U. and Zekorn, T.: Production of mitogen-contamination free alginates with variable ratios of mannuronic acid to guluronic acid by free flow electrophoresis. *Electrophoresis (Weinheim)*, 13 (1992) 269-274.

See also 1528, 1703.

10c. Glycoproteins and their constituents

- 1510 Biou, D., Bauvy, C., N'Guyen, H., Codogno, P., Durand, G. and Aubery, M.: Alterations of the glycan moiety of human $\alpha 1$ -acid glycoprotein in late-term pregnancy. *Clin. Chim. Acta*, 204 (1991) 1-12.
- 1511 Camejo, G., Hurt-Camejo, E., Rosengren, B., Wiklund, O., Lopez, F. and Bondjers, G.: Modification of copper-catalyzed oxidation of low density lipoprotein by proteoglycans and glycosaminoglycans. *J. Lipid Res.*, 32 (1991) 1983-1991.
- 1512 Carnemolla, B., Borsi, L., Bannikov, G., Troyanovsky, S. and Zardi, L.: Comparison of human tenascin expression in normal, Simian-virus-40-transformed and tumor-derived cell lines. *Eur. J. Biochem.*, 205 (1992) 561-567.
- 1513 Crawford, T.J. and Crawford, B.J.: Characterization and localization of large sulfated glycoproteins in the extracellular matrix of the developing asteroid *Pisaster ochraceus*. *Biochem. Cell Biol.*, 70 (1992) 91-98.

- 1514 Green, T.L., Hunter, D.D., Chan, W., Merlie, J.P. and Sanes, J.R.: Synthesis and assembly of the synaptic cleft protein S-laminin by cultured cells. *J. Biol. Chem.*, 267 (1992) 2014-2022.
- 1515 Hall, J.C. and Reddy, N.G.: Protein D is differentially expressed and regulated in the rat epididymis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 1109-1116.
- 1516 Hayashi, T., Niya, K., Hirokawa, S.-i. and Sakuragawa, N.: Synergistic stimulating effect between cyclic AMP and phorbol ester on plasminogen activator inhibitor type 2 production in human promyelocytic leukemia cell line PL-21. *Biochim. Biophys. Acta*, 1134 (1992) 273-277.
- 1517 Hervé, F., Duché, J.-C., Barré, J., Millot, M.-C. and Tillement, J.-P.: pH Titration curves of the desialylated human $\alpha 1$ -acid glycoprotein variants by combined isoelectrofocusing-electrophoresis: utilization in the development of a fractionation method for the protein variants by chromatography on immobilized metal affinity adsorbent. *J. Chromatogr.*, 577 (1992) 43-59.
- 1518 Helsing, M., van Schijndel, H.B., van Grunsven, W.M.J., Wolf, H. and Middeldorp, J.M.: Purification and quantification of recombinant Epstein-Barr viral glycoproteins gp350/220 from Chinese hamster ovary cells. *J. Chromatogr.*, 599 (1992) 267-272.
- 1519 Huet, G., Richet, C., Demeyer, D., Bisiau, H., Soudan, B., Tetaert, D., Han, K.K. and Degand, P.: Characterization of different proteolytic activities in *Trypanosoma brucei brucei*. *Biochim. Biophys. Acta*, 1138 (1992) 213-221.
- 1520 Laferte, S. and Loh, L.C.: Characterization of a family of structurally related glycoproteins expressing $\beta 1$ -6-branched asparagine-linked oligosaccharides in human colon carcinoma cells. *Biochem. J.*, 283 (1992) 193-201.
- 1521 Nakayashiki, N., Umetsu, K., Yuasa, I., Suenaga, K., Omoto, K., Ishida, T., Misawa, S. and Katsura, S.: Five new alleles of plasma Zn-alpha 2-glycoprotein variants phenotyped by isoelectric focusing and immunoblotting in twelve populations. *Electrophoresis (Weinheim)*, 13 (1992) 154-157.
- 1522 Neri, M., Descalzi-Cancedda, F. and Cancedda, R.: Heat-shock response in cultured chick embryo chondrocytes. Osteonectin is a secreted heat-shock protein. *Eur. J. Biochem.*, 205 (1992) 569-574.
- 1523 Peraldi, M.-N., Rondeau, E., Medcalf, R.L., Hagege, J., Lacave, R., Delarue, F., Schleunig, W.-D. and Sraer, J.-D.: Cell-specific regulation of plasminogen activator inhibitor 1 and tissue type plasminogen activator release by human kidney mesangial cells. *Biochim. Biophys. Acta*, 1134 (1992) 189-196.
- 1524 Seta, N., Tissot, B., Forestier, F., Feger, J., Daffos, F. and Durand, G.: Changes in $\alpha 1$ -acid glycoprotein serum concentrations and glycoforms in the developing human fetus. *Clin. Chim. Acta*, 203 (1991) 167-176.
- 1525 Visser, N.A., Brand, H.S., Vankampen, G.P.J., Vandestadt, R.J. and Vanderkorst, J.K.: A high-molecular-weight (8.10^5) non-collagenous glycoprotein is synthesized by bovine cartilage *in vitro*. *Biochim. Biophys. Acta*, 1120 (1992) 308-314.
- 1526 Werenskiold, A.K.: Characterization of a secreted glycoprotein of the immunoglobulin superfamily inducible by mitogen and oncogene. *Eur. J. Biochem.*, 204 (1992) 1041-1047.

See also 1602, 1684, 1706, 1745.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

1527 Oefner, P.J., Häfele, R. and Eberle, J.: Impact of separation capacity on the isotachophoretic analysis of organic acids in human seminal plasma and prostatic fluid. *Electrophoresis (Weinheim)*, 13 (1992) 122-127.

11c. Lipids and their constituents

1528 Davies, R.L., Ali, Q., Parton, R., Coote, J.G., Gibbs, A. and Freer, J.H.: Optimal conditions for the analysis of *Pasteurella haemolytica* lipopolysaccharide by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. *FEMS Microbiol. Lett.*, 90 (1991) 23-28; *C.A.*, 116 (1992) 79712d.

1529 Xu, C.J. and Nelsestuen, G.L.: Association of α -phosphatidylinositol-specific phospholipase C with phospholipid vesicles. *Biochim. Biophys. Acta*, 1120 (1992) 49-58.

11d. Lipoproteins and their constituents

1530 Campos, E., Nakajima, K., Tanaka, A. and Havel, R.J.: Properties of an apolipoprotein E-enriched fraction of triglyceride-rich lipoproteins isolated from human blood plasma with a monoclonal antibody to apolipoprotein B-100. *J. Lipid Res.*, 33 (1992) 369-380.

1531 Cartier, R. and Sassolas, A.: Apolipoprotein E phenotyping by isoelectric focusing in immobilized pH gradients and silver staining. *Electrophoresis (Weinheim)*, 13 (1992) 252-257.

1532 Delcuve, G.P., Sun, J.M. and Davie, J.R.: Expression of rainbow trout apolipoprotein A-I genes in liver and hepatocellular carcinoma. *J. Lipid Res.*, 33 (1992) 251-262.

1533 Farese, R.V., Jr., Garg, A., Pierotti, V.R., Vega, G.L. and Young, S.G.: A truncated species of apolipoprotein B, B-83, associated with hypobetalipoproteinemia. *J. Lipid Res.*, 33 (1992) 569-577.

1534 Fungwe, T.V., Cagen, L., Wilcox, H.G. and Heimberg, M.: Regulation of hepatic secretion of very low density lipoprotein by dietary cholesterol. *J. Lipid Res.*, 33 (1992) 179-191.

1535 Gambert, P. and Louvrier, E.: Immunoassay of apolipoprotein-B (apoB) of low-density lipoproteins (LDL) directly in serum. *U.S. Appl. 5,064,769 (Cl. 436-516; G01N33/561)*, 12 Nov. 1991, US Appl. 543,062, 18 Oct. 1983; 5 p.; *C.A.*, 116 (1992) 124389s.

1536 Gerritse, K., Deknijff, P., Vonierssel, G., Havekes, L.M., Frants, R.R., Schellekens, M.M., Zegers, N.D., Claassen, E. and Boersma, W.J.A.: Immunological discrimination between the human apolipoprotein-E2 (Arg₁₅₈→Cys) and E3 isoforms. *J. Lipid Res.*, 33 (1992) 273-280.

1537 Grove, R.I., Mazzucco, C., Allegretto, N., Kiener, P.A., Spitalny, G., Radka, S.F., Shoyab, M., Antonaccio, M. and Warr, G.A.: Macrophage-derived factors increase low density lipoprotein uptake and receptor number in cultured human liver cells. *J. Lipid Res.*, 32 (1991) 1889-1897.

1538 Helmhold, M., Bigge, J., Muche, R., Mainoo, J., Thiery, J., Seidel, D. and Armstrong, V.W.: Contribution of the apo[a] phenotype to plasma Lp[a] concentrations shows considerable ethnic variation. *J. Lipid Res.*, 32 (1991) 1919-1928.

1539 Hennessey, L.K., Osada, J., Ordovas, J.M., Nicolosi, R.J., Stucchi, A.F., Brousseau, M.E. and Schaefer, E.J.: Effects of dietary fats and cholesterol on liver lipid content and hepatic apolipoprotein A-I, apolipoprotein B, and apolipoprotein E and LDL receptor messenger RNA levels in cebus monkeys. *J. Lipid Res.*, 33 (1992) 351-360.

1540 Heras, H. and Pollero, R.: Hemocyanin as an apolipoprotein in the hemolymph of the cephalopod *Octopus tewelchus*. *Biochim. Biophys. Acta*, 1125 (1992) 245-250.

1541 Hermier, D. and Dillon, J.-C.: Characterization of dietary-induced hypercholesterolemia in the chicken. *Biochim. Biophys. Acta*, 1124 (1992) 178-184.

1542 Holmquist, L.: Microheterogeneity of apolipoprotein D as revealed by electroblotting following isoelectric focusing in Immobilized DryPlates. *Electrophoresis (Weinheim)*, 13 (1992) 262-264.

1543 Kagan, V.E., Serbinova, E.A., Forte, T., Scita, G. and Packer, L.: Recycling of vitamin E in human low density lipoproteins. *J. Lipid Res.*, 33 (1992) 385-397.

1544 Kohlmeier, M., Drossel, H.-J., Sinha, P. and Köttgen, E.: Rapid and simple method for the identification of apolipoprotein E isomorphic phenotypes from whole serum. *Electrophoresis (Weinheim)*, 13 (1992) 258-261.

1545 Kushwaha, R.S., McMahan, C.A., Mott, G.E., Carey, K.D., Reardon, C.A., Getz, G.S. and McGill, H.C., Jr.: Influence of dietary lipids on hepatic mRNA levels of proteins regulating plasma lipoproteins in baboons with high and low levels of large high density lipoproteins. *J. Lipid Res.*, 32 (1991) 1929-1940.

1546 Lehtimäki, T.: Determination of apolipoprotein E phenotypes from stored or *postmortem* serum samples. *Clin. Chim. Acta*, 203 (1991) 177-182.

1547 Marsh, J.B. and Diffenderfer, M.R.: Use of [¹⁵N]glycine in the measurement of apolipoprotein B synthesis in perfused rat liver. *J. Lipid Res.*, 32 (1991) 2019-2024.

1548 McCormick, S.P.A., Fellowes, A.P., Walmsley, T.A. and George, P.M.: Apolipoprotein B-32: a new truncated mutant of human apolipoprotein B capable of forming particles in the low density lipoprotein range. *Biochim. Biophys. Acta*, 1138 (1992) 290-296.

1549 Menke-Möllers, I., Kurth, J. and Oette, K.: Studies on an apolipoprotein C-II variant occurring in Caucasians. *Electrophoresis (Weinheim)*, 13 (1992) 244-251.

1550 Offermanns, S., Seifert, R., Metzger, J.W., Jung, G., Lieberknecht, A., Schmidt, U. and Schultz, G.: Lipopeptides are effective stimulators of tyrosine phosphorylation in human myeloid cells. *Biochem. J.*, 282 (1992) 551-557.

1551 Parrott, C.L., Alsayed, N., Rebouret, R. and Santamarina-Fojo, S.: ApoC-II_{Paris 2}: a premature termination mutation in the signal peptide of apoC-II resulting in the familial chylomicronemia syndrome. *J. Lipid Res.*, 33 (1992) 361-367.

1552 Provost, P.R., Villeneuve, L., Weech, P.K., Milne, R.W., Marcel, Y.L. and Rassart, E.: Localization of the major sites of rabbit apolipoprotein D gene transcription by *in situ* hybridization. *J. Lipid Res.*, 32 (1991) 1959-1970.

1553 Salmon, S., Maziere, C., Auclair, M., Theron, L., Santus, R. and Maziere, J.-C.: Malondialdehyde modification and copper-induced autooxidation of high-density lipoprotein decrease cholesterol efflux from human cultured fibroblasts. *Biochim. Biophys. Acta*, 1125 (1992) 230-235.

- 1554 Spring, D.J., Lee, S.-M., Poppione, D.L., Phillips, M., Elovson, J. and Schumaker, V.N.: Identification of a neutral lipid core in a transiently expressed and secreted lipoprotein containing an apoB-48-like apolipoprotein. *J. Lipid Res.*, 33 (1992) 233-240.
- 1555 Srivastava, R.A.K., Tang, J., Krul, E.S., Pflieger, B., Kitchens, R.T. and Schonfeld, G.: Dietary fatty acids and dietary cholesterol differ in their effect on the *in vivo* regulation of apolipoprotein A-I and A-II gene expression in inbred strains of mice. *Biochim. Biophys. Acta*, 1125 (1992) 251-261.
- 1556 Tilly-Kiesi, M., Syväne, M., Kuusi, T., Lahdenperä, S. and Taskinen, M.-R.: Abnormalities of low density lipoproteins in non-lipidemic type-II diabetic and nondiabetic patients with coronary disease. *J. Lipid Res.*, 33 (1992) 333-342.
- 1557 Vance, J.E.: Secretion of VLDL, but not HDL, by rat hepatocytes is inhibited by the ethanolamine analogue N-monomethylethanolamine. *J. Lipid Res.*, 32 (1991) 1971-1982.
- 1558 Weers, P.M., van der Horst, J., van Marrewijk, W.J.A., van den Eijnden, M., van Doorn, J.M. and Beenackers, A.M.T.: Biosynthesis and secretion of insect lipoprotein. *J. Lipid Res.*, 33 (1992) 485-491.
- 1559 Zhao, S.P., Hollaar, L., van't Hooft, F.M., Smelt, A.H.M., Leuven, J.A.G. and van der Laarse, A.: Effect of simvastatin on the apparent size of LDL particles in patients with type IIb hyperlipoproteinemia. *Clin. Chim. Acta*, 203 (1991) 109-118.
13. STEROIDS
- 13b. *Pregnane and androstane derivatives*
- 1560 Mirshahi, M., Pagano, M., Mirshahi, A. and Agarwal, M.K.: Generation of polyclonal antibodies against the mineralocorticoid receptor and analysis of mineralocorticoid in rat myocardium by immunophotochemistry. *Biochim. Biophys. Acta*, 1120 (1992) 17-23.
17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17a. *Amines and polyamines*
- See 1436, 2007.
- 17b. *Catecholamines and their metabolites*
- 1561 Olefirowitz, T.M.: Capillary electrophoresis: injection, separation, and detection of neurotransmitters from single nerve cells. Avail. *Univ. Microfilms Int.*, Order No. DA9127395, 1991, 305 pp.; C.A., 116 (1992) 99440s.
- 17d. *Other amine derivatives and amides (excl. peptides)*
- See 1561, 1966, 1987.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 1562 Crisp, R.L. and Castagnino, J.M.: (Electrophoresis of amino acids at high and low voltage in agarose). *Acta Biochim. Clin. Latinoam.*, 25 (1991) 161-169; C.A., 116 (1992) 79704c.
- 1563 Duclos, B., Marcandier, S. and Cozzone, A.J.: Chemical properties and separation of phosphoamino acids by thin-layer chromatography and/or electrophoresis. *Methods Enzymol.*, 201 (1991) 10-21; C.A., 116 (1992) 55022c.
- 1564 Guzman, N.A., Moschera, J., Iqbal, K. and Malick, A.W.: A quantitative assay for the determination of proline and hydroxyproline by capillary electrophoresis. *J. Liq. Chromatogr.*, 15 (1992) 1163-1177.
- 1565 Heber, M., Liedtke, C., Korte, H., Hoffmann-Posorske, E., Donella-Deana, A., Pinna, L.A., Perich, J., Kitas, E., Johns, R.B. and Meyer, H.F.: Non-radioactive determination of PTH and dabsyl phosphoamino acids by capillary electrophoresis. *Chromatographia*, 33 (1992) 347-350.
- 1566 Kobayashi, M., Kitaoka, Y. and Ueno, Y.: (Chemical behaviors of *p*-boronophenylalanine and its analogs in aqueous solutions). *Kyoto Daigaku Genshiro Jikkensho, [Tech. Rep.]*, KURRI-TR-354 (1991) 11-20; C.A., 116 (1992) 106712n.
- See also 1477, 1577, 1581, 1595, 1600.
- 18b. *Peptides, peptidic and proteinous hormones, growth factors*
- 1567 Bongers, J., Lambros, T., Felix, A.M. and Heimer, E.P.: Capillary zone electrophoresis of degradative and cyclic lactam derivatives of the growth hormone-releasing factor peptide. *J. Liq. Chromatogr.*, 15 (1992) 1115-1128.
- 1568 Boyle, W.J., van der Geer, P. and Hunter, T.: Phosphopeptide mapping and phosphoamino acid analysis by two-dimensional separation on thin-layer cellulose plates. *Methods Enzymol.*, 201 (1991) 110-149; C.A., 116 (1992) 55025f.
- 1569 Bramucci, M., Miano, A. and Amici, D.: Epidermal inhibitory pentapeptide phosphorylated *in vitro* by calf thymus protein kinase III is protected from serum enzyme hydrolysis. *Biochem. Biophys. Res. Commun.*, 183 (1992) 474-480.
- 1570 Carinci, V., Guida, S., Fontana, M.R., Palla, E., Rossini, M. and Melli, M.: Processing of interleukin-1 in cells of monocytic lineage is differentiation-dependent. *Eur. J. Biochem.*, 205 (1992) 295-301.
- 1571 Chen, R.-D. and Tabaeizadeh, Z.: Expression and molecular cloning of drought-induced genes in the wild tomato *Lycopersicon chilense*. *Biochem. Cell Biol.*, 70 (1992) 199-206.
- 1572 Clogston, C.L., Hsu, Y.-R., Boone, T.C. and Lu, H.S.: Detection and quantitation of recombinant granulocyte colony-stimulating factor charge isoforms: comparative analysis by cationic-exchange chromatography, isoelectric focusing gel electrophoresis, and peptide mapping. *Anal. Biochem.*, 202 (1992) 375-383.
- 1573 Cobb, K.A. and Novotny, M.V.: Selective determination of arginine-containing and tyrosine-containing peptides using capillary electrophoresis and laser-induced fluorescence detection. *Anal. Biochem.*, 200 (1992) 149-155.

