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## Bibliography Section

# JOURNAL OF CHROMATOGRAPHY A

## INCLUDING ELECTROPHORESIS AND OTHER SEPARATION METHODS



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# JOURNAL OF CHROMATOGRAPHY A

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Editorial

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

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# Bibliography Section

## Liquid Column Chromatography

### 1. REVIEWS AND BOOKS

1 Dorsey, J.G. and Cooper, W.T.: Retention mechanisms of bonded phase liquid chromatography. *Anal. Chem.*, 66 (1994) 857A-867A - a review with 52 refs.

2 Krull, I.S., Deyl, Z. and Lingeman, H.: General strategies and selection of derivatization reactions for liquid chromatography and capillary electrophoresis. *J. Chromatogr. B*, 659 (1994) 1-17 - a review with 175 refs.

3 Larionov, O.G. (Editor): *Proceedings of the 2nd International Symposium on Surface Chemistry, Adsorption and Chromatography, Moscow, 29 June-3 July 1992*, IUPAC Commision, Blackwell, Oxford, 1993, 146 p.; *C.A.*, 121 (1994) 43806b.

4 Laubsher, J.C.: (Optimization of chromatography). *Schweiz. Lab.-Z*, 51 (1994) 200-203; *C.A.*, 121 (1994) 124318w - a review without refs.

5 Michulitz, M.: (Ion chromatography). *Ber. Forschungszent. Juelich*, JUEL-2867 (1994) 35-44; *C.A.*, 121 (1994) 124062h - a review with 1 ref.

6 Revillon, A.: Alternatives to size exclusion chromatography. *J. Liq. Chromatogr.*, 17 (1994) 2991-3023 - a review with 71 refs.

7 Simpson, J.M.: Conventional chromatography. *Bioprocess Technol.*, 18(Protein Purification Process Engineering) (1994) 209-258; *C.A.*, 121 (1994) 174119c - a review with 98 refs.

8 Viovy, J.L. and Lesec, J.: Separation of macromolecules in gels: permeation chromatography and electrophoresis. *Adv. Polym. Sci.*, 114(Polymer Analysis and Characterization) (1994) 1-41; *C.A.*, 121 (1994) 199812m - a review with 186 refs.

9 Yu, H. and Yang, S.: (Review of astragaloside analytical methods). *Huaxi Yaoxue Zazhi*, 8 (1993) 163-166; *C.A.*, 121 (1994) 164076x.

10 Zhang, Z., Yang, M.J. and Pawliszyn, J.: Solid-phase microextraction. *Anal. Chem.*, 66 (1994) 844A-853A - a review with 28 refs.

See also 11, 42, 60, 65, 75, 93, 97, 102, 135, 137, 144, 145, 146, 157, 159, 194, 203, 228, 229, 242, 323, 348, 361, 426, 429, 442, 472, 687, 881, 907, 912, 981, 1051, 1206, 1222, 1224, 1241, 1242, 1248, 1254, 1275.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### *2a. General*

11 Adner, N. and Sofer, G.: Biotechnology product validation, part 3: chromatography cleaning validation. *BioPharm (Eugene)*, 7 (1994) 44-48; *C.A.*, 121 (1994) 77507v - a review with 13 refs.

12 Ammons, R.L.M.: Mathematical control theory for liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9316829, 1992, 202 p.; *C.A.*, 121 (1994) 43638y.

13 Bazylak, G. and Maslowska, J.: (The importance of association processes for physicochemical description of selectivity of chromatographic systems). *Zesz. Nauk.-Politech. Lodz., Technol. Chem. Spozyw.*, 648 (1993) 53-83; *C.A.*, 121 (1994) 164504k.

14 Busch, K.L.: Cost analysis of determinations with planar chromatography and column chromatography. *J. Planar Chromatogr.*, 7 (1994) 318-321.

15 Bussemas, H.H. and Ettre, L.S.: Gottfried Kränzlin, the first follower of Tswett. *Chromatographia*, 39 (1994) 369-374.

16 Chen, S.-H.: Fundamental studies of chromatographic systems using fluorescence spectroscopy. Avail. *Univ. Microfilms Int.*, Order No. DA9406471, 1993, 285 p.; *C.A.*, 121 (1994) 49379m.

17 Chuang, C.-Z., Ragan, F.A., Jr. and Prasad, C.: Use of triethylamine as an ion-pairing reagent. *J. Liq. Chromatogr.*, 17 (1994) 2383-2394.

18 Dolan, J.W.: Obtaining separations, Part IV: putting it all together. *LC-GC Int.*, 7, No. 10 (1994) 550-552.

19 Farkas, T., Chambers, J.Q. and Guiochon, G.: Column efficiency and radial homogeneity in liquid chromatography. *J. Chromatogr. A*, 679 (1994) 231-245.

20 Gjerde, D.T.: Preventing contamination of a chromatography column and apparatus for liquid chromatography. *PCT Int.* Appl. WO 94 08,685 (Cl. B01D15/08), 28 Apr. 1994, US Appl. 962, 097, 16 Oct. 1992; 31 p.; *C.A.*, 121 (1994) 112538e.

21 He, Y.: Magnetic resonance studies of factors controlling chromatographic retention and selectivity behavior in micellar liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9321885, 1993, 135 p.; *C.A.*, 121 (1994) 43386q.

22 Kaufmann, P., Kowalski, B.R. and Alander, J.: Multivariate optimization strategy for liquid chromatography. I. Targeting the search area in the multidimensional solvent space. *Chemom. Intell. Lab. Syst.*, 23 (1994) 331-339; *C.A.*, 121 (1994) 72746n.

23 Park, J.H., Dallas, A.J., Chau, P. and Carr, P.W.: Limitation of the ET(30) solvent strength scale in reversed-phase liquid chromatography. *J. Chromatogr. A,* 677 (1994) 1-9.
24 Seaver, C. and Sadek, P.: Solvent selection, Part I. UV absorption characteristics. *LC-GC Int.,* 7, No. 11 (1994) 631-636.
25 Woodbury, C.P., Jr.: A stochastic model of chromatography. *J. Chromatogr. Sci.,* 32 (1994) 339-348.

See also 3, 4, 90, 188, 1039.

*2b. Thermodynamics and theoretical relationships*

26 Boehm, R.E. and Martire, D.E.: Theory of homopolymer retention in the weak adsorption limit. *J. Liq. Chromatogr.,* 17 (1994) 3145-3177.
27 Bowlin, D.W., Hott, C. and Davis, J.M.: Influence of integrator parameters on estimates calculated with the statistical model of overlap. *J. Chromatogr. A,* 677 (1994) 307-318.
28 Debets, A.J.J., von Wier, P., Hupe, K.-P., Brinkman, U.A.T. and Kok, W.T.: Theoretical models for electrodialytic sample treatment in trace analysis by liquid chromatography. *Chromatographia,* 39 (1994) 460-468.
29 Fornstedt, T. and Guiochon, G.: Comparison between experimental and theoretical profiles of high concentration elution bands and large system peaks in nonlinear chromatography. *Anal. Chem.,* 66 (1994) 2686-2693.
30 Gadam, D. and Cramer, S.M.: Salt effects in anion exchange displacement chromatography: comparison of pentosan polysulfate and dextran sulfate displacers. *Chromatographia,* 39 (1994) 409-418.
31 Guillaume, Y. and Guinchard, C.: A new method of studying temperature dependence and the effect of mobile phase composition on the retention mechanism in reversed phase liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2809-2820.
32 Havelec, P. and Sevcik, J.G.K.: Concept of additivity for a nonpolar solute-solvent criterion log $L^{16}$. Non-aromatic compounds. *J. Chromatogr. A,* 677 (1994) 319-329.
33 Heinisch, S., Riviere, P. and Rocca, J.L.: Computerized optimization of gradient elution conditions with ternary solvent mobile phases in RPLC. *Chromatographia,* 39 (1994) 216-223.
34 Kuntz, M.A., Dubin, P.L., Kaplan, J.I. and Mehta, M.S.: Evaluation of models for size exclusion chromatography of asymmetric solutes. *J. Phys. Chem.,* 98 (1994) 7063-7067; *C.A.,* 121 (1994) 77548j.
35 Miyabe, K. and Suzuki, M.: Mass-transfer phenomena on the surface of adsorbents in reversed-phase chromatography. *Ind. Eng. Chem. Res.,* 33 (1994) 1792-1802; *C.A.,* 121 (1994) 43713u.
36 Schnittny, J.C.: Affinity retardation chromatography: characterization of the method and its application. The description of low-affinity laminin self-interactions. *Anal. Biochem.,* 222 (1994) 140-148.
37 Thede, R., Haberland, D., Deng, Z. and Langer, S.H.: Second-order kinetics in the liquid chromatographic reactor. *J. Chromatogr. A,* 683 (1994) 279-291.
38 Torres-Lapasió, J.R., Villanueva-Camañas, R.M., Sanchis-Mallols, J.M., Medina-Hernández, M.J. and García-Alvarez-Coque, M.C.: Interpretitave strategy for optimization of surfactant and alcohol concentration in micellar liquid chromatography. *J. Chromatogr. A,* 677 (1994) 239-253.

For additional information see *C.A.*:
121 (1994) 30449n, 103305z.

See also 21, 25, 113, 117, 127, 131, 181, 182, 1002, 1015, 1042, 1249, 1278, 1286.

*2c. Relationship between structure and chromatographic behaviour*

39 Henczi, M., Nagy, J. and Weaver, D.F.: Determination of octanol-water partition coefficients for a series of imidazolidinediones by a novel combination of micro shake-flask and HPLC techniques. *J. Liq. Chromatogr.,* 17 (1994) 2605-2613.
40 Itoh, H., Kinoshita, T. and Nimura, N.: (Binary-layered phase liquid chromatography: retention behavior of small molecules on diol phase). *Kuromatogurafi,* 14 (1993) 14-15; *C.A.,* 121 (1994) 49396q.
41 Kim, H.S., Kim, T.K. and Lee, D.W.: Prediction of high-performance liquid chromatographic retention data of carboxamides and oxadiazoles. *J. Liq. Chromatogr.,* 17 (1994) 2615-2623.
42 Peng, C.T.: Retrieval of structure information from retention index. *J. Chromatogr. A,* 678 (1994) 189-200 - a review with 50 refs.
43 Vervoort, R.J.M., Derksen, M.W.J. and Maris, F.A.: Selection of stationary phases for the liquid chromatographic analysis of basic compounds using chemometric methods. *J. Chromatogr. A,* 678 (1994) 1-15.

See also 392, 977.

*2d. Measurement of physico-chemical and related values*

44 Crow, J.A.: Using calibration data as a diagnostic tool in gel permeation chromatography. *LC-GC,* 11 (1993) 668-671; *C.A.,* 121 (1994) 135167x.
45 Giddings, J.C.: Universal calibration in size exclusion chromatography and thermal field-flow fractionation. *Anal. Chem.,* 66 (1994) 2783-2787.

For additional information see *C.A.*:
121 (1994) 135165v.

See also 39, 212, 282, 1013, 1019, 1027, 1032, 1038, 1040, 1247.

3. GENERAL TECHNIQUES

*3a. Apparatus and accessories*

46 Beinert, W.-D.: Function control of HPLC instruments according to quality standards. *LC-GC Int.,* 7, No. 10 (1994) 568-576.
47 Buttler, T., Jarskog, H., Gorton, L., Marko-Varga, G. and Ramnemark, L.: The use of microdialysis for sampling in column liquid chromatography. *Int. Lab.,* 24, No. 9 (1994) P12-P18.
48 Dadoo, R., Colon, L.A., Fishman, H.A., Shear, J.B. and Zare, R.N.: Sample separation method and apparatus. *U.S.* US 5,310,463 (Cl. 204-180.1; G01N27/26) 10 May 1994, Appl. 975,850, 13 Nov. 1992; 10 p.; *C.A.,* 121 (1994) 49340s.

49 Gabeler, S.C. and Carson, W.W.: Fluid metering, mixing and composition control system. *Eur. Pat.* Appl. EP 583,003 (Cl. G01N30/34), 16 Feb. 1994, US Appl. 929,051, 13 Aug. 1992; 21 p.; *C.A.*, 121 (1994) 124265b.

50 Gatten, R.A., Miller, L.A., McCall, T.J., Jr. and Nau, V.J.: Method and apparatus for degassing a liquid. *U.S.* US 5,290,340 (Cl. 95-46; B01D19/00), 01 Mar. 1994, US Appl. 622,999, 04 Dec. 1990; 18 p.; *C.A.*, 121 (1994) 194630r.

51 Harvey, M.C., Robinson, R.E., Harvey, M.C. and Stearns, S.D.: Further studies on high-speed switching of chromatographic valves. *J. Chromatogr. Sci.*, 32 (1994) 190-194.

52 Johnson, D.M. and Stoenhoek, L.E.: Field portable liquid chromatographic system. *Eur. Pat.* Appl. EP 600,213 (Cl. G01N30/02), 08 Jun. 1994, US Appl. 969,324, 30 Oct. 1992; 28 p.; *C.A.*, 121 (1994) 169336s.

53 Meacham, R.I., Buffham, B.A., Mason, G. and Drott, D.W.: An isothermal-enclosure air-bath thermostat for experimental apparatus. *Chem. Eng. Res. Des.*, 72 (1994) 263-271; *C.A.*, 121 (1994) 38138f.

54 Purser, K.H.: A future AMS/chromatography instrument for biochemical and environmental measurements. *Nucl. Instrum. Methods Phys. Res., Sect. B,* 92 (1994) 201-206; *C.A.*, 121 (1994) 169113s.

55 Rusek, M., Cigankova, M., Krejci, M. and Kahle, V.: New μLC/GC interface. *J. Microcolumn Sep.*, 6 (1994) 245-248; *C.A.*, 121 (1994) 169280u.

For additional information see *C.A.*: 121 (1994) 169135a.

See also 88, 105, 379, 456.

*3b. Detectors and detection reagents*

56 Balagangadharan, V.P., Kannan, K.G. and Ninan, K.N.: Online light scattering-gel permeation chromatographic analysis of propellant binders. In: Bhardwaj, I.S. (Editor), *Polym. Sci.*, 2, Allied Publ., New Delhi, 1994, pp. 725-730; *C.A.*, 121 (1994) 60753z.

57 Bohs, C.E., Linhares, M.C. and Kissinger, P.T.: The UniJet: a new electrochemical detector for microbore liquid chromatography. *Curr. Sep.*, 12 (1994) 181-186; *C.A.*, 121 (1994) 49167r.

58 Chen, L. and Krull, I.S.: Electrochemical detection as an alternative to UV in RP-HPLC peptide mapping. *Electroanalysis (N.Y.),* 6 (1994) 1-8; *C.A.*, 121 (1994) 129121m.

59 Conte, E.D.: An aerosol alkali flame ionization detector for gas chromatography and high-performance liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9326186, 1993, 146 p.; *C.A.*, 121 (1994) 49369h.

60 Gergely, A.: The use of circular dichroism as a liquid chromatographic detector. *Tech. Instrum. Anal. Chem.*, 14 (1994) 279-292; *C.A.*, 121 (1994) 147993b - a review with 30 refs.

61 Isildak, I. and Covington, A.K.: Ion-selective electrode potentiometric detection in ion chromatography. *Electroanalysis (N.Y.),* 5 (1993) 815-824; *C.A.*, 121 (1994) 72581e.

62 Josefson, M., Lick, S., Larsson, S. and Takenbergs-Hjelte, L.: Single sample linearity test for wavelength scanning detectors in liquid chromatography. *Chemom. Intell. Lab. Syst.*, 23 (1994) 87-95; *C.A.*, 121 (1994) 72572c.

63 Kohn, A.: The application of peak purity analysis in liquid chromatography and capillary electrophoresis. *LC-GC Int.*, 7, No. 11 (1994) 652-660.

64 Maystre, F., Bruno, A.E., Kühner, C. and Widmer, H.M.: Enhanced polarimetric detection in HPLC using a refractive index equalizer. *Anal. Chem.*, 66 (1994) 2882-2887.

65 Ohkura, Y., Kai, M. and Nohta, H.: Fluorogenic reactions for biomedical chromatography. *J. Chromatogr. B,* 659 (1994) 85-107 - a review with 183 refs.

66 Plante, L.D., Romano, P.M. and Fernandez, E.J.: Viscous fingering in chromatography visualized *via* magnetic resonance imaging. *Chem. Eng. Sci.*, 49 (1994) 2229-2241; *C.A.*, 121 (1994) 129159e.

67 Qi, X.S.: Metallophthalocyanine electrodes: chromatographic detection and electrosynthesis. Avail. *Univ. Microfilms Int.*, Order No. DA9332940, 1993, 166 p.; *C.A.*, 121 (1994) 49372d.

68 Roberts, R.E. and Johnson, D.C.: Fast-pulsed electrochemical detection at noble metal electrodes: the frequency-dependent response at gold electrodes for chromatographically separated carbohydrates. *Electroanalysis (N.Y.),* 6 (1994) 269-273; *C.A.*, 121 (1994) 124353d.

69 Roepke, W.: (Application of the light scattering detector in HPLC). *LaborPraxis,* 18 (1994) 57-59; *C.A.*, 121 (1994) 194574a.

70 Ryerson, T.B., Dunham, A.J., Barkley, R.M. and Sievers, R.E.: Sulfur-selective detector for liquid chromatography based on sulfur monoxide-ozone chemiluminiscence. *Anal. Chem.*, 66 (1994) 2841-2851.

71 Sanchis Mallols, J.M., Villanueva Camanas, R.M. and Ramis-Ramos, G.: Concentration gradient perturbations in micellar liquid chromatography with thermal lens spectrophotometric detection. *Anal. Lett.*, 27 (1994) 2011-2026.

72 Stevenson, S. and Dorn, H.C: $^{13}C$ Dynamic nuclear polarization: a detector for continuous-flow, on-line chromatography. *Anal. Chem.*, 66 (1994) 2993-2999.

73 Tabei, H., Takahashi, M., Hoshino, S., Niwa, O. and Horiuchi, T.: Subfemtomole detection of catecholamine with interdigitated array carbon microelectrodes in HPLC. *Anal. Chem.*, 66 (1994) 3500-3502.

74 Tran, C.D., Grishko, V.I. and Huang, G.: Chiral detection in high-performance liquid chromatography by vibrational circular dichroism. *Anal. Chem.*, 66 (1994) 2630-2635.

75 Wu, J., Zhang, Z. and Lu, J.: (New development in liquid chromatography-chemiluminescence detection). *Fenxi Huaxue,* 22 (1994) 396-405; *C.A.*, 121 (1994) 169265t - a review with 168 refs.

See also 131, 137, 187, 208, 228, 244, 271, 338, 348, 357, 379, 426, 432, 444, 478, 489, 557, 687, 881, 929, 981, 1028, 1032, 1051, 1202, 1277, 1290.

*3c. Sorbents and columns, packing procedures*

76 Antonucci, V.L.: Studies of the solvation of polystyrene by binary solvents for liquid chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9404265, 1993, 276 p.; *C.A.*, 121 (1994) 49364c.

77 Belroni, A., Cappiello, A., Famiglini, G. and Palma, P.: Generation of split-flow micro-gradients for capillary HPLC. *Chromatographia,* 39 (1994) 279-284.

78 Brown, V.A., Barrett, D.A., Shaw, P.N., Davies, M.C., Ritchie, H.J., Ross, P., Paul, A.J. and Watts, J.F.: Characterization of a range of alkyl-bonded silica HPLC stationary phases: XPS and ToF-SIMS studies. *Surf. Interface Anal.,* 21 (1994) 263-273; *C.A.,* 121 (1994) 194579f.

79 Buszewski, B., Kasturi, P., Gilpin, R.K., Gandoda, M.E. and Jaroniec, M.: Chromatographic and related studies of alkylamide phases. *Chromatographia,* 39 (1994) 155-161.

80 Ciolino, L.A. and Dorsey, J.G.: Phosphorimetry and its potential for the study of surface heterogeneity of chromatographic silica-based stationary phases. *J. Chromatogr. A,* 678 (1994) 201-212.

81 Falkenhagen, J. and Dietrich, P.G.: New aspects concerning the stability of silica-based HPLC separation phases. *Int. Lab.,* 24, No. 10 (1994) P11-P16.

82 Francotte, E., Grolimund, K. and Juvancz, Z.: Benzoylcellulose derivatives as chiral stationary phases for open tubular column chromatography. *Chirality,* 5 (1993) 232-237; *C.A.,* 121 (1994) 72734g.

83 Gross-Bley, M., Boemer, B., Grosser, R., Lange, W., Hoever, F.P. and Artl, D.: Preparation of optically active amino acid sulphoxide and sulphone monomers and their polymers for chromatographic separation of racemates. *Eur. Pat.* Appl. EP 576,949 (Cl. C07C317/50), 05 Jan. 1994, DE Appl. 4,221,711, 02 Jul. 1992; 35 p.; *C.A.,* 121 (1994) 109849b.

84 Inoue, S. and Ohtaki, N.: Metaphosphates as packing materials for biochromatography. *J. Chromatogr. A,* 679 (1994) 247-253.

85 Jinno, K. and Nakamura, H.: Retention characteristics of fluorinated bonded silica phase in reversed-phase liquid chromatography. *Chromatographia,* 39 (1994) 285-293.

86 Joseph, T., Pearson, A.J., Adam, R.C. and Swift, O.A.: Chromatography column with constant pressure differential and flow velocity. *U.S.* US 5,324,426 (Cl. 210-198.2; B01D15/08), 28 Jun. 1994, Appl. 855,095, 20 Mar. 1992; 12 p.; *C.A.,* 121 (1994) 112136x.

87 Jungbauer, A. and Lettner, H.P.: Chemical disinfection of chromatographic resins. Part 1: Preliminary studies and microbial kinetics. *BioPharm (Eugene),* 7 (1994) 46-56; *C.A.,* 121 (1994) 141635q.

88 King, B.W., Westlake, J.P., Myers, P., Zimina, T. and Smith, R.M.: An investigation of the instrumental and packing parameters affecting the routine use and application of microbore and capillary HPLC columns. *LC-GC Int.,* 7, No. 12 (1994) 702-709.

89 Kirkland, J.J.: Trends in HPLC column design for improved method development. *Int. Lab.,* 24, No. 9 (1994) P4-P11.

90 Labine, B.K., Cooper, W.T., III, He, Y., Hendayana, S., Han, J.H. and Tetreault, J.: Solid-state $^{13}C$ NMR studies of ionic surfactants adsorbed on C-18 and C-8 silicas: implications for micellar liquid chromatography. *J. Colloid Interface Sci.,* 165 (1994) 497-504; *C.A.,* 121 (1994) 66545e.

91 Lameloise, M.-L. and Viard, V.: Choice of a tracer for external porosity measurement in ion-exchange resin beds. *J. Chromatogr. A,* 679 (1994) 255-259.

92 Lavine, B.K., Hendyana, S. and Tetreault, J.: Selectivity in micellar reversed-phase liquid chromatography: C-18 and C-8 alkyl bonded phases. *Anal. Chem.,* 66 (1994) 3458-3465.

93 Li, X. and Liu, G.: (Porous zirconia and its application in chromatography as stationary phase). *Huaxue Tongbao,* (1994) 17-21; *C.A.,* 1121 (1994) 124060f - a review with 29 refs.

94 Lin, S.: Studies of the surface composition of reversed-phase liquid chromatographic packings. Avail. *Univ. Microfilms Int.,* Order NO. DA9317549, 1992, 186 p.; *C.A.,* 121 (1994) 49390h.

95 Majors, R.E.: Keeping HPLC column operating costs under control. *LC-GC Int.,* 7, No. 12 (1994) 686-690.

96 Murakami, R., Hachisako, H., Yamada, K. and Motozato, Y.: Gel permeation chromatographic properties of poly(vinyl alcohol) gel particles prepared by freezing and thawing. *J. Chromatogr. A,* 678 (1994) 180-182.

97 Pilette, J.F.: (MCLC: Membrane convective liquid chromatography). *Spectra Anal.,* 23 (1994) 43-46; *C.A.,* 121 (1994) 199821p - a review with 4 refs.

98 Pirkle, W.H. and Bowen, W.E.: Chiral stationary phase design: a study in optimization. *J. High Resolut. Chromatogr.,* 17 (1994) 629-633.

99 Riering, H. and Sieber, M.: Cyclodextrin chromatography medium for pharmacologically active substances. *Eur. Pat.* Appl. EP 608,703 (Cl. B01J20/32), 03 Aug. 1994, DE Appl. 9,300,912, 23 Jan. 1993; 9 p.; *C.A.,* 121 (1994) 160178j.

100 Sajc, L.M., Jovanovic, Z.R., Jovanovic, G.N., Vunjak-Novakovic, G., Pesic, R.D. and Vukovic, D.V.: (Fluid dynamics of a magnetically stabilized fluidized bed chromatography column). *Hem. Ind.,* 47 (1993) 62-68; *C.A.,* 121 (1994) 199947j.

101 Schmidt, L.W.: Chemically modified polymeric resins for solid-phase extraction and group separation prior to analysis by liquid or gas chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9335017, 1993, 123 p.; *C.A.,* 121 (1994) 49395p.

102 Shih, J.S.: Applications of macrocyclic polyethers in analytical sensors and ion separation. *J. Chin. Chem. Soc. (Taipei),* 41 (1994) 309-314; *C.A.,* 121 (1994) 124052e - a review with 33 refs.

103 Stalling, D.L., Guo, C., Kuo, K.C. and Saim, S.: Fullerene-linked particles as LC chromatographic media and modification of their electron donor/acceptor properties by secondary chamical reactions. *J. Microcolumn Sep.,* 5 (1993) 223-235; *C.A.,* 121 (1994) 72736j.

104 Steenackers, D. and Sandra, P.: On the analysis of polar solutes on 50 μm i.d. open tubular LC columns. *J. High Resolut. Chromatogr.,* 17 (1994) 557-559.

105 Vozka, S., Brezina, M., Moravec, V., Kriz, J. and Vodicka, L.: Column for preparative liquid chromatography. *Czech Rep. CZ* 277,859 (Cl. G01N30/60), 16 Jun. 1993, Appl. 3,722, 21 Jun. 1989; 5 p.; *C.A.,* 121 (1994) 194629x.

106 Wirth, M.J.: Spectroscopic probing of reversed-phase chromatographic retention. *LC-GC Int.,* 7, No. 11 (1994) 626-630.

107 Yamagishi, A., Tanaka, I., Taniguchi, M. and Takahashi, M.: Poly(isocyanide) as a chiral adsorbent in liquid column chromatography. *J. Chem. Soc., Chem. Commun.,* (1994) 113-114; *C.A.,* 121 (1994) 169298f.

For additional information see *C.A.*:
121 (1994) 49384j, 49398s, 49452e, 49453f, 72790x, 92756u, 103596v, 103597w, 136451x, 158382c, 158789r, 159875c, 159895j.

See also 113, 115, 143, 145, 158, 167, 168, 170, 172, 174, 197, 268, 328, 542, 847, 854, 913, 924, 1003, 1016, 1026, 1028, 1044, 1102, 1247, 1276.

*3d. Quantitative analysis*

108 Jones, T.L., Betowski, L.D. and Lopez-Avila, V.: Validation of liquid chromatography-mass spectrometry methods: interlaboratory studies. *TrAC,* 13 (1994) 333-338.

See also 119, 476, 595, 1165.

*3e. Preparative scale chromatography*

109 Chizhkov, V.P. and Varivonchik, N.E.: (High-efficiency preparative liquid low-pressure chromatography). *Zh. Fiz. Khim.,* 68 (1994) 705-708; *C.A.,* 121 (1994) 38229m.

110 Gerstner, J.A.: Novel preparative chromatographic techniques: displacement and membrane systems. Avail. *Univ. Microfilms Int.,* Order No. DA9405672, 1993, 116 pp.; *C.A.,* 121 (1994) 30450f.

111 Hu, S. and Do, D.D.: Effect of feed concentration on the preparative separation of systems having reversed selectivity. *J. Chromatogr. A,* 683 (1994) 311-320.

112 Newburger, J., DeLange, B. and Guiochon, G.: New hybrid displacement technique for preparative liquid chromatography. *J. Chromatogr. A,* 684 (1994) 1-11.

113 Sarker, M. and Guiochon, G.: Study of the packing behavior of radial compression columns for preparative chromatography. *J. Chromatogr. A,* 683 (1994) 293-309.

See also 105, 374, 463, 561, 587, 610, 611, 871, 914, 1158.

*3f. Programmed temperature, pressure, vapors, gradients*

See 183.

4. SPECIAL TECHNIQUES

*4a. Automation*

114 Buhlmann, R., Carmona, J., Donzel, A., Donzel, N. and Gil, J.: An open software environment to optimize the productivity of robotized laboratories. *J. Chromatogr. Sci.,* 32 (1994) 243-248.

See also 129, 199, 1049, 1066, 1074, 1083, 1114.

*4b. Computerization and modelling*

115 Cserhati, T.: Use of principal component and cluster analysis for the comparison of reversed-phase HPLC-columns. *Anal. Lett.,* 27 (1994) 2615-2637.

116 Dessy, R.E.: Chromatography and computers: a decade of direction and discontent. *J. Chromatogr. Sci.,* 32 (1994) 209-212.

117 Felinger, A.: Deconvolution of overlapping skewed peaks. *Anal. Chem.,* 66 (1994) 3066-3072.

118 Gonzalez, C.: Computer systems validation: a practical approach to an effective investment. *LC-GC Int.,* 7, No. 10 (1994) 564-566.

119 Hayashi, Y. and Matsuda, R.: Deductive prediction of measurement precision from signal and noise in liquid chromatography. *Anal. Chem.,* 66 (1994) 2874-2881.

120 Jochum, P.: (New opportunities for reports in modern chromatography). *LaborPraxis,* 18 (1994) 62-67; *C.A.,* 121 (1994) 49361z.

121 Lameloise, M.L. and Viard, V.: Modelling and simulation of a glucose-fructose simulated moving-bed adsorber. *Food Bioprod. Process,* 71 (1993) 27-32; *C.A.,* 121 (1994) 86138c.

122 Lysakowski, R.: Standards for chromatographic data communications, storage, and archiving. *J. Chromatogr. Sci.,* 32 (1994) 236-242.

123 McCoy, B.J. and Goto, M.: Continuous-mixture model of chromatographic separations. *Chem. Eng. Sci.,* 49 (1994) 2351-2357; *C.A.,* 121 (1994) 112257n.

124 Meyer, V.R.: Generation and investigation of chromatographic peaks using a spreadsheet program. *LC-GC Int.,* 7, No. 10 (1994) 590-596.

125 Penn, S.G., Liu, G., Bergström, E.T., Goodall, D.M. and Loran, J.S.: Systematic approach to treatment of enantiomeric separations in capillary electrophoresis and liquid chromatography. I. Initial evaluation using propranolol and dansylated amino acids. *J. Chromatogr. A,* 680 (1994) 147-155.

126 Podgórny, A. and Kowalska, T.: Physico-chemical modeling of solute retention in reversed phase liquid chromatography with acetonitrile - phosphate buffer eluents. *J. Planar Chromatogr.,* 7 (1994) 291-293.

127 Podgórny, A. and Kowalska, T.: Physico-chemical modeling of solute retention in reversed phase liquid chromatography with tetrahydrofuran-phosphate buffer and acetone-phosphate buffer eluents. *J. Planar Chromatogr.,* 7 (1994) 217-220.

128 Stauffer, S.T. and Dessy, R.E.: CHIRULE: a chiral chromatographic column selection system utilizing similarity searching. *J. Chromatogr. Sci.,* 32 (1994) 228-235.

129 Webster, G. and Knauer, W.: Optimized on-line solvent recycling in HPLC using an intelligent chromatography data system. *LC-GC Int.,* 7, No. 10 (1994) 577-588.

For additional information see *C.A.*:
121 (1994) 49408v, 148050d.

See also 28, 46, 161, 188, 342, 474, 600, 857, 928.

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

130 Allen, D.W., Clench, M.R., Crowson, A., Leathard, D.A. and Saklatvala, R.: Characterisation of electron beam generated transformation products of Irganox 1010 by particle beam liquid chromatography-mass spectrometry with on-line diode array detection. *J. Chromatogr. A,* 679 (1994) 285-297.

131 Andrews, R.W. and Richardson, H.: Effect of spectral resolution, detector linearity and chromatographic resolution on peak purity calculations. *J. Chromatogr. A,* 683 (1994) 3-8.

132 Blomberg, J., Schoenmakers, P.J. and van den Hoed, N.: Automated sample cleanup using on-line coupling of size exclusion chromatography to high resolution gas chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 411-414.

133 Ferguson, G.K.: Investigation of pharmaceutical analyses with monodisperse aerosol generator interface combining liquid chromatography with Fourier transform infrared (MAGIC-LC/FT-IR) spectrometry. Avail. *Univ. Microfilms Int.,* Order No. DA9404649, 1993, 234 p.; *C.A.,* 121 (1994) 117843k.

134 Mank, A., Gooijer, C., Lingeman, H., Velthorst, N. and Brinkman, U.: Liquid chromatography combined with visible diode-laser induced fluorescence detection for photosensitizers. *Proc. SPIE-Int. Soc. Opt. Eng.,* 2084(Biomedical Optoelectronic Devices and Systems) (1994) 255-266; *C.A.,* 121 (1994) 173964n.

135 Martin, M.: (What performance is expected from coupling in chromatography)? *Spectra 2000,* 169 (1992) 5-9; *C.A.,* 121 (1994) 148001p - a review with 8 refs.

136 Roberts, J.K. and Smith, R.J.: Use of liquid chromatography-nuclear magnetic resonance spectroscopy for the identification of impurities in drug substances. *J. Chromatogr. A,* 677 (1994) 385-389.

137 Sheppard, B.S. and Caruso, J.A.: Plasma mass spectrometry: consider the source. Invited lecture. *J. Anal. At. Spectrom.,* 9 (1994) 145-149; *C.A.,* 121 (1994) 72476z - a review with 64 refs.

138 Tinke, A.P., Niessen, W.M.A., Thaden, U.R. and van der Greef, J.: Hyperthermal surface ionization as a new interfacing approach in liquid chromatography/mass spectrometry. *Anal. Chem.,* 66 (1994) 3005-3012.

139 Wolfender, J.-L., Maillard, M. and Hostettmann, K.: Thermospray liquid chromatography-mass spectrometry in phytochemical analysis. *Phytochem. Anal.,* 5 (1994) 153-182; *C.A.,* 121 (1994) 199813n.

140 Yamamoto, H., Ichimura, K., Nakamura, K., Maeda, T., Tajima, T. and Wada, K.: Concentration and transfer methods for a thin-layer chromatography plate, and a liquid-chromatography/IR measuring method. *U.S.* US 5,306,645 (Cl. 436-162; G01N30/94), 26 Apr. 1994, JP Appl. 90/23,409, 31 Jan. 1990, 10 p.; *C.A.,* 121 (1994) 49339y.

For additional information see *C.A.*:
121 (1994) 98629b.

See also 54, 55, 72, 77, 108, 186, 196, 198, 200, 203, 204, 244, 265, 330, 357, 380, 398, 399, 405, 424, 460, 508, 523, 532, 536, 550, 684, 820, 834, 838, 839, 855, 863, 873, 927, 942, 945, 962, 967, 974, 982, 990, 1014, 1038, 1048, 1050, 1100, 1130, 1142, 1180, 1183, 1237, 1239, 1243, 1272, 1280, 1281, 1282, 1283.

*4d. Affinity chromatography (advances)*

141 Cummings, R.D.: Use of lectins in analysis of glycoconjugates. *Methods Enzymol.,* 230(Guide to Techniques in Glycobiology) (1994) 66-86; *C.A.,* 121 (1994) 77545f.

142 DiRusso, C., Rogers, R.P. and Jarrett, H.W.: Novel DNA-Sepharose purification of the FadR transcription factor. *J. Chromatogr. A,* 677 (1994) 45-52.

143 Glavanovich, M.H. and Carr, P.W.: Easily regenerable affinity chromatographic zirconia-based support with concanavalin A as model ligand. *Anal. Chem.,* 66 (1994) 2584-2589.

144 Harakas, N.K.: Biospecific affinity chromatography. *Bioprocess Technol.,* 18(Protein Purification Process Engineering) (1994) 259-316; *C.A.,* 121 (1994) 77504s - a review with 472 refs.

145 Hirayama, T.: (Affinity chromatography carrier). *Kobunshi Kako,* 43 (1994) 60-66; *C.A.,* 121 (1994) 194555v - a review with 33 refs.

146 Jack, G.W.: Immunoaffinity chromatography. *Mol. Biotechnol.,* 1 (1994) 59-86; *C.A.,* 121 (1994) 30090p - a review with 100 refs.

147 Kobata, A.: Affinity chromatography with use of immobilized lectin columns. *Biochem. Soc. Trans.,* 22 (1994) 360-364; *C.A.,* 121 (1994) 30163q.

148 Liu, H.C.: Membrane-based affinity chromatography: modeling and experiments of lysozyme onto Cibacron blue ligand immobilized on microporous cellulose membranes. Avail. *Univ. Microfilms Int.,* Order No. DA9407814, 1993, 200 pp.; *C.A.,* 121 (1994) 103059x.

149 Nokihara, K. and Ando, E.: Rapid and efficient preparation of affinity columns, in which peptide as ligands are bound to the solid-phase support. *Pept. Chem.,* 31st (1993) 25-28; *C.A.,* 121 (1994) 57970n.

150 Ono, S., Miura, T., Sakai, Y., Yoshimura, T., Shimasaki, C. and Tsukurimichi, E.: Property of chromatography gel on which an amphipathic β-structural peptide is immobilized. *Pept. Chem.,* 31st (1993) 125-128; *C.A.,* 121 (1994) 83968n.

151 Santambien, P., Sdiqui, N., Hebert, E., Girot, P., Hulak, I., Roche, A.C., Monsigny, M. and Boschetti, E.: (*In vitro* and *in vivo* toxicity studies on dye ligands used in affinity chromatography). *Ann. Pharm. Fr.,* 52 (1994) 137-152; *C.A.,* 121 (1994) 101324f.

152 Yip, T.T. and Hutchens, T.W.: Immobilized metal ion affinity chromatography. *Mol. Biotechnol.,* 1 (1994) 151-164; *C.A.,* 121 (1994) 152361y.

For additional information see *C.A.*:
121 (1994) 7770a, 30507e, 30520d, 50231p, 77786k, 173627e, 304007x.

See also 305, 546, 547, 565, 581, 597, 622, 670, 705, 727, 785, 806, 1214.

*4f. Trace analysis and preseparation techniques*

153 McDowall, R.D.: The universal SPE method. *LC-GC Int.,* 7, No. 11 (1994) 638-642.

154 Parks, O.W. and Maxwell, R.J.: Isolation of sulfonamides from fortified chicken tissues with supercritical $CO_2$ and in-line adsorption. *J. Chromatogr. Sci.,* 32 (1994) 290-293.

155 Wan, H.B., Lan, W.G., Wong, M.K., Mok, C.Y. and Poh, Y.H.: Orthogonal array designs for the optimization of solid-phase extraction. *J. Chromatogr. A,* 677 (1994) 255-263.

See also 101, 132, 192, 956, 975, 1036, 1238, 1269, 1285.

*4g. Enantiomers, separation*

156 Bradshaw, J.S., Huszthy, P., Wang, T., Zhu, C., Nazarenko, A.Y. and Izatt, R.M.: Enantiomeric recognition and separation of chiral organic ammonium salts by chiral pyridino-18-crown-6 ligands. *Supramol. Chem.,* 1 (1993) 267-275; *C.A.,* 121 (1994) 82406r.

157 Gorog, S. and Gazdag, M.: Enantiomeric derivatization for biomedical chromatography. *J. Chromatogr. B,* 659 (1994) 51-84 - a review with 218 refs.

158 Hyun, M.H., Jin, J.S., Ryoo, J.J. and Jyung, K.K.: Preparation of a new chiral stationary phase bearing both π-acidic and -basic sites from (S)-naproxen for the liquid chromatographic resolution of enantiomers. *Bull. Korean Chem. Soc.,* 15 (1994) 497-502; *C.A.,* 121 (1994) 204921c.

159 Isaksson, R., Pettersson, C., Pettersson, G., Jönsson, S., Stålberg, J., Hermansson, J. and Marle, I.: Cellulases as chiral selectors. *TrAC,* 13 (1994) 431-439 - a review with 41 refs.

160 Khan, A.Z.-Q. and Sandstroem, J.: Enantiomer and diastereoisomer resolution, rotational barriers, and CD and UV spectra of some twisted push-pull ethylenes. *J. Chem. Soc., Perkin Trans. 2,* (1994) 1575-1579; *C.A.,* 121 (1994) 156821w.

161 Koppenhoefer, B., Behnisch, R., Nothdurft, A., Trettin, U., Pierrot-Sanders, J., Piras, P., Popescu, C. and Roussel, C.: (CHIRBASE. A factual database for the chromatographic resolution of enantiomers). *Mitteilungsbl.-Ges. Dtsch. Chem., Fachgruppe Chem.-Inf.-Comput.,* 26 (1993) 19-20; *C.A.,* 121 (1994) 133193d.

162 Kumar, N., Windisch, V., Trivedi, P. and Golebiowski, C.: Separation of 3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitor drug substance diastereomers, and their analogues on β-cyclodextrin stationary phase. *J. Chromatogr. A,* 678 (1994) 259-263.

163 Kunath, A., Theil, F. and Wagner, J.: Diastereomeric and enantiomeric separation of monoesters prepared from meso-cyclopentanediols and racemic carboxylic acids on a silica phase and on amylose and cellulose chiral stationary phases. *J. Chromatogr. A,* 684 (1994) 162-167.

164 Laemmerhofer, M. and Lindner, W.: Assignment of absolute configuration and optical purity determination of (R)- and (S)-econazole nitrate by enantioselective HPLC: method development and application. *Chirality,* 6 (1994) 251-260; *C.A.,* 121 (1994) 157569g.

165 Lee, C.S. and Chen, H.H.: Determination of enantiomeric purity and absolute configuration of β-lactams by high-performance liquid chromatography on chiral columns. *J. Chin. Chem. Soc. (Taipei),* 41 (1994) 187-190; *C.A.,* 121 (1994) 91971y.

166 Leiminer, A., Stephan, B. and Mannschreck, A.: Chiral 2H-pyrans. Part 4. The enantiomers of indolino spiro compounds. Barriers to thermal cleavage of their C($sp^3$)-O bond. *Cryst. Liq. Cryst. Sci. Technol., Sect. A,* 246 (1994) 215-221; *C.A.,* 121 (1994) 156903z.

167 Lin, J.-Y. and Yang, M.-H.: N-Alkylcarbamoyl derivatives of amino acids as chiral stationary phases for high-performance liquid chromatography. I. An example of enhancing enantioselectivity by deleting the non-enantioselective π-π interaction site on the chiral stationary phase. *J. Chromatogr. A,* 684 (1994) 13-21.

168 Oi, S., Ono, H., Tanaka, H., Shijo, M. and Miyano, S.: Axially dissymmetric bianthracene-based chiral stationary phase for the high-performance liquid chromatographic separation of enantiomers. *J. Chromatogr. A,* 679 (1994) 35-46.

169 Oliveros, L., Puertolas, P.F., Minguillon, C., Camacho-Frias, E., Foucault, A. and le Goffic, F.: Donor-acceptor chiral centrifugal partition chromatography: complete resolution of two pairs of amino-acid derivatives with a chiral II donor selector. *J. Liq. Chromatogr.,* 17 (1994) 2301-2318.

170 Pirkle, W.H. and Welch, C.J.: Chromatographic and $^1$H NMR support for a proposed chiral recognition model. *J. Chromatogr. A,* 683 (1994) 347-353.

171 Rustum, A.M.: Separation of the R(-)- and S(+)-enantiomers of the ethyl ester of tiagabine • HCl using a Chiralcel-OG column. *J. Chromatogr. A,* 684 (1994) 29-36.

172 Schleimer, M., Pirkle, W.H. and Schurig, V.: Enantiomer separation by high-performance liquid chromatography on polysiloxane-based chiral stationary phases. *J. Chromatogr. A,* 679 (1994) 23-34.

173 Staahlberg, J., Joensson, S. and Pettersson, G.: Chiral recognition by cellobiohydrolase I. *Found. Biotech. Ind. Ferment. Res., [Publ.],* 8(*Trichoderma Reesei* Cellulases and Other Hydrolases) (1993) 273-280; *C.A.,* 121 (1994) 77544e.

174 Yashima, E., Fukaya, H. and Okamoto, Y.: 3,5-Dimethylphenylcarbamates of cellulose and amylose regioselectively bonded to silica gel as chiral stationary phases for high-performance liquid chromatography. *J. Chromatogr. A,* 677 (1994) 11-19.

For additional information see *C.A.*: 121 (1994) 142531q.

See also 60, 74, 82, 83, 98, 107, 128, 205, 328, 426, 429, 434, 436, 437, 444, 458, 459, 461, 465, 471, 509, 515, 870, 880, 917, 940, 978, 1051, 1052, 1058, 1062, 1064, 1068, 1069, 1075, 1078, 1084, 1088, 1090, 1099, 1102, 1106, 1117, 1126, 1154, 1171, 1185.

*4h. Other special techniques*

175 Abelev, G.I., Karamova, E.R., Lazarevich, N.L., Kiseleva, V.I. and Poverenny, A.M.: Electrochromatography: a method for automatic immunoaffinity chromatography on porous membranes. *Immunol. Lett.,* 40 (1994) 133-138; *C.A.,* 121 (1994) 129207u.

176 Behnke, B. and Bayer, E.: Pressurized gradient electro-high-performance liquid chromatography. *J. Chromatogr. A,* 680 (1994) 93-98.

177 Belgaied, J.E., Hoyos, M. and Martin, M.: Velocity profiles in thermal field-flow fractionation. *J. Chromatogr. A,* 678 (1994) 85-96.

178 Dolan, J.W.: Questions about ion pairing. *LC-GC Int.,* 7, No. 12 (1994) 691-692.

179 Hu, W., Tao, H. and Haraguchi, H.: Electrostatic ion chromatography. 2. Partitioning behavior of analyte cations and anions. *Anal. Chem.,* 66 (1994) 2514-2520.

180 Ito, Y. and Weisz, A.: pH-Zone-refining countercurrent chromatography. *U.S.* US 5,332,504 (Cl. 210-635; B01D15/08), 26 Jul. 1994, Appl. 26,939, 05 Mar. 1993; 23 p.; *C.A.,* 121 (1994) 160184h.

181 Madamba-Tan, L.S., Strasters, J.K. and Khaledi, M.G.: Gradient elution in micellar liquid chromatography. I. Micelle concentration gradient. *J. Chromatogr. A,* 683 (1994) 321-334.

182 Madamba-Tan, L.S., Strasters, J.K. and Khaledi, M.G.: Gradient elution in micellar liquid chromatography. II. Organic modifier gradients. *J. Chromatogr. A,* 683 (1994) 335-345.

183 Moore, L.K.: High-temperature gradient techniques for microbore liquid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9409347, 1993, 142 p.; *C.A.,* 121 (1994) 49405s.

184 Nagaoka, T., Kakuno, K., Fujimoto, M., Nakao, H., Yano, J. and Ogura, K.: Electrochemical chromatography using a polyaniline stationary phase. II. Effect of pH of the mobile phase and column length. *J. Electroanal. Chem.,* 368 (1994) 315-317; *C.A.,* 121 (1994) 72563a.

For additional information see *C.A.*:
121 (1994) 173920v, 182561f.

See also 66, 77, 87, 88, 97, 169, 282, 1023, 1033, 1040, 1234, 1261, 1263.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

### *5b. Cyclic hydrocarbons, fullerenes*

185 Ellis, L., Alexander, R. and Kagi, R.I.: Separation of petroleum hydrocarbons using dealuminated mordenite molecular sieve. II. Alkylnaphthalenes and alkylphenanthenes. *Org. Geochem.,* 21 (1994) 849-855; *C.A.,* 121 (1994) 160437t.

186 Galceran, M.T. and Moyano, E.: High-performance liquid chromatography-mass spectrometry (pneumatically assisted electrospray) of hydroxy polycyclic aromatic hydrocarbons. *J. Chromatogr. A,* 683 (1994) 9-19.

187 Hatrik, S. and Lehotay, J.: Optimization of the detection wavelength applied to the HPLC analysis of polycyclic aromatic hydrocarbons. *J. Liq. Chromatogr.,* 17 (1994) 2833-2844.

188 Hellal, F., Phan-tan-luu, R. and Siouffi, A.M.: Application of solvatochromic parameters to selectivity tuning in chromatography for aromatic solutes. *J. Liq. Chromatogr.,* 17 (1994) 2845-2869.

189 Kister, J. and Siouffi, A.M.: Separation by HPLC of functionalized complex polyaromatics present in fossil materials. *Polycyclic Aromat. Compd.,* 3(SUPPL) (1993) 435-442; *C.A.,* 121 (1994) 113018x.

190 Kurganov, A., Unger, K.K. and Eisenbeiss, F.: Separation of cyclic aromatic hydrocarbons under isocratic conditions by a column switching technique. *Chromatographia,* 39 (1994) 175-179.

191 Lintelmann, J., Hellemann, C. and Kettrup, A.: Coupled-column high-performance liquid chromatographic method for the determination of four metabolites of polycyclic aromatic hydrocarbons, 1-, 4- and 9-hydroxyphenanthrene and 1-hydroxypyrene, in urine. *J. Chromatogr. B,* 660 (1994) 67-73.

192 Mellor, F., Just, U. and Strumpf, T.: Supercritical fluid extraction using a new restrictor design. *J. Chromatogr. A,* 679 (1994) 147-152.

193 Ohta, H., Saito, Y., Jinoo, K., Nagashima, H. and Itoh, K.: Temperature effects in separation of fullerene by high-performance liquid chromatography. *Chromatographia,* 39 (1994) 453-459.

194 Ong, C.-N. and Lee, B.-L.: Determination of benzene and its metabolites: application in biological monitoring of environmental and occupational exposure to benzene. *J. Chromatogr. B,* 660 (1994) 1-22.

195 Quilliam, M.A., Hardstaff, W.R., Anacleto, J.F., LeBlanc, M.D., Stergiopoulos, V., Dick, K.L. and Bowser, M.T.: Preparation and certification of solution of perdeutorated polycyclic aromatic compounds intended for use as surrogate internal standards. *Fresenius J. Anal. Chem.,* 350 (1994) 109-118.

196 Robert, E., Beboulene, J.-J., Codet, G. and Enache, D.: High-performance liquid chromatography coupled off-line with capillary gas chromatography. Application to the determination of the aromatics content in middle distillates. *J. Chromatogr. A,* 683 (1994) 215-222.

197 Saito, Y., Ohta, H., Nagashima, H., Itoh, K., Jinno, K., Okamoto, M., Chen, Y.-L., Luehr, G. and Archer, J.: Separation of $C_{60}$ and $C_{70}$ fullerenes with a triphenyl bonded silica phase in microcolumn liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2359-2372.

198 Sim, P.G., Quilliam, M.A., Pleasance, S., Anacleto, J., Perneault, H., Ramaley, L. and Benoit, F.M.: Application of multidimensional chromatographic/mass spectrometric techniques to the analysis of complex mixtures of polycyclic aromatic compounds (PAC). *Polycyclic Aromat. Compd.,* 3(Suppl.) (1993) 321-328; *C.A.,* 121 (1994) 182985x.

199 Stevenson, S., Dorn, H.C., Burbank, P., Harich, K., Haynes, J., Jr., Klang, C.H., Salem, J.R., de Vries, M.S., van Loosdrecht, P.H.M., Johnson, R.D. et al.: Automated HPLC separation of endoheral metallofullerene $Sc@C_{2n}$ and $Y@C_{2n}$ fractions. *Anal. Chem.,* 66 (1994) 2675-2679.

200 Stevenson, S., Dorn, H.C., Burbank, P., Harich, K., Sun, Z., Klang, C.H., Salem, J.R., de Vries, M.S., van Loosdrecht, P.H.M., Johnson, R.D. et al.: Isolation and monitoring of the endoheral metallofullerenes $Y@C_{82}$ and $Sc_3@C_{82}$: on-line chromatographic separation with EPR detection. *Anal. Chem.,* 66 (1994) 2680-2685.

For additional information see *C.A.*:
121 (1994) 49341t.

See also 79, 1247.

### *5c. Halogen derivatives*

201 Mössner, S., Barudio, I., Spraker, T.S., Antonelis, G., Early, G., Geraci, J.R., Becker, P.R. and Ballschmiter, K.: Determination of HCHs, PCBs and DDT in brain tissues of marine mammals of different age. *Fresenius J. Anal. Chem.,* 349 (1994) 708-716.

See also 85, 1238.

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

202 Akhlaq, M.S. and Götze, P.: Detailed analysis of crude oil group types using reversed-phase high-performance liquid chromatography. *J. Chromatogr. A,* 677 (1994) 265-272.

203 Kelly, G.W. and Bartle, K.D.: The use of combined LC-GC for the analysis of fuel products: a review. *J. High Resolut. Chromatogr.,* 17 (1994) 390-397 - a review with 25 refs.

204 Trisciani, A. and Munari, E.: Characterization of fuel samples by on-line LC-GC with automatic group-type separation of hydrocarbons. *J. High Resolut. Chromatogr.,* 17 (1994) 452-456.

See also 185.

## 6. ALCOHOLS

205 Kim, J.-H., Uzawa, H., Nishida, Y., Ohrui, H. and Meguro, H.: Highly sensitive high-performance liquid chromatographic method for the determination of the absolute configuration and the optical purity of di-O-acylglycerols using a chiral derivatizing agent, (S)-(+)-2-*tert.*-butyl-2-methyl-1,3-benzodioxole-4-carboxylic acid. *J. Chromatogr. A,* 677 (1994) 35-43.

206 Marko-Varga, G., Johansson, K. and Gorton, L.: A reagentless coimmobilized alcohol biosensor as a detection unit in column liquid chromatography for the determination of methanol and ethanol. *Quim. Anal. (Barcelona),* 12 (1993) 24-29; *C.A.,* 121 (1994) 197750r.

207 Multzsch, R., Lokotsch, W., Steffen, B., Lang, S., Metzger, J.O., Schäfer, H.J., Warwel, S. and Wagner, F.: Enzymatic production and physicochemical characterization of uncommon wax esters and monoglycerides. *J. Am. Oil Chem. Soc.,* 71 (1994) 721-725.

See also 321.

## 7. PHENOLS

208 Ariese, F., Verkaik, M., Hoornweg, G.P., van de Nesse, R.J., Jukema-Leenstra, S.R., Hofstraat, J.W., Gooijer, C. and Velthorst, N.H.: Trace analysis of 3-hydroxy benzo[*a*]pyrene in urine for the biomonitoring of human exposure to polycyclic aromatic hydrocarbons. *J. Anal. Toxicol.,* 18 (1994) 195-204.

209 Baiocchi, C., Marengo, E., Roggero, M.A., Giacosa, D., Vietto, L. and Toccori, S.: A chromatographic and chemometric study of the bark phenolic compounds of two polular clones with different resistance to *Discosporium populem. Chromatographia,* 39 (1994) 481-489.

210 Brouwer, E.R. and Brinkman, U.A.T.: Determination of phenolic compounds in surface water using on-line liquid chromatographic precolumn-based columnn-switching techniques. *J. Chromatogr. A,* 678 (1994) 223-231.

211 Galvez, M.C., Barroso, C.G. and Perez-Bustamante, J.A.: Analysis of polyphenolic compounds of different venegar samples. *Z. Lebensm.-Unters. Forsch.,* 199 (1994) 29-31; *C.A.,* 121 (1994) 132513w.

212 Levin, S., Abu-Lafi, S., Golshan-Shirazi, S. and Guiochon, G.: Use of system peaks for the determination of the distribution of resorcinol, catechol and phenol in liquid chromatography. *J. Chromatogr. A,* 679 (1994) 213-229.

213 Lipniak, M., Gawlik, M., Madej, J. and Niezabitowski, P.: Determination of 1-hydroxypyrene in rat urine using liquid extraction and HPLC UV-detection method. *Chem. Anal. (Warsaw),* 39 (1994) 29-32; *C.A.,* 121 (1994) 28665m.

214 Liu, C.Y., Chang, C.H., Chyuch, S.D. and Hu, C.C.: Combination of chelating behaviour with molecular recognition as interaction for ligand exchange chromatography. *Fresenius J. Anal. Chem.,* 350 (1994) 132-134.

215 Mannino, S., Cosio, M.S. and Bertuccioli, M.: High-performance liquid chromatography of phenolic compounds in virgin olive using amperometric detection. *Ital. J. Food Sci.,* 5 (1993) 363-370; *C.A.,* 121 (1994) 81193g.

216 Ruban, V.F.: (Determination of phenols in drinking water by capillary HPLC with electrochemical detection). *Zh. Ekol. Khim.,* 1 (1993) 45-49; *C.A.,* 121 (1994) 163545n.

217 Wang, M. and Chen, T.: (Separation of tannin and saponin from Sanguisorba by liquid chromatography). *Sepu,* 12 (1994) 305; *C.A.,* 121 (1994) 152471j.

218 Yoshimura, I., Kinoshita, Y., Yamamoto, Y., Huneck, S. and Yamada, Y.: Analysis of secondary metabolites from lichen by high performance liquid chromatography with a photodiode array detector. *Phytochem. Anal.,* 5 (1994) 197-205; *C.A.,* 121 (1994) 199918a.

For additional information see *C.A.*:
121 (1994) 148051e, 194612m.

See also 194, 326, 425, 1209, 1228.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

219 Barnes, A.R., Bradley, C.R. and Nash, S.: Comparison of methods for the determination of glutaraldehyde in solution. *Pharm. Acta Helv.,* 69 (1994) 21-24; *C.A.,* 121 (1994) 141889a.

### *8a. Flavonoids*

220 Ferreres, F., Tomas-Barberan, F.A., Soler, C., Garcia-Viguera, C., Ortiz, A. and Tomas-Lorente, F.: A simple extractive technique for honey flavonoid HPLC analysis. *Apidologie,* 25 (1994) 21-30; *C.A.,* 121 (1994) 132480h.

221 Males, Z., Medic-Saric, M. and Kustrak, D.: Application of numerical methods in the investigation of the flavonoids of Christ's thorn (*Paliurus spina-christi* Mill.) *Acta Pharm. (Zagreb),* 44 (1994) 183-191; *C.A.,* 121 (1994) 200945r.

222 Pietta, P.G., Mauri, P.L. and Gardana, C.: Identification of the main flavonoids by use of chromatographic, electrophoretic, and 'on-line' spectral data. *J. High Resolut. Chromatogr.,* 17 (1994) 616-618.

223 Rehwald, A., Meier, B. and Sticher, O.: Qualitative and quantitative reversed-phase high-performance liquid chromatography of flavonoids in Crataegus leaves and flowers. *J. Chromatogr. A,* 677 (1994) 25-33.

224 Shihabi, Z.K., Kute, T., Garcia, L.L. and Hinsdale, M.: Analysis of isoflavones by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 181-185.

225 Zhang, X. and Chen, Y.: (Determination of quercetin in extract of *Ginkgo biloba* L. leaves by high performance liquid chromatography). *Sepu,* 12 (1994) 302-303; *C.A.,* 121 (1994) 152470h.

For additional information see *C.A.*:
121 (1994) 164090x.

See also 9, 416.

*8b. Aflatoxins and other mycotoxins*

226 Huang, H., Zhao, Z. and Li, Y.: (Simultaneous determination of aflatoxin $B_1$ and sterigmatocystin in feeds by high performance liquid chromatography). *Sepu,* 12 (1994) 299-300; *C.A.,* 121 (1994) 156062z.

227 Jordan, L., Hansen, T.J. and Zabe, N.A.: Automated mycotoxin analysis. *Am. Lab. (Shelton),* 26 (1994) 18-24; *C.A.,* 121 (1994) 156029u.

228 Kok, W.T.: Derivatization reactions for the determination of aflatoxins by liquid chromatography with fluorescence detection. *J. Chromatogr. B,* 659 (1994) 127-137 - a review with 76 refs.

229 Lawrence, J.F. and Scott, P.M.: HPLC methods for the determination of mycotoxins and phycotoxins. *Tech. Instrum. Anal. Chem.,* 13(Environmental Analysis) (1993) 273-309; *C.A.,* 121 (1994) 28656j - a review with 174 refs.

230 Luo, Y., Liu, F., Hu, X., Feng, J. and Yang, J.: (High performance liquid chromatography study on fusarium mycotoxins, fusarochromanone and zearalenone, in cereals). *Sepu,* 12 (1994) 197-199; *C.A.,* 121 (1994) 156074e.

231 Mallmann, C.A., Santurio, J.M., Baldissera, M.A. and von Mickwitz, G.: Determination of ochratoxin A in blood serum of pigs by using thin-layer chromatography. *Rev. Microbiol.,* 25 (1994) 107-111; *C.A.,* 121 (1994) 172378n.

232 Solfrizzo, M., Forbes-Smith, M., Strange, R.N. and Visconti, A.: Separation of chlamydosprorol epimers by reversed-phase HPLC using commercial solvent optimisation software. *Chromatographia,* 39 (1994) 443-447.

233 Stresser, D.M., Bailey, G.S. and Williams, D.E.: Indole-3-carbinol and β-naphthoflavone induction of aflatoxin $B_1$ metabolism and cytochromes P-450 associated with bioactivation detoxication of aflatoxin $B_1$ in the rat. *Drug Metab. Disp.,* 22 (1994) 383-391.

234 Stresser, D.M., Williams, D.E., McLellan, L.I., Harris, T.M. and Bailey, G.S.: Indole-3-carbinol induces a rat liver glutathione transferase subunit (YC2) with high activity toward aflatoxin $B_1$ exo-epoxide. Association with reduced levels of hepatic aflatoxin-DNA adducts *in vivo*. *Drug Metab. Disp.,* 22 (1994) 392-399.

235 Xu, Y. and Mirocha, C.J.: Analysis of wortmannin (H-1) by liquid chromatography and gas chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 942-947.

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

236 Risner, C.H.: The determination of scopoletin in environmental tobacco smoke by high-performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2723-2736.

237 Suzuki, T.: High-performance liquid chromatographic resolution of dinophysistoxin-1 and free fatty acids as 9-anthrylmethyl esters. *J. Chromatogr. A,* 677 (1994) 301-306.

238 Xu, H. and Zhou, Z.H.: Studies on separation and determination of the coumarins in *Murraya paniculata* (L.) Jack by RP-HPLC. *Chin. Chem. Lett.,* 5 (1994) 313-314; *C.A.,* 121 (1994) 174256v.

See also 77.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

239 Baj, S.: Quantitative determination of organic peroxides. *Fresenius J. Anal. Chem.,* 350 (1994) 159-161.

240 Carbonneau, M.A., Sess, D., Peuchant, E., Receveur, M.C., Dubourg, L., Thomas, M.J., Perromat, A. and Clerc, M.: Comparison of methods evaluating lipoperoxidation in plasma of malaria patients. *J. Liq. Chromatogr.,* 17 (1994) 2247-2272.

241 Corradini, C. and Corradini D.: Determination of 5-hydroxymethyl-2-furaldehyde in honey by micellar electrokinetic capillary chromatography. *J. Microcolumn Sep.,* 6 (1994) 19-22; *C.A.,* 121 (1994) 132496t.

242 Huang, Y., Zhang, Z. and Liao, G.: (Aspect of studies on determination of the anthraquinone derivatives in rheum and its compound preparations). *Huaxi Yaoxue Zazhi,* 9 (1994) 107-110; *C.A.,* 121 (1994) 164074v - a review with 18 refs.

243 Husain, S., Narsimha, R., Khalid, S. and Rao, R.N.: Application of normal- and reversed-phase high-performance liquid chromatography for monitoring the progress of reactions of anthraquinone manufacturing processes. *J. Chromatogr. A,* 679 (1994) 375-380.

244 Lores, M., García, C.M. and Cela, R.: High-performance liquid chromatography of phenolic aldehydes with highly selective fluorimetric detection by means of postcolumn photochemical derivatization. *J. Chromatogr. A,* 683 (1994) 31-44.

245 Neidigh, K.A., Kingston, D.G.I. and Lewis, N.G.: Synthesis of stereospecifically deuterated metairesinol, podorhizol, epipodorhizol and yatein. *J. Natural Prod.,* 57 (1994) 791-800.

246 Rivera, M.I., Hinojosa, L.M., Hill, B.A., Lau, S.S. and Monks, T.J.: Metabolism and toxicity of 2-bromo(diglutathion-S-yl)-hydroquinone and 2-bromo-3-(glutathion-S-yl)hydroquinone in the *in situ* perfused rat kidney. *Drug Metab. Disp.,* 22 (1994) 503-510.

247 Thies, F. and Grimme, L.H.: *In vivo* O-dealkylation of resorufin and coumarin ethers by the green alga *Chlorella fusca* analysed by a rapid and sensitive high-performance liquid chromatographic assay. *J. Chromatogr. A,* 684 (1994) 168-173.

For additional information see *C.A.*:
121 (1994) 5160x, 187395q.

See also 194, 905.

10. CARBOHYDRATES

See 157.

*10a. Mono and oligosaccharides. Structural studies*

248 Anumula, R.: Quantitative determination of monosaccharides in glycoproteins by high-pressure liquid chromatography with highly sensitive fluorescence detection. *Anal. Biochem.,* 220 (1994) 275-283.

249 Baenziger, J.U.: High-performance liquid chromatography of oligosaccharides. *Methods Enzymol.,* 230(Guide to Techniques) (1994) 237-249; *C.A.,* 121 (1994) 53275s.

250 Berry, M.N., Gregory, R.B., Grivell, A.R., Phillips, J.W. and Schön, A.: The capacity of reducing-equivalent shuttles limits glycolysis during ethanol oxidation. *Eur. J. Biochem.,* 225 (1994) 557-564.

251 Chusney, G.D. and Pickup, J.C.: Serum 1,5-anhydro-D-glucitol assay by high-performance anion-exchange chromatography. *Br. J. Biomed. Sci.,* 51 (1994) 18-23; *C.A.,* 121 (1994) 129035m.

252 Frias, J., Hedley, C.L., Price, K.R., Fenwick, G.R. and Vidal-Valverde, C.: Improved methods of oligosaccharide analysis for genetic studies of legume seeds. *J. Liq. Chromatogr.,* 17 (1994) 2469-2483.

253 Fujii, E., Iwase, H., Ishii-Karakasa, I., Yajima, Y. and Hotta, K.: Quantitation of the glycation intermediate 3-deoxyglucosone by oxidation with rabbit liver oxoaldehyde dehydrogenase to 2-keto-3-deoxygluconic acid followed by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 265-270.

254 Guile, G.R., Wong, S.Y.C. and Dwek, R.A.: Analytical and preparative separation of anionic oligosaccharides by weak anion-exchange high-performance liquid chromatography on an inert polymer column. *Anal. Biochem.,* 222 (1994) 231-235.

255 Hase, S.: High-performance liquid chromatography of pyridylaminated saccharides. *Methods Enzymol.,* 230(Guide to Techniques) (1994) 225-237; *C.A.,* 121 (1994) 53274r.

256 Honda, S., Chikada, N., Suzuki, S. and Kakehi, K.: (Ion-pair liquid chromatography of oligosaccharide derivatives). *Kuromatogurafi,* 14 (1993) 78-79; *C.A.,* 121 (1994) 129034k.

257 Izumi, J., Takagaki, K., Nakamura, T., Shibata, S., Kojima, K., Kato, I. and Endo, M.: A novel oligosaccharide, xylosylβ1-4xylosylβ1-(4-methylumbelliferone), synthesized by cultured human skin fibroblasts in the presence of 4-methylumbelliferyl-β-D-xyloside. *J. Biochem. (Tokyo),* 116 (1994) 524-529.

258 Kirino, J., Kadoya, J. and Kamata, Y.: Fractionation and purification of laminarioligosaccharides. *Jpn. Kokai Tokkyo Koho,* JP 06,145,185 [94,145,185] (Cl. CO7H1/08), 24 May 1994, Appl. 92/295,725, 05 Nov. 1992; 4 pp.; *C.A.,* 121 (1994) 109568j.

259 Klockow, A., Paulus, A., Figueiredo, V., Amadò, R. and Widmer, H.M.: Determination of carbohydrates in fruit juices by capillary electrophoresis and high-performance liquid chromatography. *J. Chromatogr. A,* 680 (1994) 187-200.

260 Kobata, A.: Size fractionation of oligosaccharides. *Methods Enzymol.,* 230(Guide to Techniques) (1994) 200-208; *C.A.,* 121 (1994) 53272p.

261 Kudo, K., Kondo, N. and Hibi, K.: (Reinvestigation of silica-NH2 sugar analysis. II. Study of analytical conditions). *Kuromatogurafi,* 14 (1993) 80-81; *C.A.,* 121 (1994) 30139m.

262 Lindqvist, L., Schweda, K.H., Reeves, P.R. and Lindberg, A.A.: *In vitro* synthesis of CDP-D-abequose using *Salmonella* enzymes of cloned rfb genes. Production of CDP-6-deoxy-D-xylo-4-hexylose, CDP-3,6-dideoxy-D-xylo-4-hexylose and CDP-3,6-dideoxy-D-galactose, and isolation by HPLC. *Eur. J. Biochem.,* 225 (1994) 863-872.

263 Low, N.H., Brause, A. and Wilhelmsen, E.: Normative data for commercial pineapple juice from concentrate. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 965-975.

264 Namba, N., Watanabe, F., Tokuda, M., Mino, M. and Furuya, E.: A new method of quantitating serum and urinary levels of 1,5-anhydroglucitol in insulin-dependent diabetes mellitus. *Diabetes Res. Clin. Pract.,* 24 (1994) 55-61; *C.A.,* 121 (1994) 199929c.

265 Schols, H.A., Mutter, M., Voragen, A.G.J., Niessen, W.M.A., van der Hoeven, R.A.M., van der Greef, J. and Bruggink, C.: The use of combined high-performance anion-exchange chromatography-thermospray mass spectrometry in the structural analysis of pectic oligosaccharides. *Carbohydr. Res.,* 261 (1994) 335-342; *C.A.,* 121 (1994) 178069j.

266 Schwaiger, H., Oefner, P.J., Huber, C., Grill, E. and Bonn, G.K.: Capillary zone electrophoresis and micellar electrokinetic chromatography of 4-aminobenzonitrile carbohydrate derivatives. *Electrophoresis (Weinheim),* 15 (1994) 941-952.

267 Strydom, D.J.: Chromatographic separation of 1-phenyl-3-methyl-5-pyrazolone-derivatized neutral, acidic and basic aldoses. *J. Chromatogr. A,* 678 (1994) 17-23.

268 Su, W., Gregory, R.B. and Gilpin, R.K.: LC studies of the mutarotation of α- and β-N,N'-diacetylchitobiose using silica-immobilized lysozyme as the stationary phase. *J. Chromatogr. Sci.,* 32 (1994) 279-281.

269 Swallow, K.W. and Low, N.H.: Determination of honey authenticity by anion-exchanged liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 695-702.

270 Theander, O., Aman, P., Westerlund, E. and Graham, H.: Enzymatic/chemical analysis of dietary fiber. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 703-709.

271 Timmermans, J.W., van Leeuwen, M.B., Tournois, H., de Wit, D. and Vliegenthart, J.F.G.: Quantitative analysis of the molecular weight distribution of inulin by means of anion-exchange HPLC with pulsed amperometric detection. *J. Carbohydr. Chem.,* 13 (1994) 881-888; *C.A.,* 121 (1994) 136509x.

272 Wu, W., Luo, L. and Yu, S.: (High performance liquid chromatographic analysis of plant monosaccharides). *Sepu,* 12 (1994) 210-211; *C.A.,* 121 (1994) 152475p.

273 Yamada, H., Miyata, S., Igaki, N., Yatabe, H., Miyauchi, Y., Ohara, T., Sakai, M., Shoda, H., Oimomi, M. and Kasuga, M.: Increase in 3-deoxyglucosone levels in diabetic rat plasma. Specific *in vivo* determination of intermediate in advanced Maillard reaction. *J. Biol. Chem.,* 269 (1994) 20275-20280.

For additional information see *C.A.*:
121 (1994) 18990z, 178007n.

See also 65, 68, 277, 280, 281, 287, 290, 331, 356, 373, 827, 841, 1001, 1232.

*10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides*


274 Bame, K.J., Zhang, L., David, G. and Esko, J.D.: Sulphated and undersulphated heparan sulphate proteoglycans in a Chinese hamster ovary cell mutant defective in N-sulphotransferase. *Biochem. J.,* 303 (1994) 81-87.

275 Bourgerie, S., Berger, S., Strecker, G., Julien, R. and Karamanos, Y.: A fluorescence high-performance liquid chromatography assay for enzymes acting on the di-N-acetylchitobiosyl part of asparagine-linked glycans. *J. Biochem. Biophys. Methods,* 28 (1994) 283-293; *C.A.*, 121 (1994) 173494j.

276 Chiu, T.-h. and Baker, J.J.: Lipoteichoic acid from *Streptococcus sanguis* is a natural glucosyl acceptor for glucosyltransferases. *Biochem. Biophys. Res. Commun.,* 202 (1994) 1407-1412.

277 Gamian, A., Kenne, L., Mieszala, M., Ulrich, J. and Defaye, J.: Structure of the *Escherichia coli* 024 and 056 O-specific sialic-acid-containing polysaccharides and linkage of these structures to the core region in lipopolysaccharides. *Eur. J. Biochem.,* 225 (1994) 1211-1220.

278 Hepler, R.W. and Ip, C.C.Y.: Application of capillary ion electrophoresis and ion chromatography for the determination of O-acetate groups in bacterial polysaccharides. *J. Chromatogr. A,* 680 (1994) 201-208.

279 Hong, Z., Mann, P., Shaw, K.J. and Didomenico, B.: Analysis of β-glucans and chitin in a *Saccharomyces cerevisiae* cell wall mutant using high-performance liquid chromatography. *Yeast,* 10 (1994) 1083-1092; *C.A.*, 121 (1994) 174277c.

280 Karamanos, N.K., Syrokou, A., Vanky, P., Nurminen, M. and Hjerpe, A.: Determination of 24 variously sulfated galactoaminoglycan- and hyaluronan-derived disaccharides by high-performance liquid chromatography. *Anal. Biochem.,* 221 (1994) 189-199.

281 Lauder, R.M., Huckerby, T.M. and Nieduszynski, I.A.: Structure of the keratan sulphate chains attached to fibromodulin isolated from bovine tracheal cartilage. Oligosaccharides generated by keratanase digestion. *Biochem. J.,* 302 (1994) 417-423.

282 Lou, J., Myers, M.N. and Giddings, J.C.: Separation of polysaccharides by thermal field-flow fractionation. *J. Liq. Chromatogr.,* 17 (1994) 3239-3260.

283 Manzi, A.E., Higa, H.H., Diaz, S. and Varki, A.: Intramolecular self-cleavage of polysialic acid. *J. Biol. Chem.,* 269 (1994) 23617-23624.

284 Matsumura, S., Aoki, K. and Toshima, K.: Builder performance in detergent formulations and biodegradability of partially dicarboxylated amylopectin. *J. Am. Oil Chem. Soc.,* 71 (1994) 749-755.

285 Misra, K.B., Kim, K.C., Cho, S., Low, M.G. and Bensadoun, A.: Purification and characterization of adipocyte heparan sulfate proteoglycans with affinity for lipoprotein lipase. *J. Biol. Chem.,* 269 (1994) 23838-23844.