- 1574 Dandeu, J.-P., Rabillon, J., Lux, M., David, B., Guillaume, J.-L. and Camoin, L.: Isolation of *Der pl*, the *Dermatophagoides pteronyssinus* major mite allergen, from a crude mite culture extract, purification by ion-chromatography, and comparison between the material obtained and a cDNA-coded *Der pl*. *J. Chromatogr.*, 599 (1992) 105-111.
- 1575 Diggle, T.A. and Denton, R.M.: Comparison of the effects of insulin and adrenergic agonists on the phosphorylation of an acid-soluble 22 kDa protein in rat epididymal fat-pads and isolated fat-cells. *Biochem. J.*, 282 (1992) 729-736.
- 1576 Giroux, R.W. and Filion, W.G.: A comparison of the chilling-stress response in two differentially tolerant cultivars of tomato (*Lycopersicon esculentum*). *Biochem. Cell Biol.*, 70 (1992) 191-198.
- 1577 Huber, J.L.A. and Huber, S.C.: Site-specific serine phosphorylation of spinach leaf sucrose-phosphate synthase. *Biochem. J.*, 283 (1992) 877-882.
- 1578 Issaq, H.J., Janini, G.M., Atamna, I.Z., Muschik, G.M. and Lukszo, J.: Capillary electrophoresis separation of small peptides: effect of pH buffer additives, and temperature. *J. Liq. Chromatogr.*, 15 (1992) 1129-1142.
- 1579 Klughammer, B., Benz, R., Betz, M., Thume, M. and Dietz, K.-J.: Reconstitution of vacuolar ion channels into planar lipid bilayers. *Biochim. Biophys. Acta*, 1104 (1992) 308-316.
- 1580 Kurfürst, M.M.: Detection and molecular weight determination of polyethylene glykol-modified hirudin by staining after sodium dodecyl sulfate-polyacrylamide gel electrophoresis. *Anal. Biochem.*, 200 (1992) 244-248.
- 1581 Purushotham, K.R., Bologna, J., Nakagawa, Y. and Humphreys-Beher, M.G.: Isolation and characterization of a new Ca^{2+} /calmodulin-dependent protein kinase from isoproterenol-stimulated proliferating rat parotid acinar cells. *Biochem. Cell Biol.*, 70 (1992) 250-255.
- 1582 Thibault, P., Paris, C. and Pleasance, S.: Analysis of peptides and proteins by capillary electrophoresis/mass spectrometry using acidic buffers and coated capillaries. *Rapid Commun. Mass Spectrom.*, 5 (1991) 484-490; *C.A.*, 116 (1992) 3158g.
- 1583 Torres-Ruiz, J.A. and McFadden, B.A.: Purification and characterization of chaperonin 10 from *Chromatium vinosum*. *Arch. Biochem. Biophys.*, 295 (1992) 172-179.
- 1584 Vinther, A., Soeberg, H., Soerensen, H.H. and Jespersen, A.M.: A practical approach to high performance capillary electrophoresis with biosynthetic human growth hormone as a model protein. *Talanta*, 38 (1991) 1369-1379; *C.A.*, 116 (1992) 102101q.
- 1585 Yasuda, A., Yamaguchi, K., Noso, T., Papkoff, H., Polenov, A.L., Nicoll, C.S. and Kawauchi, H.: The complete amino acid sequence of growth hormone from sturgeon (*Acipenser guldenstadtii*). *Biochim. Biophys. Acta*, 1120 (1992) 297-304.
- See also 1480, 1587, 1597, 1598, 1664, 1704, 1763, 1863.
- 18c. *Elucidation of structure of proteins and enzymes*
- 1586 Augier, N., Leger, J., Robert, A., Pons, F., Leger, J.J. and Mornet, D.: Proteolytic susceptibility of the central domain in chicken gizzard and skeletal muscle dystrophins. *Biochim. Biophys. Acta*, 1138 (1992) 297-304.
- 1587 Fernandez, J., DeMott, M., Atherton, D. and Mische, S.M.: Internal protein sequence analysis: enzymatic digestion for less than 10µg of protein bound to polyvinylidene difluoride or nitrocellulose membranes. *Anal. Biochem.*, 201 (1992) 255-264.
- 1588 Fischer, W.H., Karr, D., Jackson, B., Park, M. and Vale, W.: Microsequence analysis of proteins purified by gel electrophoresis. *Methods Neurosci.*, 6 (Neuropept. Technol.: Synth., Assay, Purif., Process.) (1991) 69-84; *C.A.*, 116 (1992) 37444n.
- 1589 Iwamatsu, A.: S-Carboxymethylation of proteins transferred onto polyvinylidene difluoride membranes followed by *in situ* protease digestion and amino acid microsequencing. *Electrophoresis (Weinheim)*, 13 (1992) 142-147.
- 1590 Minchiotti, L., Galliano, M., Stoppini, M., Ferri, G., Crespeau, H., Rochu, D. and Porta, F.: Two alloalbumins with identical electrophoretic mobility are produced by differently charged amino acid substitutions. *Biochim. Biophys. Acta*, 1119 (1992) 232-238.
- 1591 Morris, G.E. and thi Man, N.: Changes at the N-terminus of human brain creatine kinase during a transition between inactive folding intermediate and active enzyme. *Biochim. Biophys. Acta*, 1120 (1992) 233-238.
- 1592 Sakharov, I.Yu. and Litvin, F.E.: (Substrate specificity of collagenolytic proteases from the hepatopancreas of the crab (*Paralithodes camtschatica*)). *Biokhimiya (Moscow)*, 57 (1992) 61-68.
- 1593 Tanaka, H., Yamamoto, T., Shibuya, Y., Nishino, N., Tanase, S., Miyauchi, Y. and Kambara, T.: Activation of human plasma prekallikrein by *Pseudomonas aeruginosa* elastase. II. Kinetic analysis and identification of scissile bond of prekallikrein in the activation. *Biochim. Biophys. Acta*, 1138 (1992) 243-250.
- 1594 Taylor, J. and Giometti, C.S.: Use of principal components analysis for mutation detection with two-dimensional electrophoresis protein separations. *Electrophoresis (Weinheim)*, 13 (1992) 162-168.
- 1595 Yannoukakos, D., Vasseur, C., Piau, J.-P., Wajzman, H. and Bursaux, E.: Phosphorylation sites in human erythrocyte band 3 protein. *Biochim. Biophys. Acta*, 1061 (1991) 253-266.
- See also 1469, 1613, 1626, 1661, 1671, 1700, 1767, 1782, 1787, 1835.
19. PROTEINS
- 19a. *General techniques*
- 1596 Arai, A.: Divalent metal-containing buffer in capillary electrophoresis of proteins. *Jpn. Kokai Tokkyo Koho JP 03,259,740 [91,259,740] (Cl. G01N27/447)*, 19 Nov. 1991, Appl. 90/59,394, 09 Mar. 1990; 5 p.; *C.A.*, 116 (1992) 102242m.
- 1597 Bauer, H., Gruebler, G. and Wolf, B.: Application of flow gradient techniques to high performance capillary zone electrophoresis (HPCE) of peptides and proteins. In: Giralt, E. and Andreu, D. (Editors), *Peptides 1990, Proc. Eur. Pept. Symp.*, 21st 1990, ESCOM Sci. Publ., Leiden, 1991, pp. 329-330; *C.A.*, 115 (1991) 269578s.
- 1598 Chen, F.A., Kelly, L., Palmieri, R., Biehler, R. and Schwartz, H.: Use of high ionic strength buffers for the separation of proteins and peptides with capillary electrophoresis. *J. Liq. Chromatogr.*, 15 (1992) 1143-1161.

- 1599 Chmelik, J. and Thorman, W.: Isoelectric focusing field-flow fractionation. IV. Investigations on protein separations in the trapezoidal cross-section channel. *J. Chromatogr.*, 600 (1992) 305-311.
- 1600 Guzman, N.A., Moschera, J., Bailey, C.A., Iqbal, K. and Malick, A.W.: Assay of protein drug substances present in solution mixtures by fluorescamine derivatization and capillary electrophoresis. *J. Chromatogr.*, 598 (1992) 123-131.
- 1601 Manabe, T.: (*Gel Electrophoresis of Proteins.*) Hirokawa Publishing Co., Tokyo, 1991, 122 pp. C.A., 116 (1992) 18055v.
- 1602 Matsuda, T., Ishiguro, H., Ohkubo, I., Sasaki, M. and Nakamura, R.: Carbohydrate binding specificity of monoclonal antibodies raised against lactose-protein Maillard adducts. *J. Biochem. (Tokyo)*, 111 (1992) 383-387.
- 1603 Nashabeh, W. and El Rassi, Z.: Coupled fused silica capillaries for rapid capillary zone electrophoresis of proteins. *J. High Resolut. Chromatogr.*, 15 (1992) 289-292.
- 1604 Patterson, S.D., Hess, D., Yungwirth, T. and Aebersold, R.: High-yield recovery of electroblotted proteins and cleavage fragments from a cationic polyvinylidene fluoride-based membrane. *Anal. Biochem.*, 202 (1992) 193-203.
- 1605 Shia, S.P.: Marking polyacrylamide gel with prestained protein molecular weight marker for easy identification. *BioTechniques*, 11 (1991) 613-614; C.A., 116 (1992) 124232k.
- 1606 Towns, J.K., Bao, J. and Regnier, F.E.: Synthesis and evaluation of epoxy polymer coatings for the analysis of proteins by capillary zone electrophoresis. *J. Chromatogr.*, 599 (1992) 227-237.
- 1607 Vacquier, V.D. and Moy, G.W.: Microchemical determination of phosphate in proteins isolated from polyacrylamide gels. *Methods Enzymol.*, 201 (1991) 261-264; C.A., 116 (1992) 55029k.
- See also 1420, 1421, 1424, 1446, 1447, 1453, 1454, 1458, 1472, 1480, 1582.
- 19b. *Proteins of cells, viruses and subcellular particles*
- 1608 Blystone, S.D. and Kaplan, J.E.: Isolation of an amino-terminal fibronectin-binding protein on human U937 cells and rat peritoneal macrophages. *J. Biol. Chem.*, 267 (1992) 3968-3975.
- 1609 Coleman, R.A., Rao, P., Fogelson, R.J. and Bardes, E.S.-G.: 2-Bromopalmitoyl-CoA and 2-bromopalmitate: Promiscuous inhibitors of membrane-bound enzymes. *Biochim. Biophys. Acta*, 1125 (1992) 203-209.
- 1610 Collins, H., Najafi, H., Buettger, C., Rombeau, J., Settle, R.G. and Matschinsky, F.M.: Identification of glucose response proteins in two biological models of β -cell adaptation to chronic high glucose exposure. *J. Biol. Chem.*, 267 (1992) 1357-1366.
- 1611 Connor, J.D. and Walpita, P.: Method of identifying viruses by electrophoresis of viral proteins under conditions of suppression of host cell protein synthesis. U.S. US 5,075,214 (Cl. 435-5; C12Q1/70), 24 Dec. 1991, Appl. 268,761, 08 Nov. 1988; 9 p.; C.A., 116 (1992) 79872f.
- 1612 Correia, M.A., Yao, K., Wrighton, S.A., Waxman, D.J. and Rettie, A.E.: Differential apoprotein loss of rat liver cytochromes P450 after their inactivation by 3,5-dicarboxy-2,6-dimethyl-4-ethyl-1,4-dihydropyridine: a case for distinct proteolytic mechanisms? *Arch. Biochem. Biophys.*, 294 (1992) 493-503.
- 1613 De Pinto, V., Zara, V., Benz, R., Gnoni, G.V. and Palmieri, F.: Characterization of pore-forming activity in liver mitochondria from *Anguilla anguilla*. Two porins in mitochondria? *Biochim. Biophys. Acta*, 1061 (1991) 279-286.
- 1614 Hatayama, T., Tsujioka, K., Wakatsuki, T., Kitamura, T. and Imahara, H.: Effects of low culture temperature on the induction of hsp70 mRNA and the accumulation of hsp70 and hsp105 in mouse FM3A cells. *J. Biochem. (Tokyo)*, 111 (1992) 484-490.
- 1615 Humphery-Smith, I., Colas des Francs-Small, C., Ambart-Bretteville, F. and Remy, R.: Tissue-specific variation of pea mitochondrial polypeptides detected by computerized image analysis of two-dimensional electrophoresis gels. *Electrophoresis (Weinheim)*, 13 (1992) 168-172.
- 1616 Ichida, S., Masada, A., Yoshioka, T., Kishino, H., Akimoto, T. and Wada, T.: Effects of GTP analogues and activation of endogenous protein kinases on photoaffinity labeling with [3 H](+)-PN200-110 of crude membranes from rat heart and brain. *Biochim. Biophys. Acta*, 1106 (1992) 17-22.
- 1617 Joseph, A., Bhargava, M., Rosen, E. and Goldberg, I.D.: Binding of scatter factor to epithelial cell membrane protein: identification of its receptor. *Biochim. Biophys. Acta*, 1105 (1992) 141-147.
- 1618 Kuo, T.H., Tsang, W., Wang, K.K.W. and Carlock, L.: Simultaneous reduction of the sarcolemmal and SR calcium ATPase activities and gene expression in cardiomyopathic hamster. *Biochim. Biophys. Acta*, 1138 (1992) 343-349.
- 1619 Landemore, G., Oulhaj, N., Letaief, S.-E. and Izard, J.: The major Kurloff cell glycoproteins: lectin affinities, glycosidase susceptibilities and relationship with the sialylated acid phosphatases of the Kurloff body. *Biochim. Biophys. Acta*, 1116 (1992) 112-121.
- 1620 Li, J.-M. and Shore, G.C.: Protein sorting between mitochondrial outer and inner membranes. Insertion of an outer membrane protein into the inner membrane. *Biochim. Biophys. Acta*, 1106 (1992) 233-241.
- 1621 Lindqvist, A., Bratt, T., Altieri, M., Kastern, W. and Akerström, B.: Rat α -microglobulin: co-expression in liver with the light chain of inter- α -trypsin inhibitor. *Biochim. Biophys. Acta*, 1130 (1992) 63-67.
- 1622 Miles, M.F., Diaz, J.E. and DeGuzman, V.: Ethanol-responsive gene expression in neural cell cultures. *Biochim. Biophys. Acta*, 1138 (1992) 268-274.
- 1623 Morioka, M. and Ishikawa, H.: Mutualism based on stress: selective synthesis and phosphorylation of a stress protein by an intracellular symbiont. *J. Biochem. (Tokyo)*, 111 (1992) 431-435.
- 1624 Oka, T., Aoyama, Y., Natori, Y., Katano, T. and Endo, Y.: An efficient expression system for a variant form of the cytotoxic protein α -sarcin in *Escherichia coli*. *Biochim. Biophys. Acta*, 1130 (1992) 182-188.
- 1625 Ploug, M., Stoffer, B. and Jensen, A.L.: *In situ* alkylation of cysteine residues in a hydrophobic membrane protein immobilized on polyvinylidene difluoride membranes by electroblotting prior to microsequence and amino acid analysis. *Electrophoresis (Weinheim)*, 13 (1992) 148-153.
- 1626 Ramos-Ruiz, R., Avila, J., López-Bote, J., Bernabeu, C. and Laraga, V.: Decreased tubulin synthesis in synoviocytes from adjuvant-induced arthritic rats. *Biochim. Biophys. Acta*, 1138 (1992) 184-190.