286 Mulloy, B., Ribeiro, A.-C., Alves, A.-P., Vieira, R.P. and Mourao, P.A.S.: Sulfated fucans from echinoderms have a regular tetrasaccharide repeating unit defined by specific patterns of sulfation at the O-2 and O-4 positions. *J. Biol. Chem.,* 269 (1994) 22113-22123.

287 Neidhart, S., Gessler, A., Hannak, C., Endress, H.U. and Gierschner, K.: (Application of analytical-size exclusion chromatography to the investigation of substrate degradation by a commercial pectate lyase from *Erwinia carotovora*). *Z. Lebensm.-Unters. Forsch.,* 198 (1994) 317-324; *C.A.*, 121 (1994) 173630a.

288 Oliveira, F.W., Chavante, S.F., Santos, E.A., Dietrich, C.P. and Nader, H.B.: Appearance and fate of a β-galactanase, α,β-galactosidases, heparan sulfate and chondroitin sulfate degrading enzymes during embryonic development of the mollusc *Pomacea sp.. Biochim. Biophys. Acta,* 1200 (1994) 241-248.

289 Orvinsky, E., Soltes, L. and Al Assaf, S.: Concentration effect in hyaluronan analysis by size exclusion chromatography. *Chromatographia,* 39 (1994) 366-368.

290 Papakonstantinou, E., Karakiulakis, G., Aletras, A.J. and Misevic, G.N.: A novel class of adhesion acidic glycans in sea urchin embryos. Isolation, characterization a immunological studies during early embryonal development. *Eur. J. Biochem.,* 224 (1994) 1067-1077.

291 Politz, M.L., Timpa, J.D., White, A.R. and Wasserman, B.P.: Nonaqueous gel permeation chromatography of wheat starch in dimethylacetamide (DMAC) and LiCl: extrusion-induced fragmentation. *Carbohydr. Polym.,* 24 (1994) 91-99; *C.A.*, 121 (1994) 178045y.

292 Reantragoon, S., Arrigo, L.M., Abou Seoud, M.M., Dweck, H.S. and Rosenfeld, L.: Specific heparin fractions suppress endothelin-1 production in cultured human umbilical vein endothelial cells. *Arch. Biochem. Biophys.,* 314 (1994) 315-322.

293 Redman, C.A., Thomas-Oates, J.E., Ogata, S., Ikehara, Y. and Ferguson, M.A.: Structure of the glycosylphosphatidylinositol membrane anchor of human placental alkaline phosphatase. *Biochem. J.,* 302 (1994) 861-865.

294 Takagaki, K., Takeda, Y., Nakamura, T., Didouji, K., Narita, H. and Endo, M.: Analysis of glycosaminoglycans by high-performance liquid chromatography. *J. Biochem. Biophys. Methods,* 28 (1994) 313-320; *C.A.*, 121 (1994) 152466m.

295 Thomas, G.J., Bayliss, M.T., Har0er, K., Mason, R.M. and Davies, M.: Glomerular mesangial cells *in vitro* synthesize an aggregating proteoglycan immunologically related to versican. *Biochem. J.,* 302 (1994) 49-56.

296 Tsai, C.-M., Gu, X.-X. and Byrd, R.A.: Quantification of polysaccharide in Haemophilus influenzae type b conjugate and polysaccharide vaccines by high-performance anion-exchange chromatography with pulsed amperometric detection. *Vaccine,* 12 (1994) 700-706; *C.A.*, 112 (1994) 141833c.


For additional information see *C.A.*:
121 (1994) 174255u.

See also 30, 271, 828, 841.

*10c. Glycoproteins and their constituents*


297 Agarwala, K.L., Kawabata, S., Takao, T., Murata, H., Shimonishi, Y., Nishimura, H. and Iwanaga, S.: Activation peptide of human factor IX has oligosaccharides O-glycosidically linked to threonine residues at 159 and 169. *Biochemistry,* 33 (1994) 5167-5171.

298 Belew, M., Zhou, Y., Wang, S., Nyström, L.-E. and Janson, J.-C.: Purification of recombinant human granulocyte-macrophage colony-stimulating factor from the inclusion bodies produced by transformed *Escherichia coli* cells. *J. Chromatogr. A,* 679 (1994) 67-83.

299 Etzler, M.E.: Isolation and characterization of subunits of DB58, a lectin from the stems and leaves of *Dolichos biflorus. Biochemistry,* 33 (1994) 9778-9783.

300 Gilljam, G.: Envelope glycoproteins of HIV-2, and SIV purified with *Galanthus nivalis* agglutinin induce strong immune responses. *AIDS Res. Hum. Retroviruses,* 9 (1993) 431-438; *C.A.,* 121 (1994) 32647z.

301 Hardy, M.R. and Townsend, R.R.: High-pH anion-exchange chromatography of glycoprotein-derived carbohydrates. *Methods Enzymol.,* 230(Guide to Techniques) (1994) 208-225; *C.A.,* 121 (1994) 53273q.

302 Kato, J. and Izumi, T.: (Glycoprotein analysis by gel permeation chromatography combined with low-angle laser light scattering detection. Approach to carbohydrate content estimation). *Kuromatogurafi,* 14 (1993) 84-85; *C.A.,* 121 (1994) 30140e.

303 Kitazume, S., Kitajima, K., Inoue, S., Troy, II, F.A., Cho, J., Lennarz, W.J. and Inoue, Y.: Identification of polysialic acid-containing glycoprotein in the jelly coat of sea urchin eggs. Occurence of a novel type of polysialic acid structure. *J. Biol. Chem.,* 269 (1994) 22712-22718.

304 Konska, G., Guillot, J., Dusser, M., Damez, M. and Bottom, B.: Isolation and characterization of an N-acetyllactosamine-binding lectin from the mushroom *Laetiporus sulfureus. J. Biochem. (Tokyo),* 116 (1994) 519-523.

305 Montano, L.F., Masso, F., Paez, A., Sandoval, S., Vazquez, L., Sanchez, L., Fournet, B. and Zenteno, E.: Isolation of a 32 kDa *Mycobacterium tuberculosis* protein by lectin affinity chromatography. *Comp. Biochem. Physiol., B: Biochem. Mol. Biol.,* 108B (1994) 265-272; *C.A.,* 121 (1994) 129045q.

306 Noguchi, S., Yonezawa, N., Katsumata, T., Hashizume, K.-i., Kuwayama, M., Hamano, S., Watanabe, S. and Nakano, M.: Characterization of the zona pellucida glycoproteins from bovine ovarian and fertilized eggs. *Biochim. Biophys. Acta,* 1201 (1994) 7-14.

307 Qian, R., Shi, W.X., Shen, Z.M. and Sun, C.: A mannose-specific lectin from *Vicia villosa* seeds. *Biochim. Biophys. Acta,* 1201 (1994) 61-68.

308 Rusiniak, M., Bedi, G.S. and Back, N.: The carbohydrate structure of the asparagine-linked oligosaccharides of rat plasma thiostatin. *Biochim. Biophys. Acta,* 1208 (1994) 316-323.

309 Sareneva, T., Pirhonen, J., Cantell, K., Kalkkinen, N. and Julkunen, I.: Role of N-glycosylation in the synthesis, dimerization and secretion of human interferon-γ. *Biochem. J.,* 303 (1994) 831-840.

310 Steinfort, J., van de Stadt, R. and Beertsen, W.: Identification of new rat dentin proteoglycans utilizing C18 chromatography. *J. Biol. Chem.,* 269 (1994) 22397-22404.

311 Tezuka, T., Taguchi, T., Kanamori, A., Muto, Y., Kitajima, K., Inoue, Y. and Inoue, S.: Identification and structural determination of the KDN-containing N-linked glycan chains consisting of bi- and triantennary complex-type units of KDN-glycoprotein previously isolated from rainbow trout vitelline envelopes. *Biochemistry,* 33 (1994) 6495-6502.

312 Villalobos, A.P., Ivancic, J.S. and Halsall, H.B.: The lipocalin model for human orosomucoid: support for the chromatography of orosomucoid-monoclonal antibody complexes. *Chromatographia,* 39 (1994) 475-480.

313 Yost, J.C., Bell, A., Seale, R. and Sabe, E.H.: Purification of biologically active SPARC expressed in *Saccharomyces cerevisiae. Arch. Biochem. Biophys.,* 314 (1994) 50-63.

314 Zenteno, E., Ortega, M., Qin, Z., Montreuil, J. and Debray, H.: Fast purification of *Phaseolus vulgaris* isolectins. *Prepar. Biochem.,* 24 (1994) 175-183.

See also 141, 585, 638.

## 11. ORGANIC ACIDS AND LIPIDS

### *11a. Organic acids and simple esters*

315 Abushufa, R., Reed, P. and Weinkove, C.: Fatty acids in erythrocytes measured by isocratic HPLC. *Clin. Chem. (Washington),* 40 (1994) 1707-1712.

316 Alexander-North, L.S., North, J.A., Kiminyo, K.P., Buettner, G.R. and Spector, AS.A.: Polyunsaturated fatty acids increase lipid radical formation induced by oxidant stress in endothelial cells. *J. Lipid Res.,* 35 (1994) 1773-1785.

317 Ashton, I., Clements, K., Barrow, S.E., Secombes, C.J. and Rowley, A.F.: Effects of dietary fatty acids on eicosanoid-generating capacity, fatty acid composition and chemotactic activity of rainbow trout (*Oncorhynchus mykiss*) leucocytes. *Biochim. Biophys. Acta,* 1214 (1994) 253-262.

318 Bennat, C., Engelhardt, U.H., Kiehne, A., Wirries, F.M. and Maier, H.G.: HPLC analysis of chlorogenic acid lactones in roasted coffee. *Z. Lebensm.-Unters. Forsch.,* 199 (1994) 17-21; *C.A.,* 121 (1994) 178291a.

319 Bordier, C.G., Sellier, N., Foucault, A.P. and le Goffic, F.: Characterization and purification of fatty acid methyl esters from the liver oil of the deep sea shark (*Centrophorus squamosus*) by gas chromatography-mass spectrometry and countercurrent chromatography. *Chromatographia,* 39 (1994) 329-338.

320 Brutting, R. and Spitteler, G.: Produkte der Dimerisierung ungesättigter Fettsäuren XI: Die Fraktion der alicyclischen Dimerfettsäuren. *Fat Sci. Technol.,* 96 (1994) 361-370.

321 Busson-Breysse, J., Farines, M. and Soulier, J.: Jojoba wax: its esters and some of its minor components. *J. Am. Oil Chem. Soc.,* 71 (1994) 999-1002.

322 Cardwell, T.J. and Laughton, W.R.: Analysis of fluoride, acetate and formate in Bayer liquors by ion chromatography. *J. Chromatogr. A,* 678 (1994) 364-369.

323 Christie, W.W.: Preparation of ester derivatives of fatty acids for chromatographic analysis. In: Christie, W.W. (Editor), *Adv. Lipid Methodol. - Two,* Oily Press, Dundee, 1993, pp. 69-111; *C.A.,* 121 (1994) 128960x - a review with 370 refs.

324 Dzido, T.H. and Smolarz, H.D.: Preliminary computer simulation for fine tuning of the high-performance liquid chromatography of some phenolic acids. *J. Chromatogr. A,* 679 (1994) 59-66.

325 Fritsch, H., Molnar, I. and Wurl, M.: Separation of arachidonic acid metabolites by on-line extraction and reversed-phase high-performance liquid chromatography optiomized by computer simulation. *J. Chromatogr. A,* 684 (1994) 65-75.

326 Garcia-Parrilla, M.C., Camacho, M.L., Heredia, F.J. and Troncoso, A.M.: Separation and identification of phenolic acids in wine vinegars by HPLC. *Food Chem.,* 50 (1994) 313-315; *C.A.,* 121 (1994) 56093s.

327 George, E.D.: Fatty acid distribution of fats, oils and soaps by high-performance liquid chromatography without derivatization. *J. Am. Oil Chem. Soc.,* 71 (1994) 789-791.

328 Haginaka, J., Murashima, T. and Seyama, C.: Retention and enantioselectivity of 2-arylpropionic acid derivatives on an avidin-bonded silica column. Influence of base materials, spacer type and protein modification. *J. Chromatogr. A,* 677 (1994) 229-237.

329 Kahsai, T.Z. and Matthees, D.P.: Determination of mycophenolic acid in feed materials by high-performance liquid chromatography. *Microchem. J.,* 50 (1994) 48-50; *C.A.,* 121 (1994) 156066d.

330 Kasuya, F., Igarashi, K. and Fukui, M.: Evaluation of liquid chromatography-ion spray mass spectrometry for the determination of substituted benzoic acids and their glycine conjugates. *J. Chromatogr. A,* 684 (1994) 93-101.

331 Kaufmann, A.: (Survey and application of HPLC analysis of acids and sugars in wine). *Mitt. Geb. Lebensmittelunters. Hyg.,* 84 (1993) 311-333; *C.A.,* 121 (1994) 155951b.

332 Kaysinger, K.K., Pierce, W.M., Jr. and Nerland, D.E.: Quantitative analysis of 2-oxoglutarate in biological samples using liquid chromatography with electrochemical detection. *Anal. Biochem.,* 222 (1994) 81-85.

333 Keeley, W.T., Coffey, D.L. and Mueller, T.C.: Liquid chromatographic determination of phenolic acids in soil. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 805-809.

334 Kuhn, H., Belkner, J., Suzuki, H. and Yamamoto, S.: Oxidative modification of human lipoproteins by lipoxygenases of different positional specifities. *J. Lipid Res.,* 35 (1994) 1749-1759.

335 Li, B., Birdwell, C. and Whelan, J.: Antithetic relationship of dietary arachidonic acid and eicosapentaenoic acid in eicosanoid production *in vivo* *J. Lipid Res.,* 35 (1994) 1869-1877.

336 Madigan, D., McMurrough, I. and Smyth, M.R.: Determination of oxalate in beer and beer sediments using ion chromatography. *J. Am. Soc. Brew. Chem.,* 52 (1994) 134-137; *C.A.,* 121 (1994) 178027u.

337 Marcomini, A., Tortato, C., Capri, S. and Liberatori, A.: Preparation, characterization and RP-HPLC determination of sulphophenyl and nonylphenoxy carboxylates. *Ann. Chim. (Rome),* 83 (1993) 461-484; *C.A.,* 121 (1994) 49420t.

338 Matsumoto, K., Ichitani, Y., Ogasawara, N., Yuki, H. and Imai, K.: Precolumn fluorescence derivatization of carnitine and acylcarnitines with 4-(2-aminoethylamino)-7-nitro-2,1,3-benzoxadiazole prior to high-performance liquid chromatography. *J. Chromatogr. A,* 678 (1994) 241-247.

339 Matsuo, Y., Yagi, M. and Walser, M.: Arteriovenous differences and tissue concentrations of branched-chain ketoacids. *J. Lab. Clin. Med.,* 121 (1993) 779-784; *C.A.,* 121 (1994) 152451c.

340 Norton, R.A.: Isolation and identification of steryl cinnamic acid derivatives from corn bran. *Cereal Chem.,* 71 (1994) 111-117; *C.A.,* 121 (1994) 56056g.

341 Radin, L., Pronzato, C., Casareto, L. and Calegari, L.: Tartaric acid in wines may be useful for preventing renal calculi: rapid determination by HPLC. *J. Liq. Chromatogr.,* 17 (1994) 2231-2246.

342 Ramos, L.S.: Characterization of mycobacteria species by HPLC and pattern recognition. *J. Chromatogr. Sci.,* 32 (1994) 219-227.

343 Rotondo, D., Earl, C.R.A., Laing, K.J. and Kaimakamis, D.: Inhibition of cytokine-stimulated thymic lymphocyte proliferation by fatty acids: the role of eicosanoids. *Biochim. Biophys. Acta,* 1223 (1994) 185-194.

344 Thibault, A., Figg, W.D., McCall, N., Samid, D., Myers, C.E. and Cooper, M.R.: A simultaneous assay of the differentiating agents, phenylacetic acid and phenylbutyric acid, and one of their metabolites, phenylacetyl-glutamine, by reversed-phase, high performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2895-2900.

345 Vazques Oderiz, M., Vazques Blanco, M.E., Lopez Hernandez, J., Sihal Lozano, J. and Romero Rodriguez, M.A.: Simultaneous determination of organic acids and vitamin C in green beans by liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 1056-1059.

346 Wang, R.Y. and Dienel, G.A.: Ion chromatography with suppressed conductivity detection: recoveries of $^{14}C$-labeled metabolites. *BioTechniques,* 17 (1994) 106-113; *C.A.,* 121 (1994) 199912u.

347 Xu, Z., Li, X., Jiang, J., Yin, X., Shen, S. and Yang, J.: (Determination of the concentration of free fatty acids in the plasma of patients with malignant hematopoietic diseases by gas chromatography). *Sepu,* 12 (1994) 268-269; *C.A.,* 121 (1994) 152467n.

348 Yasaka, Y. and Tanaka, M.: Labeling of free carboxyl groups. *J. Chromatogr. B,* 659 (1994) 139-155 - a review with 84 refs.

For additional information see *C.A.*:
121 (1994) 33305y, 178018s.

See also 17, 65, 157, 163, 207, 237, 366, 434, 1103, 1220.

*11b. Prostaglandins*

349 Barbieri, B., Papadogiannakis, N., Eneroth, P., Hansson, C., Roepstorff, P. and Olding, L.B.: Identification of a substance, previously shown to enhance mitogenesis of human lymphocytes, as the acetamide of *p*-aminobenzoic acid. *Biochim. Biophys. Acta,* 1214 (1994) 309-316.

350 Celardo, A., Dell'Elba, G., Eltantawy, Z.M., Evangelista, V. and Cerletti, C.: Simultaneous determination of leukotrienes $B_4$ and $E_4$ in whole blood and of leukotriene $E_4$ in urine of rabbit by reversed-phase high-performance liquid chromatography. *J. Chromatogr. B,* 658 (1994) 261-269.

351 Deigner, H.P., Wolf, G., Ohlenmacher, U. and Reichling, J.: 1'-Hydroxyeugenol- and coniferylalcohol derivatives as effective inhibitors of 5-lipoxygenase and $Cu^{2+}$-mediated low density lipoprotein oxidation. Evidence for a dual mechanism. *Arzneim.-Forsch.,* 44 (1994) 956-961.

352 Do, U.H., Lo, S.-L., Iles, J., Rosenberger, T., Tam, P., Hong, Y. and Ahern, D.: Tritium isotope effect in high-performance liquid chromatography of eicosanoids. *Prostaglandins, Leukotrienes Essent. Fatty Acids,* 50 (1994) 335-338; *C.A.,* 121 (1994) 74037f.

See also 317, 325.

*11c. Lipids and their constituents*

353 Adosraku, R.K., Choi, G.T.Y., Constantinou-Kokotos, V., Anderson, M.M. and Gibson, W.A.: NMR lipid profiles of cells, tissues, and body fluids: proton analysis of human erythrocyte lipids. *J. Lipid Res.,* 35 (1994) 1025-1931.

354 Andersson, M., Ericsson, J., Appelkvist, E.-L., Schedin, S., Chojnacki, T. and Dallner, G.: Modulations in hepatic branch-point enzymes involved in isoprenoid biosynthesis upon dietary and drug treatments of rats. *Biochim. Biophys. Acta,* 1214 (1994) 79-87.

355 Beljaars, P.R., van Dijk, R. and Houwen-Claassen, A.A.M.: Determination of polymerized triglycerides in frying fats and oils by gel permeation chromatography: interlaboratory study. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 667-671.

356 Bock, K., Vinogradov, E.V., Holst, O. and Brade, H.: Isolation and structural analysis of oligosaccharide phosphates containing the complete carbohydrate chain of the lipopolysaccharide from *Vibrio cholerae* strain H11 (non-01). *Eur. J. Biochem.,* 225 (1994) 1029-1039.

357 Caboni, M.F., Menotta, S. and Lercker, G.: High-performance liquid chromatography separation and light-scattering detection of phospholipids from cooked beef. *J. Chromatogr. A,* 683 (1994) 59-65.

358 Chang, L., Guo, Q., Yu, Z. and Xu, G.: (Chromatographic microanalysis of gangliosides in serum). *Sepu,* 12 (1994) 189-191; *C.A.,* 121 (1994) 152477r.

359 Christie, W.W.: Silver ion and chiral chromatography in the analysis of triacylglycerols. *Prog. Lipid Res.,* 33 (1994) 9-18; *C.A.,* 121 (1994) 155956g.

360 Corradini, S.G., Cantafora, A., Capocaccia, L., Della Guardia, P., Giacomelli, L. and Angelico, M.: Development and validation of a quantitative assay for cholesterol crystal growth in human gallbladder bile. *Biochim. Biophys. Acta,* 1214 (1994) 63-72.

361 Dobarganes, M.C. and Marquez-Ruiz, G.: Size exclusion chromatography in the analysis of lipids. In: Christie, W.W. (Editor), *Adv. Lipid Methodol. - Two,* Oily Press, Dundee, 1993, pp. 113-137; *C.A.,* 121 (1994) 128961y - a review with 134 refs.

362 Dove, S.K., Lloyd, C.W. and Drobak, B.K.: Identification of a phosphatidylinositol 3-hydroxy kinase in plant cells: association with the cytoskeleton. *Biochem. J.,* 303 (1994) 347-350.

363 Estevez, F., Pulford, D., Stark, M.J.R., Carter, A.N. and Downes, C.P.: Inositol trisphosphate metabolism in *Saccharomyces cerevisiae*: identification, purification and properteis of inositol 1,4,5-trisphosphate 6-kinase. *Biochem. J.,* 302 (1994) 709-716.

364 Firestone, D.: Gel permeation liquid chromatographic method for determination of polymerized triglycerides in oils and fats: summary of collaborative study. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 957-960.

365 Firestone, D.: Liquid chromatographic method for the determination of triglycerides in vegetable oils in terms of their partition numbers: summary of collaborative study. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 954-957.

366 Folcik, V.A. and Cathcart, M.K.: Predominance of esterified hydroporoxy-linoleic acid in human monocyte-oxidized LDL. *J. Lipid Res.,* 35 (1994) 1570-1582.

367 Hernandez, A., Cooke, D.T. and Clarkson, D.T.: Lipid composition and proton transport in *Penicillium cyclopium* and *Ustilago maydis* plasma membrane vesicles isolated by two-phase partitioning. *Biochim. Biophys. Acta,* 1195 (1994) 103-109.

368 Hradec, J. and Dufek, P.: Determination of cholesteryl 14-methylhexadecanoate in blood serum by reversed-phase high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 386-389.

369 Jaaskelainen, I. and Urtti, A.: Liquid chromatography determination of liposome components using a light-scattering evaporative detector. *J. Pharm. Biomed. Anal.,* 12 (1994) 977-982.

370 Kazuya, I.-P., Hidari, J., Ichikawa, S., Furukawa, K., Yamasaki, M. and Hirabayashi, Y.: β1-4N-Acetylgalactosaminyltransferase can synthesize both asialoglycosphingolipid $G_{M2}$ and glycosphingolipid $G_{M2}$ *in vitro* and *in vivo*: isolation and characterization of a β1-4N-acetylgalactosaminyltransferase cDNA clone from rat ascites hepatoma cell line AH7974F. *Biochem. J.,* 303 (1994) 957-965.

371 Kodawaki, H., Grant, M.A. and Seyfried, T.N.: Effect of Golgi membrane phospholipid composition on the molecular species of GM3 gangliosides synthesized by rat liver sialyltransferase. *J. Lipid Res.,* 35 (1994) 1956-1964.

372 Liepkalns, V.A., Myher, J.J., Kuksis, A., Leli, U., Freysz, N. and Hauser, G.: Complementary chromatographic analysis of free diacylglycerols and potential glycerophospholipid precursors in human SH-SY5Y neuroblastoma cells following incubation with lithium chloride. *J. Chromatogr. B,* 658 (1994) 223-232.

373 Marquez-Ruiz, G., Perez-Camino, M.C., Rios, J.J. and Dobarganes, M.C.: Characterization of sucrose polyesters-triacylglycerols mixtures. *J. Am. Oil Chem. Soc.,* 71 (1994) 1017-1020.

374 Menzeleev, R.F., Krasnopolsky, Yu.M., Zvonkova, E.N. and Shvets, V.I.: Preparative separation of ganglioside $GM_3$ by high-performance liquid chromatography. *J. Chromatogr. A,* 678 (1994) 183-187.

375 Neff, W.E., Adlof, R.O. and El-Agaimy, M.: Silver ion high-performance liquid chromatography of the triacylglycerols of *Crepis alpina* seed oil. *J. Am. Oil Chem. Soc.,* 71 (1994) 853-855.

376 Noda, N., Tanaka, R., Tsujino, K., Takasaki, Y., Nakano, M., Nishi, M. and Miyahara, K.: Phosphocholine-bonded galactosylceramides having a tri-unsaturated long-chain base from the clam worm, *Marphysa sanguinea. J. Biochem. (Tokyo),* 116 (1994) 435-442.

377 Safari, M. and Kermasha, S.: Interesterification of butterfat by commercial microbial lipases in a cosurfactant - free microemulsion system. *J. Am. Oil Chem. Soc.,* 71 (1994) 969-973.

378 Simoneau, C., Fairley, P., Krochta, J.M. and German, J.B.: Thermal behavior of butterfat fractions and mixtures of tripalmitin and butterfat. *J. Am. Oil Chem. Soc.,* 71 (1994) 795-801.

379 Suortti, T., Forssell, P., Aura, A.-M., Mustranta, A. and Poutanen, K.: Reevaluation of refractive index detector for the lipid and phospholipid analysis. In: Maikki, Y. and Lambertsen, G. (Editors), *Nord. Lipid Symp., Proc. 17th, 1993,* Scand. Forum Lipid Res. Technol., Bergen, 1993, pp. 217-221; *C.A.,* 121 (1994) 156052w.

380 Valeur, A., Olsson, N.U., Kaufmann, P., Wada, S., Kroon, C.G., Westerdahl, G. and Odham, G.: Quantification and comparison of some natural sphingomyelins by online high-performance liquid chromatography/discharge-assisted thermospray mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 313-319; *C.A.,* 121 (1994) 30468t.

381 Weete, J.D., Betageri, S. and Griffith, G.L.: Improvement of lecithin as an emulsifier for water-in-oil emulsions by thermalization. *J. Am. Oil Chem. Soc.,* 71 (1994) 731-737.

382 Yamaguchi, Y., Sasagasako, N., Goto, I. and Kobayashi, T.: The synthetic pathway for glucosylsphingosine in cultured fibroblasts. *J. Biochem. (Tokyo),* 116 (1994) 704-710.

383 Yohe, H.C.: Removal of borate from tritiated gangliosides *via* the mannitoborate complex. *J. Lipid Res.,* 35 (1994) 2100-2102.

384 Ziegleder, G., Geier-Greguska, J. and Grapin, J.: HPLC - Analyse von Fettreif. *Fat Sci. Technol.,* 96 (1994) 390-394.

For additional information see *C.A.*:
121 (1994) 129386b.

See also 69, 389, 469, 915.

*11d. Lipoproteins and their constituents*

385 Evans, G.F., Bensch, W.R., Apelgren, L.D., Bailey, D., Kauffman, R.F., Bumol, T.F. and Zuckerman, S.H.: Inhibition of cholesteryl ester transfer protein in normocholesterolemic hamsters: effects on HDL subspecies, quantity, and apolipoprotein distribution. *J. Lipid Res.,* 35 (1994) 1634-1645.

386 Ikewaki, K., Rader, D.J., Zech, A. and Brewer, K.B., Jr.: *In vivo* metabolism of apolipoproteins A-I and E in patients with abetalipoproteinemia: implications for the roles of apolipoproteins B and E in HDL metabolism. *J. Lipid Res.,* 35 (1994) 1809-1819.

387 Ishigami, M., Yamashita, S., Sakai, N., Arai, T., Hirano, K.-i., Hiraoka, H., Kameda-Takemura, K. and Matsuzawa, Y.: Large and cholesteryl ester-rich high-density lipoproteins in cholesteryl ester transfer protein (CETP) deficiency can not protect macrophages from cholesterol accumulation induced by acetylated low-density lipoproteins. *J. Biochem. (Tokyo),* 116 (1994) 257-262.

388 Lopez, J., Latta, M., Collet, X., Vanloo, B., Jung, G., Denefle, P., Rosseneu, M. and Chambaz, J.: Purification and characterization of recombinant human apolipoprotein A-II expressed in *Escherichia coli. Eur. J. Biochem.,* 225 (1994) 1141-1150.

389 Ragolia, L. and Tropp, B.E.: The effects of phosphoglycerides on *Escherichia coli* cardiolipin synthase. *Biochim. Biophys. Acta,* 1214 (1994) 323-332.

390 Tallis, G.A., Shephard, M.D.S. and Whiting, M.J.: Lipoprotein profiling by high performance gel chromatography. *Clin. Chim. Acta,* 228 (1994) 171-179.

See also 520.

12. ORGANIC PEROXIDES

391 Pinkernell, U., Karst, U. and Cammann, K.: Determination of peroxyacetic acid using high-performance liquid chromatography with external calibration. *Anal. Chem.,* 66 (1994) 2599-2602.

See also 1158.

13. STEROIDS

*13a. General techniques*

392 Sadlej-Sosnowska, N.: Structure retention relationship for steroid hormones. Functional groups as structural descriptors. *J. Liq. Chromatogr.,* 17 (1994) 2319-2330.

For additional information see *C.A.*:
121 (1994) 196102u, 196103v.

See also 65, 157.

*13b. Pregnane and androstane derivatives*

393 Courtheyn, D., Verheye, N., Bakeroot, V., Dal, V., Schilt, R., Hooijerink, H., van Bennekom, E.O., Haasnoot, W., Stouten, P., et al.: Detection of corticosteroids in animal feed and premixes: a new category of growth promoters. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 251-256; *C.A.,* 121 (1994) 177964k.

394 Euerby, M.R., Johnson, C.M., Lewis, R.J. and Nichols, S.C.: The S-oxidative degradation of a novel corticosteroid tipredane (INN). Part II - detailed investigations into the primary S-oxidation of tipredane using achiral oxidants. *J. Pharm. Biomed. Anal.,* 12 (1994) 761-769.

395 Hendriks, L., Courtheyn, D., Gielen, B., Leyssens, L. and Raus, J.: A multiresidue method for the detection of anabolic steroids in fecal samples of living animals: screening and confirmation of "real samples". In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht, Univ. Fac. Vet. Med., Utrecht, 1993, pp. 367-371; *C.A.,* 121 (1994) 177969r.

396 Krynetsky, E.Yu., Kovaleva, I.E. and Luzikov, V.N.: (Heterological expression of functionally active human cytochromes P450. Cytochrome P450IIIA4 catalyzes the biotransformation of the anabolic steroid hormone methandrostenolone). *Biokhimiya (Moscow),* 59 (1994) 282-287.

397 Lykkesfeldt, J., Loft, S. and Poulsen, H.E.: Simultaneous determination of urinary free cortisol and 6β-hydroxycortisol by high-performance liquid chromatography to measure human CYP3A activity. *J. Chromatogr. B,* 660 (1994) 23-29.

398 Olah, T.V., Gilbert, J.D., Barrish, A., Greber, T.F. and McLoughlin, D.A.: A rapid and specific assay, based on liquid chromatography-atmospheric pressure chemical ionization mass spectrometry, for the determination of MK-434 (a 5α-reductase inhibitor) and its metabolites in plasma. *J. Pharm. Biomed. Anal.*, 12 (1994) 705-712.

399 Stanley, S.M.R., Wilhelmi, B.S., Rodger, J.P. and Guthrie, A.: Detection of corticosteroids by high-performance liquid chromatography/negative ion chemical ionization mass spectrometry using a particle beam interface. *Biol. Mass Spectrom.*, 23 (1994) 483-491; *C.A.*, 121 (1994) 127236d.

For additional information see *C.A.*:
121 (1994) 74064n.

*13c. Estrogens*

400 Novakovic, J., Tvrzicka, E. and Pacakova, V.: High-performance liquid chromatographic determination of equine estrogens with ultraviolet absorbance and electrochemical detection. *J. Chromatogr. A*, 678 (1994) 359-363.

401 Tacey, R.L., Harman, W.J. and Kelly, L.L.: Development of a highly sensitive and specific assay for plasma ethinylestradiol using combined extraction, liquid chromatography and radioimmunoassay. *J. Pharm. Biomed. Anal.*, 12 (1994) 1303-1310.

For additional information see *C.A.*:
121 (1994) 141419x, 196112x.

*13d. Sterols*

402 Casiraghi, E., Lucisano, M., Pompei, C. and Dellea, C.: Cholesterol determination in butter by high performance chromatography. *Milchwissenschaft*, 49 (1994) 194-196; *C.A.*, 121 (1994) 103616v.

403 Grob, K., Giuffre, A.M., Leuzzi, U. and Mincione, B.: Recognition of adulterated oils by direct analysis of the minor components. *Fat Sci. Technol.*, 96 (1994) 286-290.

404 Grob, K., Giufree, A.M., Biedermann, M. and Bronz, M.: The detection of adulteration with desterolized oils. *Fat. Sci. Technol.*, 96 (1994) 341-345.

405 Plank, C. and Lorbeer, E.: On-line liquid chromatography-gas chromatography for the analysis of free and esterified sterols in vegetable oil methyl esters used as diesel fuel substitutes. *J. Chromatogr. A*, 683 (1994) 95-104.

406 Salen, G., Batta, A.K., Tint, G.S., Shefer, S. and Ness, G.C.: Inverse relationship between plasma cholestanol concentrations and bile acid synthesis in sitosterolemia. *J. Lipid Res.*, 35 (1994) 1878-1887.

For additional information see *C.A.*:
121 (1994) 199914w.

See also 334, 353, 368.

*13e. Bile acids and alcohols*

407 Crawford, J.M., Strahs, D.C.J., Crawford, A.R. and Barnes, S.: Role of bile salt hydrophobicity in hepatic microtubule-dependent bile salt secretion. *J. Lipid Res.*, 35 (1994) 1738-1748.

408 Hagey, L.R., Schteingart, C.D., Ton-Nu, H.-T. and Hofmann, A.F.: Biliary bile acids of fruit pigeons and doves (Columbiformus): presence of 1β-hydroxy-chenodeoxycholic acid and conjugation with glycine as well as taurine. *J. Lipid Res.*, 35 (1994) 2041-2048.

409 Levy, J., Budai, K. and Jawitt, N.B.: Bile acid synthesis in HepG2 cells: effect of cyclosporin. *J. Lipid Res.*, 35 (1994) 1795-1800.

410 Marschall, H.-U., Griffiths, W.J., Zhang, J., Wietholtz, H., Matern, H., Matern, S. and Sjövall, J.: Positions of conjugation of bile acids with glucose and N-acetylglucosamine *in vitro*. *J. Lipid Res.*, 35 (1994) 1599-1610.

411 Ohshima, A., Kuramoto, T. and Hoshita, T.: Biochemical studies of inherited diseases related to abnormal cholesterol metabolism. I. High-performance liquid chromatographic analysis of bile alcohol glucuronides in cerebrotendinous xanthomatosis. *Biol. Pharm. Bull.*, 17 (1994) 721-723; *C.A.*, 121 (1994) 129044p.

412 Wahlen, E., Tamasawa, N., Ichimiya, H., Egestad, B. and Sjövall, J.: Conditions for solid-phase extraction of urinary bile acids with octadecylsilane-bonded silica. *J. Lipid Res.*, 35 (1994) 1902-1906.

413 Yoshii, M., Une, M., Kihira, K., Kuramoto, T., Akizawa, T., Yoshioka, M., Butler, V.P., Jr. and Hoshita, T.: Bile salts of the toad, *Bufo marinus*: characterization of a new unsaturated higher bile acid, 3α,7α,12α,26-tetrahydroxy-5β-cholest-23-en-27-oic acid. *J. Lipid Res.*, 35 (1994) 1646-1651.

See also 406.

*13g. Other steroids*

For additional information see *C.A.*:
121 (1994) 141829f.

## 14. STEROID GLYCOSIDES AND SAPONINS

414 Pekic, B. and Slavica, B.: High-performance liquid chromatographic determination of digoxin, α- and β-methyldigoxin. *Zb. Matice Srp. Prir. Nauke*, 84 (1993) 73-78; *C.A.*, 121 (1994) 117846p.

See also 217.

## 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

*15a. Terpenes*

415 Ando, M., Kikuchi, K., Isogai, K., Ishiwatari, T., Hirata, N. and Yamazaki, H.: Synthetic studies of sesquiterpene with a *cis*-fused decalin system. 5. A synthetic approach to the study of structure-activity relationships of the termiticidal norsesquiterpenoids, chamaecynone and related compounds. *J. Natural Prod.*, 57 (1994) 924-933.

416 Denyer, C.V., Jackson, P., Loakes, D.M., Ellis, M.R. and Young, D.A.B.: Isolation of antirhinoviral sesquiterpene from ginger (*Zingiber officinale*). *J. Natural Prod.*, 57 (1994) 658-664.

417 LeFever, R.E., Vogel, B.S. and Croteau, R.: Diterpenoid resin acid biosynthesis in conifers: enzymatic cyclization of geranylgeranyl pyrophosphate to abietadiene, the precursor of abaietic acid. *Arch. Biochem. Biophys.,* 313 (1994) 139-149.

418 Mattina, M.J.I. and MacEachern, G.J.: Extraction, purification by solid-phase extraction and high-performance liquid chromatographic analysis of taxanes from ornamental *Taxus* needles. *J. Chromatogr. A,* 679 (1994) 269-275.

419 Okamura, N., Fujimoto, Y., Kuwabara, S. and Yagi, A.: High-performance liquid chromatographic determination of carnosic acid and carnosol in *Rosmarinus officinalis* and *Salvia officinalis*. *J. Chromatogr. A,* 679 (1994) 381-386.

*15b. Essential oils*

420 Lux, I. and Popesku, H.: (Application of chromatography reagents to the identification of volatile oils). *Farmacia (Bucharest),* 41 (1993) 15-23; *C.A.*, 121 (1994) 65264a.

*15c. Bitter substances*

421 Buckee, G.K.: Determination of iso-alpha- and beta-acids in hop and isomerized hop extracts: a collaborative trial. *Tech. Q.-Master Brew. Assoc. Am.,* 30 (1993) 180-183; *C.A.*, 121 (1994) 156036u.

422 Buckee, G.K.: Determination of iso-alpha-, alpha- and beta-acids in hop and isomerized hop extracts: a collaborative trial. *J. Inst. Brew.,* 100 (1994) 151-153; *C.A.*, 121 (1994) 177998z.

16. NITRO AND NITROSO COMPOUNDS

423 Feltes, J. and Koll, J.: GC and HPLC with selective detection for the determination of explosives in water and soil. *LC-GC Int.,* 7, No. 12 (1994) 698-701.

424 Hochberg, E., Liang, Y.L. and Chen, T.H.: Rapid method for the analysis of PAX-2A. *Int. Annu Conf. ICT,* 24th (1994) 12-1/12-10; *C.A.*, 121 (1994) 38720q.

425 Voznakova, Z. and Tesarova, E.: (Determination of nitrophenols and alkylphenols by GC and HPLC). *Chem. Listy,* 88 (1994) 393-400; *C.A.*, 121 (1994) 72787b.

See also 449, 1087.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

*17a. Amines and polyamines*

426 Bovingdon, M.E. and Webster, R.A.: Derivatization reactions for neurotransmitters and their automation. *J. Chromatogr. B,* 659 (1994) 157-183 - a review with 106 refs.

427 Huebert, N.D., Schwach, V., Richter, G., Zreika, M., Hinze, C. and Haegele, K.D.: The measurement of β-phenylethylamine in human plasma and rat brain. *Anal. Biochem.,* 221 (1994) 42-47.

428 Kalligas, G., Kaniou, I., Zachariadis, G., Tsoukali, H. and Epivatianos, P.: Thin layer and high pressure liquid chromatographic determination of histamine in fish tissues. *J. Liq. Chromatogr.,* 17 (1994) 2457-2468.

429 Maisch, A., Maier-Rosenkranz, J., Kupka, A. and Foeldi, P.: (Pre-column derivatization of biochemical relevant amines). *Labor-Praxis,* 18 (1994) 48-56; *C.A.*, 121 (1994) 49354z - a review with 16 refs.

430 Mao, J., Dennis, M.W., Foster, R. and Fackler, P.H.: Analysis of diethylenetriamine in water and soil at ppb levels by high performance liquid chromatography with fluorescence detection. *J. Liq. Chromatogr.,* 17 (1994) 2485-2494.

431 Maurer, W., Nuennerich, P., Hohaus, E., York, H., Schleser, B. and Breuer, D.: (Development and application of a method for the quantitative determination of mono-, di- and triethanolamine in cooling lubricants with respect to the German technical regulation TRGS611). *Staub-Reinhalt. Luft,* 54 (1994) 239-245; *C.A.*, 121 (1994) 137247x.

432 Mei, Y.-H.: A sensitive and fast method for the determination of polyamines in biological samples. Benzoyl chloride pre-column derivatization high-performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2413-2418.

433 Nakazato, M., Saito, K., Morozumi, S., Wauke, T., Ishikawa, F., Fujinuma, K., Moriyasu, T., Nishima, T. and Tamura, Y.: (Determination of putrefactive non-volatile amines in foods following sample cleanup by solid phase extraction). *Jpn. J. Toxicol. Environ. Health,* 40 (1994) 203-209; *C.A.*, 121 (1994) 81212n.

434 Oi, N., Kitahara, H. and Aoki, F.: (Enantiomer separation of amines and carboxylic acids by HPLC with chiral copper(II) complexes as stationary phases). *Kuromatogurafi,* 14 (1993) 88-89; *C.A.*, 121 (1994) 194583c.

435 Tao, Y., Skrenta, H.M. and Chen, K.Y.: Deoxyhypusine synthase assay based on the use of polyhistidine-tagged substrate and metal chelate-affinity chromatography. *Anal. Biochem.,* 221 (1994) 103-108.

436 Walbroehl, Y. and Wagner, J.: Enantiomeric resolution of primary amines by capillary electrophoresis and high-performance liquid chromatography using chiral crown ethers. *J. Chromatogr. A,* 680 (1994) 253-261.

437 Yamazaki, S., Saito, K. and Tanimura, T.: Enantiomeric separation of underivatized aliphatic and aromatic β-aminoalcohols by reversed-phase liquid chromatography with a chiral mobile phase. *J. Liq. Chromatogr.,* 17 (1994) 2559-2567.

See also 17, 65, 104, 167, 338, 439, 478.

*17b. Catecholamines and their metabolites*

438 Carter, A.J.: Microbore high-performance liquid chromatographic method for the measurement of dopamine and its metabolites: recommendations for optimal sample collection and storage. *J. Chromatogr. B,* 660 (1994) 158-163.

439 Grosclaude, J.M., Nembo, B., Barreteau, H., Elkihel, L., Trouvin, J.-H., Jacquot, C., Gayral, P. and Goudey-Perrière, F.: Influence of sample recovery techniques on detection of biogenic amines in the rat hookworm *Nippostrongylus brasiliensis*. *J. Liq. Chromatogr.,* 17 (1994) 2705-2721.

440 Gumbhir, K. and Mason, W.D.: Determination of *m*-hydroxymandelic acid, *m*-hydroxyphenylglycol and their conjugates in human plasma using liquid chromatography with electrochemical detection. *J. Pharm. Biomed. Anal.*, 12 (1994) 943-949.

441 Justice, J.B., Jr., Newton, A.P. and Smith, A.D.: *In vivo* monitoring of neurotransmitters with voltammetry and smallbore HPLC. *J. Chin. Chem. Soc. (Taipei)*, 41 (1994) 287-292; *C.A.*, 121 (1994) 27067f.

442 Mashige, F., Takai, N., Matsushima, Y., Ito, A., Takano, M., Tsuchiya, E., Kanazawa, H., Nagata, Y., Shinozuka, N., et al.: (Simultaneous determination of catecholamines, serotonin, and their precursors and metabolites in body fluid by an HPLC system with multi-electrode electrochemical detector). *Rinsho Byori*, 42 (1994) 591-599; *C.A.*, 121 (1994) 73955s - a review with 9 refs.

443 Radjaipour, M., Raster, H. and Liebich, H.M.: Quantitation of urinary catecholamines, their abundant metabolites, and 5-hydroxyindoleacetic acid by high performance liquid chromatography and electrochemical detection, using a single mobile phase and uniform isocratic conditions. *Eur. J. Clin. Chem. Clin. Biochem.*, 32 (1994) 609-613.

444 Sallstrom Baum, S. and Rommelspacher, H.: Determination of total dopamine, R- and S-salsolinol in human plasma by cyclodextrin bonded-phase liquid chromatography with electrochemical detection. *J. Chromatogr. B*, 660 (1994) 235-241.

445 Simon-Sarkadi, L. and Holzapfel, W.H.: Determination of biogenic amines in leafy vegetables with an amino acid analyzer. *Z. Lebensm.-Unters. Forsch.*, 198 (1994) 230-233; *C.A.*, 121 (1994) 177959n.

446 Watanabe, Y., Shimada, N., Kiso, K., Kakihana, K. and Shibuya, T.: (Real-time observation of changes in monoamine levels in cultured cerebellar granule cells under hypoxia using a newly developed microdialysis method). *Neurosciences (Okayama)*, 20(Suppl.) (1994) P5-P8; *C.A.*, 121 (1994) 199937f.

For additional information see *C.A.*:
121 (1994) 77542c, 170704s.

See also 73.

*17c. Urea and guanidine derivatives*

447 Walker, T.A.: A liquid chromatographic assay for urea in over-the-counter carbamide peroxide products. *J. Pharma. Biomed. Anal.*, 12 (1994) 1277-1282.

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

448 Huynh, C.K., Vu-Duc, T. and Guillemin, M.: (Analysis of volatile and tobacco-specific altrosamines in the smoke of some cigaret brands sold in the Swiss market). *Mitt. Geb. Lebensmitteluntersuch. Hyg.*, 84 (1993) 281-290; *C.A.*, 121 (1994) 172340u.

449 Zhou, Z.Y., Dauphin, C., Prognon, P. and Hamon, M.: Luminarin 9: a new fluorescent reagent for the precolumn derivatization of main volatile and non-volatile N-nitrosamines in RP-HPLC. *Chromatographia*, 39 (1994) 185-191.

For additional information see *C.A.*:
121 (1994) 141902z.

See also 1063, 1178.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

*18a. Amino acids and their derivatives*

450 Aminuddin, M. and Miller, J.N.: A fast liquid chromatographic method for the determination of amino acids. *J. Chem. Soc. Pak.*, 16 (1994) 17-20; *C.A.*, 121 (1994) 152474n.

451 Arnold, U., Ludwig, E., Kuehn, R. and Moeschwitzer, U.: Analysis of free amino acids in green coffee beans. Part 1. Determination of amino acids after precolumn derivatization using 9-fluorenylmethylchloroformate. *Z. Lebensm.-Unters. Forsch.*, 199 (1994) 22-25; *C.A.*, 121 (1994) 132515y.

452 Brückner, H. and Westhauser, T.: Chromatographic determination of D-amino acids as native constituents of vegetables and fruits. *Chromatographia*, 39 (1994) 419-426.

453 Bruckner, H., Haasmann, S. and Friedrich, A.: Quantification of D-amino acids in human urine using GC-MS and HPLC. *Amino Acids*, 6 (1994) 205-211; *C.A.*, 121 (1994) 152698p.

454 Chen, B. and Guo, M.: (High performance liquid chromatographic Pico-Tag analysis of amino acids in pteridophyte). *Sepu*, 12 (1994) 293-294; *C.A.*, 121 (1994) 156061y.

455 Dall'Olio, G., Gheller, A., Negri, M., Magrone, V.F., Mezzena, G., Spellanzon, M. and Soffiati, G.: Measurement of urinary hydroxyproline using high-pressure liquid chromatography: reference range for Nordin's test. *Eur. J. Lab. Med.*, 1 (1993) 147-150; *C.A.*, 121 (1994) 152443b.

456 Effenhauser, C.S. and Manz, A.: Miniaturizing a whole analytical laboratory down to chip size. *Int. Lab.*, 24, No. 9 (1994) 10-12.

457 Forgacs, E.: Study of the binding of sodium dodecylsulfate to dibasic amino acids by reversed-phase chromatography. *Fresenius J. Anal. Chem.*, 349 (1994) 743-745.

458 Fu, S., Fan, C., Zhang, S., Wei, F. and Zhao, T.: (Chiral precolumn derivatization high performance liquid chromatographic resolution of aspartic acid in dentin). *Sepu*, 12 (1994) 287-288; *C.A.*, 121 (1994) 152468p.

459 Janak, J., Billiet, H.A.H., Frank, J., Luyben, K.C.A.M. and Husek, P.: Separation of selenium analogues of sulphur-containing amino acids by high-performance liquid chromatography and high-resolution gas chromatography. *J. Chromatogr. A*, 677 (1994) 192-196.

460 Jianying, Z., Machida, Y., Sugahara, K. and Kodama, H.: Determination of D,L-propargylglycine and N-acetylpropargylglycine in urine and several tissues of D,L-propargylglycine-treated rats using liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 660 (1994) 375-379.

461 Korakas, D., Valkó, K., Sakarellos, C., Sakarellos-Daisiotis, M. and Gibbons, W.A.: Analytical and semi-preparative separation of diastereomeric lipidic amino acid conjugates. *J. Pharm. Biomed. Anal.*, 12 (1994) 1141-1145.

462 Lange, M. and Mályusz, M.: Improved determination of small amounts of free hydroxyproline in biological fluids. *Clin. Chem. (Washington)*, 40 (1994) 1735-1738.

463 Ma, Y. and Ito, Y.: Separations of basic amino acid benzyl esters by pH-zone-refining counter-current chromatography. *J. Chromatogr. A*, 678 (1994) 233-240.

464 McBroom, T., Stubbs, H.J., Wadhwa, M.S., Thomas, V.H. and Rice, K.G.: Reversal of tyrosinamide-oligosaccharide derivatization by Edman degradation. *Anal. Biochem.,* 222 (1994) 243-250.

465 Okuma, E. and Abe, H.: Simultaneous determination of D- and L-amino acids in the nervous tissues of crustaceans using precolumn derivatization with (+)-1-(9-fluorenyl)ethyl chloroformate and reversed-phase ion-pair high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 243-250.

466 Pernigo, N., Faccioli, D. and Ravizza, L.: (HPLC analysis of perfusion solutions of L-amino acids by using precolumn derivatization with 9-fluorenylmethylchloroformate). *Riv. Tossicol.: Sper. Clin.,* 23 (1993) 49-61; *C.A.,* 121 (1994) 117875x.

467 Ramseier, U. and Chang, J.-Y.: Modification of cysteine residues with N-methyl iodoacetamide. *Anal. Biochem.,* 221 (1994) 231-233.

468 Saito, K., Itaya, T., Horie, M., Nakazawa, H. and Imanari, T.: Estimation of arginine metabolism in putrefactive bacteria using liquid chromatography. *Jpn. J. Toxicol. Environ. Health.,* 40 (1994) 140-146; *C.A.,* 121 (1994) 30141f.

469 Seenaiah, B. and Ellingson, J.S.: High-performance liquid chromatographic method for determination of the metabolism of polyunsaturated molecular species of phosphatidylserine labeled in the polar group. *J. Chromatogr. B,* 660 (1994) 380-385.

470 Strydom, D.J. and Cohen, S.A.: Comparison of amino acid analyses by phenylisothiocyanate and 6-aminoquinolyl-N-hydroxysiccinimidyl carbamate precolumn derivatization. *Anal. Biochem.,* 222 (1994) 19-28.

471 Szókán, G., Hadfi, S., Krizsán, K., Liembeck, A., Krecz, I., Almás, M. and Somlai, C.: HPLC determination of enantiomeric purity of protected amino acid derivatives used in peptide synthesis. *J. Liq. Chromatogr.,* 17 (1994) 2759-2775.

472 Teerlink, T.: Derivatization of posttranslationally modified amino acids. *J. Chromatogr. B,* 659 (1994) 185-207 - a review with 183 refs.

473 Van Eijk, H.M.H., Huinck, M.P.L., Rooyakkers, D.R. and Deutz, N.E.P.: Automated simultaneous isolation and quantitation of labeled amino acid fractions from plasma and tissue by ion-exchange chromatography. *J. Chromatogr. B,* 660 (1994) 251-257.

474 Wang, Q., Yan, B., Wang, S. and Tao, X.: (Computer-assisted optimization of separation of amino acids in column chromatography). *Gaodeng Xuexiao Huaxue Xuebao,* 15 (1994) 72-74; *C.A.,* 121 (1994) 72750j.

475 Whiting, M.J., Rutten, A.J., Williams, P. and Bersten, A.D.: Determination of $N^G$-nitro-L-arginine and $N^G$-nitro-L-arginine methyl ester in plasma by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 170-175.

476 Yang, Y., Qin, Q. and Guo, W.: (Separation and quantitative analysis of amino acids derivatized with phenyl isocyanate by high performance liquid chromatography). *Sepu,* 12 (1994) 295-296; *C.A.,* 121 (1994) 194596j.

477 Yoshihara, K., Mochidome, N., Hara, T., Osada, S., Takayama, A. and Nagata, M.: Urinary excretion levels of hydroxylysine glycosides in osteoporotic patients. *Biol. Pharm. Bull.,* 17 (1994) 836-839; *C.A.,* 121 (1994) 199957n.

478 Yu, J.H., Li, G.D., Krull, I.S. and Cohen, S.: Polymeric 6-aminoquinoline, an activated carbamate reagent for derivatization of amines and amino acids by high-performance liquid chromatography. *J. Chromatogr. B,* 658 (1994) 249-260.

See also 65, 89, 125, 167, 169, 246, 330, 344, 426, 552, 651, 872, 985.

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

479 Akiyama, T.H., Sasagawa, T., Suzuki, M. and Titani, K.: A method for selective isolation of the amino-terminal peptide from α-amino-blocked proteins. *Anal. Biochem.,* 222 (1994) 210-216.

480 Bordlin, G., Cordeiro Raposo, F. and Rodriguez, A.R.: Chromatographic characterization of a hexapeptide containing three thiol groups, intrinsic to the metallothionein structure. *Chromatographia,* 39 (1994) 146-154.

481 Calvaruso, G., Tesoriere, G., Vento, R., Giuliano, M. and Carabillò, M.: High-performance liquid chromatographic method for the determination of insulin synthesis in biological systems. *J. Chromatogr. B,* 660 (1994) 259-264.

482 Chang, J.P.: Non-denaturing potency assay for bovine somatotropin. *PCT Int.,* Appl. WO 94 17,403 (Cl. GO1N30/02), 04 Aug. 1994, US Appl. 9,034, 26 Jan. 1993; 38 pp.; *C.A.,* 121 (1994) 174653x.

483 Dass, C., Mahalakshmi, P. and Grandberry, D.: Manipulation of ion-pairing reagents for reversed-phase high-performance liquid chromatographic separation of phosphorylated opioid peptides from their non-phosphorylated analogues. *J. Chromatogr. A,* 678 (1994) 249-257.

484 Demin, A.A., Malinin, V.V., Shataeva, L.K. and Chernova, I.A.: Chromatographic methods for isolation of the immunostimulative peptides of milk whey. *Prikl. Biokhim. Mikrobiol.,* 30 (1994) 311-315; *C.A.,* 121 (1994) 55381x.

485 Duve, H., Johnsen, A.H., Scott, A.G., East, P. and Thorpe, A.: [$Hyp^3$]Met-Callatostatin. Identification and biological properteis of a novel neuropeptide from the blowfly *Calliphora vomitoria*. *J. Biol. Chem.,* 269 (1994) 21059-21066.

486 Electricwala, A.: Isolation of prolactin from human pituitary glands: some safety aspects of an improved partial purification procedure. *Bioseparation,* 4 (1994) 263-269; *C.A.,* 121 (1994) 170707v.

487 Ertel, E.A., Warren, V.A., Adams, M.E., Griffin, P.R., Cohen, C.J. and Smith, M.M.: Type III ω-agatoxins: a family of probes for similar binding sites on L- and N-type calcium channels. *Biochemistry,* 33 (1994) 5098-5108.

488 Fainzilber, M., Hasson, A., Oren, R., Burlingame, A.L., Gordon, D., Spira, M.E. and Zlotkin, E.: New mollusc-specific α-conotoxins block *Aplysia* neuronal acetylcholine receptors. *Biochemistry,* 33 (1994) 9523-9529.

489 Fridland, G.H. and Desiderio, D.M.: Detection of bovine pituitary opioid precursors during gel permeation using trypsin and cyanogen bromide treatment followed by radioimmunoassay. *Anal. Lett.,* 27 (1994) 2117-2125.

490 Garcia, M.L., Garcia-Calvo, M., Hidalgo, P., Lee, A. and MacKinnon, R.: Purification and characterization of three inhibitors of voltage-dependent $K^+$ channels from *Leiurus quinquestriatus* var. *hebraeus* venom. *Biochemistry,* 33 (1994) 6834-6839.

491 Gregoriou, M., Willis, A.C., Pearson, M.A. and Crawford, C.: The calpain cleavage sites in the epidermal growth factor receptor kinase domain. *Eur. J. Biochem.,* 223 (1994) 455-464.

492 Hober, S., Hansson, A., Uhlen, M. and Nilsson, B.: Folding of insulin-like growth factor I is thermodynamically controlled by insulin-like growth factor binding protein. *Biochemistry,* 33 (1994) 6758-6761.

493 Honjo, T. and Shibata, H.: Purification of human transforming growth factor-β (TGF-β). *Jpn. Kokai Tokkyo Koho* JP 06,145,197 [94,145,197] (Cl. C07K15/06), 24 May 1994, Appl. 92/322,471, 06 Nov. 1992; 5 pp; *C.A.,* 121 (1994) 100702r.

494 Ishibashi, J., Kataoka, H., Isogai, A., Kawakami, A., Saegusa, H., Yagi, Y., Mizoguchi, A., Ishizaki, H. and Suzuki, A.: Assignment of disulfide bond location in prothoracicotropic hormone of the silkworm, *Bombyx mori*: a homodimeric peptide. *Biochemistry,* 33 (1994) 5912-5919.

495 Johnsen, A.H.: Identification of cholecystokinin from frog and turtle. Divergence of cholecystokinin and gastrin occured before the evolution of amphibia. *Eur. J. Biochem.,* 224 (1994) 691-702.

496 Kung, W., David, F., Langen, H., Weyer, K.A., Schlaeger, E.-J., Lahm, H.-W., Silber, E., Mueller, H. and Eppenberger, U.: Isolation of a heregulin-like growth factor secreted by estrogen receptor-negative MDA-MB-231 human breast cancer cells that stimulated estrogen receptor-positive cells. *Biochem. Biophys. Res. Commun.,* 202 (1994) 1357-1365.

497 Laidler, P., Cowan, D.A., Hider, R.C. and Kicman, A.T.: New decision limits and quality-control material for detecting human chorionic gonadotropin misuse in sports. *Clin. Chem. (Washington),* 40 (1994) 1306-1311.

498 Lenz, V.J., Gattner, H.-G., Leithäuser, M., Brandenburg, D., Wollmer, A. and Höcker, H.: Proteolyses of a fluorogenic insulin derivative and native insulin in reversed micelles monitored by fluorescence emission reversed-phase high-performance liquid chromatography and capillary zone electrophoresis. *Anal. Biochem.,* 221 (1994) 85-93.

499 Liu, Q. and Lin, Q.: (Determination of two small peptides in serum and nutrition solution by high-performance liquid chromatography). *Zhonghua Yixue Jianyan Zazhi,* 17 (1994) 84-86; *C.A.,* 121 (1994) 199922x.

500 Marastoni, M., Salvadori, S., Scaranari, V., Spisani, S., Reali, E., Traniello, S. and Tomatis, A.: Synthesis and activity of new linear and cyclic peptide T derivatives. *Arzneim.-Forsch.,* 44 (1994) 1073-1076.

501 Mor, A., Amiche, M. and Nicolas, P.: Structure, synthesis, and activity of dermaseptin B, a novel vertebrate defensive peptide from frog skin: relationship with adenoregulin. *Biochemistry,* 33 (1994) 6642-6650.

502 Nokihara, K., Kiffe, M., Yokomizo, Y., Nakamura, S. and Nishine, T.: Large-scale continuous-flow peptide synthesis with solvent and acyl component recovery. *Int. Lab.,* 24, No. 9 (1994) 15-18.

503 Odum, L. and Johnsen, A.H.: Human seminal plasma contains somatostatin. *Biochem. J.,* 303 (1994) 263-268.

504 Paloheimo, L.I. and Rehfeld, J.F.: A processing-independent assay for human procholecystokinin and its products. *Clin. Chim. Acta,* 229 (1994) 49-65.

505 Pyo, D. and Lee, M.: Chemical analysis of microcystins RR and LR in cyanobacterium using a prepacked cyano cartridge. *Chromatographia,* 39 (1994) 427-430.

506 Rehfeld, J.F. and Johnsen, A.J.: Identification of gastrin component I as gastrin-71. The largest possible bioactive progastrin product. *Eur. J. Biochem.,* 223 (1994) 765-773.

507 Saelsen, L., Andersen, H.B., Bratholm, P. and Christensen, N.J.: Radioimmunoassay of plasma neuropeptide Y using HPLC for separation of related peptides and fragments. *Scand. J. Clin. Lab. Invest.,* 54 (1994) 207-214; *C.A.,* 121 (1994) 27051w.

508 Stacey, C.C., Kruppa, G.H., Watson, C.H., Wronka, J., Laukien, F.H., Banks, J.F. and Whitehouse, C.M.: Reverse-phase liquid chromatography/electrospray-ionization Fourier-transform mass spectrometry in the analysis of peptides. *Rapid Commun. Mass Spectrom.,* 8 (1994) 513-516; *C.A.,* 121 (1994) 129325f.

509 Straub, J.A., Akiyama, A., Parmar, P. and Musso, G.F.: Limited enzymatic digestion for the determination of the quantities of minor diastereomeric impurities in preparations of RMP-7, a peptide containing a reduced peptide bond. *J. Chromatogr. A,* 679 (1994) 85-91.

510 Teal, P.E.A. and Nachman, R.J.: Separation of neuropeptides by inverse gradient reversed-phase liquid chromatography on a bonded phenyl support. *Anal. Biochem.,* 221 (1994) 422-425.

511 Tetaert, D., Briand, G., Soudan, G., Richet, C., Demeyer, D., Boersma, A. and Degand, P.: Analysis by electrospray mass spectrometry of glycopeptides from *in vitro* oxyglycosylation reaction using human mucin motif peptide. *Anal. Biochem.,* 222 (1994) 409-416.

512 Török, A., Vecsernyes, M. and Penke, B.: Affinity chromatographic method for the extraction of oxytocin from human and rat plasma. *Eur. J. Clin. Chem. Clin. Biochem.,* 32 (1994) 595-598.

513 Veenstra, J.: Isolation and identification of three leucokinins from the mosquito *Aedes aegypti*. *Biochem. Biophys. Res. Commun.,* 202 (1994) 715-719.

514 Voelker, J.R., Cobb, S.L. and Bowsher, R.R.: Improved HPLC-radioimmunoassay for quantifying angiotensin II in plasma. *Clin. Chem. (Washington),* 40 (1994) 1537-1543.

515 Wutte, A., Gübitz, G., Friebe, S. and Krauss, G.-J.: High-performance liquid chromatography of *cis-trans* isomers of proline-containing dipeptides. III. Comparative studies with different stationary phases. *J. Chromatogr. A,* 677 (1994) 186-191.

516 Wybrandt, G.B. and Andersen, S.O.: Cuticle-catalyzed coupling between polyamino acids and N-acetyldopamine. *Biochim. Biophys. Acta,* 1201 (1994) 15-18.

517 Yamaguchi, T., Umeda, F., Masakado, M., Isaji, M., Mizushima, S. and Nawata, H.: Purification and molecular cloning of prostacyclin-stimulating factor from serum-free conditioned medium of human diploid fibroblast cells. *Biochem. J.,* 303 (1994) 591-598.

518 Zhu, X. and Desiderio, D.M.: Peptidase inhibitors are not necessary in the analysis of neuropeptides. *Anal. Lett.,* 27 (1994) 2267-2280.

For additional information see *C.A.*:
121 (1994) 30504b, 132492p, 149249n, 196121z.

See also 65, 157, 293, 523, 525, 580, 646, 650, 675, 677, 730, 802, 805, 1021, 1225, 1226.

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

519 Amons, R., Guerrucci, M.-A., Karssies, R.H., Morales, J., Cormier, P., Möller, W. and Bellé, R.: The leucine-zipper in elongation factor EF-1δ, a guanine-nucleotide exchange protein, is conserved in *Artemia* and *Xenopus*. *Biochim. Biophys. Acta,* 1218 (1994) 346-350.

520 Araki, K., Sasaki, J., Matsunaga, A., Takada, Y., Moriyama, K., Hidaka, K. and Arakawa, K.: Characterization of two new human apolipoprotein A-I variants: Apolipoprotein A-I Tsushima (Trp-108→Arg) and A-I Hita (Ala-95→Asp). *Biochim. Biophys. Acta,* 1214 (1994) 272-278.

521 Cao, Q.P., Pitt, S., Leszyk, J. and Baril, E.F.: DNA-Dependent ATPase from HeLa cells is related to human Ku autoantigen. *Biochemistry,* 33 (1994) 8548-8557.

522 Chang, J., Canals, F., Schindler, P., Querol, E. and Aviles, F.X.: The disulfide folding pathway of potato carboxypeptidase inhibitor. *J. Biol. Chem.,* 269 (1994) 22087-22094.

523 Chang, J.P., Richardson, J.M. and Riggin, R.M.: Characterization of tryptic peptides of a potent growth hormone releasing hormone analog by reversed phase high performance liquid chromatography-ionspray mass spectrometry. *J. Liq. Chromatogr.,* 17 (1994) 2881-2894.

524 De Wolf, M.J.S. and Dierick, W.S.H.: Regeneration of active receptor recognition domains on the B subunit of cholera toxin by formation of hybrids from chemically inactivated derivatives. *Biochim. Biophys. Acta,* 1223 (1994) 285-295.

525 DePaolis, A. and Sharma, B.: Tryptic map variation of erythropoietin resulting from carboxypeptidase B-like activity. *J. Liq. Chromatogr.,* 17 (1994) 2777-2789.

526 Fujii, N., Satoh, K., Harada, K. and Ishibashi, Y.: Simultaneous stereoinversion and isomerization at specific aspartic acid residues in αA-crystallin from human lens. *J. Biochem. (Tokyo),* 116 (1994) 663-669.

527 Gill, D.S., Roush, D.J. and Willson, R.C.: Presence of a preferred anion-exchange binding site on cytochrome $b_5$: structural and thermodynamic considerations. *J. Chromatogr. A,* 684 (1994) 55-63.

528 Hattori, M., Adachi, H., Tsujimoto, M., Arai, H. and Inoue, K.: The catalytic subunit of bovine brain platelet-activating factor acetylhydrolase is a novel type of serine esterase. *J. Biol. Chem.,* 269 (1994) 23150-23155.

529 Hountondji, C., Gillet, S., Schmitter, J.-M., Fukui, T. and Blanquet, S.: Affinity labeling of the two species of *Escherichia coli* lysyl-tRNA synthetase with adenosine di- and triphosphopyridoxals. *J. Biochem. (Tokyo),* 116 (1994) 493-501.

530 Johnson, R.S., Ohguro, H., Palczewski, K., Hurley, J.B., Walsh, K.A. and Neubert, T.A.: Heterogenous N-acylation is a tissue- and species-specific posttranslational modification. *J. Biol. Chem.,* 269 (1994) 21067-21071.

531 Lebreton, F., Delepierre, M., Ramirez, A.N., Balderas, C. and Possani, L.D.: Primary and NMR three-dimensional structure determination of a novel crustacean toxin from the venom of the scorpion *Centruroides limpidus limpidus* Karsch. *Biochemistry,* 33 (1994) 11135-11149.

532 Mansour, S.J., Resing, K.A., Candi, J.M., Hermann, A.S., Gloor, J.W., Herskind, K.R., Wartmann, M., Davis, R.J. and Ahn, N.G.: Mitogen-activated protein (MAP) kinase phosphorylation of MAP kinase kinase: determination of phosphorylation sites by mass spectrometry and site-directed mutagenesis. *J. Biochem. (Tokyo),* 116 (1994) 304-314.

533 Mildner, A.M., Rothrock, D.J., Leone, J.W., Bannow, C.A., Lull, J.M., Reardon, I.M., Sarcich, J.L., Howe, W.J., Tomich, C.C., Smith, C.W. et al.: The HIV-1 protease as enzyme and substrate: mutagenesis of autolysis sites and generation of a stable mutant with retained kinetic properties. *Biochemistry,* 33 (1994) 9405-9413.

534 Negri, A., Tedeschi, G., Bonomi, F., Zhang, J.-H. and Kurtz, D.M., Jr.: Amino-acid sequences of the alpha- and beta-subunits of hemerythrin from *Lingula reevii*. *Biochim. Biophys. Acta,* 1208 (1994) 277-285.

535 Rasmussen, H.H., Mørtz, E., Mann, M., Roepstorff, P. and Celis, J.E.: Identification of transformation sensitive proteins recorded in human two-dimensional gel protein databases by mass spectrometric peptide mapping alone and in combination with microsequencing. *Electrophoresis (Weinheim),* 15 (1994) 406-416.

536 Roach, P.L., Baldwin, J.E., Aplin, R.T., Robinson, C.V. and Schofield, C.J.: Peptide mapping of the active site of *Bacillus cereus* β-lactamase I by the use of high pressure liquid chromatography coupled to electrospray ionization mass spectrometry. *J. Chem. Soc. Chem. Commun.,* (1994) 849-850; *C.A.,* 121 (1994) 102930n.

537 Salih, E., Chishti, S.B., Vicedomine, P., Cohen, S.G., Chiara, D.C. and Cohen, J.B.: Active-site peptides of acetylcholinesterase of *Electrophorus electricus*: labelling of His-440 by 1-bromo-[2-$^{14}$C]pinacolone and Ser-200 by tritiated diisopropyl fluorophosphate. *Biochim. Biophys. Acta,* 1208 (1994) 324-331.

538 Sommerlade, H.-J., Selmer, T., Ingendoh, A., Gieselmann, V., von Figura, K., Niefer, K. and Schmidt, B.: Glycosylation and phosphorylation of arylsulfatase A. *J. Biol. Chem.,* 269 (1994) 20977-20981.

539 Taneda, H., Andoh, K., Nishioka, J., Takeya, H. and Suzuki, K.: Blood coagulation factor Xa interacts with a linear sequence of the kringle 2 domain of prothrombin. *J. Biochem. (Tokyo),* 116 (1994) 589-597.

540 Tsujimura, K., Tanaka, J., Ando, S., Matsuoka, Y., Kusubata, M., Sugiura, H., Yamauchi, T. and Inagaki, M.: Identification of phosphorylation sites on glial fibrillary acidic protein for cdc2 kinase and $Ca^{2+}$-calmodulin-dependent protein kinase II. *J. Biochem. (Tokyo),* 116 (1994) 426-434.

541 Wells, T.N.C., Scully, P. and Magnenat, E.: Arginine 304 is an active site residue in phosphomannose isomerase from *Candida albicans*. *Biochemistry,* 33 (1994) 5777-5782.

See also 58, 89, 494, 617, 655, 656, 667, 679.

## 19. PROTEINS

### *19a. General techniques*

542 Berggrund, A., Drevin, I., Knuuttila, K.G., Wardhammar, J. and Johansson, B.L.: Chemical and chromatographic characterization of a new BioProcess medium for hydrophobic interaction chromatography: Butyl Sepharose 4 Fast Flow. *Process Biochem. (Oxford),* 29 (1994) 455-463; *C.A.*, 121 (1994) 199905u.

543 Cameron, G.W.W. and Bruce, N.C.: Introduction to chromatographic methods for protein purification. *Methods Mol. Cell. Biol.,* 4 (1993) 184-188; *C.A.*, 121 (1994) 152355z.

544 Choeng, H.S. and Kim, S.S.: Simple purification of recombinant human TNF-α by conventional chromatography. *Korean Biochem. J.,* 27 (1994) 330-334; *C.A.*, 121 (1994) 177059u.

545 Coffman, J.L., Roper, D.K. and Lightfoot, E.N.: High-resolution chromatography of proteins in short columns and adsorptive membranes. *Bioseparation,* 4 (1994) 183-200; *C.A.*, 121 (1994) 199924z.

546 Gaillard, I., Martial, A., Marc, A., Engasser, J.-M. and Fick, M.: Analytical method optimization for protein determination by fast high-performance liquid chromatography. *J. Chromatogr. A,* 679 (1994) 261-268.

547 Galaev, I.Yu., Warrol, C. and Mattiasson, B.: Temperature-induced displacement of proteins from dye-affinity columns using an immobilized polymeric displacer. *J. Chromatogr. A,* 684 (1994) 37-43.

548 Horvath, J., Boschetti, E., Guerrier, L. and Cooke, N.: High-performance protein separations with novel strong ion exchangers. *J. Chromatogr. A,* 679 (1994) 11-22.

549 Huddleston, J.G., Wang, R. and Lyddiatt, A.: On the use of mild hydrophobic interaction chromatography for "method scouting" protein purification strategies in aqueous two-phase systems: a study using model proteins. *Biotechnol. Bioeng.,* 44 (1994) 626-635; *C.A.*, 121 (1994) 129055t.

550 Hunter, A.P. and Games, D.E.: Chromatographic and mass spectrometric methods for the identification of phosphorylation sites in phosphoproteins. *Rapid Commun. Mass Spectrom.,* 8 (1994) 559-570; *C.A.*, 121 (1994) 129326g.

551 Iton, H., Nagae, N., Kinoshita, T. and Nimura, N.: Reversed-phase liquid chromatographic separation of proteins on a C30 alkyl bonded nonporous silica gel column. *Kuromatogurafi,* 14 (1993) 89R-98R; *C.A.*, 121 (1994) 53270m.

552 Jug, R.A. and Hale, J.E.: On-line procedures for alkylation of cysteine residues with 3-bromopropylamine prior to protein sequence analysis. *Anal. Biochem.,* 221 (1994) 374-378.

553 Lee, D.W. and Cho, B.Y.: Investigation of the retention behavior and structural change of proteins in reversed phase and hydrophobic interaction chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2541-2558.

554 Lee, W.C., Chuang, C.Y., Chen, C.L. and Chiu, C.Y.: High-performance affinity chromatography of proteins using non-porous silica beads. *Biotechnol. Tech.,* 8 (1994) 447-450; *C.A.*, 121 (1994) 174258x.

555 Nenortas, E. and Beckett, D.: Reduced-scale large-zone analytical gel filtration chromatography for measurement of protein association equilibria. *Anal. Biochem.,* 222 (1994) 366-373.

556 Nicolas-Simonnot, M.O., Bailly, M. and Grevillot, G.: Investigation of ion exchange phenomena in frontal anion exchange chromatography of a protein. *Stud. Surf. Sci. Catal.,* 80(Fundamentals of Adsorption) (1993) 591-598; *C.A.*, 121 (1994) 152453e.

557 O'Keefe, D.O.: Quantitative electrophoretic analysis of proteins labeled with monobromobimane. *Anal. Biochem.,* 222 (1994) 86-94.

558 Rott, G.M., Podgorodnichenko, V.K., Rozhynskaya, I.V. and Novikova, I.S.: (Anion exchange chromatography of proteins leads to induction of their DNA-binding activity). *Mol. Biol. (Moscow),* 28 (1994) 383-391; *C.A.*, 121 (1994) 102260u.

559 Shiosaki, A., Goto, M. and Hirose, T.: Frontal analysis of protein adsorption on a membrane adsorber. *J. Chromatogr. A,* 679 (1994) 1-9.