- 1627 Schoenmakers, C.H.H., Pigmans, G.A.J. and Visser, T.J.: Species differences in liver type I iodothyronine deiodinase. *Biochim. Biophys. Acta*, 1121 (1992) 160-166.
- 1628 Schubert, U., Schneider, T., Henklein, P., Hoffmann, K., Berthold, E., Hauser, H., Pauli, G. and Porstmann, T.: Human-immunodeficiency-virus-type-1-encoded Vpu protein is phosphorylated by casein kinase II. *Eur. J. Biochem.*, 204 (1992) 875-883.
- 1629 Takakura, H., Tsunasawa, S., Miyagi, M. and Warner, J.R.: NH₂-Terminal acetylation of ribosomal proteins of *Saccharomyces cerevisiae*. *J. Biol. Chem.*, 267 (1992) 5442-5445.
- 1630 Tokunaga, M. and Kohno, K.: (Structure and function of BiP protein). *Cell Sci.*, 7 (1991) 718-725; *C.A.*, 116 (1992) 101176f - a review with 25 refs.
- 1631 Vorbroker, D.K., Dey, C., Weaver, T.E. and Whitsett, J.A.: Surfactant protein C precursor is palmitoylated and associates with subcellular membranes. *Biochim. Biophys. Acta*, 1105 (1992) 161-169.
- See also 1501, 1635, 1639, 1658, 1722, 1735, 1764, 1856.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*
- 1632 Bayer, M.G., Gebhart, U.B., Maier, T.L. and Schenk, H.E.A.: Two-step purification of *Cyanophora* ferredoxin and its identification in soluble protein preparations by isoelectric focusing. *Protein Expression Purif.*, 2 (1991) 240-247; *C.A.*, 116 (1992) 37478b.
- 1633 Bischoff, R., Roecklin, D. and Roitsch, C.: Analysis of recombinant proteins by isoelectric focusing in immobilized pH gradients. *Electrophoresis (Weinheim)*, 13 (1992) 214-219.
- 1634 Inoue, H., Takahashi, S. and Miyake, Y.: Modulation of active renin secretion by renin-binding protein (RnBP) in mouse pituitary AtT-20 cells transfected with human renin and RnBP cDNAs. *J. Biochem. (Tokyo)*, 111 (1992) 407-412.
- 1635 Iwahashi, J., Furuya, S., Mihara, K. and Omura, T.: Characterization of adrenodoxin precursor expressed in *Escherichia coli*. *J. Biochem. (Tokyo)*, 111 (1992) 451-455.
- 1636 Siow, Y.L., Chilcote, T.J., Benfenati, F., Greengard, P. and Thiel, G.: Synapsin IIa: expression in insect cells, purification, and characterization. *Biochemistry*, 31 (1992) 4268-4275.
- 1637 Tarditi, L., Camagna, M., Parisi, A., Vassarotto, C., DeMonte, L.B., Letarte, M., Malavasi, F. and Mariani, M.: Selective high-performance liquid chromatographic purification of bispecific monoclonal antibodies. *J. Chromatogr.*, 599 (1992) 13-20.
- See also 1662, 1728, 1734.
- 19d. *Microbial and plant proteins*
- 1638 Akhumov, A.A., Ibragimov, F.A., Mustakiimova, E.Ch. and L'vov, V.M.: (Electrophoretic study of fiber proteins of cotton of Andizhan-9 and S-6524 varieties). *Dokl. Akad. Nauk UzSSR*, (1990) 45-46; *C.A.*, 116 (1992) 37988t.
- 1639 Benz, R., Francis, G., Nakae, T. and Ferenci, T.: Investigation of the selectivity of maltoporin channels using mutant LamB proteins: mutations changing the maltodextrin binding site. *Biochim. Biophys. Acta*, 1104 (1992) 299-307.
- 1640 Böttcher, B., Gräber, P. and Boekema, E.J.: The structure of Photosystem I from the thermophilic cyanobacterium *Synechococcus* sp. determined by electron microscopy of two-dimensional crystals. *Biochim. Biophys. Acta*, 1100 (1992) 125-136.
- 1641 Cosio, E.G., Frey, T. and Ebel, J.: Identification of a high-affinity binding protein for a hepta- β -glucoside phytoalexin elicitor in soybean. *Eur. J. Biochem.*, 204 (1992) 1115-1123.
- 1642 Gianazza, E., de Ponti, P., Scienza, A., Villa, P. and Martinelli, L.: Monitoring by two-dimensional electrophoresis somatic embryogenesis in leaf and petiole explants from *Vitis*. *Electrophoresis (Weinheim)*, 13 (1992) 203-209.
- 1643 Görg, A., Postel, W., Baumer, M. and Weiss, W.: Two-dimensional polyacrylamide gel electrophoresis, with immobilized pH gradients in the first dimension, of barley seed proteins: discrimination of cultivars with different malting grades. *Electrophoresis (Weinheim)*, 13 (1992) 192-203.
- 1644 Kolster, P. and van Gelder, W.M.J.: A method for the quantification of individual high molecular weight glutenin subunits using SDS-PAGE and laser scanning densitometry. In: Bushuk, W. and Tkachuk, R. (Editors), *Gluten Proteins 1990 [Int. Workshop] 4th*, 1990, Am. Assoc. Cereal Chem., St. Paul, 1991, pp. 349-361; *C.A.*, 116 (1992) 82297c.
- 1645 Le Rudulier, D., Gloux, K. and Riou, N.: Identification of an osmotically induced periplasmic glycine betaine-binding protein from *Rhizobium meliloti*. *Biochim. Biophys. Acta*, 1061 (1991) 197-205.
- 1646 Marcone, M.F. and Yada, R.Y.: Study of the charge profile and covalent subunit association of the oligomeric seed globulin from *Amaranthus hypochondriacus*. *J. Agric. Food Chem.*, 40 (1992) 385-389.
- 1647 Marshall, H.F., Jr. and Conkerton, E.J.: Analytical evaluation of the globulin proteins of cottonseed meals. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 918-920.
- 1648 Nakamura, J., Doi, K., Higashida, Y., Hamachi, M. and Honma, T.: Identification of hiochi bacteria by sodium dodecyl sulfate-polyacrylamide gel electrophoretic patterns of whole cell proteins. *Agric. Biol. Chem.*, 55 (1991) 2455-2460; *C.A.*, 116 (1992) 5214w.
- 1649 Orden, J.A., Goyache, J., Hernandez, F.J., Domenech, A., Suarez, G. and Gomez-Lucia, E.: Detection of staphylococcal enterotoxin and toxic shock syndrome toxin-1 (TSST-1) by immunoblot combined with a semiautomated electrophoresis system. *J. Immunol. Methods*, 144 (1991) 197-202; *C.A.*, 116 (1992) 77915y.
- 1650 Pingel, S. and Duzsenko, M.: Identification of two distinct galactosyltransferase activities acting on the variant surface glycoprotein of *Trypanosoma brucei*. *Biochem. J.*, 283 (1992) 479-485.
- 1651 Polyá, G.M., Chandra, S., Chung, R., Neumann, G.M. and Höj, P.B.: Purification and characterization of wheat and pine small basic protein substrates for plant calcium-dependent protein kinase. *Biochim. Biophys. Acta*, 1120 (1992) 273-280.
- 1652 Post, A.F., Gal, A., Ohad, I., Milbauer, K.M. and Bullerjahn, G.S.: Characterization of light-activated reversible phosphorylation of a chlorophyll *a/b* antenna apoprotein in the photosynthetic prokaryote *Prochlorothrix hollandica*. *Biochim. Biophys. Acta*, 1100 (1992) 75-82.
- 1653 Salter, A.H., Virgin, I., Hagman, A. and Andersson, B.: On the molecular mechanism of light-induced D1 protein degradation in photosystem II core particles. *Biochemistry*, 31 (1992) 3990-3998.

- 1654 Simon, S.M. and Aderem, A.: Myristoylation of proteins in the yeast secretory pathway. *J. Biol. Chem.*, 267 (1992) 3922-3931.
- 1655 Taylor, E.A., Jackman, P.J.H. and Phillips, I.: The differentiation of a saccharolytic anaerobic gram-positive cocci by protein electrophoresis. *J. Med. Microbiol.*, C.A., 116 (1992) 3251g.
- 1656 Tokunaga, H. and Nakae, T.: Calcium ion-mediated regulation of the α -toxin pore of *Staphylococcus aureus*. *Biochim. Biophys. Acta*, 1105 (1992) 125-130.
- 1657 Wheeler, L., Wang, Y. and Mathews, C.K.: Specific associations of T4 bacteriophage proteins with immobilized deoxycytidylate hydroxymethylase. *J. Biol. Chem.*, 267 (1992) 7664-7670.
- 1658 Williams, W.P. and Gounaris, K.: Stabilisation of PS-II-mediated electron transport in oxygen-evolving PS II core preparations by the addition of compatible co-solutes. *Biochim. Biophys. Acta*, 1100 (1992) 92-97.
- 1659 Zecherle, G.N., Oleinikov, A. and Traut, R.R.: The proximity of the C-terminal domain of *Escherichia coli* ribosomal protein L7/L12 to L10 determined by cysteine site-directed mutagenesis and protein-protein cross-linking. *J. Biol. Chem.*, 267 (1992) 5889-5896.
- 1660 Zourari, A., Commissaire, J. and Desmazeaud, M.J.: SDS-Solubilized whole-cell protein patterns of *Streptococcus salivarius thermophilus* and *Lactobacillus delbrueckii bulgaricus* isolated from Greek yogurts. *J. Dairy Res.*, 59 (1992) 105-109; C.A., 116 (1992) 102326s.
- See also 1615, 1624, 1704, 1707.
- 19e. *Proteins of blood, serum and blood cells*
- 1661 Beach, C.M., de Beer, M.C., Sipe, J.D., Loose, L.D. and de Beer, F.C.: Human serum amyloid A protein. Complete amino acid sequence of a new variant. *Biochem. J.*, 282 (1992) 615-620.
- 1662 Costello, M.A., Woititz, C., de Feo, J., Stremlo, D., Wen, L.-F.L., Palling, D.J., Iqbal, K. and Guzman, N.A.: Characterization of humanized anti-Tac monoclonal antibody by traditional separation techniques and capillary electrophoresis. *J. Liq. Chromatogr.*, 15 (1992) 1081-1097.
- 1663 Cruz, M. and Sidén, A.: Immobilized pH gradient isoelectric focusing and immunoblotting for investigations of anti-*Borrelia burgdorferi* IgG antibodies. *Electrophoresis (Weinheim)*, 13 (1992) 229-234.
- 1664 De Beer, M.C., de Beer, F.C., Beach, C.M., Carreras, I. and Sipe, J.D.: Mouse serum amyloid A protein. Complete amino acid sequence and mRNA analysis of a new isoform. *Biochem. J.*, 283 (1992) 673-678.
- 1665 Ferrandiz, F., Rodenas, S., del Castillo, B. and Villegas, A.: Optimization of a polyacrylamide gel electrophoresis method for the analysis of erythrocyte membrane proteins. *An. R. Acad. Farm.*, 56 (1990) 543-554; C.A., 116 (1992) 3092f.
- 1666 Grant, A.J., Jessup, W. and Dean, R.T.: Accelerated endocytosis and incomplete catabolism of radical-damaged protein. *Biochim. Biophys. Acta*, 1134 (1992) 203-209.
- 1667 Heise, H., Bayerl, T., Isenberg, G. and Sackmann, E.: Human platelet P-235, a talin-like actin binding protein, binds selectively to mixed lipid bilayers. *Biochim. Biophys. Acta*, 1061 (1991) 121-131.
- 1668 Hinney, A., Luckenbach, C. and Ritter, H.: Temperature gradient gel electrophoresis: rapid detection of alpha-1-antitrypsin deficiency carriers. *Electrophoresis (Weinheim)*, 13 (1992) 279-282.
- 1669 Jeppsson, J.-O. and Einarsson, R.: Genetic variants of α 1-antitrypsin and hemoglobin typed by isoelectric focusing in preselected narrow pH gradients with PhastSystem™. *Clin. Chem. (Winston-Salem)*, 38 (1992) 577-580.
- 1670 Klonek, S. and Deuticke, B.: Involvement of cytoskeletal proteins in the barrier function of the human erythrocyte membrane. II. Formation of membrane leaks in ghost membranes after limited proteolysis of skeletal proteins by trypsin. *Biochim. Biophys. Acta*, 1106 (1992) 137-142.
- 1671 Klonek, S. and Deuticke, B.: Involvement of cytoskeletal protein in the barrier function of the human erythrocyte membrane. III. Permeability of spectrin-depleted inside-out membrane vesicles to hydrophilic nonelectrolytes. Formation of leaks by chemical or enzymatic modification of membrane proteins. *Biochim. Biophys. Acta*, 1106 (1992) 143-150.
- 1672 Knudsen, K.L., Hansen, M.B., Henriksen, L.R., Andersen, B.K. and Lihme, A.: Sulfone-aromatic ligands for thiophilic adsorption chromatography: purification of human and mouse immunoglobulins. *Anal. Biochem.*, 201 (1992) 170-177.
- 1673 Laursen, I. and Lykkesfeldt, A.E.: Purification and characterization of an α 1-antichymotrypsin-like 66 kDa protein from the human breast cancer cell line, MCF-7. *Biochim. Biophys. Acta*, 1121 (1992) 119-129.
- 1674 Lutz, H.U., Stammeler, P., Fasler, S., Ingold, M. and Fehr, J.: Density separation of human red blood cells on self forming Percoll gradients: correlation with cell age. *Biochim. Biophys. Acta*, 1116 (1992) 1-10.
- 1675 Munoz-Barús, I., Carracedo, A. and Pascali, V.L.: The use of immobilized pH gradients for the detection of human polymorphisms in the forensic identification of bloodstains. *Electrophoresis (Weinheim)*, 13 (1992) 239-243.
- 1676 Ong, C.-N., Liau, L.S. and Ong, H.Y.: Separation of globins using free zone capillary electrophoresis. *J. Chromatogr.*, 576 (1992) 346-350.
- 1677 Polson, A.: Zone electrophoresis of anti-human sperm antibodies in concentration gradients of sucrose. *Immunol. Invest.*, 20 (1991) 451-459; C.A., 116 (1992) 4725b.
- 1678 Pontet, F., Diemert, M.C., Pressac, M. and Bienvenu, J.: Study of six antisera used for the immunonephelometric assay of human IgG. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 145-152.
- 1679 Schwartze, G.: Testing of chemical substances *in vitro* for biocompatibility. *Ger. (East) DD 295,922 (Cl. G01N27/26)*, 14 Nov. 1991, Appl. 342,049, 26 Jun. 1990; 4 p.; C.A., 116 (1992) 100979h.
- 1680 Takasaki, M., Funakoshi, F. and Sekiguchi, E.: (Study of erythrocyte membrane proteins. (I). Analysis of red blood cell ghosts by sodium-dodecyl-sulfate polyacrylamide gel electrophoresis (SDS-PAGE) with thin layer plates). *Tokyo Ika Daigaku Zasshi*, 49 (1991) 482-492; C.A., 116 (1992) 37338f.
- 1681 Tissot, J.D., Schneider, P., James, R.W., Daigneault, R. and Hochstrasser, D.F.: High-resolution two-dimensional protein electrophoresis of pathological plasma/serum. *Appl. Theor. Electrophor.*, 2 (1991) 7-12; C.A., 116 (1992) 102093p.
- 1682 Vegh, Z., Kremmer, T., Boldizsar, M., Gesztesi, K.A. and Szajani, B.: A re-evaluation of the lipid-bound sialic acid determination. *Clin. Chim. Acta*, 203 (1991) 259-268.
- 1683 Vogt, U., Gürtler, L. and Cleve, H.: Inter- α -trypsin inhibitor polymorphism in African blacks. *Electrophoresis (Weinheim)*, 13 (1992) 337-338.