560 Soltes, L. and Sebille, B.: Study of macrobiomolecule-ligand interactions by liquid-chromatographic separation methods under equilibrium and nonequilibrium conditions. *J. Liq. Chromatogr.,* 17 (1994) 2207-2230.

561 Takahashi, Y. and Goto, S.: Continuous separation and concentration of proteins using an annular chromatograph. *Stud. Surf. Sci. Catal.,* 80(Fundamentals of Adsorption) (1993) 639-646; *C.A.*, 121 (1994) 152412r.

562 Wang, S. and Gao, R.: Counteracting chromatographic electrophoresis, a new process for purification of proteins. *Process Technol. Proc.,* 11(Separation Technology) (1994) 845-852; *C.A.*, 121 (1994) 200154g.

563 Werner, M.H., Clore, G.M., Gronenborn, A.M., Kondoh, A. and Fisher, R.J.: Refolding proteins by gel filtration chromatography. *FEBS Lett.,* 345 (1994) 125-130; *C.A.*, 121 (1994) 53292v.

564 Whitley, R.D., Zhang, X. and Wang, N.-H.L.: Protein denaturation in nonlinear isocratic and gradient elution chromatography. *AIChE J.,* 40 (1994) 1067-1081; *C.A.*, 121 (1994) 77560g.

565 Wilchek, M., Knudsen, K.L. and Miron, T.: Improved method for preparing N-hydroxysuccinimide ester-containing polymers for affinity chromatography. *Bioconjugate Chem.,* 5 (1994) 491-492; *C.A.*, 121 (1994) 174526h.

566 Xu, C. and Regnier, F.E.: Frontal immunoaffinity chromatography of protein variants. *Anal. Methods Instrum.,* 1 (1993) 145-152; *C.A.*, 121 (1994) 199930y.

567 Yamaki, S., Izumi, T., Matsuoka, K., Kaji, H., Isobe, T. and Shinoda, T.: (Analysis of heterogeneity in proteins by automated two-dimensional liquid chromatographic system). *Kuromatogurafi,* 14 (1993) 66-67; *C.A.*, 121 (1994) 30137j.

For additional information see *C.A.*:
121 (1994) 129027k, 174649a, 199920v.

See also 104, 602, 659, 684.

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

568 Corthesy, B. and Kao, P.N.: Purification by DNA affinity chromatography of two polypeptides that contact the NF-AT DNA binding site in the interleukin 2 promoter. *J. Biol. Chem.,* 269 (1994) 20682-20690.

569 Gehring, H.: Detection of mycoplasma contamination of cell cultures by reversed-phase high-performance liquid chromatography. *Anal. Biochem.,* 220 (1994) 430-431.

570 Hubbard, M.J. and Carne, A.: Differential feeding-related regulation of ubiquitin and calbindin$_{9kDa}$ in rat duodenum. *Biochim. Biophys. Acta,* 1200 (1994) 191-196.

571 Minich, W.B., Balasta, M.L., Goss, D.J. and Rhoads, R.E.: Chromatographic resolution of *in vivo* phosphorylated and nonphosphorylated eukaryotic translation initiation factor eIF-4E: increased cap affinity of the phosphorylated form. *Proc. Natl. Acad. Sci. U.S.A.,* 91 (1994) 7668-7672; *C.A.,* 121 (1994) 152460e.

572 Ogata, K., Kurahashi, A., Nishiyama, C. and Terao, K.: Presence and role of the 5SrRNA-L5 protein complex (5SRNP) in the threonyl- and histidyl-tRNA synthetase complex in rat liver cytosol. *Biochim. Biophys. Acta,* 1218 (1994) 388-400.

573 Rowling, P.J.E., McLaughlin, S.H., Pollock, G.S. and Freedman, R.B.: A single purification procedure for the major resident proteins of the ER lumen: endoplasmin, BiP, calreticulin and protein disulfide isomerase. *Protein Expression Purif.,* 5 (1994) 331-336; *C.A.,* 121 (1994) 199926b.

574 Sigurdardottir, O. and Wiman, B.: Identification of a PAI-1 binding site in vitronectin. *Biochim. Biophys. Acta,* 1208 (1994) 104-110.

575 Tao, Y. and Chen, K.Y.: PCR-Based cloning of the full-length *Neurospora* eukaryotic initiation factor 5A cDNA: polyhistidine-tagging and overexpression for protein affinity binding. *Biochem. J.,* 302 (1994) 517-525.

576 Thinnes, F.P., Floerke, H., Winkelbach, H., Stadtmueller, U., Heiden, M., Karabinos, A., Hesse, D., Kratzin, H.D., Fleer, E. and Hilschmann, N.: Studies on human porin, part X. Channel active mammalian porin, purified from crude membrane fractions of human B lymphocytes or bovine skeletal muscle, reversibly binds the stilbene-disulfonate group of the chloride channel blocker DIDS. *Biol. Chem. Hoppe-Seyler,* 375 (1994) 315-322; *C.A.,* 121 (1994) 128134f.

577 Wisniewski, J.R., Schulze, E. and Sapetto, B.: DNA Binding and nuclear translocation of insect high-mobility-group protein-1 (HMG1) proteins are inhibited by phosphorylation. *Eur. J. Biochem.,* 225 (1994) 687-693.

For additional information see *C.A.*: 121 (1994) 174262w.

*19c. Proteins synthesized by genetic manipulation, monoclonal antibodies*

578 Abe, M., Abe, K., Iwabuchi, K., Domoto, C. and Arai, S.: Corn cystatin I expressed in *Escherichia coli*: investigation of its inhibitory profile and occurrence in corn kernels. *J. Biochem. (Tokyo),* 116 (1994) 488-492.

579 Kosaka, T., Suzuki, N., Ishibashi, Y., Matsumoto, H., Itoh, Y., Ohkubo, S., Ogi, K., Kitada, C., Onda, H. and Fujino, M.: Biosynthesis of human endothelins in transformants expressing cDNAs for human prepro-endothelins. *J. Biochem. (Tokyo),* 116 (1994) 443-449.

580 Lopatin, S.A., Ilyna, A.V., Shulga, A.A., Grinchenko, O.S., Varlamov, V.P., Skryabin, K.G. and Kirpichnikov, M.P.: (A universal method of isolation of recombinant somatotropin and its mutants using metal chelate affinity chromatography). *Biokhimiya (Moscow),* 59 (1994) 226-230.

*19d. Microbial and plant proteins*

581 Alderton, W.K., Lowe, C.R. and Thatcher, D.R.: Purification of recombinant ricin A chain with immobilised triazine dyes. *J. Chromatogr. A,* 677 (1994) 289-299.

582 Ceccardi, T.L., Meyer, N.C. and Close, T.J.: Purification of a maize dehydrin. *Protein Expression Purif.,* 5 (1994) 266-269; *C.A.,* 121 (1994) 53298b.

583 Chang, T.-m., Hossain, A. and Chang, C.H.L.: Effect of rate of intracellular transport and diacytosis on cytotoxicity of hybrid toxins. Study with hybrids using hepatic asialoglycoprotein receptor-mediated endocytosis. *Biochim. Biophys. Acta,* 1224 (1994) 77-88.

584 De Wolf, M.J.S., Dams, E. and Dierick, W.S.H.: Interaction of a cholera toxin derivative containing a reduced number of receptor binding sites with intact cells in culture. *Biochim. Biophys. Acta,* 1223 (1994) 296-305.

585 Goossens, A., Geremia, R., Bauw, G., van Montagu, M. and Angenon, G.: Isolation and characterization of arcelin-5 proteins and cDNAs. *Eur. J. Biochem.,* 225 (1994) 787-795.

586 Hader, D.-P. and Lebert, M.: Analysis of photoreceptor proteins of microorganisms by gradient gel electrophoresis and other biochemical separation methods. *Electrophoresis (Weinheim),* 15 (1994) 1051-1061.

587 Lopes, H.R., Milhomem, A.M., Noleto, A.L.S. and Bergdoll, M.S.: Purification of staphylococcal enterotoxin A by dye ligand chromatography. *Rev. Microbiol.,* 24 (1993) 228-231; *C.A.,* 121 (1994) 51588x.

588 Peleato, M.L., Ayora, S., Inda, L.A. and Gomez-Moreno, C.: Isolation and characterization of two different flavodoxins from the eukaryote *Chlorella fusca*. *Biochem. J.,* 302 (1994) 807-811.

589 Peruffo, A.D.B., Curioni, A., Pressi, G., Pogna, N.E. and Zamorani, A.: Adsorption chromatography on controlled-pore glass beads of acetic-acid-soluble wheat gluten proteins. *Cereal Chem.,* 71 (1994) 122-129; *C.A.,* 121 (1994) 33495k.

590 Phadtare, S., Fisher, M.T. and Yarbrough, L.R.: Refolding and release of tubulins by a functional immobilized groEL column. *Biochim. Biophys. Acta,* 1208 (1994) 189-192.

591 Schönherr, R., Hilger, M., Broer, S., Benz, R. and Braun, V.: Interaction of *Serratia marcescens* hemolysin (ShlA) with artificial and erythrocyte membranes. Demonstration of the formation of aqueous multistate channels. *Eur. J. Biochem.,* 223 (1994) 655-663.

592 Turner, J.B., Gordon, D.B., Garner, G.V., Lord, G.A. and Smith, C.A.: Purification of α-gliadins to apparent homogeneity. *Biochem. Soc. Trans.,* 22 (1994) 403S; *C.A.,* 121 (1994) 199960h.

593 Vasconcelos, I.M., Tremtim, A., Guimaraes, J.A. and Carlini, C.R.: Purification and physicochemical characterization of soyatoxin, a novel toxic protein isolated from soybeans (*Glycine max*). *Arch. Biochem. Biophys.,* 312 (1994) 357-366.

594 Vu, L. and Huynh, Q.K.: Isolation and characterization of a 27-kDa antifungal protein from the fruits of *Diospyros texana*. *Biochem. Biophys. Res. Commun.*, 202 (1994) 666-672.

For additional information see *C.A.*:
121 (1994) 129051p.

See also 305, 578, 661, 662, 688.

*19e. Proteins of blood, serum and blood cells*

595 Beer, D.J., Yates, A.M. and Jack, G.W.: Development of enzyme-linked immunosorbent assays (ELISAs) for the detection of monoclonal antibody leakage from immunoaffinity chromatography matrixes. *J. Immunol. Methods,* 173 (1994) 103-109; *C.A.*, 121 (1994) 155002t.

596 Christnsen, S. and Sottrup-Jensen, L.: Characterization of two serpins from bovine plasma and milk. *Biochem. J.*, 303 (1994) 383-390.

597 Curbelo, D., Gonzalez, G., Lage, A. and Facenda, E.: (Optimization of IOR-T3 purification by affinity chromatography). *Biotecnol. Apl.*, 10 (1993) 84-85; *C.A.*, 121 (1994) 155049p.

598 Ermolenko, M.N. and Sviridov, O.V.: (Interaction of thyroid hormones with immunoglobulins isolated from human blood serum. II. Structural elements and location of the thyroxine-binding region in the immunoglobulin M molecule). *Biokhimiya (Moscow),* 59 (1994) 88-95.

599 Falkenberg, C., Enghild, J.J., Thogersen, I.B., Salvesen, G. and Akerström, B.: Isolation and characterization of fibronectin-$\alpha_1$-microglobulin complex in rat plasma. *Biochem. J.*, 301 (1994) 745-651.

600 Girault, J., Longueville, D., Malgouyat, J.M., Istin, B., Lecomte, G. and Fourtillan, J.B.: Simultaneous quantitative measurement of a new platelet activating factor antagonist (BN 50730) and its two main metabolites in human plasma and urine by LC-MS. *Chromatographia,* 39 (1994) 228-238.

601 Gorkun, O.V., Veklich, Y.I., Medved', L.V., Henschen, A.H. and Weisel, J.W.: Role of the αC domains of fibrin in clot formation. *Biochemistry,* 33 (1994) 6986-6997.

602 Grandics, P.: Monoclonal antibody purification guide: part 1. *Am. Biotechnol. Lab.*, 12 (1994) 58-62; *C.A.*, 121 (1994) 80486t.

603 Iino, M., Takeya, H., Nishioka, J., Nakagaki, T., Tamura, K. and Suzuki, K.: The role of human factor X activation peptide in activation of factor X by factor IXa. *J. Biochem. (Tokyo),* 116 (1994) 335-340.

604 Iranzo, M., Marcilla, A., Elorza, M.V., Mormeneo, S. and Sentandreu, R.: Preparation of anti-protein and anti-mannan antisera against fungal cell wall by affinity chromatography. *Exp. Mycol.*, 18 (1994) 159-167; *C.A.*, 121 (1994) 131830k.

605 Ishiwata, N., Takio, K., Katayama, M., Watanabe, K., Titani, K., Ikeda, Y. and Handa, M.: Alternatively spliced isoform of P-selectin is present *in vivo* as a soluble molecule. *J. Biol. Chem.*, 269 (1994) 23708-23715.

606 Mohammad, J. and Hjerten, S.: A simple and inexpensive chromatographic method for the purification of γ-globulin from human serum. *J. Biochem. Biophys. Methods,* 28 (1994) 321-327; *C.A.*, 121 (1994) 155040d.

607 Onishi, T., Shimizu, T. nad Kajikawa, T.: Simple and efficient purification of C-reactive protein from canine serum. *J. Vet. Med. Sci.*, 56 (1994) 417-419; *C.A.*, 121 (1994) 53282s.

608 Poole, R.C. and Halestrap, A.P.: N-Terminal protein sequence analysis of the rabbit erythrocyte lactate transporter suggests identity with the cloned monocarboxylate transport protein MCT1. *Biochem. J.*, 303 (1994) 755-759.

609 Pu, X.P., Iwamoto, A., Nishimura, H.a nd Nagasawa, S.: Purification and characterization of a novel substrate for plasma kallikrein (PK-120) in human plasma. *Biochim. Biophys. Acta,* 1208 (1994) 338-343.

610 Raut, S., Corran, P.H. and Gaffney, P.J.: Ultra-rapid preparation of milligram quantities of the purified polypeptide chains of human fibrinogen. *J. Chromatogr. B,* 660 (1994) 390-394.

611 Rodriguez, P.E.A., Barra, J.L. and Cuman, F.A.: Glycolipids noncovalently bound to DEAE-Sephadex: use of the complexes for purification of IgM and IgG anti(Galβ1→3GalNAc-) antibodies. *Biochem. Mol. Biol. Int.*, 33 (1994) 273-281; *C.A.*, 121 (1994) 55396f.

612 Severina, I.S.: (Soluble guanylate cyclase of platelets: significance of heme in the mechanism of enzyme regulation and role of the enzyme in platelet aggregation). *Biokhimiya (Moscow),* 59 (1994) 325-339.

613 Sviridov, O.V. and Ermolenko, M.N.: (Interaction of thyroid hormones with immunoglobulins isolated from human blood serum. I. Parameters of the complex formation and the nature of the binding reaction). *Biokhimiya (Moscow),* 59 (1994) 78-87.

614 Valdes, R., Ramos, R., Horestein, A., Merino, M., Salma, N., Reyes, B., Seuret, N., Martinez, L. and Duarte, C.: Optimization of anion exchange chromatography for the purification of a mouse monoclonal antibody from ascitic fluid. *Biotecnol. Apl.*, 10 (1993) 65; *C.A.*, 121 (1994) 155048n.

For additional information see *C.A.*:
121 (1994) 29905b, 132390d, 155759v.

See also 539.

*19f. Structural and muscle proteins*

615 All-Hillawi, E., Minchin, S.D. and Trayer, I.P.: Overexpression of human cardiac troponin-I and troponin-C in *Escherichia coli* and their purification and characterization. Two point mutations allow high-level expression of troponin-I. *Eur. J. Biochem.*, 225 (1994) 1195-1201.

616 Gutierrez, L.M., Zhao, X.-l. and Hosey, M.M.: Protein kinase C-mediated regulation of L-type Ca channels from skeletal muscle requires phosphorylation of the $\alpha_1$ subunit. *Biochem. Biophys. Res. Commun.*, 202 (1994) 857-865.

617 Niyibizi, C. and Eyre, D.R.: Structural characterization of cross-linking sites in type V collagen of bone. Chain specificities and heterotypic links to type I collagen. *Eur. J. Biochem.*, 224 (1994) 943-950.

618 Weser, U. and Kaup, Y.: Intact mummified bone alkaline phosphatase. *Biochim. Biophys. Acta,* 1208 (1994) 186-188.

619 Zhu, G.-G., Melkko, J., Risteli, J., Kauppila, A. and Risteli, L.: Differential processing of type I and type III procollagens in the tumour cysts and peritoneal ascitic fluid of patients with benign and malignant ovarian tumours. *Clin. Chim. Acta,* 229 (1994) 87-97.

See also 540.

*19g. Protamines, histones and other nuclear proteins*

620 Gianazza, E., Coari, P., Lovati, M.R., Manzoni, C., Ghibaudi, E. and Salmona, M.: The purification of histones by metal-chelate chromatography. *Anal. Biochem.,* 222 (1994) 505-507.

See also 794.

*19h. Chromoproteins and metalloproteins*

621 Böhm, B., Wilbrink, B., Kuettner, K.E. and Mollenhauer, J.: Structural and fractional comparison of anchorin CII (artilage annexin V) and muscle annexin V. *Arch. Biochem. Biophys.,* 314 (1994) 64-74.

622 Cefalu, W.T., Wang, Z.Q., Bell-Farrow, A., Kiger, F.D. and Izlar, C.: Glycohemoglobin measured by automated affinity HPLC correlates with both short-term and long-term antecedent glycemia. *Clin. Chem. (Washington),* 40 (1994) 1317-1321.

623 Chatterjee, A., Butler, M., Blum, M. and Warner, A.H.: Characterization of parvalbumin cDNA clone and gene expression in normal and dystrophic mice of strain 129 ReJ. *Biochem. Cell Biol.,* 72 (1994) 70-77.

624 Fasching, P., Rohac, M., Waldhaeusl, W., Streli, C., Nowotny, P. and Endler, A.T.: Influence of hyperlipidemia on $HbA_{1c}$ values. A comparison between HPLC and a new immunoturbidimetric assay. *Klin. Labor.,* 39 (1993) 1042-1045; *C.A.,* 121 (1994) 200193u.

625 Feuerlein, R.J. and Weber, R.E.: Rapid and simultaneous measurement of anodic and cathodic hemoglobins and ATP and GTP concentrations in minute quantities of fish blood. *J. Exp. Biol.,* 189 (1994) 273-277; *C.A.,* 121 (1994) 129036n.

626 Kautzky-Willer, A., Endler, A.T., Streli, C., Graf, H. and Prager, R.: Glycated hemoglobin in hemodialysis patients with and without erythropoietin substitution: a method comparison. *Klin. Labor.,* 39 (1993) 1046-1048; *C.A.,* 121 (1994) 200194v.

627 Miedema, K.: Influence of hemoglobin variants on the determination of glycated hemoglobin. *Klin. Labor.,* 39 (1993) 1029-1032; *C.A.,* 121 (1994) 200192t.

628 Musatov, A. and Robinson, N.C.: Subunit analysis of bovine cytochrome $bc_1$ by reverse-phase HPLC and determination of the subunit molecular masses by electrospray ionization mass spectrometry. *Biochemistry,* 33 (1994) 10561-10567.

629 Niederau, C.M. and Reinauer, H.: Comparison of seven methods for the determination of glycated hemoglobins. *Klin. Labor.,* 39 (1993) 1009-1014; *C.A.,* 121 (1994) 200268x.

630 Niederau, C.M., Coe, A. and Katayama, Y.: Interference of non-glucose-adducts on the determination of glycated hemoglobins. *Klin. Labor.,* 39 (1993) 1015-1023; *C.A.,* 121 (1994) 200191s.

631 Okahashi, M., Cao, G.M. and Hoshino, T.: (Development of rapid determination method for glycated hemoglobin -IV-). *Kuromatogurafi,* 14 (1993) 72-75; *C.A.,* 121 (1994) 30138k.

632 Osawa, Y., Fellows, C.S., Meyer, C.A., Woods, A., Castoro, J.A., Cotter, R.J., Wilkins, C.L. and Highet, R.J.: Structure of the novel heme adduct formed during the reaction of human hemoglobin with $BrCCl_3$ in red cell lysates. *J. Biol. Chem.,* 269 (1994) 15481-15487.

633 Pic, P., Ducrocq, R. and Girot, R.: (Separation of hemoglobins, F, Fac, S, C, A1c and determination of hemoglobin F using high performance liquid chromatography). *Ann. Biol. Clin.,* 52 (1994) 129-132; *C.A.,* 121 (1994) 199932a.

634 Shima, K. and Nagamine, Y.: Interlaboratory standardization of measurements of glycohemoglobins in Tokushima area. *Klin. Labor.,* 39 (1993) 1006-1008; *C.A.,* 121 (1994) 174245r.

635 Shorr, R.G.L., Cho, M.O. and Nho, K.: Fractionation of polyalkylene oxide-conjugated hemoglobin solutions so they do not produce hemoglobinuria in mammals. *PCT Int.* Appl. WO 94 09,027 (Cl. CO7K3/12), 28 Apr. 1994, US Appl. 960,007, 13 Oct. 1992; 30 pp.; *C.A.,* 121 (1994) 53482g.

636 Xie, F. and Duda, C.: (Separation of hemoglobins F, Fac, S, C, A1c and determination of hemoglobin F using high performance liquid chromatography). *Curr. Sep.,* 13 (1994) 18-21; *C.A.,* 121 (1994) 199931z.

See also 527, 553.

*19i. Proteins of glands, gland products, various zymogens (incl. milk proteins)*

637 Dev, B.C., Sood, S.M., DeWind, S. and Slattery, C.W.: κ-Casein and β-caseins in human milk micelles: structural studies. *Arch. Biochem. Biophys.,* 314 (1994) 329-336.

638 Gowda, D.C. and Davidson, E.A.: Isolation and characterization of novel mucin-like glycoproteins from cobra venom. *J. Biol. Chem.,* 269 (1994) 20031-20039.

639 Jinno, M.: Affinity chromatography for screening of sperms. *Jpn. Kokai Tokkyo Koho* JP 06,178,634 [94,178,634] (Cl. A01K67/02), 28 Jun. 1994, Appl. 92/332,982, 14 Dec. 1992; 5 pp.; *C.A.,* 121 (1994) 174652w.

640 Mandal, A. and Bhattacharyya, A.K.: Collective isolation of two major, close molecular weight coagulum proteins occurring in human semen before liquefaction. *Int. J. Androl.,* 17 (1994) 63-67; *C.A.,* 121 (1994) 152452d.

641 Mihara, S., Habu, A., Mochizuki, T., Yanaihara, C., Hong, Y.M., Ohkubo, R. and Yanaihara, N.: Purification procedure of immunoreactive cholecystokinin in yellow fin tuna hypothalamus. *Pept. Chem.,* 31st (1993) 133-136; *C.A.,* 121 (1994) 174251q.

642 Papoff, C.M., Law, A.J.R., Dalgleish, D.G. and Campus, R.L.: Determination of the composition of ovine casein by anion-exchange FPLC. *Sci. Tec. Latt.-Casearia,* 44 (1993) 273-291; *C.A.,* 121 (1994) 33413g.

643 Paz, C., Dada, L.A., Cornejo Maciel, M.F., Mele, P.G., Cymeryng, C.B., Neuman, I., Mendez, C.F., Finkielstein, C.V., Solano, A.R., Park, M. et al.: Purification of a novel 43-kDa protein (p43) intermediary in the activation of steroidogenesis from rat adrenal gland. *Eur. J. Biochem.,* 224 (1994) 709-716.

644 Qian, Z.Y., Fiat, A.M. and Jolles, P.: A fast method for the preparation of high amounts of sheep κ-casein. *Milchwissenschaft,* 49 (1994) 78-80; *C.A.,* 121 (1994) 33615z.

645 Takagi, T., Nakamura, A., Deguchi, R. and Kyozuka, K.-i.: Isolation, characterization, and primary structure of three major proteins obtained from *Mytilus edulis* sperm. *J. Biochem. (Tokyo),* 116 (1994) 598-605.

646 Tang, G., Chen, M. and Wu, H.: (Isolation and determination of crotin toxin by high performance gel filtration chromatography with photodiode array detector). *Sepu,* 12 (1994) 244-246; *C.A.,* 121 (1994) 152472k.

See also 484, 531, 596.

*19j. Proteins of brain, cerebrospinal fluid and eye*

647 Gucquoy, S., Jolles, P. and Schoentgen, F.: Relationships between molecular interactions (nucleotides, lipids and proteins) and structural features of the bovine brain 21-kDa protein. *Eur. J. Biochem.,* 225 (1994) 1203-1210.

648 Harhammer, R., Nürnberg, B., Spicher, K. and Schultz, G.: Purification of the G protein $G_{13}$ from rat brain membranes. *Biochem. J.,* 303 (1994) 135-140.

649 Harhammer, R., Nürnberg, B., Spicher, K. and Schultz, G.: Rapid isolation of $G\alpha_{13}$ from bovine brain membranes: supportive effect of ethylene glycol. *Biochem. Biophys. Res. Commun.,* 204 (1994) 835-840.

650 Kolbeck, R., Jungbluth, S. and Barde, Y.-A.: Characterisation of neurotrophin dimers and monomers. *Eur. J. Biochem.,* 225 (1994) 995-1003.

651 Kumari, K., Phanna, P., Ansari, N.H. and Srivastava, S.K.: High-performance liquid chromatography method for the determination of protein-glutathione mixed disulfide. *Anal. Biochem.,* 220 (1994) 374-376.

652 Parish, C.A. and Rando, R.R.: Functional significance of G protein carboxymethylation. *Biochemistry,* 33 (1994) 9986-9991.

653 Pazzagli, C. and Avila, J.: Purification of brain microtubule-associated protein MAPIA. *Neurochem. Res.,* 19 (1994) 1195-1198; *C.A.,* 121 (1994) 199955k.

See also 526, 530, 658.

*19k. Proteins of neoplastic tissue and transformed cells*

654 Jagoda, E.M., Wen, M.-I.D., Yost, F.J., Schreiber, G.J. and Tu, J.-I.: An affinity column method for determination of the immunoreactivity of $^{131}$I-chimeric L6 monoclonal antibody and comparison to *in vivo* tumor localization. *J. Immunol. Methods,* 173 (1994) 191-201; *C.A.,* 121 (1994) 152299j.

655 Ji, H., Whitehead, R.H., Reid, G.E., Moritz, R.L., Ward, L.D. and Simpson, R.J.: Two-dimensional electrophoretic analysis of proteins expressed by normal and cancerous human crypts: application of mass spectrometry to peptide-mass fingerprinting. *Electrophoresis (Weinheim),* 15 (1994) 391-405.

*19l. Specific binding and receptor proteins*

656 Brown, J.C. and Jones, A.M.: Mapping the auxin-binding site of auxin-binding protein 1. *J. Biol. Chem.,* 269 (1994) 21136-21140.

657 Day, R.A., Ahluwalia, R. and Du, Y.: Novel analysis of penicillin-binding proteins using liquid chromatography. *LC-GC,* 12 (1994) 384-394; *C.A.,* 121 (1994) 174246s.

658 Gorodovikova, E.N. and Philippov, P.P.: (Study of a function of the calcium-binding protein p26 (recoverin) in bovine retina rod cells). *Biokhimiya (Moscow),* 59 (1994) 582-588.

659 Hale, J.E. and Beidler, D.E.: Purification of humanized murine and murine monoclonal antibodies using immobilized metal-affinity chromatography. *Anal. Biochem.,* 222 (1994) 29-33.

660 Jung, S.-K. and Fujimoto, D.: A novel β-galactoside-binding lectin in adult rat kidney. *J. Biochem. (Tokyo),* 116 (1994) 547-553.

661 Korthout, H.A.A.J., van der Hoeven, P.C.J., Wagner, M.J., van Hunnik, E. and de Boer, A.H.: Purification of the fusicoccin-binding protein from oat root plasma membrane by affinity chromatography with biotinylated fusicoccin. *Plant Physiol.,* 105 (1994) 1281-1288; *C.A.,* 121 (1994) 174271w.

662 Li, Z.-S., Noubhani, A.M., Boourbouloux, A. and Delrot, S.: Affinity purification of sucrose binding proteins from the plant plasma membrane. *Biochim. Biophys. Acta,* 1219 (1994) 389-397.

663 McClung, A.D., Carroll, A.D. and Battey, N.H.: Identification and characterization of ATPase activity associated with maize (*Zea mays*) annexins. *Biochem. J.,* 303 (1994) 709-712.

664 Morton, R.E. and Greene, D.J.: Enhanced detection of lipid transfer inhibitor protein activity by an assay involving only low density lipoprotein. *J. Lipid Res.,* 35 (1994) 2094-2099.

665 Nadano, D., Yasuda, T., Takeshita, H., Uchide, K. and Kishi, K.: Purification and characterization of human brain ribonuclease inhibitor. *Arch. Biochem. Biophys.,* 312 (1994) 421-428.

666 Podesta, A. and Montagnoli, G.: Specificity in protein-ligand interactions: a model from estrone-antiserum binding. *Biochim. Biophys. Acta,* 1200 (1994) 291-296.

667 Regalado, F., Martínez, M.P., López de Haro, M.S. and Nieto, A.: Isolation and characterization of two isoforms of a retinoic acid-binding protein from rabbit epididymal secretions. *Biochim. Biophys. Acta,* 1200 (1994) 235-240.

668 Rehberg, E.F., Greenlee, K.A., Melchior, G.W. and Marotti, K.R.: Purification of human cholesteryl ester transfer protein by affinity chromatography on immobilized triazine dyes. *Protein Expression Purif.,* 5 (1994) 285-290; *C.A.,* 121 (1994) 77556k.

669 Rohrer, S.P., Jacobson, E.B., Hayes, E.C., Birzin, E.T. and Schaeffer, J.M.: Immunoaffinity purification of avermectin-binding proteins from the free living nematode *Caenorhabditis elegans* and the fruitfly *Drosophila melanogastera*. *Biochem. J.,* 302 (1994) 339-345.

670 Sakai, S., Nakajima, M. and Yamaguchi, I.: Isolation of gibberellin-binding proteins by affinity chromatography. *Biosci., Biotechnol., Biochem.,* 58 (1994) 963-964; *C.A.,* 121 (1994) 53288y.

671 Sivaprasadarao, A., Boudjelal, M. and Findlay, J.B.C.: Solubilization and purification of the retinol-binding protein receptor from human placental membranes. *Biochem. J.,* 302 (1994) 245-251.

672 Smith, G.B. and Olsen, R.W.: Identification of a [$^3$H]muscimol photoaffinity substrate in the bovine γ-aminobutyric $acid_A$ receptor α subunits. *J. Biol. Chem.,* 269 (1994) 20380-20387.

673 Wang, G. and Thomas, K.A.: Purification and characterization of a functional soluble fibroblast growth factor receptor 1. *Biochem. Biophys. Res. Commun.,* 203 (1994) 1781-1788.

674 Ward, L.D., Howlett, G.J., Discolo, G., Yasukawa, K., Hammacher, A., Moritz, R.L. and Simpson, R.J.: High affinity interleukin-6 receptor is a hexameric complex consisting of two molecules each of interleukin-6, interleukin-6 receptor, and gp-130. *J. Biol. Chem.,* 269 (1994) 23286-23289.

675 Yamauchi, K. and Tata, J.R.: Purification and characterization of a cytosolic thyroid-hormone-binding protein (CTBP) in *Xenopus* liver. *Eur. J. Biochem.,* 225 (1994) 1105-1112.

676 Zhang, R., Yang, X., Li, C. and Xu, X.: (Study of the DNA-binding properties of peptides containing a specified motif by high performance affinity chromatography). *Sepu,* 12 (1994) 297-298; *C.A.,* 121 (1994) 174269b.

677 Zwijsen, A., Blockx, H., van Arnhem, W., Willems, J., Fransen, L., Devos, K., Raymackers, J., van de Woorde, A. and Slegers, H.: Characterization of a rat C glioma-secreted follistatin-related protein (FRP). Cloning and sequence of the human homologue. *Eur. J. Biochem.,* 225 (1994) 937-946.

For additional information see *C.A.*:
121 (1994) 149252p.

See also 142, 304, 519, 570, 621, 793.

*19m. Urinary proteins*

For additional information see *C.A.*:
121 (1994) 129040j.

See also 600.

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

678 Awadé, A.C., Moreau, S., Mollé, D., Brulé, G. and Maubois, J.-L.: Two-step chromatographic procedure for the purification of hen egg white ovomucin, lysozyme, ovotransferrin and ovalbumin and characterization of purified proteins. *J. Chromatogr. A,* 677 (1994) 279-288.

679 Bigg, H.F., Clark, I.M. and Cawston, T.E.: Fragments of human fibroblast collagenase: interaction with metalloproteinase inhibitors and substrates. *Biochim. Biophys. Acta,* 1208 (1994) 157-165.

680 DiCesare, P.E., Mörgelin, M., Mann, K. and Paulsson, M.: Cartilage oligomeric motiv protein and thromospondin 1 from articular cartilage, electron microscopic structure, and chondrocyte binding. *Eur. J. Biochem.,* 223 (1994) 927-937.

681 Fortes-Dias, C.L., Lin, Y., Ewell, J., Diniz, C.R. and Liu, T.: A photolipase $A_2$ inhibitor from the plasma of the South American rattlesnake (*Crotalus durissus terrificus*). Protein structure, genomic structure, and mechanism of action. *J. Biol. Chem.,* 269 (1994) 15646-15651.

682 Garcia-Casado, G., Sanchez-Monge, R., Lopez-Otin, C. and Salcedo, G.: Rye inhibitors of animal α-amylases show different specifities, aggregative properties and IgE-binding capacities than their homologues from wheat and barley. *Eur. J. Biochem.,* 224 (1994) 525-531.

683 Hatayama, T., Yasuda, K. and Nishiyama, E.: Characterization of high-molecular-mass heat shock proteins and 42°C-specific heat shock proteins of murine cells. *Biochem. Biophys. Res. Commun.,* 204 (1994) 357-365.

684 Medzihradszky, K.F., Maltby, D.A., Hall, S.C., Settineri, C.A. and Burlingame, A.L.: Characterization of protein N-glycosylation by reversed-phase microbore liquid chromatography/electrospray mass spectrometry, complementary mobile phases, and sequential exoglycosidase digestion. *J. Am. Soc. Mass Spectrom.,* 5 (1994) 350-358; *C.A.,* 121 (1994) 174264w.

685 Melrose, J., Rodgers, K. and Ghosh, P.: The preparation and use of biotinylated trypsin in western blotting for the detection of trypsin inhibitory proteins. *Anal. Biochem.,* 222 (1994) 34-43.

686 Ruggiero-Lopez, D., Manioc, C., Geourjon, C., Louisot, P. and Martin, A.: Purification and partial amino acid sequence of fuctinin, an endogenous inhibitor of fucosyltransferase activities. *Eur. J. Biochem.,* 224 (1994) 47-55.

See also 517, 522, 596.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

687 Welling, G.W., Scheffer, A.J. and Welling-Wester, S.: Determination of enzyme activity by high-performance liquid chromatography. *J. Chromatogr. B,* 659 (1994) 209-225 - a review with 127 refs.

*20a. Oxidoreductases*

688 Bruchhaus, I. and Tannich, E.: Purification and molecular characterization of the $NAD^+$-dependent acetaldehyde:alcohol dehydrogenase from *Entamoeba histolytica. Biochem. J.,* 303 (1994) 743-748.

689 Burdotte, D. and Zeikus, J.G.: Purification of acetaldehyde dehydrogenases and alcohol dehydrogenases from *Thermoanaerobacter ethanolicus* 39E and characterization of the secondary-alcohol dehydrogenase (2° Adh) as a bifunctional alcohol dehydrogenase-acetyl-CoA reductive thioesterase. *Biochem. J.,* 302 (1994) 163-170.

690 Buters, J.T.M., Korzekwa, K.R., Kunze, K.L., Omata, Y., Hardwick, J.P. and Gonzalez, F.J.: cDNA-Directed expression of human cytochrome P450 CYP3A4 using baculovirus. *Drug Metab. Disp.,* 22 (1994) 688-692.

691 Danielsson, O., Shafqat, J., Estonius, M. and Jörnvall, H.: Alcohol dehydrogenase class III contrasted to class I. Characterization of the cyclostome enzyme, the existence of multiple forms as for the human enzyme, and distant cross-series hybridization. *Eur. J. Biochem.,* 225 (1994) 1081-1088.

692 Ding, Z. and Xu, Y.: Purification and properties of cow splenic biliverdin reductase. *Prepar. Biochem.,* 24 (1994) 193-201.

693 Estonius, M., Hjelmqvist, L. and Jörnvall, H.: Diversity of vertebrate class I alcohol dehydrogenase. Mammalian and non-mammalian enzyme functions correlated through the structure of a ratite enzyme. *Eur. J. Biochem.,* 224 (1994) 373-378.

694 Feil, I.K., Lerch, H.P. and Schomburg, D.: Deletion variants of L-hydroxyisocaproate dehydrogenase. *Eur. J. Biochem.,* 223 (1994) 857-863.

695 Gärtner, D.E., Keilholz, W. and Seitz, H.U.: Purification, characterization and partial peptide microsequencing of progesterone 5β-reductase from shoot cultures of *Digitalis purpurea. Eur. J. Biochem.,* 225 (1994) 1125-1132.

696 Hannaert, V., Callens, M., Opperdoes, F.R. and Michels, P.A.M.: Purification and characterization of the native and the recombinant *Leishmania mexicana* glycosomal glyceraldehyde-3-phosphate dehydrogenase. *Eur. J. Biochem.,* 225 (1994) 143-149.

697 Hernández-Díaz, F.J., Abreu, P., Díaz-Cruz, A.T. and Alonso, R.: Simultaneous HPLC analysis of tryptophan hydroxylase activity and serotonin metabolism in rat pineal gland: determination of its kinetic properties. *J. Liq. Chromatogr.,* 17 (1994) 2939-2950.

698 Itoh, N., Morinaga, N. and Kouzai, T.: Purification and characterization of a novel metal-containing nonheme bromoperoxidase from *Pseudomonas putida*. *Biochim. Biophys. Acta,* 1207 (1994) 208-216.

699 John, G.H., Hasler, J.A., He, Y.-a. and Halpert, J.R.: *Escherichia coli* expression and characterization of cytochromes P450, 2B11, 2B1, and 2B5. *Arch. Biochem. Biophys.,* 314 (1994) 367-375.

700 Kunitoh, S., Tanaka, T., Imaoka, S., Funae, Y. and Monna, Y.: Contribution of cytochrome P450s to MEOS (microsomal ethanol-oxidizing system): a specific and sensitive assay of MEOS activity by HPLC with fluorescence labeling. *Alcohol Alcohol.,* 28 (1993) 63-68; *C.A.,* 121 (1994) 29052w.

701 Kunow, J., Linder, D., Stetter, K.O. and Thauer, R.K.: $F_{420}H_2$:Quinone oxidoreductase from *Archaeglobus fulgidus*. Characterization of a membrane-bound multisubunit complex containing FAD and iron-sulfur clusters. *Eur. J. Biochem.,* 223 (1994) 503-511.

702 Lübben, M., Arnaud, S., Castresana, J., Warne, A., Albracht, S.P.J. and Saraste, M.: A second terminal oxidase in *Sulfolobus acidocaldarius*. *Eur. J. Biochem.,* 224 (1994) 151-159.

703 Munro, A.W., Malarkey, K., McKnight, J., Thomson, A.J., Kelly, S.M., Price, N.C., Lindsay, J.G., Coggins, J.R. and Miles, J.S.: The role of tryptophan 97 of cytochrome P450 BM3 from *Bacillus megaterium* in catalytic function. Evidence against the covalent switching' hypothesis of P-450 electron transfer. *Biochem. J.,* 303 (1994) 423-428.

704 Muratsubaki, H., Enomoto, K., Ichijoh, Y., Tezuka, T. and Katsume, T.: Rapid purification of yeast cytoplasmic fumarate reductase by affinity chromatography of Blue Sepharose CL-6B. *Prepar. Biochem.,* 24 (1994) 289-296.

705 Ninfali, P. and Marioni, S.: Purification of glucose-6-phosphate dehydrogenase from rabbit reticulocytes by immunoaffinity chromatography. *Ital. J. Biochem.,* 43 (1994) 61-70; *C.A.,* 121 (1994) 151868g.

706 Ottado, J., Arakaki, A.K., Calcaterra, N.B. and Cecarelli, E.A.: Expression, assembly and secretion of afully active plant ferredoxin-NADP reductase by *Saccharomyces cerevisiae*. *Eur. J. Biochem.,* 225 (1994) 677-685.

707 Pesliakas, H., Zutautas, V., Baskeviciute, B.: Immobilized metal-ion affinity partitioning of $NAD^+$-dependent dehydrogenases in poly(ethylene glycol)-dextran two-phase systems. *J. Chromatogr. A,* 678 (1994) 25-34.

708 Pontoppidan, B. and Kannangara, C.G.: Purification and partial characterization of barley glutamyl-$tRNA^{Glu}$ reductase, the enzyme that directs glutamate to chlorophyll biosynthesis. *Eur. J. Biochem.,* 225 (1994) 529-537.

709 Roveri, A., Maiorino, M., Nisii, C. and Ursini, F.: Purification and characterization of phospholipid hydroperoxide glutathione peroxidase from rat testis mitochondrial membranes. *Biochim. Biophys. Acta,* 1208 (1994) 211-221.

710 Sato, K., Nakanishi, M., Deyashiki, Y., Hara, A., Matsuura, K. and Ohya, I.: Purification and characterization of dimeric dihydrodiol dehydrogenase from dog liver. *J. Biochem (Tokyo),* 116 (1994) 711-717.

711 Steinkuhler, C., Carri, M.T., Micheli, G., Knoepfel, L., Weser, U. and Rotilio, G.: Copper-dependent metabolism of Cu,Zn-superoxide dismutase in human K562 cells. Lack of specific transcriptional activation and accumulation of a partially inactivated enzyme. *Biochem. J.,* 302 (1994) 687-694.

712 Van Schijndel, J.W.P.M., Barnett, P., Roelse, J., Vollenbroek, E.G.M. and Wever, R.: The stability and steady-state kinetics of vanadium chloroperoxidase from the fungus *Curvularia inaequalis*. *Eur. J. Biochem.,* 225 (1994) 151-157.

713 Wang, X.T., Dumoulin, M.J., Befani, O., Mondovi, B. and Mateescu, M.A.: Joint chromatographic purification of bovine serum ceruloplasmin and amineoxidase. *Prepar. Biochem.,* 24 (1994) 237-250.

For additional information see *C.A.*:
121 (1994) 156021k.

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

714 Hayes, J.D., Nguyen, T., Judah, D.J., Petersson, D.G. and Neal, G.E.: Cloning of cDNAs from fetal rat liver encoding glutathione S-transferase $Y_c$ polypeptides. The $Y_2$ subunit is expressed in adult rat liver resistant to the hepatocarcinogen aflatoxin $B_1$. *J. Biol. Chem.,* 269 (1994) 20707-20717.

715 Mera, N., Ohmori, S., Itahashi, K., Kiuchi, M., Igarashi, T., Rikihisa, T. and Kitada, M.: Immunochemical evidence for the occurrence of mu class glutathione S-transferase in human fetal livers. *J. Biochem. (Tokyo),* 116 (1994) 315-320.

716 Pescaglini, M., Micheli, V., Simmonds, H.A., Rocchigiani, M. and Pompucci, G.: Nicotinic acid phosphoribosyltransferase activity in human erythrocytes: studies using a new HPLC method. *Clin. Chim. Acta,* 229 (1994) 15-25.

717 Petrovic, S., Krajnovic-Ozretic, M. and Ozretic, B.: Isolation and properties of mitochondrial aspartate aminotransferase from red muscle of grey mullet, *Mugil auratus* Risso. *Biochim. Biophys. Acta,* 1207 (1994) 201-207.

718 Sato, F., Tsujita, T., Katagiri, Y., Yoshida, S. and Yamada, Y.: Purification and characterization of S-adenosyl-L-methionine:norclaurine 6-0-methyltransferase from cultured *Coptis japonica* cells. *Eur. J. Biochem.,* 225 (1994) 125-131.

719 Singh, R.N. and Mehta, K.: Purification and characterization of a novel transglutaminase from filarial nematode *Brugia malayi*. *Eur. J. Biochem.,* 225 (1994) 625-634.

720 Suzuki, H., Murakoshi, I. and Saito, K.: A novel O-tigloyltransferase for alkaloid biosynthesis in plants. Purification, characterization, and distribution in *Lupinus* plants. *J. Biol. Chem.,* 269 (1994) 15853-15860.

721 Tricot, C., Vander Wauven, C., Wattiez, R., Falmagne, P. and Stalon, V.: Purification and properteis of a succinyltransferase from *Psudomonas aeruginosa* specific for both arginine and ornithine. *Eur. J. Biochem.,* 224 (1994) 852-861.

722 Wetzel, A. and Sandermann, H., Jr.: Plant biochemistry of xenobiotics: isolation and characterization of a soybean O-glucosyltransferase of DDT metabolism. *Arch. Biochem. Biophys.,* 314 (1994) 323-328.

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

723 Aukema, H.M., Davidson, L.A., Chang, W.-C., Lupton, J.R., Derr, J.N. and Chapkin, R.S.: Dietary modulation of rat colonic cAMP-dependent protein kinase activity. *Biochim. Biophys. Acta,* 1224 (1994) 51-60.

724 Collinson, R., Fearnley, I.M., Skehel, J.M., Runswick, M.J. and Walker, J.E.: ATP Synthase from bovine heart mitochondria: identification of proteolysis of sites in $F_0$ exposed by removal of $F_1$ and the oligomycin-sensitivity conferral protein. *Biochem. J.,* 303 (1994) 639-645.

725 Davies, S.P., Hawley, S.A., Woods, A., Carling, D., Haystead, T.A.J. and Hardie, D.G.: Purification of the AMP-activated protein kinase on ATP-γ-Sepharose and analysis of its subunit structure. *Eur. J. Biochem.,* 223 (1994) 351-357.

726 Dent, P., Chow, Y.-H., Wu, J., Morrison, D.K., Jove, R. and Sturgill, T.W.: Expression, purification and characterization of recombinant mitogen-activated protein kinase kinases. *Biochem. J.,* 303 (1994) 105-112.

727 Galaev, I.Yu., Garg, N. and Mattiasson, B.: Interaction of Cibacron Blue with polymers: implications for polymer-shielded dye-affinity chromatography of phosphofructokinase from baker's yeast. *J. Chromatogr. A,* 684 (1994) 45-54.

728 Henry, S.P. and Killilea, S.D.: Purification and characterization of bovine heart glycogen synthase kinase-3. *Prepar. Biochem.,* 24 (1994) 263-277.

729 Koegl, M., Kypta, R.M., Bergman, M., Altalo, K. and Courtneidge, S.A.: Rapid and efficient purification of Src homology 2 domain-containing proteins: Fyn, Csk and phosphatidylinositol 3-kinase p85. *Biochem. J.,* 302 (1994) 737-744.

730 Kracht, M., Shiroo, M., Marshall, C.J., Hsuan, J.J. and Saklatvala, J.: Interleukin-1 activates a novel protein kinase that phosphorylates the epidermal-growth-factor receptor peptide T669. *Biochem. J.,* 302 (1994) 897-905.

731 Micheli, V., Rocchigiani, M. and Pompucci, G.: An HPLC-linked assay of phosphoribosylpyrophosphate synthetase activity in the erythrocytes of adults and children with neurological disorders. *Clin. Chim. Acta,* 227 (1994) 79-86.

732 Mitra, S., Nath, D. and Majumder, G.C.: Purification and characterization of a protein kinase from goat sperm plasma membrane. *Biochem. Cell Biol.,* 72 (1994) 218-226.

733 Miwa, I., Kito, Y. and Okuda, J.: Purification and characterization of triokinase from porcine kidney. *Prepar. Biochem.,* 24 (1994) 203-223.

734 Nanmori, T., Taguchi, W., Kinugasa, M., Oli, Y., Sahara, S., Fukami, Y. and Kikkawa, U.: Purification and characterization of protein kinase C from a higher plant, *Brassica campestris* L. *Biochem. Biophys. Res. Commun.,* 203 (1994) 311-318.

735 Rempel, A., Bannasch, P. and Mayer, D.: Microheterogeneity of cytosolic and membrane-bound hexokinase II in Morris hepatoma 3924A. *Biochem. J.,* 303 (1994) 269-274.

736 Salvarelli, S., Munoz, S. and Conde, F.P.: Purification and characterization of a ribonuclease from *Aspergillus giganteus* IFO 5518, the gigantin. Immunological and enzymic comparison with alphasarcin. *Eur. J. Biochem.,* 225 (1994) 243-251.

737 Snyder, F.F., Jenuth, J.P., Dilay, J.E., Fung, E., Lightfoot, T. and Mably, E.R.: Secondary loss of deoxyguanosine kinase activity in purine nucleoside phosphorylase deficient mice. *Biochim. Biophys. Acta,* 1227 (1994) 33-40.

738 Steinböck, F., Choojun, S., Held, I., Roehr, M. and Kubicek, C.P.: Characterization and regulatory properties of a single hexokinase from the citric acid accumulating fungus *Aspergillus niger. Biochim. Biophys. Acta,* 1200 (1994) 215-223.

739 Toyoda, Y., Miwa, I., Kamiya, M., Ogiso, S. and Okuda, J.: Purification of rat liver glycokinase. *Prepar. Biochem.,* 24 (1994) 225-236.

740 Utsumi, T., Tokunaga, T., Horii, J., Edashige, K., Utsumi, K., Koga, D. and Ide, A.: Myristoylation of protein at a distinct position allows its phosphorylation by protein kinase C. *Arch. Biochem. Biophys.,* 313 (1994) 337-345.

741 Walsh, J.P., Suen, R., Lemaitre, R.N. and Glomset, J.A.: Arachidonoyl-diacylglycerol kinase from bovine testis. *J. Biol. Chem.,* 269 (1994) 21155-21164.

742 Watanabe, F., Teraoka, H., Iijima, S., Mimori, T. and Tsukada, K.: Molecular properties, substrate specificity and regulation of DNA-dependent protein kinase from Raji Burkitt's lymphoma cells. *Biochim. Biophys. Acta,* 1223 (1994) 255-260.

See also 532, 696, 835.

*20d. Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*

743 Arrese, E.L. and Wells, M.A.: Purification and properties of a phosphorylatable triacylglycerol lipase from the fat body of an insect, *Manduca sexta. J. Lipid Res.,* 35 (1994) 1652-1660.

744 Artashov, D.K., Gevantmakher, S.V., Vagina, O.N., Rozmukhamedova, B. and Davranov, K.D.: (Purification and properties of *Penicillium* sp. lipase in aqueous solutions and in reversed micelles in benzene). *Biokhimiya (Moscow),* 59 (1994) 425-433.

745 Bauer, K.: Purification and characterization of the thyrotropin-releasing-hormone-degrading ectoenzyme. *Eur. J. Biochem.,* 224 (1994) 387-396.

746 Bayard, B., Bette-Bovillo, P. and Aliau, S.: Affinity purification and characterization of (2'-5')oligo(adenylate)-dependent RNase from mouse spleen. *Eur. J. Biochem.,* 223 (1994) 403-410.

747 Bornscheuer, U., Reif, O.-W., Lausch, R., Freitag, R., Scheper, T., Kolisis, F.N. and Menge, U.: Lipase of *Pseudomonas cepacia* for biotechnological purposes: purification, crystallization and characterization. *Biochim. Biophys. Acta,* 1201 (1994) 55-60.

748 Crevel, I., U, S., Carne, A. and Katan, M.: Purification and properties of zinc-metallo-phospholipase C from *Pseudomonas fluorescens. Eur. J. Biochem.,* 224 (1994) 845-852.

749 Hoppe, E., Berne, P.-F., Stock, D., Rasmussen, J.S., Moller, N.P.H., Ullrich, A. and Huber, R.: Expression, purification and crystallization of human phosphotyrosine phosphatase 1B. *Eur. J. Biochem.,* 223 (1994) 1069-1077.

750 Iwasaki, Y., Niwa, S., Nakano, H., Nagasawa, T. and Yamane, T.: Purification and properties of phosphatidylinositol-specific phospholipase C from *Streptomyces antibioticus. Biochim. Biophys. Acta,* 1214 (1994) 221-228.

751 Kawamura, M., Gotoda, T., Mori, N., Shimano, H., Kozaki, K., Harada, K., Shimada, M., Inaba, T., Watanabe, Y., Yazaki, Y. and Yamada, N.: Establishment of enzyme-linked immunosorbent assays for lipoprotein lipase with newly developed antibodies. *J. Lipid Res.,* 35 (1994) 1688-1697.

752 King, A.J., Andjelkovic, N., Hemmings, B.A. and Akhtar, M.: The phospho-opsin phosphatase from bovine rod outer segments. An insight into the mechanism of stimulation of type-2A protein phosphatase activity by protamine. *Eur. J. Biochem.,* 225 (1994) 383-394.

753 Ma, Y., Henderson, H.E., Liu, M.-S., Zhang, H., Forsythe, I.J., Clarke-Lewis, I., Hayden, M.R. and Brunzell, J.D.: Mutagenesis in four candidate heparin binding regions (residues 279-282, 291-304, 390-393, and 439-448) and identification of residues affecting heparin binding of human lipoprotein lipase. *J. Lipid Res.,* 35 (1994) 2049-2059.

754 Mínguez-Mosquera, M.I., Gandul-Rojas, B. and Gallardo-Guerrero, L.: Measurement of chlorophyllase activity in olive fruit (*Olea europaea*). *J. Biochem. (Tokyo),* 116 (1994) 263-268.

755 Moorhead, G.B.G., Hodgson, R.J. and Plaxton, W.C.: Copurification of cytosolic fructose-1,6-bisphosphatase and cytosolic aldolase from endosperm of germinating castor oil seeds. *Arch. Biochem. Biophys.,* 312 (1994) 326-335.

756 Mounier, C., Vargaftig, B.B., Franken, P.A., Verheij, H.M., Bon, C. and Touqui, L.: Platelet secretory phospholipase $A_2$ fails to induce rabbit platelet activation and to release arachidonic acid in contrast with venom phospholipases $A_2$. *Biochim. Biophys. Acta,* 1214 (1994) 88-96.

757 Ohmori, H., Kuba, M. and Kumon, A.: 3-Phosphohistidine/6-phospholysine phosphatase from rat brain as acid phosphatase. *J. Biochem. (Tokyo),* 116 (1994) 380-385.

758 Pete, M.J., Ross, A.H. and Exton, J.H.: Purification and properteis of phospholipase $A_1$ from bovine brain. *J. Biol. Chem.,* 269 (1994) 19494-19500.

759 Previato, L., Guardamagna, O., Dugi, K.A., Ronan, R., Talley, G.D., Santamarina-Fojo, S. and Brewer, H.B., Jr.: A novel missense mutation in the C-terminal domain of lipoprotein lipase (Glu410142Val) leads to enzyme inactivation and familial chylomicronemia. *J. Lipid Res.,* 35 (1994) 1552-1560.

760 Ramanadham, S., Wolf, M.J., Jett, P.A., Gross, R.W. and Turk, J.: Characterization of an ATP-stimulatable $Ca^{2+}$-independent phospholipase $A_2$ from clonal insulin-secreting HIT cells and rat pancreatic islets: a possible molecular component of the β-cell fuel sensor. *Biochemistry,* 33 (1994) 7442-7452.

761 Shapovalova, N.I., Zheleznaya, L.A., Matvienko, N.N. and Matvienko, N.I.: (New site-specific endonuclease BspKT51). *Biokhimiya (Moscow),* 59 (1994) 485-493.

762 Shiotsuki, T., Huang, T.L., Uematsu, T., Bonning, B.C., Ward, V.K. and Hammock, B.D.: Juvenile hormone esterase purified by affinity chromatography with 8-mercapto-1,1,1-trifluoro-2-octanone as a rationally designed ligand. *Protein Expression purif.,* 5 (1994) 296-306; *C.A.,* 121 (1994) 199083z.

763 Tsujita, T. and Okuda, H.: The synthesis of fatty acid ethyl ester by carboxyester lipase. *Eur. J. Biochem.,* 224 (1994) 57-62.

764 Zeggari, M., Esteve, J.-P., Raully, I., Cambillau, C., Mazarguil, H., Dufresne, M., Pradayrol, L., Chayvialle, J.-A., Vaysse, N. and Susini, C.: Co-purification of a protein tyrosine phosphatase with activated somatostatin receptors from rat pancreatic acinar membranes. *Biochem. J.,* 303 (1994) 441-448.

For additional information see *C.A.*: 121 (1994) 76820e.

See also 528, 537, 538, 618, 725, 804.

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

765 Christokopoulos, P., Goodenough, P.W., Kekos, D., Macris, B.J., Claeyssens, M. and Bhat, M.K.: Purification and characterization of an extracellular β-glucosidase with transglycosylation and exo-glucosidase activities from *Fusarium oxysporum*. *Eur. J. Biochem.,* 224 (1994) 379-385.

766 Dong, D.L.-Y. and Hart, G.W.: Purification and characterization of an O-GlcNAc selective N-acetyl-β-D-glucosaminidase from rat spleen cytosol. *J. Biol. Chem.,* 269 (1994) 19321-19330.

767 Gehrmann, M.C., Opper, M., Sedlacek, H.H., Bosslet, K. and Czech, J.: Biochemical properties of recombinant human β-glucuronidase synthesized in baby hamster kidney cells. *Biochem. J.,* 301 (1994) 821-828.

768 Kitajima, K., Kuroyanagi, H., Inoue, S., Ye, J., Troy, II, F.A. and Inoue, Y.: Discovery of a new type of sialidase, "KDNase," which specifically hydrolyzes deaminoneuraminyl (3-deoxy-D-glycero-D-galacto-2-nonulosonic acid) but not N-acylneuraminyl linkages. *J. Biol. Chem.,* 269 (1994) 21415-21419.

769 Li, H. and Li, H.: (Rapid purification of α-amylase by ion exchange chromatography). *Sepu,* 12 (1994) 89-91; *C.A.,* 121 (1994) 102653z.

770 Manin, C., Shareek, F., Morosoli, R. and Kluepfel, D.: Purification and characterization of an α-L-arabinofuranoside from *Streptomyces lividans* 66 and DNA sequence of the gene (abfA). *Biochem. J.,* 302 (1994) 443-449.

771 Sakai, N., Inui, K., Midorikawa, M., Okuno, Y., Ueda, S., Iwamatsu, A. and Okada, S.: Purification and characterization of galactocerebrosidase from human lymphocytes. *J. Biochem. (Tokyo),* 116 (1994) 615-620.

772 Shirokane, Y., Arai, A. and Uchida, R.: A new enzyme, maltobionate α-glucohydrolase, from alkalophilic *Bacillus* sp. N-1053. *Biochim. Biophys. Acta,* 1207 (1994) 143-151.

773 Tomizawa, H., Yamada, H., Ueda, T. and Imoto, T.: Isolation and characterization of 101-succinimide lysozyme that possesses the cyclic imide at Asp101-Gly102. *Biochemistry,* 33 (1994) 8770-8774.

774 Venerando, B., Fiorilli, A., Di Francesco, L., Chiarini, A., Monti, E., Zizioli, D. and Tettamanti, G.: Cytosolic sialidase from pig brain: a 'protein complex' containing catalytic and protective units. *Biochim. Biophys. Acta,* 1208 (1994) 229-237.

See also 148, 288.

*20f. Other hydrolases*

775 Akama, K., Terao, K., Tanaka, Y., Noguchi, A., Yonezawa, N., Nakano, M. and Tobita, T.: Purification and characterization of a novel acrosin-like enzyme from boar cauda epididymal sperm. *J. Biochem. (Tokyo),* 116 (1994) 464-470.

776 Arao, M., Yamaguchi, T., Sugimoto, T., Fukase, M. and Chihara, K.: Characterization of a chymotrypsin-like hydrolytic activity in the opossum kidney cell. *Biochem. Cell Biol.,* 72 (1994) 157-162.

777 Azaryan, A.V. and Hook, V.Y.H.: Distinct properties of prohormone thiol protease (PTP) compared to cathepsins B, L, and H: evidence for PTP as a novel cysteine protease. *Arch. Biochem. Biophys.,* 314 (1994) 171-177.

778 Bedi, G.S.: Purification and characterization of lysine- and arginine-specific gingivain proteases from *Porphyromonas gingivalis*. *Prepar. Biochem.*, 24 (1994) 251-261.

779 Burton, N.P. and Lowe, C.R.: Design of novel cationic ligands for the purification of trypsin-like proteases by affinity chromatography. *J. Mol. Recognit.*, 6 (1993) 31-40; *C.A.*, 121 (1994) 199062s.

780 Chu, Y., Wilson, S.E. and Schlender, K.K.: A latent form of protein phosphatase 1α associated with bovine heart myofibrils. *Biochim. Biophys. Acta*, 1208 (1994) 45-54.

781 Collinson, I.R., Runswick, M.J., Buchanan, S.K., Fearnley, I.M., Skehel, J.M., van Raaij, M.J., Griffiths, D.E. and Walker, J.E.: $F_0$ Membrane domain of ATP synthase from bovine heart mitochondria: purification, subunit composition, and reconstitution with $F_1$-ATPase. *Biochemistry*, 33 (1994) 7971-7978.

782 De Felice, C., Hayakawa, K., Tanaka, T., Watanabe, T., Hibi, I., Kohsaka, T. and Itoh, K.: High-performance liquid chromatographic assay for biotinidase activity in the human urine. *J. Liq. Chromatogr.*, 17 (1994) 2641-2650.

783 Dumont, L., Verneuil, B., Wallach, J. and Julien, R.: Purification and characterization of an alkaline elastase from *Myxococcus xanthus*. *Eur. J. Biochem.*, 223 (1994) 775-782.

784 Escobar, W.A., Miller, J. and Fink, A.L.: Effects of site-specific mutagenesis of tyrosine 105 in a class A β-lactamase. *Biochem. J.*, 303 (1994) 555-558.

785 Grzywnowicz, K. and Lobarzewski, J.: A purification method for specific serine proteases using one-step affinity chromatography. *J. Chem. Technol. Biotechnol.*, 60 (1994) 153-160; *C.A.*, 121 (1994) 151849b.

786 Karasawa, K., Kato, H., Setaka, M. and Nojima, S.: Accumulation of platelet-activating factor acetylhydrolase in the peritoneal cavity of guinea pig after endotoxin shock. *J. Biochem. (Tokyo)*, 116 (1994) 368-373.

787 Karasawa, K., Yato, M., Setaka, M. and Nojima, S.: Purification and characterization of platelet-activating factor acetylhydrolase from peritoneal fluid obtained from guinea pigs after endotoxin shock. *J. Biochem. (Tokyo)*, 116 (1994) 374-379.

788 Laliberte, J. and Momparler, R.L.: Human cytidine deaminase: purification of enzyme, cloning, and expression of its complementary DNA. *Cancer Res.*, 54 (1994) 5401-5407.

789 Napper, A.D., Bennett, S.P., Borowski, M., Holdridge, M.B., Leonard, M.J.C., Rogers, E.E., Duan, Y., Laursen, R.A., Reinhold, B. and Shames, S.L.: Purification and characterization of multiple forms of the pineapple-stem-derived cysteine proteinases ananain and comosain. *Biochem. J.*, 301 (1994) 727-735.

790 Ogawa, J. and Shimizu, S.: β-Ureidopropionase with N-carbamoyl-α-L-amino acid amidohydrolase activity from an aerobic bacterium, *Pseudomonas putida* IFO 12996. *Eur. J. Biochem.*, 223 (1994) 625-630.

791 Ohshita, T. and Kido, H.: Involvement of a cystatine-α-sensitive cysteine proteinase in the degradation of native L-lactate dehydrogenase and serum albumin by rat liver or kidney lysosomes. *Eur. J. Biochem.*, 225 (1994) 781-786.

792 Pshezhetsky, A.V. and Potier, M.: Direct affinity purification and supramolecular organization of human lysosomal cathepsin A. *Arch. Biochem. Biophys.*, 313 (1994) 64-70.

793 Romes, T. and Höltje, J.-V.: Penicillin-binding protein 7/8 of *Escherichia coli* is a DD-endopeptidase. *Eur. J. Biochem.*, 224 (1994) 597-604.

794 Sanchez del Pino, M.M., Lopez-Rodas, G., Sendra, R. and Tordera, V.: Properties of the yeast nuclear histone deacetylase. *Biochem. J.*, 303 (1994) 723-729.

795 Schoyen, H., Wassdal, I., Toft, K., Almendingen, M. and Berg, T.: Purification of enzymes of the kallikrein gene family (rK8 and rK9) from the rat prostate. *Biochem. J.*, 302 (1994) 229-235.

796 Sharoyan, S.G., Antonyan, A.A. and Mardanyan, S.S.: (Isolation, purification and comparative characteristics of adenosine deaminase from five divisions of bovine brain). *Biokhimiya (Moscow)*, 59 (1994) 240-245.

797 Stewart, A.E., Arfin, S.M. and Bradshaw, R.A.: Protein $NH_2$-terminal asparagine deamidase. Isolation and characterization of a new enzyme. *J. Biol. Chem.*, 269 (1994) 23509-23517.

798 Wang, W., Hendriks, D.F. and Scharpe, S.S.: Carboxypeptidase U, a plasma carboxypeptidase with high affinity for plasminogen. *J. Biol. Chem.*, 269 (1994) 15937-15944.

799 Werlen, R.C., Offord, R.E. and Rose, K.: Preparation and characterization of novel substrates of insulin proteinase (EC. 3.4.99.45). *Biochem. J.*, 302 (1994) 907-911.

800 Yang, S.-H., Wu, X.-H. and Lin, W.Y.: Chemical modification of aminopeptidase isolated from pronase. *Biochem. J.*, 302 (1994) 595-600.

801 Zuo, S., Guo, Q. and Chang, Y.-H.: A protease assay *via* precolumn derivatization and high-performance liquid chromatography. *Anal. Biochem.*, 222 (1994) 514-516.

See also 521, 533, 609, 679.

*20g. Lyases*

802 Böttcher, K., Waheed, A. and Sly, W.S.: Membrane-associated carbonic anhydrase from the crab gill: purification, characterization and comparison with mammalian CAs. *Arch. Biochem. Biophys.*, 312 (1994) 429-435.

803 Chu, W.-C. and Metzler, D.E.: Enzymatically active truncated cat brain glutamate decarboxylase: expression, purification, and absorption spectrum. *Arch. Biochem. Biophys.*, 313 (1994) 287-295.

804 Heller, M., Bütikofer, P. and Brodbeck, U.: Generation by limited proteolysis of a catalytically active 39-kDa protein from the 115-kDa form a phosphatidylinositol-glycan-specific phospholipase D from bovine serum. *Eur. J. Biochem.*, 224 (1994) 823-833.

805 Huang, W.-Y., Chirala, S.S. and Wakil, S.J.: Amino-terminal blocking group and sequence of the animal fatty acid synthase. *Arch. Biochem. Biophys.*, 314 (1994) 45-49.

806 James, K.D., Russell, R.J.M., Parker, L., Daniel, R.M., Hough, D.W. and Danson, M.J.: Citrate synthases from the Archaea: development of a bio-specific, affinity chromatography purification procedure. *FEMS Microbiol. Lett.*, 119 (1994) 181-186; *C.A.*, 121 (1994) 102665e.

807 Lee, H.J., Lin, C.-C., Chiou, S.-H. and Chang, G.-G.: Characterization of the multiple forms of duck lens δ-crystallin with endogenous argininosuccinate lyase activity. *Arch. Biochem. Biophys.*, 314 (1994) 31-38.

808 Li, B. and Chollet, R.: Salt induction and the partial purification/characterization of phosphoenolpyruvate carboxylase protein-serine kinase from an inducible crassulacean-acid metabolism (CAM) plant, *Mesembryanthemum crystallinum* L. *Arch. Biochem. Biophys.*, 314 (1994) 247-254.

809 Peak, M.J., Peak, J.G., Stevens, F.J., Blamey, J., Mai, X., Zhou, Z.H. and Adams, M.W.W.: The hyperthermophilic glycolytic enzyme enolase in the archaeon, *Pyrococcus furiosus*: comparison with mesophilic enolases. *Arch. Biochem. Biophys.,* 313 (1994) 280-286.

810 Yu, S.M.: Thaloporphine selectively inhibits expression of the inducible, but not the constitutive, nitric oxide synthase. *Biochem. J.,* 303 (1994) 283-294.

See also 755.

*20h. Isomerases*

811 Park, S.M. and Koo, H.-S.: Purification of *Caenorhabditis elegans* DNA topoisomerase I. *Biochim. Biophys. Acta,* 1219 (1994) 47-54.

See also 541.

*20i. Ligases*

812 Bespalova, L.A., Korshunova, V.E., Antonyuk, L.P. and Ignatov, V.V.: (Isolation, purification and some kinetic properties of glutamine synthetase in the average state of adenylation from *Azospirillum brasilense* sp. 245). *Biokhimiya (Moscow),* 59 (1994) 55-61.

813 Chiba, Y., Suzuki, Y., Aoki, Y., Ishida, Y. and Narisawa, K.: Purification and properties of bovine liver holocarboxylase synthetase. *Arch. Biochem. Biophys.,* 313 (1994) 8-14.

814 Dehaye, L., Alban, C., Job, C., Douce, R. and Job, D.: Kinetics of the two forms of acetyl-CoA carboxylase from *Pisum sativum*. Correlation of the substrate specificity of the enzymes and sensitivity towards aryloxyphenoxypropionate herbicides. *Eur. J. Biochem.,* 225 (1994) 1113-1123.

815 Pajares, M.A., Duran, C., Corrales, F. and Mato, J.M.: Protein kinase C phosphorylation of rat liver S-adenosylmethionine synthetase: dissociation and production of an active monomer. *Biochem. J.,* 303 (1994) 949-955.

See also 529.

*20j. Complex mixtures and incompletely identified enzymes*

816 Avakyan, S.A., Boyaiyan, A.S., Pogosyan, A.G. and Karagezyan, K.G.: (Prostaglandin $D_2$-synthase from bovine brain: purification and physico-chemical properties). *Biokhimiya (Moscow),* 59 (1994) 251-258.

817 Kal'cheva, E.O., Shanskaya, V.O. and Malyuta, S.S.: (Analysis of key enzyme activities of the aspartate family amino acid biosynthesis in *Streptococcus bovis*). *Biokhimiya (Moscow),* 59 (1994) 96-101.

## 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

818 Arabshahi, A. and Frey, P.A.: A simplified procedure for synthesizing nucleoside 1-thiotriphosphates: $dATP_{\alpha}S$, $dGTP_{\alpha}S$, $UTP_{\alpha}S$ and $dTTP_{\alpha}S$. *Biochem. Biophys. Res. Commun.,* 204 (1994) 150-155.

819 Bernocchi, P., Ceconi, C., Cargnoni, A., Pedersini, P., Curello, S. and Ferrari, R.: Extraction and assay of creatine phosphate, purine, and pyridine nucleotides in cardiac tissue by reversed-phase high-performance liquid chromatography. *Anal. Biochem.,* 222 (1994) 374-379.

820 Bleicher, K. and Bayer, E.: Analysis of oligonucleotides using coupled high performance liquid chromatography-electrospray mass spectrometry. *Chromatographia,* 39 (1994) 405-408.

821 Dale, C.J. and Lyddiatt, A.: Quantitative analysis of purine nucleosides and free bases in wort and beer. *J. Inst. Brew.,* 100 (1994) 173-178; *C.A.,* 121 (1994) 177999a.

822 Damha, M.J., Giannaris, P.A. and Marfey, P.: Antisense L/D-oligodeoxynucleotide chimeras: nuclease stability, base-pairing properties, and activity at directing ribonuclease H. *Biochemistry,* 33 (1994) 7877-7885.

823 Downs, S.M.: High performance liquid chromatography analysis of hypoxanthine metabolism in mouse oocyte-cumulus cell complexes: effects of purine metabolic perturbants. *Biol. Reprod.,* 50 (1994) 1403-1412; *C.A.,* 121 (1994) 30146m.

824 Geisen, K., Utz, R., Grötsch, H., Lang, H.J. and Nimmersgern, H.: Sorbitol-accumulating pyrimidine derivatives. *Arzneim.-Forsch.,* 44 (1994) 1032-1043.

825 Guieu, R., Paganelli, F., Sampieri, F., Bechis, G., Levy, S. and Rochat, H.: The use of HPLC to evaluate the variations of blood coronary adenosine levels during percutaneous transluminal angioplasty. *Clin. Chim. Acta,* 230 (1994) 63-68.

826 Guieu, R., Sampiéri, F., Bechis, G. and Rochat, H.: Use of HPLC to measure circulating adenosine levels in migrainous patients. *Clin. Chim. Acta,* 227 (1994) 185-194.

827 Hull, S.R. and Montgomery, R.: Separation and analysis of 4'-epimeric UDP-sugars, nucleotides, and sugar phosphates by anion-exchange high performance liquid chromatography with conductometric detection. *Anal. Biochem.,* 222 (1994) 49-54.

828 Imai, Y., Yanagishita, M. and Hascall, V.C.: Measurement of contribution form intracellular cysteine to sulfate in phosphoadenosine phosphosulfate in rat ovarian granulosa cells. *Arch. Biochem. Biophys.,* 312 (1994) 392-400.

829 Jeong, S.-S. and Gready, J.E.: A method of preparation and purification of (4R)-deuterated-reduced nicotinamide adenine dinucleotide phosphate. *Anal. Biochem.,* 221 (1994) 273-277.

830 Loregian, A., Scremin, C., Schiavon, M., Marcello, A. and Palu, G.: Quantitative analysis of ribonucleotide triphosphates in cell extracts by high-performance liquid chromatography and micellar electrokinetic capillary chromatography: a comparative study. *Anal. Chem.,* 66 (1994) 2981-2984.

831 Mirzayans, R., Enns, L., Cubitt, S., Karimian, K., Radatus, B. and Paterson, M.C.: Effect of DNA polymerase inhibitors on repair of $\gamma$ ray-induced DNA damage in proliferating (intact *versus* permeable) human fibroblasts: evidence for differences in the modes of action of aphidicolin and 1-β-D-arabinofuranosylcosine. *Biochim. Biophys. Acta,* 1227 (1994) 92-100.

832 Misra, R.R., Chiang, S.Y. and Swenberg, J.A.: A comparison of two ultrasensitive methods for measureing 1,-$N^6$-etheno-2'-deoxyadenosine and 3,$N^4$-etheno-2'-deoxycytidine in cellular DNA. *Carcinogenesis,* 15 (1994) 1647-1652; *C.A.*, 121 (1994) 197759a.

833 Panzeter, P.L., Zweifel, B. and Althaus, F.R.: Fast protein liquid chromatographic purification of poly(ADP-ribose) polymerase and separation of ADP-ribose polymers. *J. Chromatogr. A,* 678 (1994) 35-40.

834 Porcelli, B., Pagani, R., Lorenzini, L., de Martino, A., Catinella, S. and Traldi, P.: Different mass spectrometric approaches in the identification of endogenous methylated purine bases in urine extracts. *Rapid Commun. Mass Spectrom.,* 8 (1994) 443-450; *C.A.*, 121 (1994) 53339r.

835 Pulido-Cejudo, G., Gagnon, J., Leclerc, J.-M., Jamison, K., Gordon, J. and Campione-Piccardo, J.: Measurement of nucleoside diphosphate kinase-Nm23 activity by anion-exchange high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 37-47.