- 1684 Weidinger, S.: Reliable phenotyping of alpha-1-antitrypsin by hybrid isoelectric focusing in an ultranarrow immobilized pH gradient. *Electrophoresis (Weinheim)*, 13 (1992) 234-239.
- 1685 Whitehead, A.S., de Beer, M.C., Steel, D.M., Rits, M., Lelias, J.M., Lane, W.S. and de Beer, F.C.: Identification of novel members of the serum amyloid A protein superfamily as constitutive apolipoproteins of high density lipoproteins. *J. Biol. Chem.*, 267 (1992) 3862-3867.
- See also 1477, 1590, 1600, 1637, 1739, 1745, 1756.
- 19f. *Structural and muscle proteins*
- 1686 Bárány, K., Polyák, E. and Bárány, M.: Protein phosphorylation in arterial muscle contracted by high concentration of phorbol dibutyrate in the presence and absence of Ca²⁺. *Biochim. Biophys. Acta*, 1134 (1992) 233-241.
- 1687 Camps, M., Castello, A., Munoz, P., Monfar, M., Testar, X., Palacin, M. and Zorzano, A.: Effect of diabetes and fasting on GLUT-4(muscle/fat) glucose-transporter expression in insulin-sensitive tissues. Heterogeneous response in heart, red and white muscle. *Biochem. J.*, 282 (1992) 765-772.
- 1688 Crimmins, D.L. and Thoma, R.S.: Chromatographic analysis of tropomyosins from rabbit skeletal, chicken gizzard and earthworm muscle. *J. Chromatogr.*, 599 (1992) 51-63.
- 1689 Graceffa, P.: Heat-treated smooth muscle propomyosin. *Biochim. Biophys. Acta*, 1120 (1992) 205-207.
- 1690 Han, S., Blumenfeld, O.O. and Seifert, S.: Specific identification of collagens and their fragments by clostridial collagenase and anti-collagenase antibody. *Anal. Biochem.*, 201 (1992) 336-342.
- 1691 Hankey, D.P., Nicholas, R.M. and Hughes, A.E.: Two-dimensional polyacrylamide gel electrophoresis reveals differences between osteoblast and fibroblast extracellular proteins. *Electrophoresis (Weinheim)*, 13 (1992) 329-332.
- 1692 Katus, H.A., Looser, S., Hallermayer, K., Remppis, A., Scheffold, T., Borgya, A., Essig, U. and Geuss, U.: Development and *in vitro* characterization of a new immunoassay of cardiac troponin T. *Clin. Chem. (Winston-Salem)*, 38 (1992) 386-393.
- 1693 Lehmann, H.W., Bodo, M., Fröhn, C., Nerlich, A., Rimek, D., Notbohm, H. and Müller, P.K.: Lysyl hydroxylation in collagens from hyperplastic callus and embryonic bones. *Biochem. J.*, 282 (1992) 313-318.
- 1694 Majamaa, K., Savolainen, E.-R. and Myllylä, V.V.: Synthesis of structurally unstable type III procollagen in patients with cerebral artery aneurysm. *Biochim. Biophys. Acta*, 1138 (1992) 191-196.
- 1695 Ukishima, Y., Kino, M., Kubota, H., Wada, S. and Okada, S.: Identification of whale species by thin-layer isoelectric focusing of sarcoplasmic proteins. *J. Assoc. Off. Anal. Chem.*, 74 (1991) 943-950.
- See also 1586, 1863.
- 19g. *Protamines, histones and other nuclear proteins*
- 1696 Delcuve, G.P. and Davie, J.R.: Western blotting and immunochemical detection of histones electrophoretically resolved on acid-urea-Triton- and sodium dodecyl sulfate-polyacrylamide gels. *Anal. Biochem.*, 200 (1992) 339-341.
- 1697 Hallupp, M., Buck, F. and Strätling, W.H.: Structure analysis of purified histone H5 and of H5 in nuclei by limited proteolysis. *Biochem. J.*, 282 (1992) 435-441.
- 1698 Lindner, H., Helliger, W., Dirschlmayer, A., Jaquemar, M. and Puschendorf, B.: High-performance capillary electrophoresis of core histones and their acetylated modified derivatives. *Biochem. J.*, 283 (1992) 467-471.
- 1699 Martell, R.E., Strahler, J.R. and Simpson, R.U.: Identification of lamin B and histones as 1,25-dihydroxyvitamin D₃-regulated nuclear phosphoproteins in HL-60 cells. *J. Biol. Chem.*, 267 (1992) 7511-7519.
- 1700 Redpath, N.T.: High-resolution one-dimensional polyacrylamide gel isoelectric focusing of various forms of elongation factor-2. *Anal. Biochem.*, 202 (1992) 340-343.
- 1701 Sugimoto, K., Muro, Y. and Himeno, M.: Anti-helix-loop-helix domain antibodies: discovery of autoantibodies that inhibit DNA binding activity of human centromere protein B (CENP-B). *J. Biochem. (Tokyo)*, 111 (1992) 478-483.
- 1702 Wedrychowski, A., Henzel, W., Huston, L., Paslidis, N., Ellerson, D., McRae, M., Seong, D., Howard, O.M.Z. and Deisseroth, A.: Identification of proteins binding to interferon-inducible transcriptional enhancers in hematopoietic cells. *J. Biol. Chem.*, 267 (1992) 4533-4540.
- 1703 Westergren-Thorsson, G., Schmidtchen, A., Särnstrand, B., Fransson, L.-A. and Malmstrom, A.: Transforming growth factor- β induces selective increase of proteoglycan production and changes in the copolymeric structure of dermatan sulphate in human skin fibroblasts. *Eur. J. Biochem.*, 205 (1992) 277-286.
- See also 1753, 1759, 1926, 1969, 1977.
- 19h. *Chromoproteins and metalloproteins*
- 1704 Abrahamson, S.L., Speiser, D.M. and Ow, D.W.: A gel electrophoresis assay for phytochelatin. *Anal. Biochem.*, 200 (1992) 239-243.
- 1705 Aoki, Y., Tohyama, C. and Suzuki, K.T.: A Western blotting procedure for detection of metallothionein. *J. Biochem. Biophys. Methods*, 23 (1991) 207-216; C.A., 116 (1992) 17861t.
- 1706 De Jong, G., van Noort, W.L. and van Eijk, H.G.: Carbohydrate analysis of transferrin subfractions isolated by preparative isoelectric focusing in immobilized pH gradients. *Electrophoresis (Weinheim)*, 13 (1992) 225-228.
- 1707 Harrison, M.A., Melis, A. and Allen, J.F.: Restoration of irradiance-stressed *Dunaliella salina* (green alga) to physiological growth conditions: changes in antenna size and composition of Photosystem II. *Biochim. Biophys. Acta*, 1100 (1992) 83-91.
- 1708 Rivat, C., Sertillanges, P., Patin, E. and Stoltz, J.F.: Single-step method for purification of human transferrin from a by-product of chromatographic fractionation of plasma. *J. Chromatogr.*, 576 (1992) 71-77.
- 1709 Silitine, F.I. and Toulmond, A.: Two-dimensional electrophoresis of *Arenicola marina* extracellular hemoglobin: separation of chains with identical molecular mass but different isoelectric point. *Comp. Biochem. Physiol., B: Comp. Biochem.*, 100B (1991) 631-634; C.A., 116 (1992) 124237r.
- 1710 Takamatsu, K., Kitamura, K. and Noguchi, T.: Isolation and characterization of recoverin-like Ca²⁺-binding protein from rat brain. *Biochem. Biophys. Res. Commun.*, 183 (1992) 245-251.

- 1711 Thorn, W. and Riebe, D.: (Human serum transferrin analysis by capillary isotachopheresis). *Labor-Med.*, 14 (1991) 339-344; C.A., 116 (1992) 37341b.
- 1712 Ubukata, K., Ohi, H., Kitada, M. and Kamataki, T.: A new form of cytochrome P-450 responsible for mutagenic activation of 2-amino-3-methylimidazo[4,5-f]quinoline in human livers. *Cancer Res.*, 52 (1992) 758-763.
- 1713 Valenti, D. and Mammini, P.: (Electrophoresis of hemoglobin and determination of HbA₂ with the automatic instrument JOOKOO CTE 150). *G. Ital. Chim. Clin.*, 16 (1991) 11-16; C.A., 116 (1992) 17954a.
- See also 1502, 1522, 1632, 1669, 1679.
- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 1714 Franco, F.J., Diaz, C., Barcia, M. and Freire, M.: Thymosin α_1 is a native peptide in several tissues. *Biochim. Biophys. Acta*, 1120 (1992) 43-48.
- 1715 Fuchs, M.J. and Keim, V.: Separation of rat pancreatic secretory proteins by cation-exchange fast protein liquid chromatography. *J. Chromatogr.*, 576 (1992) 287-295.
- 1716 Fujita, T., Uchida, K. and Maruyama, N.: Purification of senescence marker protein-30 (SMP30) and its androgen-independent decrease with age in the rat liver. *Biochim. Biophys. Acta*, 1116 (1992) 122-128.
- 1717 Giancotti, V., Buratti, E., Santucci, A., Neri, P. and Crane-Robinson, C.: Molluscan sperm proteins: *Ensis minor*. *Biochim. Biophys. Acta*, 1119 (1992) 296-302.
- 1718 Inoko, Y., Yamamoto, M., Fujiwara, S. and Ueki, T.: X-Ray scattering study of the shape of the DNA region in nucleosome core particle with synchrotron radiation. *J. Biochem. (Tokyo)*, 111 (1992) 310-316.
- 1719 Lee, S.H., Jeon, W.M., Kim, Y.K., Lee, S.U. and Jeong, S.Y.: Electrophoretic analysis of major proteins in bovine milk. *Han'guk Ch'uksan Hakhoechi*, 33 (1991) 392-398; C.A., 116 (1992) 82321f.
- 1720 Mehrens, H.A. and Hoelken, P.: (Research methods for milk proteins. Membrane proteins in milk). *Lebensmittelchem., Lebensmittelqual.*, 4 (1991) 205-212; C.A., 116 (1992) 104568w - a review with 26 refs.
- 1721 Srinivas, U.K. and Revathi, C.J.: Characterisation of a high-molecular-weight developmentally regulated adult rat liver-specific protein. *Biochim. Biophys. Acta*, 1119 (1992) 281-286.
- 1722 Watanabe, T., Okawa, S., Itoga, H., Imanaka, T. and Suga, T.: Involvement of calmodulin- and protein kinase C-related mechanism in an induction process of peroxisomal fatty acid oxidation-related enzymes by hypolipidemic peroxisome proliferators. *Biochim. Biophys. Acta*, 1135 (1992) 84-90.
- 1723 Yom, H.-C. and Bremel, R.D.: Xerographic paper as a transfer medium for western blots: quantification of bovine α S1-casein by western blot. *Anal. Biochem.*, 200 (1992) 249-253.
- See also 1748, 1820.
- 19j. *Proteins of brain, cerebrospinal fluid and eye*
- 1724 Assigeo, R. and Santarén, J.F.: High resolution two-dimensional gel analysis of proteins in the central nervous system of larvae of *Drosophila melanogaster*. *Electrophoresis (Weinheim)*, 13 (1992) 321-328.
- 1725 Bresgen, M., Martiny, B., Weller, M., Heimann, K. and Wiedemann, P.: (Protein composition analysis of human vitreous humor by SDS-PAGE and Western blot of surgical and *postmortem* samples). *Fortschr. Ophthalmol.*, 88 (1991) 665-670; C.A., 116 (1992) 102201x.
- 1726 Fredman, P.: Detection of oligoclonal IgG bands in cerebrospinal fluid by immunofixation after isoelectric focusing on polyacrylamide gels with the PhastSystem. *Electrophoresis (Weinheim)*, 13 (1992) 158-161.
- 1727 Llona, I., Annaert, W.G. and de Potter, W.P.: Simultaneous purification of the neuroproteins synapsin I and synaptophysin. *J. Chromatogr.*, 596 (1992) 51-58.
- 1728 Merck, K.B., de Haard-Hoekman, W.A., Essink, B.B.O., Bloemendal, H. and de Jong, W.W.: Expression and aggregation of recombinant α A-crystallin and its two domains. *Biochim. Biophys. Acta*, 1130 (1992) 267-276.
- 1729 Wallis, C.J., Wenegieme, E.F. and Babitch, J.A.: Characterization of calcium binding to brain spectrin. *J. Biol. Chem.*, 267 (1992) 4333-4337.
- See also 1452, 1710, 1751, 1759, 1765.
- 19k. *Proteins of neoplastic tissue and transformed cells*
- 1730 Kawamoto, K., Yamaguchi, T., Watanabe, S. and Uchida, K.: An androgen-dependent subclone derived from a mouse mammary tumor, Shionogi carcinoma 115, secretes a heparin-binding growth factor having an apparent molecular weight of 31 000 in response to androgen. *Biochim. Biophys. Acta*, 1134 (1992) 183-188.
- 1731 Wirth, P.J., Luo, L.-d., Fujimoto, Y. and Bisgaard, H.C.: Two-dimensional electrophoretic analysis of transformation-sensitive polypeptides during chemically, spontaneously, and oncogene-induced transformation of rat liver epithelial cells. *Electrophoresis (Weinheim)*, 13 (1992) 305-320.
- See also 1673, 1746.
- 19l. *Specific binding and receptor proteins*
- 1732 Bandorowicz, J., Pikula, S. and Sobota, A.: Annexins IV (p32) and VI (p68) interact with erythrocyte membrane in a calcium-dependent manner. *Biochim. Biophys. Acta*, 1105 (1992) 201-206.
- 1733 Bisaccia, F., de Palma, A. and Palmieri, F.: Identification and purification of the aspartate/glutamate carrier from bovine heart mitochondria. *Biochim. Biophys. Acta*, 1106 (1992) 291-296.
- 1734 Boyhan, A., Casimir, C.M., Franch, J.K., Teahan, C.G. and Segal, A.W.: Molecular cloning and characterization of grancalcin, a novel EF-hand calcium-binding protein abundant in neutrophils and monocytes. *J. Biol. Chem.*, 267 (1992) 2928-2933.
- 1735 Diede, H.E., Rodilla-Sala, E., Gunawan, J., Manns, M. and Stremmel, W.: Identification and characterization of a monoclonal antibody to the membrane fatty acid binding protein. *Biochim. Biophys. Acta*, 1125 (1992) 13-20.

- 1736 Edwards, D.P., Estes, P.A., Fadok, V.A., Bona, B.J., Onate, S., Nordeen, S.K. and Welch, W.J.: Heat shock alters the composition of heteromeric steroid receptor complexes and enhances receptor activity *in vivo*. *Biochemistry*, 31 (1992) 2482-2491.
- 1737 Favarato, M., Mizzen, C.A. and McLachlan, D.R.: Resolution of serum aluminum-binding proteins by size-exclusion chromatography: identification of a new carrier of aluminum in human serum. *J. Chromatogr.*, 576 (1992) 271-285.
- 1738 Fazleabas, A.T. and Donnelly, K.M.: Characterization of insulin-like growth factor binding proteins by two-dimensional polyacrylamide gel electrophoresis and ligand blot analysis. *Anal. Biochem.*, 202 (1992) 40-45.
- 1739 Jo, I., Hah, J.S., Rampal, A.L., Chakrabarti, R., Paterson, A.R.P., Craik, J.D., Cass, C.E., Zobel, C.R. and Jung, C.Y.: Transport function and subcellular distribution of purified human erythrocyte glucose transporter reconstituted into rat adipocytes. *Biochim. Biophys. Acta*, 1106 (1992) 45-55.
- 1740 Komada, M., Miyazawa, K., Ishii, T. and Kitamura, N.: Characterization of hepatocyte-growth-factor receptors on MethA cells. *Eur. J. Biochem.*, 204 (1992) 857-864.
- 1741 Kwatra, M.M., Bigner, D.D. and Cohn, J.A.: The ligand binding domain of the epidermal growth factor receptor is not required for receptor dimerization. *Biochim. Biophys. Acta*, 1134 (1992) 178-181.
- 1742 Lin, H. and Konieczny, S.F.: Identification of MRF4, myogenin, and E12 oligomer complexes by chemical cross-linking and two-dimensional gel electrophoresis. *J. Biol. Chem.*, 267 (1992) 4773-4780.
- 1743 Longbottom, D., Sallenave, J.-M. and van Heyningen, V.: Subunit structure of calgranulins A and B obtained from sputum, plasma, granulocytes and cultured epithelial cells. *Biochim. Biophys. Acta*, 1120 (1992) 215-222.
- 1744 McCarthy, M.P. and Moore, M.A.: Effects of lipids and detergents on the conformation of the nicotinic acetylcholine receptor from *Torpedo californica*. *J. Biol. Chem.*, 267 (1992) 7655-7663.
- 1745 Nakashima, N., Miyazaki, K., Ishikawa, M., Yatohgo, T., Ogawa, H., Uchibori, H., Matsumoto, I., Seno, N. and Hayashi, M.: Vitronectin diversity in evolution but uniformity in ligand binding and size of the core polypeptide. *Biochim. Biophys. Acta*, 1120 (1992) 1-10.
- 1746 Piccart, M.J., Muquardt, C., Bosman, C., Pirotte, P., Veenstra, S., Grillo, F. and Leclercq, G.: Comparison of tritiated estradiol and tamoxifen aziridine for measurement of estragen receptors in human breast cancer cytosols. *J. Natl. Cancer Inst.*, 83 (1991) 1553-1559; *C.A.*, 116 (1992) 76490u.
- 1747 Riaz-ul-Haq and Chytil, F.: Effect of retinoids on nuclear retinoic acid receptors messenger RNA in adipose tissue of retinol-deficient rats. *J. Lipid Res.*, 33 (1992) 381-384.
- 1748 Sanz, L., Calvete, J.J., Schäfer, W., Mann, K. and Töpfer-Petersen, E.: Isolation and biochemical characterization of two isoforms of a boar sperm zona pellucida-binding protein. *Biochim. Biophys. Acta*, 1119 (1992) 127-132.
- 1749 Segarini, P.R., Ziman, J.M., Kane, C.J.M. and Dasch, J.R.: Two novel patterns of transforming growth factor β (TGF- β) binding to cell surface proteins are dependent upon the binding of TGF- β 1 and indicate a mechanism of positive cooperativity. *J. Biol. Chem.*, 267 (1992) 1048-1053.
- 1750 Solberg, H., Lober, D., Eriksen, J., Ploug, M., Ronne, E., Behrendt, N., Dano, K. and Hoyer-Hansen, G.: Identification and characterization of the murine cell surface receptor for the urokinase-type plasminogen activator. *Eur. J. Biochem.*, 205 (1992) 451-458.
- 1751 Srikant, C.B., Murthy, K.K. and Patel, Y.C.: Tissue-specific distribution of cross-linked somatostatin receptor proteins in the rat. *Biochem. J.*, 282 (1992) 339-344.
- 1752 Stamatiadis, D., Dadoun, F., Portois, M.-C., Wright, F., Mowszowicz, I. and Mauvais-Jarvis, P.: Isoelectric focusing and 2D electrophoresis of the human androgen receptor. *J. Steroid Biochem. Mol. Biol.*, 41 (1992) 43-51; *C.A.*, 116 (1992) 121216x.
- 1753 Sun, S.-C. and Faye, I.: Cecropia immunoresponsive factor, an insect immunoresponsive factor with DNA-binding properties similar to nuclear-factor κ B. *Eur. J. Biochem.*, 204 (1992) 885-892.
- 1754 Torres, M., Delicado, E.G., Fideu, M.D. and Miras-Portugal, M.T.: Down-regulation and recycling of the nitrobenzylthioinosine-sensitive nucleoside transporter in cultured chromaffin cells. *Biochim. Biophys. Acta*, 1105 (1992) 291-299.
- 1755 Tsao, F.H.C., Tian, Q. and Strickland, M.S.: Purification, characterization and substrate specificity of rabbit lung phospholipid transfer proteins. *Biochim. Biophys. Acta*, 1125 (1992) 321-329.
- 1756 Uemura, K., Inagaki, H., Wada, Y., Nakanishi, K., Asai, K., Kato, T., Ando, Y. and Kannagi, R.: Identification of immuno-reactive lipocortin 1-like molecules in serum and plasma by an enzyme immunoassay for lipocortin 1. *Biochim. Biophys. Acta*, 1119 (1992) 250-255.
- 1757 Van Haren, L., Teerds, K.J., Ossendorp, B.C., van Heusden, G.P.H., Orly, J., Stocco, D.M., Wirtz, K.W.A. and Rommerts, F.F.G.: Sterol carrier protein 2 (non-specific lipid transfer protein) is localized in membranous fractions of Leydig cells and Sertoli cells but not in germ cells. *Biochim. Biophys. Acta*, 1124 (1992) 288-296.
- 1758 Witcher, D.R., Striffler, B.A. and Jones, L.R.: Cardiac-specific phosphorylation site for multifunctional Ca²⁺/calmodulin-dependent protein kinase is conserved in the brain ryanodine receptor. *J. Biol. Chem.*, 267 (1992) 4963-4967.
- 1759 Ye, R.R. and Bretscher, A.: Identification and molecular characterization of the calmodulin-binding subunit gene (CMP1) of protein phosphatase β from *Saccharomyces cerevisiae*. An α -factor inducible gene. *Eur. J. Biochem.*, 204 (1992) 713-723.
- 1760 Yoshida, H., Yusin, M., Ren, I., Kuhlenkamp, J., Hirano, T., Stolz, A. and Kaplowitz, N.: Identification, purification, and immunochemical characterization of a tocopherol-binding protein in rat liver cytosol. *J. Lipid Res.*, 33 (1992) 343-350.
- 1761 Zhang, X.-Y., Asiedu, C.K., Supakar, P.C. and Ehrlich, M.: Increasing the activity of affinity-purified DNA-binding proteins by adding high concentrations of nonspecific proteins. *Anal. Biochem.*, 201 (1992) 366-374.

See also 1619, 1641, 1645, 1667, 1692, 1969.

19m. *Urinary proteins*

- 1762 Okutani, R., Itoh, Y., Hirata, H., Kasahara, T., Mukaida, N. and Kawai, T.: Simple and high-yield purification of urine protein 1 using immunoaffinity chromatography: evidence for the identity of urine protein 1 and human Clara cell 10-kilodalton protein. *J. Chromatogr.*, 577 (1992) 25-35.

19n. *Other proteins (incl. proteinous inhibitors of enzymic activity)*

- 1763 Austin, R.C., Sheffield, W.P., Rachubinski, R.A. and Blajchman, M.A.: The N-terminal domain of antithrombin-III is essential for heparin binding and complex-formation with, but not cleavage by, α -thrombin. *Biochem. J.*, 282 (1992) 345-351.
- 1764 Braulke, T., Tippmer, S., Matzner, U., Gartung, C. and von Figura, K.: Mannose 6-phosphate/insulin-like growth factor II receptor in I-cell disease fibroblasts: increased synthesis and defective regulation of cell surface expression. *Biochim. Biophys. Acta*, 1138 (1992) 334-342.
- 1765 Chasovnikova, L.V., Formazyuk, V.E., Sergienko, V.I. and Kokryakov, V.N.: (Myeloperoxidase and defensin interaction with lipid monolayers). *Biokhimiya (Moscow)*, 57 (1992) 97-102.
- 1766 Hecht, S.M., Berry, D.E., MacKenzie, L.J., Busby, R.W. and Nauti, C.A.: A strategy for identifying novel, mechanistically unique inhibitors of topoisomerase I. *J. Natural Prod.*, 55 (1992) 401-413.
- 1767 Mast, A.E., Enghild, J.J. and Salvesen, G.: Conformation of the reactive site loop of α_1 -proteinase inhibitor probed by limited proteolysis. *Biochemistry*, 31 (1992) 2720-2728.
- 1768 Rose, T.M., Tremblay, S. and Khandjian, E.W.: Repression of a G₀-associated 65-kilodalton protein in actively proliferating and SV40-transformed mouse kidney cells. *Biochem. Cell Biol.*, 70 (1992) 149-155.
- 1769 Schumacher, U., Mausolf, A., Barth, J., Welsch, U. and Petermann, W.: Recovery of proteins from the broncho-alveolar lavage fluid. Proposal for a standardisation. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 11-14.
- 1770 Voss, T., Schäfer, K.P., Nielsen, P.F., Schäfer, A., Maier, C., Hannaappel, E., Maassen, J., Landis, B., Klemm, K. and Przybylski, M.: Primary structure differences of human surfactant-associated proteins isolated from normal and proteinosis lung. *Biochim. Biophys. Acta*, 1138 (1992) 261-267.
- 1771 Wolff, E.C., Kinzy, T.G., Merrick, W.C. and Park, M.H.: Two isoforms of eUF-5A in chick embryo. Isolation, activity, and comparison of sequences of the hypusine-containing proteins. *J. Biol. Chem.*, 267 (1992) 617-6113.

See also 1684.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

20a. *Oxidoreductases*

- 1772 Buchwalder, A., Szadkowski, H. and Kirschner, K.: A fully active variant of dihydrofolate reductase with a circularly permuted sequence. *Biochemistry*, 31 (1992) 1621-1630.

- 1773 Burgos-Trinidad, M., Ismail, R., Ettinger, R.A., Prah, J.M. and DeLuca, H.F.: Immunopurified 25-hydroxyvitamin D 1 α -hydroxylase and 1,25-dihydroxyvitamin D 24-hydroxylase are closely related but distinct enzymes. *J. Biol. Chem.*, 267 (1992) 3498-3505.
- 1774 De, P.K. and Banerjee, R.K.: Purification and characterization of a soluble peroxidase of rat preputial gland: comparison with lactoperoxidase. *Biochim. Biophys. Acta*, 1120 (1992) 167-172.
- 1775 Dickinson, F.M. and Wadforth, C.: Purification and some properties of alcohol oxidase from alkane-grown *Candida tropicalis*. *Biochem. J.*, 282 (1992) 325-331.
- 1776 Doderer, A., Kokkelink, I., van der Veen, S., Valk, B.E., Schram, A.W. and Douma, A.C.: Purification and characterization of two lipoxygenase isoenzymes from germinating barley. *Biochim. Biophys. Acta*, 1120(1992) 97-104.
- 1777 Eipper, B.A., Green, C.B.-R., Campbell, T.A., Stoffers, D.A., Keutmann, H.T., Mains, R.E. and Ouafik, L.: Alternative splicing and endoproteolytic processing generate tissue-specific forms of pituitary peptidylglycine α -amidating monooxygenase (PAM). *J. Biol. Chem.*, 267 (1992) 4008-4015.
- 1778 Inazu, N., Ruepp, B., Wirth, H. and Wermuth, B.: Carbonyl reductase from human testis: purification and comparison with carbonyl reductase from human brain and rat testis. *Biochim. Biophys. Acta*, 1116 (1992) 50-56.
- 1779 Jackson, P. and Ricardo, C.P.P.: Cytochrome c aided resolution of *Lupinus albus* isoperoxidases in a cathodal polyacrylamide gel electrophoresis system. *Anal. Biochem.*, 200 (1992) 36-41.
- 1780 Kjalke, M., Andersen, M.B., Schneider, P., Christensen, B., Schüle, M. and Welinder, K.G.: Comparison of structure and activities of peroxidases from *Coprinus cinereus*, *Coprinus macrorhizus* and *Arthromyces ramosus*. *Biochim. Biophys. Acta*, 1120 (1992) 248-256.
- 1781 Liu, S.-Q., Bhatnagar, A. and Srivastava, S.K.: Carboxymethylation-induced activation of bovine lens aldose reductase. *Biochim. Biophys. Acta*, 1120 (1992) 329-336.
- 1782 Lombardo, M.C.P., van der Zwaan, J.W., Brul, S. and Tager, J.M.: A procedure for selecting mammalian cells with an impairment in oxidative phosphorylation. *Biochim. Biophys. Acta*, 1138 (1992) 275-281.
- 1783 Müller, S. and Walter, R.D.: Purification and characterization of polyamine oxidase from *Ascaris suum*. *Biochem. J.*, 283 (1992) 75-80.
- 1784 Robb, F.T., Park, J.-B. and Adams, M.W.W.: Characterization of an extremely thermostable glutamate dehydrogenase: a key enzyme in the primary metabolism of the hyperthermophilic archaeobacterium, *Pyrococcus furiosus*. *Biochim. Biophys. Acta*, 1120 (1992) 267-272.
- 1785 Segura-Aguilar, J., Kaiser, R. and Lind, C.: Separation and characterization of isoforms of DT-diaphorase from rat liver cytosol. *Biochim. Biophys. Acta*, 1120 (1992) 33-42.
- 1786 Sheldon, P.S., Kekwick, R.G.O., Smith, C.G., Sidebottom, C. and Slabas, A.R.: 3-Oxoacyl-[ACP] reductase from oilseed rape (*Brassica napus*). *Biochim. Biophys. Acta*, 1120 (1992) 151-159.
- 1787 Sikorska, M., Kwast-Welfeld, J., Youdale, T., Richards, R., Whitfield, J.F. and Walker, P.R.: The M1 subunit of rat liver ribonucleotide reductase appears to be modified by ubiquitination. *Biochem. Cell Biol.*, 70 (1992) 215-223.

- 1788 Snider, J., Neville, C., Yuan, L.-C. and Bullock, J.: Characterization of the heterogeneity of polyethylene glycol-modified superoxide dismutase by chromatographic and electrophoretic techniques. *J. Chromatogr.*, 599 (1992) 141-155.
- 1789 Van Kuilenburg, A.B.P., van Deeumen, J.J., Demol, H., van den Bogert, C., Schouten, I. and Muijsers, A.O.: Subunit IV of human cytochrome c oxidase, polymorphism and a putative isoform. *Biochim. Biophys. Acta*, 1119 (1992) 218-224.
- 1790 Zaidman, J.L., Waron, M., Meyer, S. and Micle, S.: Amniotic fluid components and changes due to storage conditions. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 43-45.
- See also 1765.
- 20b. *Transferases (excl. E.C. 2.7.-.-)*
- 1791 Davis, A.S., Davey, M.R., Clothier, R.C. and Cocking, E.C.: Quantification and comparison of chloramphenicol acetyltransferase activity in transformed plant protoplasts using high-performance liquid chromatography- and radioisotope-based assays. *Anal. Biochem.*, 201 (1992) 87-93.
- 1792 Fournier, D., Bride, J.M., Poirie, M., Berge, J.-B. and Plapp, F.W., Jr.: Insect glutathione S-transferases. Biochemical characteristics of the major forms from houseflies susceptible and resistant to insecticides. *J. Biol. Chem.*, 267 (1992) 1840-1845.
- 1793 Homma, H., Kamakura, M., Nakagome, I. and Matsui, M.: Purification of a rat liver phenol sulphotransferase (P-ST_G) with the aid of guanidine hydrochloride treatment. *Chem. Pharm. Bull.*, 39 (1991) 3307-3312.
- 1794 Mayer, D., Seelmann-Eggebert, G. and Letsch, I.: Glycogen phosphorylase isoenzymes from hepatoma 3924A and from a non-tumorigenic liver cell line. Comparison with the liver and brain enzymes. *Biochem. J.*, 282 (1992) 665-673.
- 1795 Rye, K.A., Garrety, K.H. and Barter, P.J.: Changes in the size of reconstituted high density lipoproteins during incubation with cholesteryl ester transfer protein - a role of apolipoproteins. *J. Lipid Res.*, 33 (1992) 215-224.
- 1796 Singhal, S.S., Saxena, M., Ahmad, H. and Awasthi, Y.C.: Glutathione S-transferases of mouse liver: sex-related differences in the expression of various isozymes. *Biochim. Biophys. Acta*, 1116 (1992) 137-146.
- 1797 Zhou, G., Broyles, S.S., Dixon, J.E. and Zalkin, H.: Avian glutamine phosphoribosylpyrophosphate amidotransferase propeptide processing and activity are dependent upon essential cysteine residues. *J. Biol. Chem.*, 267 (1992) 7936-7942.
- 20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.-)*
- 1798 Bhatt, A.M. and Knowler, J.T.: Tissue distribution and change in potato starch phosphorylase mRNA levels in wounded tissue and sprouting tubers. *Eur. J. Biochem.*, 204 (1992) 971-975.
- 1799 Clark, J.F., Khuchua, Z. and Ventura-Clapier, R.: Creatine kinase binding and possible role in chemically skinned guinea-pig taenia coli. *Biochim. Biophys. Acta*, 1100 (1992) 137-145.
- 1800 Friedman, D.L. and Roberts, R.: Purification and localization of brain-type creatine kinase in sodium chloride transporting epithelia of the spiny dogfish, *Squalus acanthias*. *J. Biol. Chem.*, 267 (1992) 4270-4276.
- 1801 Furuhashi, K. and Hatano, S.: Actin kinase: a protein kinase that phosphorylates actin of fragmin-actin complex. *J. Biochem. (Tokyo)*, 111 (1992) 366-370.
- 1802 Garmendia, C., Bernad, A., Esteban, J.A., Blanco, L. and Salas, M.: The bacteriophage ø29 DNA polymerase, a proofreading enzyme. *J. Biol. Chem.*, 267 (1992) 2594-2599.
- 1803 Kottke, M., Adams, V., Wallimann, T., Nalam, V.K. and Bridiczka, D.: Location and regulation of octameric mitochondrial creatine kinase in the contact sites. *Biochim. Biophys. Acta*, 1061 (1991) 215-225.
- 1804 Sakurabayashi, I., Morita, S. and Tsukada, H.: (Usefulness of CK-MM isoforms for diagnosis and monitoring during the early stages of acute myocardial infarction using electrophoretic technique). *Rinsho Byori*, 39 (1991) 1135-1139; *C.A.*, 116 (1992) 81366n.
- 1805 Sanghera, J.S., Charlton, L.A., Paddon, H.B. and Pelech, S.L.: Purification and characterization of echinoderm casein kinase II. Regulation by protein kinase C. *Biochem. J.*, 283 (1992) 829-837.
- 1806 Skalhegg, B.S., Landmark, B., Foss, K.B., Lohmann, S.M., Hansson, V., Lea, T. and Jahnsen, T.: Identification, purification, and characterization of subunits of cAMP-dependent protein kinase in human testis. Reverse mobilities of human RII α and RII β on sodium dodecyl sulfate-polyacrylamide gel electrophoresis compared with rat and bovine RII α s. *J. Biol. Chem.*, 267 (1992) 5374-5379.
- 1807 Stamellos, K.D., Shackelford, J.E., Tanaka, R.D. and Krisans, S.K.: Mevalonate kinase is localized in rat liver peroxisomes. *J. Biol. Chem.*, 267 (1992) 5560-5568.
- 1808 Torri, A.F. and Englund, P.T.: Purification of a mitochondrial DNA polymerase from *Crithidia fasciculata*. *J. Biol. Chem.*, 267 (1992) 4786-4792.
- 1809 Zwizinski, C.W. and Schmid, H.H.O.: Peroxidative damage to cardiac mitochondria: identification and purification of modified adenine nucleotide translocase. *Arch. Biochem. Biophys.*, 294 (1992) 178-183.
- See also 1591.
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*
- 1810 Brisson-Lougarre, A., Vergnes, H., Grozdea, J., Bourrouillou, G. and Colombies, P.: Isoelectric focusing of neutrophil alkaline phosphatase in trisomy 21 pregnancies. *Clin. Chim. Acta*, 204 (1991) 305-308.
- 1811 Cap, G.B. and Roberts, P.A.: A rapid and efficient method for the screening of acid phosphatase 1 in young tomato seedlings, and for the identification of root-knot nematode species using miniaturized polyacrylamide gel electrophoresis. *Electrophoresis (Weinheim)*, 13 (1992) 295-299.
- 1812 Freeman, C. and Hopwood, J.J.: Human glucosamine-6-sulphatase deficiency. Diagnostic enzymology towards heparin-derived trisaccharide substrates. *Biochem. J.*, 282 (1992) 605-614.
- 1813 Gjellesvik, D.R., Lombardo, D. and Walther, B.T.: Pancreatic bile salt dependent lipase from cod (*Gadus morhua*): purification and properties. *Biochim. Biophys. Acta*, 1124 (1992) 123-134.
- 1814 Griffiths, W.C., Camara, P.D., Rosner, M., Lev, R. and Brooks, E.M.: Prevalence and properties of the intestinal alkaline phosphatase identified in serum by cellulose acetate electrophoresis. *Clin. Chem. (Winston-Salem)*, 38 (1992) 507-511.