836 Seymour, K.K., Lyons, S.D., Phillips, L., Rieckmann, K.H. and Christoperson, R.I.: Cytotoxic effects of inhibitors of *de novo* pyrimidine biosynthesis upon *Plasmodium falciparum*. *Biochemistry,* 33 (1994) 5268-5274.

837 Sun, Y., Palasingam, K. and Nicholson, W.L.: High-pressure liquid chromatography assay for quantitatively monitoring spore photoproduct repair mediated by spore photoproduct lyase during germination of UV-irradiated *Bacillus subtilis* spores. *Anal. Biochem.,* 221 (1994) 61-65.

838 Takeda, N., Nakamura, M., Yoshizumi, H. and Tatematsu, A.: Detection of ribose-methylated nucleotides in *Pyrodictium occultum* tRNA by liquid chromatography - frit-fast atom bombardment mass spectrometry. *J. Chromatogr. B,* 660 (1994) 223-233.

839 Takeda, N., Nakamura, M., Yoshizumi, H. and Tatematsu, A.: Structural characterization of modified nucleosides in tRNA hydrolyzates by frit-fast atom bombardment liquid chromatography/mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 465-474; *C.A.*, 121 (1994) 174267z.

840 Van Schepdael, A., Heerinckx, F., van Aerschot, A., Herdewijn, P., Roets, E. and Hoogmartens, J.: Comparative liquid chromatographic stability study of thymidine and 1-(2-deoxy-α-D-erythro-pentofuranosyl)thymine. *Nucleosides Nucleotides,* 13 (1994) 1113-1123; *C.A.*, 121 (1994) 109557e.

841 Ysart, G.E. and Mason, R.M.: Serum factors, growth factors and UDP-sugar metabolism in bovine articular cartilage chondrocytes. *Biochem. J.,* 303 (1994) 713-721.

See also 65, , 157, 176, 426, 882, 1092, 1166, 1243.

*21b. Nucleic acids, RNA*

842 Kanduc, D.: Fractionation of rat liver tRNA by reversed-phase high performance liquid chromatography: isolation of isotRNAs$^{Pro}$. *Prepar. Biochem.,* 2114 (1994) 167-174.

843 Kowalak, J.A., Dalluge, J.J., McCloskey, J.A. and Stetter, K.O.: The role of posttranscriptional modification in stabilization of transfer RNA from hyperthermophiles. *Biochemistry,* 33 (1994) 7869-7876.

844 Mesters, J.R., Vorstenbosch, E.L.H., de Boer, A.J. and Kraal, B.: Complete purification of tRNA, charged or modified with hydrophobic groups, by reversed-phase high-performance liquid chromatography on a $C_4/C_{18}$ column system. *J. Chromatogr. A,* 679 (1994) 93-98.

See also 104.

*21c. Nucleic acids, DNA*

845 Mischiati, C., Fiorentino, D., Feriotto, G., Bianchi, N. and Gambari, R.: A chromatographic procedure for fully automated isolation of DNA from human whole blood. *J. Biochem. Biophys. Methods,* 28 (1994) 185-193; *C.A.*, 121 (1994) 152444c.

846 Mitra, A. and Que, Q.: Ectopic expression of a viral adenine methyltransferase gene in tobacco. *Biochim. Biophys. Acta,* 1219 (1994) 244-249.

847 Nickoloff, J.A.: Sepharose spin column chromatography. A fast, nontoxic replacement for phenol:chloroform extraction/ethanol precipitation. *Mol. Biotechnol.,* 1 (1994) 105-108; *C.A.*, 121 (1994) 77547h.

For additional information see *C.A.*:
121 (1994) 103543a.

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

848 Bonn, G., Huber, C. and Oefner, P.: Separation of nucleic acid fragments with alkylated nonporous polymer beads. *PCT Int.* Appl. WO 94 11,305 (Cl. CO2F1/28), 26 May 1994, AT Appl. 92/2,285, 18 Nov. 1992; 30 pp.; *C.A.*, 121 (1994) 127045r.

See also 846.

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

849 King, L.C., George, M., Gallagher, J.E. and Lewtas, J.: Separation of $^{32}$P-postlabeled DNA adducts of polycyclic aromatic hydrocarbons and nitrated polycyclic aromatic hydrocarbons by HPLC. *Chem. Res. Toxicol.,* 7 (1994) 503-510; *C.A.*, 121 (1994) 51586v.

## 22. ALKALOIDS

850 Buech, U., Isenberg, E. and Buech, H.P.: HPLC assay for atropine in serum and protein solutions after *in vitro* addition of the tropane alkaloid. *Methods Find. Exp. Clin. Pharmacol.,* 16 (1994) 361-365; *C.A.*, 121 (1994) 194780q.

851 Burton, D.E., Powell, L.L. and Xi, X.: Reproducibility of the determination of caffeine in coffee by micellar electrokinetic capillary chromatography. *J. Microcolumn Sep.,* 6 (1994) 5-10; *C.A.*, 121 (1994) 132495s.

852 Cieri, U.R.: Determination of reserpine in tablets by liquid chromatography with fluorescence detection: revised procedure. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 758-760.

853 Gilar, M., Perlik, F. and Patzelova, V.: (Determination of caffeine by high-performance liquid chromatography). *Ceska Slov. Farm.,* 43 (1994) 78-80; *C.A.*, 121 (1994) 49515c.

854 Häberlein, H. and Tschiersch, K.-P.: Effects of surface structure of reversed phases on the separation of alkaloids by HPLC. *Pharmazie,* 49 (1994) 769-775.

855 Iwasa, K., Kondo, Y., Kamigauchi, M. and Takao, N.: An application of HPLC and LC/API-MS for identification of metabolites of protoberberine alkaloids in cell cultures of *Corydalis pallida* var. *tenuis*. *Planta Med.,* 60 (1994) 290-292; *C.A.,* 121 (1994) 175153w.

856 Rasamussen, B.B., Nielsen, K.K. and Brosen, K.: Determination of theophylline metabolites in human liver microsomes by high-performance liquid chromatography. *Anal. Biochem.,* 222 (1994) 9-13.

857 Remberg, B., Krenn, L., Kopp, B., Buchbauer, G. and Nikiforov, A.: Principal component analysis (PCA) of opium alkaloid contents for origin determination. *Pharmazie,* 49 (1994) 766-768.

858 Volkov, S.K. and Grodnitskaya, E.I.: Application of high-performance liquid chromatography to the determination of vinblastine in *Catharanthus roseus*. *J. Chromatogr. B,* 660 (1994) 405-408.

859 Zahlsen, K. and Nilsen, O.G.: Nicotine in hair of smokers and non-smokers: sampling procedure and gas chromatographic/mass spectrometric analysis. *Pharmacol. Toxicol. (Copenhagen),* 75 (1994) 143-149; *C.A.,* 121 (1994) 198365f.

For additional information see *C.A.*:
121 (1994) 51650m, 98935y, 109335f, 141823z, 187391k, 194773q.

See also 1119, 1167, 1184, 1216.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

### *23a. Porphyrins and other pyrroles*

860 Houston, T., Moore, M.R., McColl, K.E.L. and Fitzsimons, E.J.: Regulation of haem biosynthesis in normoblastic erythropoiesis: role of 5-aminolaevulinic acid synthase and ferrochelatase. *Biochim. Biophys. Acta,* 1201 (1994) 85-93.

861 Inoue, H., Yamashita, H., Furuya, K., Nonomura, Y., Yoshioka, N. and Li, S.: Determination of copper(II) chlorophyllin by reversed-phase high-performance liquid chromatography. *J. Chromatogr. A,* 679 (1994) 99-104.

862 Kondo, Y., Nagano, Y., Watanabe, S., Yoshihara, T. and Nakamura, T.: Isolation and purification of cell-killing components of hematoporphyrins. *Jpn Kokai Tokkyo Koho* JP 05,331,170 (93,331,170) (Cl. C07D487/22), 14 Dec. 1993, Appl. 92/166,877, 02 Jun. 1992; 8 p.; *C.A.,* 121 (1994) 98848x.

863 Kumar, U., Dorsey, J.G., Caruso, J.A. and Evans, E.H.: Metalloporphyrin speciation by liquid chromatography and inductively coupled plasma-mass spectrometry. *J. Chromatogr. Sci.,* 32 (1994) 282-285.

864 Lubben, M. and Morand, K.: Novel prenylated hemes as cofactors of cytochrome oxidases. Archaea have modified hemes A and O. *J. Biol. Chem.,* 269 (1994) 21473-21479.

865 Miksik, I., Holan, V. and Deyl, Z.: Quantification and variability of eggshell pigment content. *Comp. Biochem. Physiol., A,* 109 (1994) 769-772.

866 Sato, H., Ido, K. and Kimura, K.: Simultaneous separation and quantification of free and metal-chelated protoporphyrins in blood by three-dimensional HPLC. *Clin. Chem. (Washington),* 40 (1994) 1239-1244.

See also 867.

### *23b. Bile pigments*

867 Yamaguchi, T., Shioji, I., Sugimoto, A., Komoda, Y. and Nakajima, H.: Chemical structure of a new family of bile pigments from human urine. *J. Biochem. (Tokyo),* 116 (1994) 298-303.

### *23c. Indole derivatives and plant hormones (gibberelins)*

868 Agatsuma, S., Sekino, H., Nagoshi, T. and Watanabe, H.: Indoxyl-β-D-glucuronide, the primary emitter of low-level chemiluminescence in plasma of hemodialysis patients. *Clin. Chem. (Washington),* 40 (1994) 1580-1586.

869 Gibis, M. and Fischer, A.: (HPLC method for the rapid determination of indole and skatol in the adipose tissue of swine). *Dtsch. Lebensm.-Rundsch.,* 89 (1993) 313-316; *C.A.,* 121 (1994) 106762g.

See also 442, 821, 873.

### *23d. Pyridine derivatives*

870 Josefsson, M., Carlsson, B. and Norlander, B.: Chiral ion-pair chromatographic separation of two dihydropyridines with camphorsulfonic acids on porous graphitic carbon. *J. Chromatogr. A,* 684 (1994) 23-27.

For additional information see *C.A.*:
121 (1994) 124478y.

See also 104.

### *23e. Other N-heterocyclic compounds*

871 Abell, A.D., Erhard, K.F., Yen, H.K., Yamashita, D.S., Brandt, M., Mohammed, H., Levy, M.A. and Holt, D.A.: Preparative chiral HPLC separation of all possible stereoisomers of LY191704 and LY266111 and their *in vitro* inhibition of human types 1 and 2 steroid 5α-reductases. *Bioorg. Med. Chem. Lett.,* 4 (1994) 1365-1368; *C.A.,* 121 (1994) 133926v.

872 Baruffini, A., Massolini, G. and Gandini, C.: High-performance liquid chromatographic determination of pyroglutamic acid in cosmetic preparations. *Farmaco,* 49 (1994) 219-220; *C.A.,* 121 (1994) 42395e.

873 Mao, J., Pacheco, C.R., Traficante, D.D. and Rosen, W.: Analysis of neutral nitrogen compounds in diesel oil by direct injection high-performance liquid chromatography-mass spectrometry-ultraviolet spectrometry methods. *J. Chromatogr. A,* 684 (1994) 103-111.

874 Van Landuyt, K.G., Thienpont, L.M., de Leenheer, A.R. and Stöckl, D.: Determination of creatinine in human serum using isocratic HPLC with an aluminium oxide stationary phase. *J. Chromatogr. Sci.,* 32 (1994) 294-297.

875 Vianna-Rodrigues, S., Martins-Viana, L., Quiroga, J., Insuasty, B., Abonia, R. and Baumann, W.: Chromatographic and spectroscopic properties of regioisomers of some 1H-1,5-benzodiazepines. *J. Heterocycl. Chem.,* 31 (1994) 813-817; *C.A.,* 121 (1994) 179043h.

See also 41, 976, 1225.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

876 Bauer, L.N., Min, R.S., Savinova, I.A. and Plyusnin, A.N.: (Separation and concentration of sulphur-containing compounds based on complexation). In: Bol'shakov, G.F. (Editor), *Probl. Khim. Nefti,* Nauka, Sib Otd, Novosibirsk, 1992, pp. 34-39; *C.A.,* 121 (1994) 112979z.

877 Futani, S., Ubuka, T. and Abe, T.: High-performance liquid chromatographic determination of hypotaurine and taurine after conversion to 4-dimethylaminoazobenzene-4'-sulfonyl derivatives and its application to the urine of cysteine-administered rats. *J. Chromatogr. B,* 660 (1994) 164-169.

878 Husain, S., Khalid, S., Nagaraj, V. and Rao, R.N.: Rapid determination of 2,5-diaminobenzene-1,4-disulfonic acid by reversed phase HPLC. *J. High Resolut. Chromatogr.,* 17 (1994) 561-562.

879 Masuoka, N., Yao, K., Kinuta, M., Ohta, J., Wakimoto, M. and Ubuka, T.: High-performance liquid chromatographic determination of taurine and hypotaurine using 3,5-dinitrobenzoyl chloride as derivatizing reagent. *J. Chromatogr. B,* 660 (1994) 31-35.

880 Roussel, C. and Favrou, A.: HPLC separation of the atropisomers of some substituted N-arylthiazoline-2-thiones with γ-cyclodextrin as a chiral mobile phase additive: size and lipophilicity effect of substituents. *J. Inclusion Phenom. Mol. Recognit. Chem.,* 16 (1993) 283-296; *C.A.,* 121 (1994) 169292z.

881 Shimada, K. and Mitamura, K.: Derivatization of thiol-containing compounds. *J. Chromatogr. B,* 659 (1994) 227-241 - a review with 77 refs.

For additional information see *C.A.*:
121 (1994) 141838h, 169312f, 179709e.

See also 70, 337, 651.

## 25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

882 Alnatan, A. and Mitchelson, F.: A simple and rapid HPLC assay for quantitating cyclic AMP accumulation in intact cell preparations. *J. Pharmacol. Toxicol. Methods,* 31 (1994) 47-51; *C.A.,* 121 (1994) 152442a.

883 Palmieri, M.J., Reynolds, R.A., Gibson, J.B., Berry, G.T. and Segal, S.: Concentration of white blood cell UDP-galastose and UDP-glucose determined by high performance liquid chromatography. *Enzyme Protein,* 47 (1994) 105-115; *C.A.,* 121 (1994) 103323d.

884 Tarelli, E. and Wheeler, S.F.: Drying from phosphate-buffered solutions can result in the phosphorylation of primary and secondary alcohol groups in saccharides, hydroxylated amino acids, proteins and glycoproteins. *Anal. Biochem.,* 22 (1994) 196-201.

For additional information see *C.A.*:
121 (1994) 132475k, 179708d.

See also 356, 417, 469, 540, 550, 571, 625, 827, 915, 1202.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

### *26a. Organometallic compounds*

885 Dean, J.R., Ebdon, L., Foulkes, M.E., Crews, H.M. and Massey, R.C.: Determination of the growth promoter 4-hydroxy-3-nitrophenylarsonic acid in chicken tissue by coupled high-performance liquid chromatography-inductively coupled plasma mass spectrometry. *J. Anal. At. Spectrom.,* 9 (1994) 615-618; *C.A.,* 121 (1994) 106806z.

886 Farag, A.B., El-Shahawi, M.S. and Farrag, S.: The sorption behavior and separation of some metal thiocyanate complexes on polyether-based polyurethane foam. *Talanta,* 41 (1994) 617-623; *C.A.,* 121 (1994) 98569g.

887 Shibata, Y., Yoshinaga, J. and Morita, M.: Detection of arsenobetaine in human blood. *Appl. Organomet. Chem.,* 8 (1994) 249-251; *C.A.,* 121 (1994) 75470d.

888 Wilken, R.D., Kuballa, J. and Jantzen, E.: Organotins: their analysis and assessment in the Elbe river system, Northern Germany. *Fresenius J. Anal. Chem.,* 350 (1994) 77-84.

See also 459.

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

889 Harfst, S., Moller, D., Ketz, H., Rösler, J. and Gabel, D.: Reversed-phase separation of ionic organoborate clusters by high-performance liquid chromatography. *J. Chromatogr. A,* 678 (1994) 41-48.

See also 1136.

### *26c. Coordination compounds*

890 Vrchlabsky, M., Janik, V. and Vespalec, R.: Chromatography of chromium(III) complexes with azo dyes. *Scr.-Chem.,* 22 (1992) 45-56; *C.A.,* 121 (1994) 181916p.

For additional information see *C.A.*:
121 (1994) 30142g.

See also 199, 200, 876, 1284.

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


891 Achkar, C.C., Bentel, J.M., Boylan, J.F., Scher, H.I., Gudas, L.J. and Miller, W.H., Jr.: Differences in the pharmacokinetic properteis of orally administered all-*trans*-retinoic acid and 9-*cis*-retinoic acid in the plasma of nude mice. *Drug Metab. Disp.,* 22 (1994) 451-458.

892 Aitzetmüller, K.: HPLC von Vitamin A - Estern in Margarine. *Fat Sci. Technol.,* 96 (1994) 279-285.

893 Aksnes, L.: Simultaneous determination of retinol, α-tocopherol, and 25-hydroxyvitamin D in human serum by high-performance liquid chromatography. *J. Pediatr. Gastroenterol. Nutr.,* 18 (1994) 339-343; *C.A.,* 121 (1994) 152441z.

894 Anes, J.M., Beck, R.A., Brink, J.J. and Goldberg, R.J.: Nitritocobalamin and nitrosocobalamin may be confused with sulfitocobalamin using cation-exchange chromatography. *J. Chromatogr. B,* 660 (1994) 180-185.

895 Behrens, W.A. and Madere, R.: A procedure for the separation and quantitative analysis of ascorbic acid, dehydroascorbic acid, isoascorbic acid, and dehydroisoascorbic acid in food and animal tissue. *J. Liq. Chromatogr.,* 17 (1994) 2445-2455.

896 Besler, K., Knecht, U. and Nöll, G.N.: Replacement of toxic mobile phases commonly used in high performance liquid chromatography of retinoids. *Fresenius J. Anal. Chem.,* 350 (1994) 182-184.

897 Biacs, P.A. and Daood, H.G.: High-performance liquid chromatography with photodiode-array detection of carotenoids and carotenoid esters in fruits and vegetables. *J. Plant Physiol.,* 143 (1994) 520-525; *C.A.,* 121 (1994) 81220p.

898 Blanco Gomis, D., Escotet Arias, V.J., Fidalgo Alvarez, L.E. and Gutiérrez Alvarez, M.D.: Simultaneous determination of vitamins $D_3$, E and $K_1$ and retinyl palmitate in cattle plasma by liquid chromatography with a narrow-bore column. *J. Chromatogr. B,* 660 (1994) 49-55.

899 Blau, N., Kierat, L., Matasovic, A., Leimbacher, W., Heizmann, C.W., Guardamagna, O. and Ponzone, A.: Antenatal diagnosis of tetrahydrobiopterin deficiency by quantification of pterins in amniotic fluid and enzyme activity in fetal and extrafetal tissue. *Clin. Chim. Acta,* 226 (1994) 159-169.

900 Carpenter, D.R., Hammerstone, J.F., Jr., Romanczyk, L.J., Jr. and Aitken, W.M.: Lipid composition of *Herrania* and *Theobroma* seeds. *J. Am. Oil Chem. Soc.,* 71 (1994) 845-851.

901 Chase, G.W., Jr., Akoh, C.C. and Eitenmiller, R.R.: Analysis of tocopherols in vegetable oils by high-performance liquid chromatography: comparison of fluorescence and evaporative light-scattering detection. *J. Am. Oil Chem. Soc.,* 71 (1994) 877-880.

902 Dutta, P.C., Helmersson, S., Kebedu, E., Aleman, G. and Appelquist, L.-A.: Variation of lipid composition of niger seed (*Guizotia abyssinica* Cass.) samples from different regions in Ethiopia. *J. Am. Oil Chem. Soc.,* 71 (1994) 839-843.

903 Gonzalez-Corbella, M.J., Lloberas-Blanch, N., Castellote-Bargallo, A.I., Lopez-Sabater, M.C. and Rivero-Urgell, M.: Determination of α-tocopherol in plasma and erythrocytes by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 395-400.

904 Hagar, A.F., Madsen, L., Wales, L., Jr. and Bradford, H.B., Jr.: Reversed-phase liquid chromatographic determination of vitamin D in milk. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 1047-1051.

905 Ifuku, O., Koga, N., Haze, S.-i., Kishimoto, J. and Wachi, Y.: Flavodoxin is required for conversion of dellviobiotin to biotin in *Escherichia coli. Eur. J. Biochem.,* 224 (1994) 173-178.

906 Kirchhoeffer, R.D.: Niacin II: identification of isonicotinic acid in niacin by liquid chromatography with diode array detection. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 587-590.

907 Kobayashi, N. and Shimada, K.: (Development of analysis method for vitamin D metabolite). *Farumashia,* 30 (1994) 864-868; *C.A.,* 121 (1994) 174179x - a review with 17 refs.

908 Marchetti, M.N., Bun, H., Geiger, J.M. and Durand, A.: Determination of a new retinoid: 9-*cis* retinoic acid in plasma by HPLC. *Anal. Lett.,* 27 (1994) 1847-1862.

909 McDiarmid, R.E., Majak, W. and Cheng, K.J.: Procedure for analysis of α-tocopherol acetate in bovine ruminal fluid. *Can. J. Anim. Sci.,* 74 (1994) 391-392; *C.A.,* 121 (1994) 199928d.

910 Morita, K., Fukuzawa, Y., Kodaka, K. and Ujiie, T.: (A simple method for determination of vitamin D in foods by ethyl acetate/*n*-hexane extraction-high performance liquid chromatography). *Bitamin,* 68 (1994) 303-307; *C.A.,* 121 (1994) 156027s.

911 Mueller, H.: (Determination of the folic acid content of grain, cereal products, bakery products, and legumes by HPLC). *Z. Lebensm.-Unters. Forsch.,* 197 (1993) 573-577; *C.A.,* 121 (1994) 203613s.

912 Pfander, H., Riesen, R. and Niggli, U.: HPLC and SFC of carotenoids - scope and limitations. *Pure Appl. Chem.,* 66 (1994) 947-954; *C.A.,* 121 (1994) 77516x - a review with 36 refs.

913 Richheimer, S.L., Kent, M.C. and Bernart, M.W.: Reversed-phase high-performance liquid chromatographic method using a pentafluorophenyl bonded phase for analysis of tocopherols. *J. Chromatogr. A,* 677 (1994) 75-80.

914 Shin, T.-S. and Godber, J.S.: Isolation of four tocopherols and four tocotrienols from a variety of natural sources by semi-preparative high-performance liquid chromatography. *J. Chromatogr. A,* 678 (1994) 49-58.

915 Tsujii, M., Kuroda, H., Furusawa, Y. and Hirota, K.: Column chromatography for purification of crude products, including lecithin and vitamin K. *Eur. Pat.* Appl. EP 592,962 (Cl. B01D15/08), 20 Apr. 1994, JP Appl. 92/300,560, 14 Oct. 1992, 7 p.; *C.A.,* 121 (1994) 38599g.

916 Ul'yanova, S.V., Shchavlinskii, A.N., Morev, S.N., Dimitrenko, T.S. and Finkel'shtein, E.I.: (HPLC analysis of water-soluble vitamins $B_1$, $B_2$, $B_6$, C and nicotinamide in the Hexavit tablets). *Farmatsiya (Moscow),* 42 (1993) 50-51; *C.A.,* 121 (1994) 141849n.

917 Wang, X.-D., Krinsky, N.I., Benotti, P.N. and Russel, R.M.: Biosynthesis of 9-*cis*-retinoic acid from 9-*cis*-β-carotene in human intestinal mucosa *in vitro. Arch. Biochem. Biophys.,* 313 (1994) 150-155.

918 Wei, S., Tanaka, H., Kubo, T., Ichikawa, M. and Seino, Y.: A multiple assay for vitamin D metabolites without high-performance liquid chromatography. *Anal. Biochem.,* 222 (1994) 359-365.

919 Wilberg, V.C. and Rodriguez-Amaya, D.B.: (Quantification by high-efficiency liquid chromatography of β-carotene and lycopene in tomatoes and some tomato products). *Cienc. Tecnol. Aliment.,* 13 (1993) 132-141; *C.A.,* 121 (1994) 81205n.

920 Zalewski, S.: Effect of cooking methods on vitamin C, nitrates and nitrites contents and sensory quality in Brussels sprouts. *Pol. J. Food Nutr. Sci.,* 2 (1993) 85-92; *C.A.,* 121 (1994) 106971z.

921 Zhiri, A. and Belichard, P.: Reversed-phase liquid chromatographic analysis of coenzyme Q10 and stability study in human plasma. *J. Liq. Chromatogr.,* 17 (1994) 2633-2640.

For additional information see *C.A.*:
121 (1994) 106766m, 187452f, 199907w.

See also 240, 1005, 1204.

## 28. ANTIBIOTICS

922 Allan, L., Cummings, J., Willmott, N., Whateley, T.L. and Smyth, J.F.: Incorporation and release of chemically intact mitomycin C from albumin microspheres: a high-performance liquid chromatography evaluation. *J. Drug Targeting,* 1 (1993) 317-323; *C.A.,* 121 (1994) 91643t.

923 Bayo, J., Moreno, M.A., Prieta, J., Diaz, S., Suarez, G. and Dominguez, L.: Chloramphenicol extraction from milk by using the diphasic dialysis method followed by liquid chromatographic determination. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 854-856.

924 Blanchflower, W.J., Cannavan, A., McCracken, R.J., Hewitt, S.A. and Kennedy, D.G.: Determination of chloramphenicol in plasma, milk and tissue using liquid chromatography/thermospray mass spectrometry. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 196-200; *C.A.,* 121 (1994) 132499w.

925 Blanchflower, W.J., McCracken, R.J. and Kennedy, D.G.: Detection of furazolidone in muscle using liquid chromatography/thermospray mass spectrometry. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B.: (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 201-205; *C.A.,* 121 (1994) 156005h.

926 Blows, W.M., Foster, G., Lane, S.J., Noble, D., Piercey, J.E., Sidebotton, P.J. and Webb, G.: The squalestatins, novel inhibitors of squalene synthase produced by a spcies of *Phoma*. V. Minor metabolites. *J. Antibiot.,* 47 (1994) 740-754.

927 Boison, J.O.K., Keng, L.J.-Y. and MacNeil, J.D.: Analysis of penicillin G in milk by liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 565-570.

928 Bonfichi, R.: Computer-assisted rapid development of gradient high-performance liquid chromatographic methods for the analysis of antibiotics. *J. Chromatogr. A,* 678 (1994) 213-221.

929 Bryan, P.D.: Part I. Use of post-column reactions with luminescence detection for the HPLC analysis of drugs. Part II. HPLC analysis of tetracyclines using polymeric columns with acidic mobile phases. Avail. *Univ. Microfilms Int.,* Order No. DA9404635, 1993, 138 p.; *C.A.,* 121 (1994) 117853p.

930 Bryan, P.D. and Stewart, J.T.: Chromatographic analysis of selected tetracyclines from dosage forms and bulk drug substance using polymeric columns with acidic mobile phases. *J. Pharm. Biomed. Anal.,* 12 (1994) 675-692.

931 Buchan, T., Roach, C., Ruby, C., Taylor, D., Preisig, C. and Reeves, C.: Mutants of *Streptomyces cattleya* defective in the synthesis of a factor required for thienamycin production. *J. Antibiot.,* 47 (1994) 992-1000.

932 Chan, W. and Salisbury, C.D.C.: Determination of penicillin G residues in eggs. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 236-237; *C.A.,* 121 (1994) 156008m.

933 Chan, W. and Salisbury, C.D.C.: Determination of tetracycline antibiotics in eggs. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 238-240; *C.A.,* 121 (1994) 156009n.

934 Charles, B.G., Foo, C.C. and Gath, J.: Rapid column liquid chromatographic analysis of flucloxacillin in plasma on a microparticulate pre-column. *J. Chromatogr. B,* 660 (1994) 186-190.

935 Cravedi, J.P., Baradat, M., Debrauwer, L., Alary, J., Tulliez, J.: Evidence for new metabolic pathways of chloramphenicol in the duck. *Drug Metab. Disp.,* 22 (1994) 578-583.

936 Demotes-Mainard, F., Labat, L., Vincon, G. and Bannwarth, B.: Column-switching high-performance liquid-chromatographic determination of vancomycin in serum. *Ther. Drug Monit.,* 16 (1994) 293-297; *C.A.,* 121 (1994) 169546k.

937 Ericson, J.F., Calcagni, A. and Lynch, M.J.: Determination of semduramicin sodium in poultry liver by liquid chromatography with vanillin postcolumn derivatization. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 577-582.

938 Friedrich, L.V., White, R.L., Kays, M.B. and Burgess, D.S.: Drug degradation during HPLC analysis of aztreonam: effect on pharmacokinetic parameter estimation. *Ann. Pharmacother.,* 28 (1994) 444-446; *C.A.,* 121 (1994) 98939c.

939 Gerhardt, G.C., Salisbury, C.D.C. and McNeil, J.D.: Analysis of streptomycin and dihydrostreptomycin milk by liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 765-767.

940 Gooden, W.E., Du, Y., Ahluwalia, R. and Day, R.A.: The separation of biologically active diastereomers of zwitterionic β-lactams by anion exchange chromatography. *Anal. Lett.,* 27 (1994) 2153-2169.

941 Haagsma, N. and Scherpenisse, P.: High-performance liquid chromatographic determination of tetracyclines in animal tissue and eggs. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 342-346; *C.A.,* 121 (1994) 156011g.

942 Hattori, H., Suzuki, O., Seno, H., Ishii, A. and Yamada, T.: Analyses of quinolone antimicrobials in human plasma by capillary high-performance liquid chromatography/fast atom bombardment mass spectrometry. *Hochudoku,* 11 (1993) 166-175; *C.A.,* 121 (1994) 26124k.

943 Hormazábal, V. and Yndestad, M.: A rapid and time-effective assay for determination of oxolinic acid and flumequine in fish tissues by HPLC. *J. Liq. Chromatogr.,* 17 (1994) 2911-2917.

944 Hormazábal, V. and Yndestad, M.: Simultaneous extraction and determination of oxolinic acid and flumequine in fish silage by HPLC. *J. Liq. Chromatogr.,* 17 (1994) 2901-2909.

945 Hornish, R.E. and Cazers, A.R.: Determinative and confirmatory analysis for pirlimycin residue in bovine milk and liver by thermospray HPLC/MS. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 382-386; *C.A.,* 121 (1994) 132502s.

946 Kamiyama, T., Umino, T., Nakamura, Y., Itezono, Y., Sawari, S., Satoh, T. and Yokose, K.: Bacithrocins A, B and C, novel thrombin inhibitors. *J. Antibiot.,* 47 (1994) 959-968.

947 Kikuchi, Y., Kitazaki, T., Saito, H., Shibanuma, T., Morozumi, N., Kanai, Y., Yonemoto, Y., Sugita, O. and Ohnuma, N.: (Microbiological assay method for SY5555, a new oral penem, in biological fluids). *Chemotherapy (Tokyo),* 42(Suppl. 1) (1994) 227-234; *C.A.,* 121 (1994) 49520a.

948 Kobayashi, Y., Miyazaki, H., Shiozaki, M. and Haruyama, H.: Synthesis of 5-epi-trehazolin (trehalostatin). *J. Antibiot.,* 47 (1994) 932-938.

949 Koiso, Y., Li, Y., Iwasaki, S., Hanaoka, K., Kobayashi, T., Sonoda, R., Fujita, Y., Yaegashi, H. and Sato, Z.: Ustiloxins, antimytotic cyclic peptides from false smut balls on rice panicles caused by *Ustilagoidea virens. J. Antibiot.,* 47 (1994) 765-773.

950 Kuschel, A., Anke, T., Velten, R., Klostermeyer, D., Steglich, W. and König, B.: The mniopetals, new inhibitors of reverse transcriptase from a *Mniopetalum* species (Basidiomycetes). I. Producing organism, formation, isolation and biological activities. *J. Antibiot.,* 47 (1994) 733-739.

951 Lim, J.M., Kim, H., Marco, A., Mojaverian, P. and Lin, C.-C.: Liquid chromatographic determination of ceftibuten, a new oral cephalosporin, in human plasma and urine. *J. Pharm. Biomed. Anal.,* 12 (1994) 699-703.

952 Lin, Q.: (Effect of pH value of mobile phase on the retention behavior of *Mydecamycin* in high performance liquid chromatography). *Sepu,* 12 (1994) 150-151; *C.A.,* 121 (1994) 53277u.

953 Maniara, W.M. and Powell, M.L.: Determination of the rifamycin-related hypolipidemic drug CGP 43371 in human feces, plasma and urine by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 135-142.

954 Meinertz, J.R., Dawson, V.K., Gingerich, W.H., Chebg, B. and Tubergen, M.M.: Liquid chromatographic determination of sarafloxacin residues in channel carfish muscle tissue. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 871-875.

955 Moats, W.A., Anderson, K.L., Rushing, J.E. and Wesen, D.P.: Comparison of the Charm II test and an HPLC method for detection of oxytetracycline in milk. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 495-498; *C.A.,* 121 (1994) 156019r.

956 Moore, W.N. and Taylor, L.T.: Analytical inverse supercritical fluid extraction of polar pharmaceutical compounds from cream and ointment matrices. *J. Pharm. Biomed. Anal.,* 12 (1994) 1227-1232.

957 Morishita, A., Ishikawa, S., Ito, Y., Ogawa, K., Takada, M., Yaginuma, S. and Yamamoto, S.: AM4299A and B, novel thiol protease inhibitors. *J. Antibiot.,* 47 (1994) 1065-1068.

958 Morovjan, G., Horvath, E., Vagi, I. and Fekete, J.: Determination of oxytetracycline and its decomposition products in Tetran vulnerary powder. *Acta Pharm. Hung.,* 64 (1994) 67-73; *C.A.,* 121 (1994) 91978f.

959 Morris, S.A., Schwartz, R.E., Sesin, D.F., Masurekar, P., Hallada, T.C., Schmatz, D.M., Bartizal, K., Hensens, O.D. and Zink, D.L.: Pneumocandin $D_0$, a new antifungal agent and potent inhibitor of *Pneumocystis carinii. J. Antibiot.,* 47 (1994) 755-764.

960 Nakanishi, S., Kita, K., Uosaki, Y., Yoshida, M., Saitoh, Y., Mihara, A., Kawamoto, I. and Matsuda, Y.: MS-282a and MS-282b, new inhibitors of calmodulin-activated myosin light chain kinase from *Streptomyces tauricus* ATCC 27470. *J. Antibiot.,* 47 (1994) 855-861.

961 Oka, H., Ikai, Y., Hayakawa, J., Masuda, K., Harada, K.-I. and Suzuki, M.: Improvement of chemical analysis of antibiotics. Part XIX: determination of tetracycline antibiotics in milk by liquid chromatography and thin-layer chromatography/fast atom bombardment mass spectrometry. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 891-895.

962 Porter, S.: The confirmation of tetracycline residues in kidney by thermospray liquid chromatography-mass spectrometry. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 533-537; *C.A.,* 121 (1994) 203621t.

963 Pouliquen, H., le Bris, H., Keita, D. and Pinault, L.: Determination of oxytetracycline in shellfish *(Crassostrea gigas, Ruditapes philippinarum* and *Scrobicularia plana)* by high-performance liquid chromatography-application to an experimental study performed in shellfish exposed to a seawater effluent containing oxytetracycline. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 553-557; *C.A.,* 121 (1994) 132604b.

964 Priston, M.J. and Sewell, G.J.: Improved LC assay for the determination of mitozantrone in plasma: analytical considerations. *J. Pharm. Biomed. Anal.,* 12 (1994) 1153-1162.

965 Rodewald, J.M., Moran, T.D., Donoho, A.L. and Coleman, M.R.: Determination of narasin in raw material, premix, and animal feeds by liquid chromatography and correlation to microbial assay. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 821-828.

966 Roudaut, B. and Garnier, M.: Rapid determination of oxytetracycline in milk by high performance liquid chromatography. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 596-600; *C.A.,* 121 (1994) 177971k.

967 Sanders, P. and Delepine, B.: Confirmatory analysis for spiramycin residue in bovine muscle by liquid chromatography/particle beam mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 369-375; *C.A.,* 121 (1994) 56086s.

968 Szanya, T., Hanak, L., Strbka, G., Nagy, E., Melczer, I., Deak, G., Mako, B., Karczub, A., Marton, G., et al.: Process for the purification of cyclosporin A. *Can. Pat.* Appl. CA 2,096,892 (Cl. CO7K7/64), 26 Nov. 1993, HU Appl. 92/9,201,728, 25 May 1992; 23 pp.; *C.A.,* 121 (1994) 177850v.

969 Tsukamoto, T. and Ushio, T.: Determination of (2S, 3S, 5R)-3-methyl-7-oxo-3-(1H-1,2,3-triazol-1-ylmethyl)-4-thia-1-azabicyclo [3.2.0]heptane-2-carboxylic acid 4,4-dioxide (YTR-830H) and piperacillin in pharmaceutical preparations by high-performance liquid chromatography. *J. Chromatogr. A,* 678 (1994) 69-76.

970 Tyczkowska, K.L., Voyksner, R.D., Anderson, K.L. and Papich, M.G.: Simultaneous determination of enrofloxacin and its primary metabolite ciprofloxacin in bovine milk and plasma by ion-pairing liquid chromatography. *J. Chromatogr. B,* 658 (1994) 341-348.

971 Wiese, B. and Horn af Rantzien, M.: Improved sensitive and selective bioanal. HPLC method for the determination of benzylpenicillin in milk and other body fluids at concentrations ≥ 4 ng/ml. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 680-684; *C.A.*, 121 (1994) 203628a.