- 1815 Hada, T. and Higashino, K.: (Analysis of serum cholinesterase isozymes in patients with chronic liver diseases by use of lectin-containing agarose gel electrophoresis). *Seibutsu Butsuri Kagaku*, 35 (1991) 189-192; C.A., 116 (1992) 2582d.
- 1816 Jaeger, K.-E., Adrian, F.-J., Meyer, H.E., Hancock, R.E.W. and Winkler, U.K.: Extracellular lipase from *Pseudomonas aeruginosa* in an amphiphilic protein. *Biochim. Biophys. Acta*, 1120 (1992) 315-321.
- 1817 Krueger, J.K., Stock, J. and Schutt, C.E.: Evidence that the methylsterase of bacterial chemotaxis may be a serine hydrolase. *Biochim. Biophys. Acta*, 1119 (1992) 322-326.
- 1818 McLellan, A.C. and Thornalley, P.J.: Electrophoretic analysis of isoforms of glyoxalase II in clinical blood samples. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 7-10.
- 1819 Moreno, J., Vera, M.C. and Yorio, M.A.: Method for determining high-M_r (biliary) alkaline phosphatase in plasma. *Clin. Chem. (Winston-Salem)*, 38 (1992) 319-320.
- 1820 Possani, L.D., Mochca-Morales, J., Amezcua, J., Martin, B.M., Prestipino, G. and Nobile, M.: Anionic currents of chick sensory neurons are affected by a phospholipase A₂ purified from the venom of the taipan snake. *Biochim. Biophys. Acta*, 1134 (1992) 210-216.
- 1821 Rascón, A., Lindgren, S., Stavenow, L., Belfrage, P., Andersson, K.-E., Manganiello, V.C. and Degerman, E.: Purification and properties of the cGMP-inhibited cAMP phosphodiesterase from bovine aortic smooth muscle. *Biochim. Biophys. Acta*, 1134 (1992) 149-156.
- 1822 Saffari, B., Ong, J.M. and Kern, P.A.: Regulation of adipose tissue lipoprotein lipase gene expression by thyroid hormone by rats. *J. Lipid Res.*, 33 (1992) 241-249.
- 1823 Sakakibara, R., Hashida, K., Kitahara, T. and Ishiguro, M.: Characterization of a unique nonsecretory ribonuclease from urine of pregnant women. *J. Biochem. (Tokyo)*, 111 (1992) 325-330.
- 1824 Sztajer, H., Lünsdorf, H., Erdmann, H., Menge, U. and Schmid, R.: Purification and properties of lipase from *Penicillium simplicissimum*. *Biochim. Biophys. Acta*, 1124 (1992) 253-261.
- 1825 Van Lith, H.A., Haller, M., van Zutphen, L.F.M. and Beynen, A.C.: The use of three Ferguson-plot-based calculation methods to determine the molecular mass of proteins as illustrated by molecular mass assessment of plasma carboxylesterases ES-1, ES-2, and ES-14. *Anal. Biochem.*, 201 (1992) 288-300.
- 1826 Yasuda, T., Nadano, D., Awazu, S. and Kishi, K.: Human urine deoxyribonuclease II (DNase II) isoenzymes: a novel immunofinity purification, biochemical multiplicity, genetic heterogeneity and broad distribution among tissues and body fluids. *Biochim. Biophys. Acta*, 1119 (1992) 185-193.
- 20e. *Hydrolases, acting on glycosyl compounds (E.C. 3.2.-)*
- 1827 Danielsen, E.M.: Folding of intestinal brush border enzymes. Evidence that high-mannose glycosylation is an essential early event. *Biochemistry*, 31 (1992) 2266-2272.
- 1828 Johnson, S.W., Pieseci, S., Wang, R.F., Damjanov, I. and Alhadeff, J.A.: Analysis of purified human liver α -L-fucosidase by Western-blotting with lectins and polyclonal and monoclonal antibodies. *Biochem. J.*, 282 (1992) 829-834.
- 1829 Pieseci, S. and Alhadeff, J.A.: The effect of carbohydrate removal on the properties of human liver α -L-fucosidase. *Biochim. Biophys. Acta*, 1119 (1992) 194-200.
- 1830 Sopher, B.L., Travis, C.E., Cavanagh, K.T., Jones, M.Z. and Friderici, K.H.: Purification and characterization of goat lysosomal β -mannosidase using monoclonal and polyclonal antibodies. *J. Biol. Chem.*, 267 (1992) 6178-6182.
- 1831 Takase, K., Matsumoto, T., Mizuno, H. and Yamane, K.: Site-directed mutagenesis of active site residues in *Bacillus subtilis* α -amylase. *Biochim. Biophys. Acta*, 1120 (1992) 281-288.
- See also 1870.
- 20f. *Other hydrolases*
- 1832 Croall, D.E., Slaughter, C.A., Wortham, H.S., Skelly, C.M., DeOgny, L. and Moomaw, C.R.: Polyclonal antisera specific for the proenzyme form of each calpain. *Biochim. Biophys. Acta*, 1121 (1992) 47-53.
- 1833 De Llano, J.J.M. and Gavilanes, J.G.: Increased electrophoretic mobility of sodium sulfite-treated jack bean urease. *Electrophoresis (Weinheim)*, 13 (1992) 300-304.
- 1834 Foltmann, B., Drohse, H.B., Nielsen, P.K. and James, M.N.G.: Separation of porcine pepsinogen A and progastricsin. Sequencing of the first 73 amino acid residues in progastricsin. *Biochim. Biophys. Acta*, 1121 (1992) 75-82.
- 1835 Fukushima, Y., Asano, S. and Takada, J.: K⁺-Site-directed pyridine derivative, AU-1421, activates hydrolysis of the K⁺-sensitive phosphoenzyme of sarcoplasmic reticulum Ca²⁺-ATPase and inactivates that of K⁺-transporting ATPases. *Biochim. Biophys. Acta*, 1106 (1992) 71-76.
- 1836 Gottschalk, E.M., Hippe, H. and Patzke, F.: Creatinine deiminase (EC 3.5.4.21) from bacterium BN11: purification, properties and applicability in a serum/urine creatinine assay. *Clin. Chim. Acta*, 204 (1991) 223-238.
- 1837 Hasnain, S., Adeli, K. and Storer, A.C.: Purification and characterization of an extracellular thiol-containing serine proteinase from *Thermomyces lanuginosus*. *Biochem. Cell Biol.*, 70 (1992) 177-122.
- 1838 Hatsuzawa, K., Murakami, K. and Nakayama, K.: Molecular and enzymatic properties of furin, a Kex2-like endoprotease involved in precursor cleavage at Arg-X-Lys/Arg-Arg sites. *J. Biochem. (Tokyo)*, 111 (1992) 296-301.
- 1839 Kajiyama, N., Masuda, T., Tatsumi, H. and Nakano, E.: Purification and characterization of luciferases from fireflies, *Luciola cruciata* and *Luciola lateralis*. *Biochim. Biophys. Acta*, 1120 (1992) 228-232.
- 1840 Mach, L., Stüwe, K., Hagen, A., Ballaun, C. and Glössl, J.: Proteolytic processing and glycosylation of cathepsin B. The role of the primary structure of the latent precursor and of the carbohydrate moiety for cell-type-specific molecular forms of the enzyme. *Biochem. J.*, 282 (1992) 577-582.
- 1841 Mileyskovskaya, E.I., Kormer, S.S. and Allison, W.S.: Significant quantities of endogenous GDP and ADP are present on catalytic sites of the F₁-ATPase isolated from *M. lysodaikticus* in the absence of added nucleotides. *Biochem. Biophys. Acta*, 1099 (1992) 219-225.
- 1842 Niino, Y. and Miki-Noumura, T.: ATPase sites in two-headed fragment of *Tetrahymena* 22S ciliary dynein. *Biochim. Biophys. Acta*, 1100 (1992) 146-154.
- 1843 Page, A.E., Warburton, M.J., Chambers, T.J., Pringle, J.A.S. and Hayman, A.R.: Human osteoclastomas contain multiple forms of cathepsin B. *Biochim. Biophys. Acta*, 1116 (1992) 57-66.

- 1844 Pike, R.N., Coetzer, T.H.T. and Dennison, C.: Proteolytically active complexes of cathepsin L and a cysteine proteinase inhibitor; purification and demonstration of their formation *in vitro*. *Arch. Biochem. Biophys.*, 294 (1992) 623-629.
- 1845 Ryan, J.W., Valido, F., Berryer, P., Chung, A.Y.K. and Ripka, J.E.: Purification and characterization of guinea pig serum aminoacylproline hydrolase (aminopeptidase P). *Biochim. Biophys. Acta*, 1119 (1992) 140-147.
- 1846 Tollersrud, O.K. and Aronson, N.N., Jr.: Comparison of liver glycosylasparaginases from six vertebrates. *Biochem. J.*, 282 (1992) 891-897.
- 1847 Wakagi, T., Lee, C.-H. and Oshima, T.: An extremely stable inorganic pyrophosphatase purified from the cytosol of a thermoacidophilic archaeobacterium, *Sulfolobus acidocaldarius* strain 7. *Biochim. Biophys. Acta*, 1120 (1992) 289-296.
- 1848 Warren, M., Smith, J.A.C. and Apps, D.K.: Rapid purification and reconstitution of a plant vacuolar ATPase using Triton X-114 fractionation: subunit composition and substrate kinetics of the H⁺-ATPase from the tonoplast of *Kalanchoe daigremontiana*. *Biochim. Biophys. Acta*, 1106 (1992) 117-125.
- See also 1519, 1593, 1827.
- 20g. *Lyases*
- 1849 McLellan, A.C. and Thornalley, P.J.: Optimisation of non-denaturing polyacrylamide gel electrophoretic analysis of glyoxalase I phenotypes in clinical blood samples. *Clin. Chim. Acta*, 204 (1991) 137-144.
- 1850 Ronai, Z., Robinson, R., Rutberg, S., Lazarus, P. and Sardana, M.: Aldolase-DNA interactions in a SEWA cell system. *Biochim. Biophys. Acta*, 1130 (1992) 20-28.
- 1851 Waheed, A., Zhu, X.L. and Sly, W.S.: Membrane-associated carbonic anhydrase from rat lung. Purification, characterization, tissue distribution, and comparison with carbonic anhydrase IVs of other mammals. *J. Biol. Chem.*, 267 (1992) 3308-3311.
- 20h. *Isomerases*
- 1852 Boege, F., Gieseler, F., Biersack, H. and Meyer, P.: The measurement of nuclear topoisomerase II inhibition *in vitro*: a possible tool for detecting resistance on a subcellular level in haematopoietic malignancies. *Eur. J. Clin. Chem. Clin. Biochem.*, 30 (1992) 63-68.
- See also 1766.
- 20i. *Ligases*
- 1853 Nureki, O., Suzuki, K., Hara-Yokoyama, M., Kohno, T., Matsuzawa, H., Ohta, T., Shimizu, T., Morikawa, K., Miyazawa, T. and Yokoyama, S.: Glutamyl-tRNA synthetase from *Thermus thermophilus* HB8. Molecular cloning of the gltX gene and crystallization of the overproduced protein. *Eur. J. Biochem.*, 204 (1992) 465-472.
- 20j. *Complex mixtures and incompletely identified enzymes*
- 1854 Bialek, G. and Grosse, F.: The DNA synthesizing subunit of polymerase-primase from calf thymus. *J. Biol. Chem.*, 267 (1992) 2915-2919.
- 1855 Gillespie, R.B., Facemire, C.F. and Guttman, S.I.: Cryptic variation in electrophoretically-detected allozymes of caddisfly larvae (*Hydropsyche simulans*, *Hydropsyche bifida*) and spottin shiners (*Notropis spilopterus*): implications for allele and genotype determinations. *Biochem. Syst. Ecol.*, 19 (1991) 541-548; *C.A.*, 116 (1992) 102096.
- 1856 Schulze, E., Westphal, A.H., Veenhuis, M. and de Kok, A.: Purification and cellular localization of wild type and mutated dihydrolipoyltransacetylases from *Azotobacter vinelandii* and *Escherichia coli* expressed in *E. coli*. *Biochim. Biophys. Acta*, 1120 (1992) 87-96.
21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. *Purines, pyrimidines, nucleosides, nucleotides*
- See 1444, 1956.
- 21b. *Nucleic acids, RNA*
- 1857 Abad, J.P., Smith, C. and Amils, R.: Genomic organization studies in halobacteria using pulse field gel electrophoresis. *NATO ASI Ser., Ser. A*, 201 (Gen. Appl. Aspects Halophilic Microorg.) (1991) 295-303; *C.A.*, 116 (1992) 1418t.
- 1858 Abe, K., Yamashita, H., Arai, S. and Kurihara, Y.: Molecular cloning of curculin, a novel taste-modifying protein with a sweet taste. *Biochim. Biophys. Acta*, 1130 (1992) 232-234.
- 1859 Bai, G., Nichols, R.A. and Weiss, B.: Cyclic AMP selectively up-regulates calmodulin genes I and II in PC12 cells. *Biochim. Biophys. Acta*, 1130 (1992) 189-196.
- 1860 Bamberg, K., Mercier, F., Reuben, M.A., Kobayashi, Y., Munson, K.B. and Sachs, G.: cDNA cloning and membrane topology of the rabbit gastric H⁺/K⁺-ATPase α -subunit. *Biochim. Biophys. Acta*, 1131 (1992) 69-77.
- 1861 Bandara, G., Lin, C.W., Georgescu, H.I. and Evans, C.H.: The sinovial activation of chondrocytes: evidence for complex cytokine interactions involving a possible novel factor. *Biochim. Biophys. Acta*, 1134 (1992) 309-318.
- 1862 Berezowsky, C. and Gag, J.: Developmentally regulated troponin C mRNAs of chicken skeletal muscle. *Biochem. Cell Biol.*, 70 (1992) 156-165.
- 1863 Blouin, R., Swierenga, S.H. and Marceau, N.: Evidence for post-transcriptional regulation of cytokeratin gene expression in a rat liver epithelial cell line. *Biochem. Cell Biol.*, 70 (1992) 1-9.
- 1864 Ciesiolka, J., Lorenz, S. and Erdmann, V.A.: Different conformational forms of *Escherichia coli* and rat liver 5S rRNA revealed by Pb(II)-induced hydrolysis. *Eur. J. Biochem.*, 204 (1992) 583-589.
- 1865 Ciesiolka, J., Lorenz, S. and Erdmann, V.A.: Structural analysis of three prokaryotic 5S rRNA species and selected 5S rRNA-ribosomal protein complexes by means of Pb(II)-induced hydrolysis. *Eur. J. Biochem.*, 204 (1992) 575-581.
- 1866 Dimberg, J., Gustafson-Svård, C., Weström, B., Tagesson, C. and Söderkvist, P.: Group I phospholipase A₂ mRNA expression in rat glandular stomach and pancreas. Ontogenic development and effects of cortisone acetate. *Biochim. Biophys. Acta*, 1130 (1992) 47-51.

- 1867 Elima, K., Metsäranta, M., Kallio, J., Perälä, M., Eerola, I., Garofalo, S., de Crombrughe, B. and Vuorio, E.: Specific hybridization probes for mouse $\alpha 2$ (IX) and $\alpha 1$ (X) collagen mRNAs. *Biochim. Biophys. Acta*, 1130 (1992) 78-80.
- 1868 Fine, A., Matsui, R., Zhan, X., Poliks, C.F., Smith, B.D. and Goldstein, R.H.: Discordant regulation of human type I collagen genes by prostaglandin E₂. *Biochim. Biophys. Acta*, 1135 (1992) 67-72.
- 1869 Franklin, C.C. and Kraft, A.S.: Protein kinase C-independent activation of c-jun and c-fos transcription by epidermal growth factor. *Biochim. Biophys. Acta*, 1134 (1992) 137-142.
- 1870 Hall, J., Hirst, B.H., Hazlewood, G.P. and Gilbert, H.J.: The use of chimeric gene constructs to express a bacterial endoglucanase in mammalian cells. *Biochim. Biophys. Acta*, 1130 (1992) 259-266.
- 1871 Hosaka, K., Nikawa, J.-i., Kodaki, T. and Yamashita, S.: A dominant mutation that alters the regulation of INO1 expression in *Saccharomyces cerevisiae*. *J. Biochem. (Tokyo)*, 111 (1992) 352-358.
- 1872 Imai, M., Ogishima, T., Shimada, H. and Ishimura, Y.: Effect of dietary sodium restriction on mRNA for aldosterone synthase cytochrome P-450 in rat adrenals. *J. Biochem. (Tokyo)*, 111 (1992) 440-443.
- 1873 Jordan, E.M. and Breen, G.A.M.: Molecular cloning of an import precursor of the δ -subunit of the human mitochondrial ATP synthase complex. *Biochim. Biophys. Acta*, 1130 (1992) 123-126.
- 1874 Kondo, M., Ishida, N., Kobayashi, M. and Mitsui, Y.: Secretion of endothelin-1 in human endothelial cell line but not in B cell line by transfection of preproendothelin-1 cDNA. *Biochim. Biophys. Acta*, 1134 (1992) 242-246.
- 1875 Lizardi, P.M.: Method and apparatus for separating nucleic acids and nucleic acid probes. U.S. Pat. 5,059,294 (Cl. 204-182.8; BO1D57/02), 22 Oct. 1991, US Appl. 813,662, 26 Dec. 1985; 10 pp; C.A., 116 (1992) 1785k.
- 1876 Marjamäki, A., Ala-Uotila, S., Luomala, K., Perälä, M., Jansson, C., Jalkanen, M., Regan, J.W. and Scheinin, M.: Stable expression of recombinant human $\alpha 2$ -adrenoceptor subtypes in two mammalian cell lines: characterization with [³H]rauwolscine binding, inhibition of adenylate cyclase and RNase protection assay. *Biochim. Biophys. Acta*, 1134 (1992) 169-177.
- 1877 Melloni, R.H., Jr., Estes, P.S., Howland, D.S. and DeGennaro, L.J.: A method for the direct measurement of mRNA in discrete regions of mammalian brain. *Anal. Biochem.*, 200 (1992) 95-99.
- 1878 Minchiotti, G., Gargano, S. and Maresca, B.: Molecular cloning and expression of hsp82 gene of the dimorphic pathogenic fungus *Histoplasma capsulatum*. *Biochim. Biophys. Acta*, 1131 (1992) 103-107.
- 1879 Neno, M., Mita, K. and Ichimura, S.: Evolutionarily conserved structure of the 3' non-translated region of a Chinese hamster polyubiquitin gene. *Biochim. Biophys. Acta*, 1130 (1992) 247-252.
- 1880 Oka, T., Endo, Y., Ito, M., Miyamoto, K.-i., Sasakawa, T., Suzuki, I. and Natori, Y.: Molecular cloning of chick liver HMG 2a cDNA and developmental expression of HMG 2a mRNA. *Biochim. Biophys. Acta*, 1130 (1992) 224-226.
- 1881 Rabek, J.P., Hsie, D.Y. and Papaconstantinou, J.: α -Fetoprotein expression in fetal kidney cells does not require enhancers. *Biochim. Biophys. Acta*, 1130 (1992) 317-325.
- 1882 Rosenbaum, S.E. and Niles, R.M.: Regulation of protein kinase C gene expression by retinoic acid in B16 mouse melanoma cells. *Arch. Biochem. Biophys.*, 294 (1992) 123-129.
- 1883 Sadowski, K.B., Wheeler, T.T. and Young, D.A.: Gene expression during 3T3-L1 adipocyte differentiation. Characterization of initial responses to the inducing agents and changes during commitment to differentiation. *J. Biol. Chem.*, 267 (1992) 4722-4731.
- 1884 Seong, B.L., Kobayashi, M., Nagata, K., Brownlee, G.G. and Ishihama, A.: Comparison of two reconstituted systems for *in vitro* transcription and replication of influenza virus. *J. Biochem. (Tokyo)*, 111 (1992) 496-499.
- 1885 Shimomura, I., Tokunaga, K., Jiao, S., Funahashi, T., Keno, Y., Kobatake, T., Kotani, K., Suzuki, H., Yamamoto, T., Tarui, S. and Matsuzawa, Y.: Marked enhancement of acyl-CoA synthetase activity and mRNA, paralleled to lipoprotein lipase mRNA, in adipose tissues of Zucker obese rats (fa/fa). *Biochim. Biophys. Acta*, 1124 (1992) 112-118.
- 1886 Tomoda, T., Kurashige, T. and Taniguchi, T.: Inhibition of interferon- γ and phorbol ester-induced HLA-DR and interleukin-1 production by the expression of a transfected poly(ADP-ribose) synthetase gene in human leukemia THP- α cells. *Biochim. Biophys. Acta*, 1135 (1992) 79-83.
- 1887 Yanagimoto, T., Itoh, S., Muller-Enoch, D. and Kamataki, T.: Mouse liver cytochrome P-450 (P-450III_{Am1}): its cDNA cloning and inducibility by dexamethasone. *Biochim. Biophys. Acta*, 1130 (1992) 329-332.
- 1888 Yang, F., Chen, Z.-L., Bergeron, J.M., Cupples R.L. and Friedrichs, W.E.: Human $\alpha 2$ -HS-glycoprotein/bovine fetuin homologue in mice: identification and developmental regulation of the gene. *Biochim. Biophys. Acta*, 1130 (1992) 149-156.
- 1889 Ziemke, P. and McCarthy, J.E.G.: The control of mRNA stability in *Escherichia coli*: manipulation of the degradation pathway of the polycistronic atp mRNA. *Biochim. Biophys. Acta*, 1130 (1992) 297-306.
- See also 1420, 1447, 1458, 1472, 1532, 1552, 1618, 1694, 1757, 1946, 1947.
- 21c. *Nucleic acids, DNA*
- 1890 Aakerman, B., Jonsson, M., Moore, D. and Schellman, J.: Conformational dynamics of DNA during gel electrophoresis studied by linear dichroism spectroscopy. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 23-41; C.A., 116 (1992) 17948b.
- 1891 Calladine, C.R., Colis, C.M., Drew, H.R. and Mott, M.R.: A study of electrophoretic mobility of DNA in agarose and polyacrylamide gels. *J. Mol. Biol.*, 221 (1991) 981-1005; C.A., 116 (1992) 3097m.
- 1892 Czaika, G. and Mamet-Bratley, M.D.: Defective DNA injection by alkylated and nonalkylated bacteriophage T7. *Biochim. Biophys. Acta*, 1130 (1992) 52-62.
- 1893 Deuchars, K.L., Duthie, M. and Ling, V.: Identification of distinct P-glycoprotein gene sequences in rat. *Biochim. Biophys. Acta*, 1130 (1992) 157-165.
- 1894 Dingwall, A.: Analysis of bacterial genome organization and replication using pulsed-field gel electrophoresis. *Methods (San Diego)*, 1 (1990) 160-168; C.A., 116 (1992) 100217h.

- 1895 Duke, T.: The physics of DNA electrophoresis. *NATO ASI Ser., Ser. B*, 263 (1991) 71-80; *C.A.*, 116 (1992) 79710b.
- 1896 Duke, T.A.J. and Viovy, J.L.: Simulation of megabase DNA undergoing gel electrophoresis. *Phys. Rev. Lett.*, 68 (1992) 542-545; *C.A.*, 116 (1992) 102102r.
- 1897 Ebbehøj, K.F. and Thomsen, P.D.: Species differentiation of heated meat products by DNA hybridization. *Meat Sci.*, 30 (1991) 221-234; *C.A.*, 116 (1992) 82296b.
- 1898 Ecker, J.R.: PFGE and YAC analysis of the *Arabidopsis* genome. *Methods (San Diego)*, 1 (1990) 186-194; *C.A.*, 116 (1992) 100219k.
- 1899 Fisher, R.P., Lisowsky, T., Parisi, M.A. and Clayton, D.A.: DNA wrapping and bending by a mitochondrial high mobility group-like transcriptional activator protein. *J. Biol. Chem.*, 267 (1992) 3358-3367.
- 1900 Friedl, A.A., Baur, M. and Eckardt-Schupp, F.: (Quantitative analysis of DNA damage with pulsed field gel electrophoresis). *Bioforum*, 14 (1991) 242-246; *C.A.*, 116 (1992) 17959f.
- 1901 Fukudome, K., Iwasaki, K., Matsumoto, S. and Yamaoka, K.: Undesirable contamination of DNA electrophoresed through polyacrylamide and agarose gels as revealed by reversing-pulse electric birefringence signals. *Biopolymers*, 31 (1991) 1455-1458; *C.A.*, 116 (1992) 102100p.
- 1902 Galley, K.A., Singh, B. and Gupta, R.S.: Cloning of HSP70 (dnaK) gene from *Clostridium perfringens* using a general polymerase chain reaction based approach. *Biochim. Biophys. Acta*, 1130 (1992) 203-208.
- 1903 Gandrille, S. and Alach, M.: Polymorphism in the protein C gene detected by denaturing gradient gel electrophoresis. *Nucleic Acids Res.*, 19 (1991) 6982; *C.A.*, 116 (1992) 52774p.
- 1904 Garner, M.M. and Chrambach, A.: Resolution of circular, nicked circular and linear DNA, 4.4 kb in length, by electrophoresis in polyacrylamide solutions. *Electrophoresis (Weinheim)*, 13 (1992) 176-178.
- 1905 Gemmill, R.M.: Pulsed field gel electrophoresis. *Adv. Electrophor.*, 4 (1991) 1-48; *C.A.*, 116 (1992) 100172q - a review with 111 refs.
- 1906 Gersten, D.M. and Zapolski, E.J.: Detection and quantification of DNA in electrophoresis gels and blots. *Adv. Electrophor.*, 4 (1991) 49-79; *C.A.*, 116 (1992) 100173r - a review with 92 refs.
- 1907 Gill, P., Kimpton, C.P. and Sullivan, K.: A rapid polymerase chain reaction method for identifying fixed specimens. *Electrophoresis (Weinheim)*, 13 (1992) 173-175.
- 1908 Glazer, A.M., Mathies, R.A. and Peck, K.: Multichromophore fluorescent probes. *PCT Int. Appl. WO 91 13,897 (Cl. CO7H15/12)*, 19 Sep. 1991, US Appl. 493,307, 14 Mar. 1990; 28 pp.; *C.A.*, 116 (1992) 37507k.
- 1909 Grossman, P.D. and Soane, D.S.: Experimental and theoretical studies of DNA separations by capillary electrophoresis in entangled polymer solutions. *Biopolymers*, 31 (1991) 1221-1228; *C.A.*, 116 (1992) 3101h.
- 1910 Grothues, D. and Tuemmler, B.: New approaches in genome analysis by pulsed-field gel electrophoresis: application to the analysis of *Pseudomonas* species. *Mol. Microbiol.*, 5 (1991) 2763-2776; *C.A.*, 116 (1992) 52467r.
- 1911 Guerin, M. and Pellissier, P.: A rapid method for measuring the steady state levels of mitochondrial RNA in whole mitochondria. *Nucleic Acids Res.*, 20 (1992) 142; *C.A.*, 116 (1992) 124238s.
- 1912 Han, X. and Liehr, J.G.: Induction of covalent DNA adducts in rodents by tamoxifen. *Cancer Res.*, 52 (1992) 1360-1363.
- 1913 Hasse, A., Schulz, W.A. and Sies, H.: *De novo* methylation of transfected CAT gene plasmid constructs in F9 mouse embryonal carcinoma cells. *Biochim. Biophys. Acta*, 1131 (1992) 16-22.
- 1914 Holwarth, G., Whitcomb, R.W., Platt, K.J., Crater, G.D. and McKee, C.B.: Velocity of linear DNA during pulsed-field gel electrophoresis. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 43-53; *C.A.*, 116 (1992) 17949c.
- 1915 Huang, X.C., Stuart, S.G., Bente, P.F. and Brennan, T.M.: Capillary gel electrophoresis of single-stranded DNA fragments with UV detection. *J. Chromatogr.*, 600 (1992) 289-295.
- 1916 Imai, T., Iida, A., Miwa, T., Tashiro, H., Song, J., Yokoyama, K. and Soeda, E.: Analysis of YAC clones by pulsed-field gel electrophoresis: physical mapping of cooper/zinc superoxide dismutase gene locus. *Methods (San Diego)*, 1 (1990) 180-185; *C.A.*, 116 (1992) 100218j.
- 1917 Jastrow, A.: Quick drying procedure of DNA sequencing gels. *BioTechniques*, 11 (1991) 473; *C.A.*, 116 (1992) 79703b.
- 1918 Kans, J.A., Spengler, S.J., Cole, G.M. and Mortimer, R.K.: An electrophoretic method for assaying polymerase and nuclease activities. *Methods Mol. Cell. Biol.*, 2 (1991) 266-272; *C.A.*, 116 (1992) 17518m.
- 1919 Lee, C., Hartley, J.A., Berardini, M.D., Butler, J., Siegel, D., Ross, D. and Gibson, N.W.: Alteration in DNA cross-linking and sequence selectivity of a series of aziridinylbenzoquinones after enzymatic reduction by DT-diaphorase. *Biochemistry*, 31 (1992) 3019-3025.
- 1920 Leger, R.J.S., Frank, D.C., Roberts, D.W. and Staples, R.C.: Molecular cloning and regulatory analysis of the cuticle-degrading-protease structural gene from the entomopathogenic fungus *Metarhizium anisopliae*. *Eur. J. Biochem.*, 204 (1992) 991-1001.
- 1921 Lerman, L.S. and Sinha, D.: Describing resolution in gel electrophoresis. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 1-8; *C.A.*, 116 (1992) 17947a.
- 1922 Mortimer, R.K., Game, J.C., Bell, M. and Contopoulou, C.R.: Use of pulsed-field gel electrophoresis to study the chromosomes of *Saccharomyces* and other yeasts. *Methods (San Diego)*, 1 (1990) 169-170; *C.A.*, 116 (1992) 100174s - a review with 53 refs.
- 1923 Murchie, A.I.H., Bowater, R., Aboul-ela, F. and Lilley, D.M.J.: Helix opening transitions in supercoiled DNA. *Biochim. Biophys. Acta*, 1131 (1992) 1-15 - a review with 86 refs.
- 1924 Nashabeh, W. and El Rassi, Z.: Enzymophoresis of nucleic acids by tandem capillary enzyme reactor-capillary zone electrophoresis. *J. Chromatogr.*, 596 (1992) 251-264.
- 1925 Olive, P.L., Wlodek, D., Durand, R.E. and Banath, J.P.: Factors influencing DNA migration from individual cells subjected to gel electrophoresis. *Exp. Cell Res.*, 198 (1992) 259-267; *C.A.*, 116 (1992) 124234n.
- 1926 Penner, C.G. and Davie, J.R.: Multisubunit erythroid complexes binding to the enhancer element of the chicken histone H5 gene. *Biochem. J.*, 283 (1992) 905-911.
- 1927 Ramírez-Solis, R., Rivera-Pérez, J., Wallace, J.D., Wims, M., Zheng, H. and Bradley, A.: Genomic DNA microextraction: a method to screen numerous samples. *Anal. Biochem.*, 201 (1992) 331-335.

- 1928 Rampino, N.J. and Chrambach, A.: Conformational correlates of DNA band compression and bidirectional migration during field inversion gel electrophoresis, detected by quantitative video epifluorescence microscopy. *Biopolymers*, 31 (1991) 1297-1307; *C.A.*, 116 (1992) 54930k.
- 1929 Rampino, N.J. and Chrambach, A.: DNA Electrophoresis in uncross-linked polyacrylamide solution, studied by epifluorescence microscopy. *J. Chromatogr.*, 596 (1992) 141-149.
- 1930 Robertson, J., Ziegler, J., Kronick, M., Madden, D. and Budowle, B.: Genetic typing using automated electrophoresis and fluorescence detection. *Experientia, Suppl.*, 58 (1991) 391-398; *C.A.*, 116 (1992) 121907y - a review with 10 refs.
- 1931 Serwer, P. and Louie, D.F.: High molecular weight DNA compositions for use in electrophoresis of large nucleic acids. *PCT Int, Appl. WO 91 18,095* (Cl. C12N15/10), 28 Nov. 1991, US Appl. 523,766, 15 May 1990; 25 p.; *C.A.*, 116 (1992) 77795j.
- 1932 Shikata, T. and Kotaka, T.: (Gel electrophoresis of large DNA. A polymer physicists' viewpoint). *Tanpakushitsu Kakusan Koso*, 37 (1992) 50-56; *C.A.*, 116 (1992) 79554d - a review with 30 refs.
- 1933 Smith, S.B., Gurrieri, S. and Bustamante, C.: Fluorescence microscopy and computer simulations of DNA molecules in conventional and pulsed-field gel electrophoresis. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 55-79; *C.A.*, 116 (1992) 17950w.
- 1934 Solov'yan, V.T., Andreev, I.O. and Kunakh, V.A.: (The fractionation of eukaryotic DNA by pulsed field gel electrophoresis. II. The discrete DNA fragments and the levels of chromatin structural organization). *Mol. Biol. (Moscow)*, 25 (1991) 1483-1491; *C.A.*, 116 (1992) 78728b.
- 1935 Song, L. and Maestre, M.F.: Observation of DNA molecules undergoing capillary electrophoresis. *J. Biomol. Struct. Dyn.*, 9 (1991) 525-536; *C.A.*, 116 (1992) 54931m.
- 1936 Taylor, G.R., Haward, S., Noble, J.S. and Murday, V.: Isolation and sequencing of CAGT repeat microsatellites from chromosomal libraries without subcloning. *Anal. Biochem.*, 200 (1992) 125-129.
- 1937 Tomioka, Y., Hirose, A., Moritani, H., Hishinuma, T., Hashimoto, T. and Mizugaki, M.: cDNA cloning of mitochondrial Δ^3, Δ^2 -enoyl-CoA isomerase of rat liver. *Biochim. Biophys. Acta*, 1130 (1992) 109-112.
- 1938 Turmel, C., Brassard, E., Forsyth, R., Hood, K., Slater, G.W. and Noolandi, J.: High-resolution zero integrated field electrophoresis of DNA. *Curr. Commun. Cell Mol. Biol.*, 1 (Electrophor. Large DNA Mol.) (1990) 101-131; *C.A.*, 116 (1992) 17951x.
- 1939 Ulfelder, K.J., Schwartz, H.E., Hall, J.M. and Sunzeri, F.J.: Restriction fragment length polymorphism analysis of ERBB2 oncogene by capillary electrophoresis. *Anal. Biochem.*, 200 (1992) 260-267.
- 1940 Whitaker, S.J. and McMillan, T.J.: Oxygen effect for DNA double-strand break induction determined by pulsed-field gel electrophoresis. *Int. J. Radiat. Biol.*, 61 (1992) 29-41; *C.A.*, 116 (1992) 79467c.
- 1941 Wilson, M.R. and Coussens, P.M.: Purification and characterization of infectious Marek's disease virus genomes using pulsed field electrophoresis. *Virology*, 185 (1991) 673-680; *C.A.*, 116 (1992) 35447s.
- 1942 Yamamoto, K. and Kawanishi, S.: Enhancement and alteration of bleomycin-catalyzed site-specific DNA cleavage by distamycin A and some minor groove binders. *Biochem. Biophys. Res. Commun.*, 183 (1992) 292-299.
- 1943 Yoskikawa, K., Tsuzuki, H., Fujiwara, T., Nakamura, E., Iwamoto, H., Matsumoto, K., Shin, M., Yoshida, N. and Teraoka, H.: Purification, characterization and gene cloning of a novel glutamic acid-specific endopeptidase from *Staphylococcus aureus* ATCC 12600. *Biochim. Biophys. Acta*, 1121 (1992) 221-228.
- See also 1420, 1444, 1447, 1458, 1471, 1472, 1532, 1718, 1766, 1875, 1888, 1945, 1976, 1994.
- 21d. *Structural studies on RNA and RNA mapping*
- 1944 Chow, C.S., Hartmann, K.M., Rawlings, S.L., Huber, P.W. and Barton, J.K.: Delineation of structural domains in eukaryotic 5S rRNA with a rhodium probe. *Biochemistry*, 31 (1992) 3534-3542.
- 1945 Herring, W.J., McKean, M., Dracopoli, N. and Danner, D.J.: Branched chain acyltransferase absence due to an Alu-based genomic deletion allele and an exon skipping allele in a compound heterozygote proband expressing maple syrup urine disease. *Biochim. Biophys. Acta*, 1138 (1992) 236-242.
- 1946 Inoue, A., Yanagisawa, M. and Masaki, T.: Differential tissue expression of multiple genes for chicken smooth muscle/non-muscle regulatory light chains. *Biochim. Biophys. Acta*, 1130 (1992) 197-202.
- 1947 Ishizuka, T., Iizasa, T., Taira, M., Ishijima, S., Sonoda, T., Shimada, H., Nagatake, N. and Tatibana, M.: Promoter regions of the human X-linked housekeeping genes PRPS1 and PRPS2 encoding phosphoribosylpyrophosphate synthetase subunit I and II isoforms. *Biochim. Biophys. Acta*, 1130 (1992) 139-148.
- 1948 Itoh, S., Yanagimoto, T., Tagawa, S., Hashimoto, H., Kitamura, R., Nakajima, Y., Okochi, T., Fujimoto, S., Uchino, J. and Kamataki, T.: Genomic organization of human fetal specific P-450III_{A7} (cytochrome P-450HFLa)-related gene(s) and interaction of transcriptional regulatory factor with its DNA element in the 5' flanking region. *Biochim. Biophys. Acta*, 1130 (1992) 133-138.
- 1949 Kawakami, H., Moriyoshi, K., Utsumi, T. and Nakanishi, S.: Structural organization and expression of the gene for bovine myosin I heavy chain. *J. Biochem. (Tokyo)*, 111 (1992) 302-309.
- 1950 Mackie, G.A.: Secondary structure of the mRNA for ribosomal protein S20. Implications for cleavage by ribonuclease E. *J. Biol. Chem.*, 267 (1992) 1054-1061.
- 1951 Phillips, S.C. and Birnstiel, M.L.: Analysis of a gene cluster coding for the *Xenopus laevis* U7 snRNA. *Biochim. Biophys. Acta*, 1131 (1992) 95-98.
- 1952 Robbins, S.M., Williams, J.G., Spiegelman, G.B. and Weeks, G.: Cloning and characterization of the *Dictyostelium discoideum* rasG genomic sequences. *Biochim. Biophys. Acta*, 1130 (1992) 85-89.
- 1953 Schmidt, S., Niemann, A., Krynetskaya, N.F., Oretskaya, T.S., Metelev, V.G., Suchomlinov, V.V., Shabarova, Z.A. and Cech, D.: The use of oligonucleotide probes containing 2'-deoxy-2'-fluoro-nucleosides for regiospecific cleavage of RNA by RNase H from *Escherichia coli*. *Biochim. Biophys. Acta*, 1130 (1992) 41-46.

See also 1469, 1966.

21e. *Structural studies on DNA and DNA mapping*

- 1954 Bierwerth, S., Kahl, G., Weigand, F. and Weising, K.: Oligonucleotide fingerprinting of plant and fungal genomes: a comparison of radioactive, colorigenic and chemiluminescent detection methods. *Electrophoresis (Weinheim)*, 13 (1992) 115-122.
- 1955 Chu, T.-J., Caldwell, K.D., Weiss, R.B., Gesteland, R.F. and Pitt, W.G.: Low fluorescence background electroblotting membrane for DNA sequencing. *Electrophoresis (Weinheim)*, 13 (1992) 105-114.
- 1956 Comess, K.M., Burstyn, J.N., Essigmann, J.M. and Lippard, S.J.: Replication inhibition and translesion synthesis on templates containing site-specifically placed cis-diamminedichloroplatinum(II) DNA adducts. *Biochemistry*, 31 (1992) 3975-3990.
- 1957 Gotoda, T., Yamada, N., Murase, T., Miyake, S., Murakami, R., Kawamura, M., Kozaki, K., Mori, N., Shimano, H., Shimada, M. and Yazaki, Y.: A newly identified null allelic mutation in the human lipoprotein lipase (LPL) gene of a compound heterozygote with familial LPL deficiency. *Biochim. Biophys. Acta*, 1138 (1992) 353-356.
- 1958 Kainz, P., Schmiedlechner, A. and Strack, H.B.: *In vitro* amplification of DNA fragments 10 kb. *Anal. Biochem.*, 202 (1992) 46-49.
- 1959 Mac Crehan, W.A., Rasmussen, H.T. and Northrop, D.M.: Size-selective capillary electrophoresis (SSCE) separation of DNA fragments. *J. Liq. Chromatogr.*, 15 (1992) 1063-1080.
- 1960 Male, R., Nerland, A.H., Lorens, J.B., Telle, W., Lossius, I. and Totland, G.K.: The complete nucleotide sequence of the Atlantic salmon growth hormone I gene. *Biochim. Biophys. Acta*, 1130 (1992) 345-348.
- 1961 Matyasek, R.: The 5'-terminal phosphates slow migration of single-stranded DNA fragments during electrophoresis in non-denaturing acrylamide gels. *Anal. Biochem.*, 202 (1992) 204-209.
- 1962 McInnes, B., Brown, C.A. and Mahuran, D.J.: Two small deletion mutations of the HEXB gene are present in DNA from a patient with infantile Sandhoff disease. *Biochim. Biophys. Acta*, 1138 (1992) 315-317.
- 1963 Meyer, C.G., Tannich, E., Harders, J., Henco, K. and Horstmann, R.D.: Direct sequencing of variable HLA gene segments after *in vitro* amplification and allele separation by temperature-gradient gel electrophoresis. *J. Immunol. Methods*, 142 (1991) 251-256; *C.A.*, 116 (1992) 77338n.
- 1964 Miranda, A.G., Singh, K.V. and Murray, B.E.: DNA fingerprinting of *Euterooccus faecium* by pulsed-field gel electrophoresis may be a useful epidemiologic tool. *J. Clin. Microbiol.*, 29 (1991) 2752-2757; *C.A.*, 116 (1992) 18151y.
- 1965 Otter, C.A., Edqvist, J. and Straby, K.B.: Characterization of transcription and processing from plasmids that use polIII and a yeast tRNA gene as promoter to transcribe promoterdeficient downstream DNA. *Biochim. Biophys. Acta*, 1131 (1992) 62-68.
- 1966 Poustka, A.: Physical mapping by PFGE. *Methods (San Diego)*, 1 (1990) 204-211; *C.A.*, 116 (1992) 100176u - a review with 37 refs.
- 1967 Rusanganwa, E., Singh, B. and Gupta, R.S.: Cloning of HSP60 (GroEL) operon from *Clostridium perfringens* using a polymerase chain reaction based approach. *Biochim. Biophys. Acta*, 1130 (1992) 90-94.
- 1968 Shen, Y.: (An efficient method to recover DNA small fragments). *Bingduxue Zazhi*, 6 (1991) 181-182; *C.A.*, 116 (1992) 3155d.
- 1969 Taira, T., Negishi, Y., Kihara, F., Iguchi-Arigo, S.M.M. and Ariga, H.: c-myc Protein complex binds to two sites in human hsp70 promoter region. *Biochim. Biophys. Acta*, 1130 (1992) 166-174.
- 1970 Thoma, F.: Nucleosome positioning. *Biochim. Biophys. Acta*, 1130 (1992) 1-19 - a review with 143 refs.
- 1971 Tietz, D. and Chrambach, A.: Concave Ferguson plots of DNA fragments and convex Ferguson plots of bacteriophages: evaluation of molecular and fiber properties, using desktop computers. *Electrophoresis (Weinheim)*, 13 (1992) 286-294.
- 1972 Tornaletti, S., Andersen, A.H., Christiansen, K. and Pedrini, A.M.: 8-Methoxycaffeine inhibition of *Drosophila* DNA topoisomerase II. *Biochim. Biophys. Acta*, 1131 (1992) 30-34.
- 1973 Wu, T.-H., Grelland, E., Boye, E. and Marinus, M.G.: Identification of a weak promoter for the dam gene of *Escherichia coli*. *Biochim. Biophys. Acta*, 1131 (1992) 47-52.
- 1974 Zhou, P. and Wei, K.: (Measurement of DNA double strand breaks in mammalian cells after ionizing radiation by pulsed field gel electrophoresis). *Shengwu Huaxue Zazhi*, 7 (1991) 513-517; *C.A.*, 116 (1992) 123992w.

See also 1469, 1924, 1940, 1948, 2003.

21f. *Complex mixtures of nucleic acids and their fragments*

- 1975 Dooley, S., Welter, C. and Blin, N.: DNA-Protein interaction analysis using polyacrylamide gel electrophoresis and a simple and sensitive UV crosslinking procedure. *Electrophoresis (Weinheim)*, 13 (1992) 333-334.
- 1976 Kanamaru, K. and Mizuno, T.: Signal transduction and osmoregulation in *Escherichia coli*: a novel mutant of the positive regulator, OmpR, that functions in a phosphorylation-independent manner. *J. Biochem. (Tokyo)*, 111 (1992) 425-430.
- 1977 Ni, F., Xu, Y. and Hong, G.: The formation of specific protein-DNA complexes in the solid electrophoresis matrix. *Chin. Sci. Bull.*, 36 (1991) 1126-1129; *C.A.*, 116 (1992) 37330x.

22. ALKALOIDS

- 1978 Lee, K.-J., Heo, G.S., Kim, N.J. and Moon, D.-C.: Separation of theophylline and its analogues by micellar electrokinetic chromatography: application to the determination of theophylline in human plasma. *J. Chromatogr.*, 577 (1992) 135-141.
- 1979 Liu, Y.-M. and Sheu, S.-J.: Determination of ephedrine alkaloids by capillary electrophoresis. *J. Chromatogr.*, 600 (1992) 370-372.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23e. *Other N-heterocyclic compounds*

- 1980 Pleasance, S., Ayer, S.W., Laycock, M.V. and Thibault, P.: Ion-spray mass spectrometry of marine toxins. III. Analysis of paralytic shellfish poisoning toxins by flow-injection analysis, liquid chromatography/mass spectrometry, and capillary electrophoresis/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 6 (1992) 14-24; *C.A.*, 116 (1992) 77932b.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 1981 Morin, P., Villard, F., Quinsac, A. and Dreux, M.: Miscellar electrokinetic capillary chromatography of glucosinolates and desulfo-glucosinolates with a cationic surfactant. *J. High Resolut. Chromatogr.*, 15 (1992) 271-275.
- 1982 Vrskova, M. and Zelenska, V.: (Isotachophoretic determination of sulphur oxo compounds in sulphite pulping and waste liquors). *Vys. Pr. Odboru Pap. Celul.*, 35 (1990) V32-V34; *C.A.*, 116 (1992) 43302f.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

See 1563, 1568, 1595.

27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)

See 1747.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. Herbicides

- 1983 Cai, J. and el Rassi, Z.: On-line preconcentration of triazine herbicides with tandem octadecyl capillaries-capillary zone electrophoresis. *J. Liq. Chromatogr.*, 15 (1992) 1179-1192.
- 1984 Cai, J. and el Rassi, Z.: Capillary zone electrophoresis of two cationic herbicides, paraquat and diquat. *J. Liq. Chromatogr.*, 15 (1992) 1193-1200.

30. SYNTHETIC AND NATURAL DYES

30b. Chloroplast and other natural pigments

- 1985 Trubetskoi, O.A., Kudryavtseva, L.Yu. and Shirshova, L.T.: Characterization of soil humic matter by polyacrylamide gel electrophoresis in the presence of denaturing agents. *Soil Biol. Biochem.*, 23 (1991) 1179-1181; *C.A.*, 116 (1992) 82680x.

31. PLASTICS AND THEIR INTERMEDIATES

- 1986 Chiari, M., Micheletti, C., Righetti, P.G. and Poli, G.: Polyacrylamide gel polymerization under non-oxidizing conditions, as monitored by capillary zone electrophoresis. *J. Chromatogr.*, 598 (1992) 287-297.
- 1987 Gelfi, C., de Besi, P., Alloni, A., Righetti, P.G., Lyubimova, T. and Briskman, V.A.: Kinetics of acrylamide photopolymerization as investigated by capillary zone electrophoresis. *J. Chromatogr.*, 598 (1992) 277-285.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 1988 Mc Laughlin, G.M., Nolan, J.A., Lindahl, J.L., Palmieri, R.H., Anderson, K.W., Morris, S.C., Morrison, J.A. and Bronzert, T.J.: Pharmaceutical drug separations by HPCE: practical guidelines. *J. Liq. Chromatogr.*, 15 (1992) 961-1021.
- 1989 Pluym, A., van Ael, W. and de Smet, M.: Capillary electrophoresis in chemical/pharmaceutical quality control. *TrAC*, 11 (1992) 27-32 - a review with 8 refs.

32d. Central nervous system drugs

- 1990 Polasek, M., Gas, B., Hirokawa, T. and Vacik, J.: Determination of limiting ionic mobilities and dissociation constants of some local anaesthetics. *J. Chromatogr.*, 596 (1992) 265-270.

See also 1485.

32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 1991 Ackermans, M.T., Beckers, J.L., Everaerts, F.M., Hoogland, H. and Tomassen, M.J.H.: Determination of sulphonamides in pork meat extracts by capillary zone electrophoresis. *J. Chromatogr.*, 596 (1992) 101-109.
- 1992 D'Emanuele, A. and Staniforth, J.N.: An electrically modulated drug delivery device. II. Effect of ionic strength, drug concentration, and temperature. *Pharm. Res.*, 9 (1992) 215-219; *C.A.*, 116 (1992) 113472n.
- 1993 Ng, C.L., Lee, H.K. and Li, S.F.Y.: Systematic optimization of capillary electrophoretic separation of sulphonamides. *J. Chromatogr.*, 598 (1992) 133-138.

32h. Toxicological and forensic applications

- 1994 Verga, V. and Erickson, R.P.: Pulsed-field gel electrophoresis and its application to human and mouse sex determination. In: Adolph, K.W. (Editor), *Adv. Tech. Chromosome Res.*, Dekker, New York, 1991, pp. 155-180; *C.A.*, 116 (1992) 121911v.

See also 1487, 1675.

32i. Plant extracts

- 1995 Pietta, P., Gardana, C. and Mauri, P.: Application of HPLC and MECC for the detection of flavonol aglycones in plant extracts. *J. High Resolut. Chromatogr.*, 15 (1992) 136-139.

33. CLINICO-CHEMICAL APPLICATIONS

33b. Complex mixtures and profiling (single compounds by cross-reference only)

- See 1510, 1524, 1527, 1530, 1533, 1535, 1536, 1538, 1543, 1546, 1551, 1556, 1559, 1678, 1681, 1682, 1693, 1769, 1790, 1804, 1810, 1814, 1818, 1819, 1849, 1852.

34. FOOD ANALYSIS

34b. Complex mixtures (single compounds by cross-reference only)

- 1996 Zerifi, A., Labie, C. and Benard, G.: SDS-PAGE Technique for the species identification of cooked meat. *Fleischwirtschaft*, 71 (1991) 1060-1062, 1107-1110; C.A., 116 (1992) 57656m.

See also 1660, 1719, 1720, 1897, 1991.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

36c. Complex mixtures, technical products and unidentified compounds

- 1997 Benjamin, C.: Electrophoretic mobility of fluorophore labeled particles in gels by fluorophore movement after photobleaching. *PCT Int. Appl. WO 92 00,796* (Cl. B01D61/42), 23 Jan. 1992, US Appl. 550,713, 09 Jul. 1990; 62 p.; C.A., 116 (1992) 124365f.
- 1998 Bowen, W.R. and Sabuni, H.A.M.: Pulsed electrochemical cleaning of inorganic microfiltration membranes. *Chem. Eng. Commun.*, 110 (1991) 199-216; C.A., 116 (1992) 109038h.
- 1999 Rowell, R.L., Shiau, S.J. and Marlow, B.J.: Electrophoretic fingerprinting for surface characterization of colloidal particles. *ACS Symp. Ser.*, 472 (1991) 326-336; C.A., 115 (1991) 287710h a review with 18 refs.
- 2000 Wang, J.F., Riman, R.E. and Shanefield, D.J.: Reliable electrokinetic characterization procedures for ceramic powders. *Mater. Res. Soc. Symp. Proc.*, 180 (1990) 293-297; C.A., 115 (1991) 285488t.
- 2001 Wortmann, G. and Wortmann, F.J.: Wool contaminations in cashmere. *Dtsch. Wollforschungsinst (Tech. Hochsch. Aachen)*, 106 (1990) 138-146; C.A., 116 (1992) 108159m.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

- 2002 Churaev, N.V. and Nikologorskaya, E.A.: Brownian and electrophoretic mobility of silica particles coated with adsorbed layers of polyethylenoxides. *Colloids Surf.*, 59 (1991) 71-82; C.A., 116 (1992) 68176f.

- 2003 Hebenbrock, K., Maschke, H.E., Schuegerl, K. and Friehs, K.: (Plasmid analysis by capillary electrophoresis). *BioTec (Wuerzburg)*, 3 (1991) 35-37; C.A., 116 (1992) 5213v.

- 2004 Krajacic, M. and Stefanac, Z.: Standardizing the conditions for performance of immunoelectrophoretic experiments with tobacco streak virus particles. *Acta Bot. Croat.*, 49 (1990) 1-5; C.A., 116 (1992) 102090k.

- 2005 Masuda, K., Takahashi, S., Nomura, K. and Inoue, M.: A simple procedure for the isolation of pure nuclei from carrot embryos in synchronized cultures. *Plant Cell Rep.*, 10 (1991) 329-333; C.A., 116 (1992) 102167r.

- 2006 Shimizu, M., Sekine, K., Matsuzawa, A. and Iwaguchi, T.: Cell electrophoretic characterization of abnormally expanded lymphocytes in autoimmune lpr^g, lpr, gld and Yaa mice, and of thymocyte subsets. *Electrophoresis (Weinheim)*, 13 (1992) 136-142.

See also 1999.

38. INORGANIC COMPOUNDS

38a. Cations

- 2007 Beck, W. and Engelhardt, H.: Capillary electrophoresis of organic and inorganic cations with indirect UV detection. *Chromatographia*, 33 (1992) 313-316.

- 2008 Ghouri, M.S., Chohan, Z.H. and Sammee, A.: Separation of inorganic ions by paper electrophoresis. *J. Indian Chem. Soc.*, 68 (1991) 372-374; C.A., 116 (1992) 75072x.

- 2009 Wang, W., Zhang, S. and Gao, L.: (Determination of chromium(III) and chromium(VI) in plating effluent simultaneously by paper electrophoresis-photo-density scanning process). *Diandu Yu Huanbo*, 11 (1991) 28-29; C.A., 115 (1991) 286776x.

38b. Anions

See 1607.

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