972 Wong, S.H.Y., Ghodgaonkar, B., Fong, P., Campbell, B., Burdick, J.F. and Boctor, F.: Supercritical fluid chromatography for therapeutic drug monitoring of immunosuppressants: selectivity for cyclosporine A, FK 506 (Tacrolimus), and rapamycin. *J. Liq. Chromatogr.,* 17 (1994) 2093-2109.

973 Yongxin, Z., Hendrix, C., Busson, R., Janssen, G., Roets, E. and Hoogmartens, J.: Isolation and structural elucidation of an impurity of cefradine. *J. Pharm. Biomed. Anal.,* 12 (1994) 1137-1140.

974 Yoshida, K. and Kondo, F.: Procedure for liquid chromatographic determination of thiamphenicol in bovine serum and milk. *J. Liq. Chromatogr.,* 17 (1994) 2625-2632.

For additional information see *C.A.*:
121 (1994) 49514b, 117854q, 164087b.

See also 165, 1177, 1206.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

### *29a. General techniques*

975 Barceló, D., Chiron, S., Lacorte, S., Martinez, E., Salau, J.S. and Hennion, M.C.: Solid-phase sample preparation and stability of pesticides in water using Empore disks. *TrAC,* 13 (1994) 352-361.

976 Ellerbroek, L.: Microbial and chemical detection methods for residues of quinolones and related substances in animal tissue. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 280-284; *C.A.*, 121 (1994) 156010f.

977 Fischer, J. and Jandera, P.: Chromatographic behaviour of phenylurea pesticides in high-performance liquid chromatography with nitrile- and amino-bonded stationary phases. *J. Chromatogr. A,* 684 (1994) 77-92.

978 Furuta, R. and Doi, T.: Chiral separation of diniconazole, uniconazole and structurally related compounds by cyclodextrin-modified micellar electrokinetic chromatography. *Electrophoresis (Weinheim),* 15 (1994) 1322-1325.

979 Hogendoorn, E.A. and van Zoonen, P.: Coupled-column reversed phase liquid chromatography as a versatile technique for the determination of polar pesticides. *Tech. Instrum. Anal. Chem.,* 13(Environmental Analysis) (1993) 181-224; *C.A.*, 121 (1994) 29096p.

980 Jimena Garcia, J.A., Gimenez Plaza, J. and Cano Pavon, J.M.: Determination of fenitrothion, tetramethrin, dichlorvos, permethrin and piperonyl butoxide in insecticide formulations by liquid chromatography. *Quim. Anal. (Barcelona),* 12 (1993) 35-37; *C.A.*, 121 (1994) 151168d.

981 McGarvey, B.D.: Derivatization reactions applicable to pesticide determination by high-performance liquid chromatography. *J. Chromatogr. B,* 659 (1994) 243-257 - a review with 113 refs.

982 Schütz, S., Hummel, H.E., Duhr, A. and Wollnik, H.: Structural elucidation and trace analysis with combined hyphenated chromatographic and mass spectrometric methods. Potential of using hybrid sector mass spectrometry-time-of-flight mass spectrometry for pesticide analysis. *J. Chromatogr. A,* 683 (1994) 141-149.

For additional information see *C.A.*:
121 (1994) 52239w, 81189k.

See also 77, 108, 155, 1239, 1241.

### *29c. Phosphorus insecticides*

983 Loukas, Y.L., Antoniadou-Vyza, E. and Papadaki-Valiraki, A.: High-performance liquid chromatography in stability studies of an organophosphorus insecticide in free form and after formulation as emulsifiable concentrate. Response surface design correlation of kinetic data and parameters. *J. Chromatogr. A,* 677 (1994) 53-61.

984 Murakita, H., Hamada, N. and Yagi, T.: (Determination of glyphosate by HPLC). *Kuromatogurafi,* 14 (1993) 12-13; *C.A.*, 121 (1994) 56074m.

985 Sancho, J.V., López, F.J., Hernández, F., Hogendoorn, E.A. and van Zoonen, P.: Rapid determination of glufosinate in environmental water samples using 9-fluorenylmethoxycarbonyl precolumn derivatization, large-volume injection and coupled-column liquid chromatography. *J. Chromatogr. A,* 678 (1994) 59-67.

### *29e. Herbicides*

986 Butz, S., Heberer, T. and Stan, H.-J.: Determination of phenoxyalkanoic acids and other acidic herbicides at the low ppt level in water applying solid-phase extraction with RP-$C_{18}$ material. *J. Chromatogr. A,* 677 (1994) 63-74.

987 Färber, H., Nick, K. and Schöler, H.F.: Determination of hydroxy-S-triazines in water using HPLC or GC-MS. *Fresenius J. Anal. Chem.,* 350 (1994) 145-149.

988 Fogarty, A.M., Traina, S.J. and Tuovinen, O.H.: Determination of dicamba by reverse-phase HPLC. *J. Liq. Chromatogr.,* 17 (1994) 2667-2674.

989 Willian, W.T. and Mueller, T.C.: Liquid chromatographic determination of norflurazon and its initial metabolite in soil. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 752-755.

See also 977, 1177.

### *29f. Fungicides*

990 Rietveld, R. and Quirijns, J.: On-line liquid chromatography-gas chromatography for determination of fenarimol in fruiting vegetables. *J. Chromatogr. A,* 683 (1994) 151-155.

*29g. Other types of pesticides and various agrochemicals*

991 Gray, A., Eadsforth, C.V., Dutton, A.J. and Vaughan, J.A.: Non-invasive method for monitoring the exposure of barn owls to second-generation rodenticides. *Pestic. Sci.,* 41 (1994) 339-343; *C.A.,* 121 (1994) 197753u.

992 Kondo, F., Hamada, E., Tsai, C.-E., Lin, S.-Y., Tateyama, S. and Saitanu, K.: A reverse-phase high-performance liquid chromatographic determination of nicarbazin residues in eggs. *Cytobios,* 76 (1993) 175-182; *C.A.,* 121 (1994) 56067m.

993 Koppen, B.: Liquid chromatographic determination of pyrethroids as active ingredients in pesticide formulations. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 810-814.

994 Lu, Z., Liu, Y., Xu, W. and Tian, C.: (Reversed-phase high performance liquid chromatographic determination of quinclorac). *Sepu,* 12 (1994) 217-218; *C.A.,* 121 (1994) 151171z.

995 Stepanovic, R.D., Howell, C. and Hedin, P.A.: Biosynthesis of gliovirin: incorporation of L-phenylalanine (1-$^{13}$C). *J. Antibiot.,* 47 (1994) 942-944.

30. SYNTHETIC AND NATURAL DYES

*30a. Synthetic dyes*

996 Allen, J.L., Gofus, J.E. and Meinertz, J.R.: Determination of malachite green residues in the eggs, fry, and adult muscle tissue of rainboat trout (*Oncorhynchus mykiss*). *J. Assoc. Off. Anal. Chem.,* 77 (1994) 553-557.

997 Andrisano, V., Gotti, R., di Pietra, A.M. and Cavrini, V.: HPLC analysis of oxidation hair dyes in permanent hair colorants. *J. Liq. Chromatogr.,* 17 (1994) 2919-2937.

998 Andrisano, V., Gotti, R., DiPietra, A.M. and Cavrini, V.: Analysis of basic hair dyes by HPLC with on-line post-column photochemical derivatisation. *Chromatographia,* 39 (1994) 138-145.

999 Kopecky, J., Kajan, M. and Tichy, V.: (Analysis of alimentary dyes from fresh-water algae by HPLC method). *Kvasny Prum.,* 39 (1993) 102-106; *C.A.,* 121 (1994) 199913v.

1000 Weisz, A., Andrzejewski, D. and Ito, Y.: Preparative separation of components of the color additive D&C Red No. 28 (phloxine B) by pH-zone-refining counter-current chromatography. *J. Chromatogr. A,* 678 (1994) 77-84.

*30b. Chloroplast and other natural pigments*

1001 Bento, L.S.M.: Separation of sugar colorants through sucrose chromatography. *Int. Sugar J.,* 95 (1993) 391-396; *C.A.,* 121 (1994) 37956j.

1002 Chen, T.M. and Chen, B.H.: Optimization of mobile phases for HPLC of *cis-trans* carotene isomers. *Chromatographia,* 39 (1994) 346-354.

1003 Lalitha, N.: Chromatographic separation of plant pigments using sand as the adsorbent: an inexpensive chromatographic technique. *J. Chem. Educ.,* 71 (1994) 432; *C.A.,* 121 (1994) 34369j.

1004 Millie, D.F., Paerl, H.W. and Hurley, J.P.: Microalgal pigment assessments using high-performance liquid chromatography: a synopsis of organismal and ecological applications. *Can. J. Fish. Aquat. Sci.,* 50 (1993) 2513-2527; *C.A.,* 121 (1994) 30086s.

1005 Papadopoulou, K. and Ames, J.M.: Kinetics of all *trans*-β-carotene degradation on heating with and without phenylalanine. *J. Am. Oil Chem. Soc.,* 71 (1994) 893-896.

1006 Simpson, K.I., Guimaraes, I.S. and Wilberg, V.C.: Isolation and purification of bixin on a C-18 reverse phase column. *Cienc. Tecnol. Aliment.,* 13 (1993) 164-167; *C.A.,* 121 (1994) 103310x.

1007 Suzuki, R., Takahashi, M., Furuya, K. and Ishimaru, T.: Simplified technique for the rapid determination of phytoplankton pigments by reverse-phase high-performance liquid chromatography. *J. Oceanogr.,* 49 (1993) 571-580; *C.A.,* 121 (1994) 174261t.

1008 Szajdak, L.: (Chromatographic studies of humic acids). *Zesz. Probl. Postepow Nauk Roln.,* 411 (1993) 229-240; *C.A.,* 121 (1994) 132982y.

1009 Val, J., Monge, E. and Baker, N.R.: An improved HPLC method for rapid analysis of the xanthophyll cycle pigments. *J. Chromatogr. Sci.,* 32 (1994) 286-289.

1010 Ward, K., Scarth, R., Daun, J.K. and Thorsteinson, C.T.: A comparison of high-performance liquid chromatography and spectrophotometry to measure chlorophyll in canola seed and oil. *J. Am. Oil Chem. Soc.,* 71 (1994) 931-934.

1011 Ward, K., Scarth, R., Duan, J.K. and Thorteinson, C.T.: Effects of processing and storage on chlorophyll derivatives in commercially extracted canola oil. *J. Am. Oil Chem. Soc.,* 71 (1994) 811-815.

For additional information see *C.A.*: 121 (1994) 117302h.

See also 15, 897, 912, 919.

31. PLASTICS AND THEIR INTERMEDIATES

1012 Berek, D., Janco, M., Kitayama, T. and Hatada, K.: Separation of poly(methyl methacrylates) according to their tacticity. 1. Preliminary studies on the tacticity dependence of chromatographic behavior of stereoregular PMMAs. *Polym. Bull. (Berlin),* 32 (1994) 629-635; *C.A.,* 121 (1994) 110068c.

1013 Campos, A., García, R., Porcar, I. and Soria, V.: Solution properties of polyelectrolytes. XI. Adsorption effects in aqueous size-exclusion chromatography of polyanions. *J. Liq. Chromatogr.,* 17 (1994) 3261-3283.

1014 Chang, T.T.: Characterization of methoxymethyl melamine resins by liquid chromatography/mass spectrometry. *Anal. Chem.,* 66 (1994) 3267-3273.

1015 Cools, P.J.C.H., van Herk, A.M., German, A.L. and Staal, W.: Critical retention behavior of homopolymers. *J. Liq. Chromatogr.,* 17 (1994) 3133-3143.

1016 Eleveld, J.T., Claessens, H.A., Ammerdorffer, J.L., van Herk, A.M. and Cramers, C.A.: Evaluation of mixed-mode stationary phases in liquid chromatography for the separation of charged and uncharged oligomer-like model compounds. *J. Chromatogr. A,* 677 (1994) 211-227.

1017 Glöckner, G., Wolf, D. and Engelhardt, H.: Control of adsorption and solubility in gradient high performance liquid chromatography. Part 4. Sudden-transition gradient elution of styrene/ethyl methacrylate copolymers in reverse phase mode. *Chromatographia,* 39 (1994) 170-174.

1018 Huguenard, C., Elaissari, A. and Pefferkorn, E.: Surface area exclusion chromatography of diblock copolymers from micellar solutions. *Macromolecules,* 27 (1994) 5277-5284; *C.A.*, 121 (1994) 158531a.

1019 Krüger, R.-P., Much, H. and Schulz, G.: Determination of functionality and molar mass distribution of aliphatic polyesters by orthogonal liquid chromatography. I. Off-line investigation of poly(1,6-hexanediol adipates). *J. Liq. Chromatogr.*, 17 (1994) 3069-3090.

1020 Lehmann, U., Augenstein, M. and Neidhart, B.: Insight into the chemical heterogeneity of cationic polyelectrolytes by gradient-HPLC using salt gradients. *J. Liq. Chromatogr.*, 17 (1994) 3285-3306.

1021 Lochmuller, C.H., Jiang, C. and Elomaa, M.: Retention behavior of poly(L-tryptophan)s and poly(D,L-tryptophan)s in reversed-phase liquid chromatography. *J. Liq. Chromatogr.*, 17 (1994) 3179-3189.

1022 Marks, M.J., Erskine, J.S. and McCrery, D.A.: Products and mechanismus of the thermal crosslinking of benzocyclobutane-terminated bisphenol A polycarbonates. *Macromolecules,* 27 (1994) 4114-4126; *C.A.*, 121 (1994) 58742b.

1023 Mirabella, F.M., Jr.: Temperature rising elution fractionation (TREF) characterization of polypropylene copolymers. *J. Liq. Chromatogr.*, 17 (1994) 3201-3219.

1024 Mori, S. and Taziri, H.: Separation of styrene-acrylonitrile copolymers by stepwise gradient elution - high-performance precipitation liquid chromatography. *J. Liq. Chromatogr.*, 17 (1994) 3055-3068.

1025 Mourey, T.H. and Bryan, T.G.: Size-exclusion chromatography of nylons in methylene chloride-dichloroacetic acid. *J. Chromatogr. A,* 679 (1994) 201-205.

1026 Ogino, K., Maruo, T. and Sato, H.: Separation of styrene-butyl methacrylate copolymers by high performance liquid chromatography. *J. Liq. Chromatogr.*, 17 (1994) 3025-3041.

1027 Pasch, H. and Zammert, I.: Chromatographic investigations of macromolecules in the critical range of liquid chromatography. VIII. Analysis of polyethylene oxides. *J. Liq. Chromatogr.*, 17 (1994) 3091-3108.

1028 Pille, L. and Solomon, D.H.: Studies on microgels. 1. Microgel formation studied by gel-permeation chromatography with an online light scattering detector. *Macromol. Chem. Phys.*, 195 (1994) 2477-2489; *C.A.*, 121 (1994) 84726u.

1029 Podzimek, S.: Characterization of synthetic resins by gel permeation chromatography with a multi-angle laser light scattering detector. *J. Chromatogr. A,* 677 (1994) 21-24.

1030 Reid, S.P., Meehan, E. and Dawkins, J.V.: Compositional separation of poly(vinyl alcohol) using a reverse phase packing in HPLC. *J. Liq. Chromatogr.*, 17 (19943) 3043-3053.

1031 Rissler, K. and Fuchslueger, U.: Separation of polybutylene glycols on $C_{18}$ and $C_4$ stationary phases. *J. Liq. Chromatogr.*, 17 (1994) 2791-2808.

1032 Rissler, K., Fuchslueger, U. and Grether, H.J.: Separation of polyethylene glycol oligomers on normal-phase and reversed-phase materials by gradient high performance liquid chromatography and detection by evaporative light scattering. A comparative study. *J. Liq. Chromatogr.*, 17 (1994) 3109-3132.

1033 Schimpf, M.E., Russell, D.D. and Lewis, J.K.: Separation of charged latex particles by electrical field-flow fractionation. *J. Liq. Chromatogr.*, 17 (1994) 3221-3238.

1034 Shalliker, R.A., Kavanagh, P.E. and Russell, I.M.: Comparison of isocratic and gradient elution reversed-phase behaviour of high-molecular-mass polystyrenes in dichloromethane and acetonitrile. *J. Chromatogr. A,* 679 (1994) 105-114.

1035 Staal, W.J., Cools, P., van Herk, A.M. an German, A.L.: Monitoring of originated polymer in pure monomer with gradient polymer elution chromatography (GPEC)®. *J. Liq. Chromatogr.*, 17 (1994) 3191-3199.

1036 Tang, M.T.: An efficient sample preparation technique for high-temperature gel permeation chromatography. *Tappi J.*, 76 (1993) 157-160; *C.A.*, 121 (1994) 110225b.

1037 Wang, T.-W.: Chromatographic separation of polymer mixtures using combined adsorption-size exclusion mechanisms. Avail. *Univ. Microfilms Int.*, Order N. DA9414473, 1993, 174 p.; *C.A.*, 121 (1994) 158502s.

1038 Wyatt, P.J. and Papazian, L.A.: The interdetector volume in modern light scattering and high performance size-exclusion chromatography. *LC-GC,* 11 (1993) 862-872; *C.A.*, 121 (1994) 84469n.

For additional information see *C.A.*:
121 (1994) 112536c.

See also 6, 26, 1197.

## 32. DRUG ANALYSIS

### *32a. Drug analysis, general techniques*

1039 Bliesner, D.M.: Graphical correlation of TLC and HPLC data in the development of pharmaceutical compounds. *J. Planar Chromatogr.*, 7 (1994) 197-201.

1040 Blunk, T., Mak, E. and Mueller, R.H.: Characterization of colloidal drug carriers. Determination of surface hydrophobicity by hydrophobic-interaction chromatography. *Pharm. Ind.*, 55 (1993) 612-615; *C.A.*, 121 (1994) 186938g.

1041 Haasnoot, W., Ezkerro, S.M. and Keukens, H.: Application of immunochemical selectivity for screening and confirmation of animal drug residues in biological samples. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 347-351; *C.A.*, 121 (1994) 156012h.

1042 Hamoip, T., Bourguignon, B. and Massart, D.L.: Validation of a strategic approach to high-performance liquid chromatographic method selection. *Chromatographia,* 39 (1994) 339-345.

1043 Hill, D.W. and Kind, A.J.: Reversed-phase solvent-gradient HPLC retention indexes of drugs. *J. Anal. Toxicol.*, 18 (1994) 233-242.

1044 Neue, U.D., Phillips, D.J., Walter, T.H., Capparello, M., Alden, B. and Fisk, R.P.: Reverse-phase column quality and its effect on the quality of a pharmaceutical analysis. *LC-GC,* 12 (1994) 468-480; *C.A.,* 121 (1994) 91968c.

1045 Ng, C.L., Ong, C.P., Lee, H.K. and Li, S.F.Y.: Determination of pharmaceuticals and related impurities by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 579-586.

1046 Porter, S. and Johnston, N.: The application of narrow-bore HPLC columns to the analysis of veterinary drugs. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 538-542; *C.A.,* 121 (1994) 124467u.

1047 Rekker, R.F. and de Vries, G.: A basic confrontation of Rekker's revised Σf-system with HPLC retention data obtained on a mixed series of aliphatic and aromatic hydrocarbons. In: Wermuth, C.-G. (Editor), *Trends QSAR Mol. Modell. 92, Proc. Eur. Symp. Struct.-Act. Relat: QSAR Mol. Modell., 9th 1992,* ESCOM, Leiden, 1993, pp. 132-136; *C.A.,* 121 (1994) 73061x.

1048 Robson, J.N., Draper, S. and Tennant, K.: Atmospheric pressure ionization liquid chromatography-mass spectrometry in the quantification of drugs in biological fluids. *Anal. Proc.,* 31 (1994) 159-161; *C.A.,* 121 (1994) 169541e.

1049 Shah, K.P., Zhou, J., Lee, R., Schowen, R.L., Elsbernd, R., Ault, J.M., Stobaugh, J.F., Slavik, M. and Riley, C.M.: Automated analytical systems for drug development studies. I - A system for the determination of drug stability. *J. Pharm. Biomed. Anal.,* 12 (1994) 993-1001.

1050 Van der Greef, J., Arts, C.J.M., van Baak, M. and Verheij, E.R.: Possibilities of liquid chromatography-mass spectrometry in drug residue analysis. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 35-40; *C.A.,* 121 (1994) 156003f.

1051 Zhou, Y., Luan, P., Liu, L. and Sun, Z.P.: Chiral derivatizing reagents for drug enantiomers bearing hydroxyl groups. *J. Chromatogr. B,* 659 (1994) 109-126 - a review with 54 refs.

See also 99, 133, 136, 157, 159, 328, 956.

*32b. Antirheumatics and antiinflammatory drugs*

1052 De Vries, J.X., Schmitz-Kummer, E. and Siemon, D.: The analysis of ibuprofen enantiomers in human plasma and urine by high-performance liquid chromatography on an α1-acid glycoprotein chiral stationary phase. *J. Liq. Chromatogr.,* 17 (1994) 2127-2145.

1053 Foda, N.H. and Al Gohary, O.M.: High performance liquid chromatographic determination of flurbiprofen in pharmaceutical dosage forms. *Anal. Lett.,* 27 (1994) 2523-2534.

1054 Guentert, T.W., Stebler, T., Banken, L., Defoin, R. and Schmitt, M.: Relative bioavailability of oral dosage forms of texoxicam. *Arzneim.-Forsch.,* 44 (1994) 1051-1054.

1055 Joshi, A.S., Raghavan, N., Williams, R.M., Takahashi, K., Shingu, H. and King, S.-Y.P.: Simultaneous quantification of an anti-inflammatory compound (DuP 697) and a potential metabolite (X6882) in human plasma and urine by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 143-150.

1056 Niazy, E.M., Khidr, S.H. and El-Sayed, Y.M.: High-performance liquid chromatographic determination of meclofenamate sodium in plasma. *J. Liq. Chromatogr.,* 17 (1994) 2331-2341.

1057 Nivaud-Guernet, E., Guernet, M., Ivanovic, D. and Medenica, M.: Effect of eluent pH on the ionic and molecular forms of the non-steroidal anti-inflammatory agents in reversed-phase high-performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2343-2357.

1058 Van Overbeke, A., Baeyens, W., van den Bossche, W. and Dewaele, C.: Enantiomeric separation of amide derivatives of some 2-arylpropionic acids by HPLC on a cellulose-based chiral stationary phase. *J. Pharm. Biomed. Anal.,* 12 (1994) 911-916.

1059 Wakabayashi, H., Yamato, S., Nakajima, M. and Shimada, K.: Application of an electrochemical detector with a graphite electrode to liquid chromatographic determination of penicillamine and captopril in biological samples. *J. Pharm. Biomed. Anal.,* 12 (1994) 1147-1152.

For additional information see *C.A.*:
121 (1994) 199921w.

See also 1125.

*32c. Autonomic and cardiovascular drugs*

1060 Bernard, N., Lush, M., Probitts, J., Ferry, N., Cuisinaud, G. and Sassard, J.: Determination of piroximone in plasma and urine by high performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2187-2197.

1061 Boulieu, R.: Solid-phase extraction method for the determination of diltiazem and its metabolites by high-performance liquid chromatography: fact or fallacy? *J. Chromatogr. B,* 660 (1994) 221-222.

1062 Chapeau, V., Moulin, A., Caude, M. and Dufour, A.: High-performance liquid chromatographic determination of oxodipine enantiomers, a new 1,4-dihydropyridine, applied to stereoselectivity studies in man and dog. *J. Chromatogr. B,* 660 (1994) 341-346.

1063 Di Pietra, A.M., Roveri, P., Gotti, R. and Cavrini, V.: Spectrophotometric and chromatographic (HPLC) analysis of hydralazine, dihydralazine and hydrazine after derivatization with 2-nitrocinnamaldehyde. *Farmaco,* 48 (1993) 1555-1567; *C.A.,* 121 (1994) 91992f.

1064 Fujimaki, M.: Oxidation of R(+)- and S(-)-carvediol by rat liver microsomes. Evidence for stereoselective oxidation and characterization of the cytochrome P450 isozymes involved. *Drug Metab. Disp.,* 22 (1994) 700-708.

1065 Hasegawa, T., Hara, K. and Hata, S.: Binding of dorzolamide and its metabolite, N-deethylated dorzolamide, to human erythrocytes *in vitro. Drug Metab. Disp.,* 22 (1994) 377-382.

1066 Hubert, P. and Crommen, J.: HPLC determination of verapamil and norverapamil in plasma using automated solid phase extraction for sample preparation and fluorometric detection. *J. Liq. Chromatogr.,* 17 (1994) 2147-2170.

1067 Laganière, S., Goernert, L. and Beatch, G.: High-performance liquid chromatographic assay for sematilide in plasma using solid-phase extraction microcolumn technology. *J. Chromatogr. B,* 660 (1994) 191-195.

1068 Lankford, S.M., Maskasame, C. and Bai, S.A.: Effects of diltiazem on the disposition and metabolism of the enantiomers of propranolol in the dog during multiple oral dosing. *Drug Metab. Disp.,* 22 (1994) 776-787.

1069 Li, F., Cooper, S.F., Côté, M. and Ayotte, C.: Determination of the enantiomers of bunolol in human urine by high-performance liquid chromatography on a chiral AGP stationary phase and identification of their metabolites by gas chromatography-mass spectrometry. *J. Chromatogr. B,* 660 (1994) 327-339.

1070 Lippi, A., Criscuoli, M., Sardelli, G. and Subissi, A.: High-performance liquid chromatographic method with electrochemical detection for the determination of idrapril, a novel angiotensin-converting enzyme inhibitor, in biological matrices. *J. Chromatogr. B,* 660 (1994) 127-134.

1071 Misztal, G. and Hopkala, H.: Determination of aprindine and nadoxolol in pharmaceuticals by HPLC. *Pharmazie,* 49 (1994) 697-698.

1072 Misztal, G. and Przyborowski, L.: Determination of nadoxolol in human plasma using reversed-phase high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 409-411.

1073 Modamio, P., Lastra, C.F. and Marino, E.L.: Determination of celiprolol by high-performance liquid chromatography and stability in solution. *Int. J. Pharm.,* 107 (1994) 243-245; *C.A.*, 121 (1994) 42882m.

1074 Murkitt, G.S., Trafankowska, E.Z., Dunne, M. and Manchee, G.R.: Fully automated assay for the determination of GR117289X in human plasma using mixed mode solid-phase extraction and high-performance liquid chromatography with ultraviolet detection. *J. Pharm. Biomed. Anal.,* 12 (1994) 1181-1187.

1075 Narimatsu, S., Huang, Y., Mizukami, T., Masobuchi, Y. and Suzuki, T.: Development of a high-performance liquid chromatographic method for the analysis of enantiomer/enantiomer interaction in oxidative metabolism of bunitrozol in rat liver microsomes. *Anal. Biochem.,* 222 (1994) 256-261.

1076 Nielsen, F., Kramer Nielsen, K. and Brøsen, K.: Determination of quinidine, dihydroquinidine, (3S)-3-hydroxyquinidine and quinidine N-oxide in plasma and urine by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 103-110.

1077 Oertel, R., Richter, K., Trausch, B., Berndt, A., Gramatté, T. and Kirch, W.: Elucidation of the structure of talinolol metabolites in man. Determination of talinolol and hydroxylated talinolol metabolites in urine and analysis of talinolol in serum. *J. Chromatogr. B,* 660 (1994) 353-363.

1078 Pham-Huy, C., Sahui-Gnassi, A., Saada, V., Gramond, J.P., Galons, H., Ellouk-Achard, S., Levresse, V., Fompeydie, D. and Claude, J.R.: Microassay of propranolol enantiomers and conjugates in human plasma and urine by high-performance liquid chromatography after chiral derivatization for pharmacokinetic study. *J. Pharm. Biomed. Anal.,* 12 (1994) 1189-1198.

1079 Romanova, D., Brandsteterova, E., Kralikova, D., Bozekova, L. and Kriska, M.: Determination of verapamil and its metabolites in plasma using HPLC. *Pharmazie,* 49 (1994) 779-780.

1080 Sandoval, T.M., Fujitaki, J.M., Chen, L.-S. and Dixon, R.: A simultaneous assay for acadesine (AICA-riboside) and acadesine 5'-monophosphate using ion-pair reverse phase high performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2373-2381.

1081 Sigusch, H., Henschel, L., Kraul, H., Merkel, U. and Hoffmann, A.: Lack of effect of grapefruit juice on diltiazem bioavailability in normal subjects. *Pharmazie,* 49 (1994) 675-679.

1082 Simmons, B.R. and Stewart, J.T.: HPLC separation of selected cardiovascular agents on underivatized silica using an aqueous organic mobile phase. *J. Liq. Chromatogr.,* 17 (1994) 2675-2690.

1083 Sioufi, A., Marfil, F. and Godbillon, J.: Automated determination of an angiotensin II receptor antagonist, CGP 48933, in plasma by high-performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2179-2186.

1084 Tang, C., Zhang, K., Lepage, F., Levi, R.H. and Baillie, T.A.: Metabolic chiral inversion of stiripentol in the rat. II. Influence of route of administration. *Drug Metab. Disp.,* 22 (1994) 554-560.

1085 Ueno, K., Ishida, Y., Kawaguchi, Y., Bito, K. and Konishi, T.: (Effect of other antiarrhythmic drugs, mexiletine and disopyramide on high performance liquid chromatography determination of pilsicainide in plasma). *Pharma Med.,* 12 (1994) 127-130; *C.A.*, 121 (1994) 148217p.

1086 Ulvi, V. and Keski-Hynnilä, H.: First-derivative UV spectrophotometric and high-performance liquid chromatographic analysis of some thiazide diuretics in the presence of their photodecomposition products. *J. Pharm. Biomed. Anal.,* 12 (1994) 917-922.

1087 Zell, C., Neidlein, R. and Sterin, K.: Biotransformation of the organic nitrate *trans*-N-(4-nitroxycyclohexyl)acetamine in dogs. *Arzneim.-Forsch.,* 44 (1994) 1021-1028.

1088 Zhang, K., Tang, C., Rashed, M.N., Cui, D., Tombret, F., Botte, H., Lepage, F., Levi, R.H. and Baillie, T.A.: Metabolic chiral inversion of stiripentol in the rat. I. Mechanistic studies. *Drug Metab. Disp.,* 22 (1994) 544-553.

1089 Zhong, D. and Blume, H.: HPLC-Bestimmung von Loratadin und seinem aktiven Metaboliten Descarboethoxyloratadin in Humanplasma. *Pharmazie,* 49 (1994) 736-739.

For additional information see *C.A.*:
121 (1994) 75430r, 141480k.

See also 125, 953, 960, 1059, 1063.

*32d. Central nervous system drugs*

1090 Abu-Lafi, S., Sterin, M. and Levin, S.: Role of hydroxyl groups in chiral recognition of cannabinoids by carbamated amylose. *J. Chromatogr. A,* 679 (1994) 47-58.

1091 Agundez, J.A.G., Martinez, C., Martin, R. and Benitez, J.: Determination of aminopyrine, dipyrone and their metabolites in urine by high-performance liquid chromatography. *Ther. Drug Monit.,* 16 (1994) 316-322; *C.A.*, 121 (1994, 169549p.

1092 Banditt, P.: Determination of orotic acid in serum by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 176-179.

1093 Beaulieu, N., Sears, R.W. and Lovering, E.G.: Liquid chromatographic methods for determination of trazodone and related compounds in drug taw materials. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 857-861.

1094 Bednarikova, A., Lehotay, J. and Cizmarik, J.: Study of local anaesthetics. Part 123: HPLC study of pentacaine, heptacaine and carbisocaine. *Pharmazie,* 49 (1994) 577-579.

1095 Benhamou-Batut, F., Demotes-Mainard, F., Labat, L., Vinçon, G. and Bannwarth, B.: Determination of flunitrazepam in plasma by liquid chromatography. *J. Pharm. Biomed. Anal.,* 12 (1994) 931-936.

1096 Bounine, J.P., Tardif, B., Beltran, P. and Mazzo, D.J.: High-performance liquid chromatographic stability-indicating determination of zopiclone in tablets. *J. Chromatogr. A,* 677 (1994) 87-93.

1097 Chen, I.-W. and Lin, J.H.: Physiological disposition of L-663,581, a partial agonist of the benzodiazepine receptor, in laboratory animals. *Drug Metab. Disp.,* 22 (1994) 693-699.

1098 Dow, J., Piriou, F., Wolf, E., Dulery, B.D. and Haegele, K.D.: Novel carbamate metabolites of mofegiline, a primary amine monoamine oxidase B inhibitor, in dogs and humans. *Drug Metab. Disp.,* 22 (1994) 738-749.

1099 Eto, S., Noda, H. and Noda, A.: Simultaneous determination of antiepileptic drugs and their metabolites, including chiral compounds, *via* β-cyclodextrin inclusion complexes by a column-switching chromatographic technique. *J. Chromatogr. B,* 658 (1994) 385-390.

1100 Girault, J., Malgouyat, J.M., Longueville, D., Lecomte, G., Revaud, M. and Fourtillan, J.B.: Quantitative measurement of a new synthetic hetrazepine derivative, BN50730, in human plasma and urine by combined liquid chromatography-negative chemical ionization mass spectrometry using a particle beam interface. *J. Chromatogr. B,* 658 (1994) 289-301.

1101 Goldnik, A., Gajewska, M. and Jaworska, M.: Determination of oxazepam and diazepam in body fluids by HPLC. *Acta Pol. Pharm.,* 50 (1993) 421-422; *C.A.,* 121 (1994) 194774r.

1102 Guebitz, G., Wintersteiger, R., Nihellyes, S. and Kobinger, G.: Resolution of the enantiomers of barbiturates on a new chiral amino alcohol phase by CLEC. *Quin. Anal. (Barcelona),* 12 (1993) 45-47; *C.A.,* 121 (1994) 187411s.

1103 Haginaka, J., Murashima, T., Pinkerton, T.C., Comiskey, J.P., Ulrych, E.L., Markley, J.L. and Walkenhorst, W.F.: (Enantioselectivity of ovomucoid bonded-phase HPLC columns produced with isolated domains). *Kuromatogurafi,* 14 (1993) 100-101; *C.A.,* 121 (1994) 91966a.

1104 Hansen, B.B. and Hansen, S.H.: Determination of zuclopenthixol and its main N-dealkylated metabolite in biological fluids using high-performance liquid chromatography with post-column photochemical derivatization and fluorescence detection. *J. Chromatogr. B,* 658 (1994) 319-325.

1105 Holeman, J.A. and Danielson, N.D.: Liquid chromatography of antihistamines using post-column tris(2,2'-bipyridine) ruthenium(III) chemiluminescence detection. *J. Chromatogr. A,* 679 (1994) 277-284.

1106 Hooper, W.D., Pool, W.F., Woolf, T.F. and Gal, J.: Stereoselective hydroxylation of tacrine in rats and humans. *Drug Metab. Disp.,* 22 (1994) 719-724.

1107 Kaliszan, R., Kaliszan, A., Noctor, T.A.G., Purcell, W.P. and Waine, I.W.: Mechanism of retention of benzodiazepines in affinity, reversed-phase and adsorption high-performance liquid chromatography in view of quantitative structure-retention relationships. In: Wermuth, C.-G. (Editor), *Trends QSAR Mol. Modell. 92, Proc. Eur. Symp. Struct.-Act. Relat.: QSAR Mol. Modell., 9th 1992,* ESCOM, Leiden, 1993, pp. 109-111; *C.A.,* 121 (1994) 169688h.

1108 Kudoh, S., Sato, T., Okada, H., Kumakura, H. and Nakamura, H.: Simultaneous determination of granisetron and 7-hydroxygranisetron in human plasma by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. B,* 660 (1994) 205-210.

1109 Kuhn, O.S., Silva, G.P. and Fonseca, A.L.: (Simultaneous analysis of some antiepileptic drugs and metabolites by liquid chromatography). *An. R. Acad. Farm.,* 59 (1993) 349-360; *C.A.,* 121 (1994) 72905p.

1110 Linhares, M.C. and Kissinger, P.T.: Pharmacokinetic studies using microdialysis probes in subcutaneous tissues: effects of the co-administration of ethanol and acetaminophen. *J. Pharm. Biomed. Anal.,* 12 (1994) 619-627.

1111 Macho, M.L. and Munoz, P.: Screening and determination of tranquilizers in porcine urine. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 465-468; *C.A.,* 121 (1994) 124466t.

1112 Marescaux, P., Belan, E., Houdret, N., Goudemand, M. and Lhermitte, M.: Simultaneous determination of clomipramine and its demethylated metabolite in plasma and erythrocytes by high-performance liquid chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2171-2177.

1113 Nakai, H., Shimamura, Y., Kanazawa, T., Yasuda, S. and Kayano, M.: Determination of a new $H^+$-$K^+$ ATPase inhibitor (E3810) and its four metabolites in human plasma by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 211-220.

1114 Nichols, J.H., Charlson, J.R. and Lawson, G.M.: Automated HPLC assay of fluoxetine and norfluoxetine in serum. *Clin. Chem. (Washington),* 40 (1994) 1312-1316.

1115 Porter, S., Patel, R. and Johnston, N.: Multiresidue analysis of some tranquilizers and carazolol by HPLC. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 543-547; *C.A.,* 121 (1994) 203622u.

1116 Rakestraw, D.C., Bilski, D.A. and Lam, G.N.: Determination of linopirdine and its N-oxide metabolites in rat plasma by liquid chromatography. *J. Pharm. Biomed. Anal.,* 12 (1994) 1055-1061.

1117 Rizzi, A.M., Hirz, R., Cladrow-Runge, S. and Jonsson, H.: Enantiomeric separation of amphetamine, methamphetamine and ring substituted amphetamines means of a β-cyclodextrin-chiral stationary phase. *Chromatographia,* 39 (1994) 131-137.

1118 Rodrigues, A.D., Ferrero, J.L., Amann, M.T., Rotert, G.A., Cepa, S.P., Surber, B.W., Machinist, J.M., Tich, N.R., Sullivan, J.P., Garvey, D.S. et al.: The *in vitro* hepatic metabolism of ABT-418, a cholinergic channel activator, in rats, dogs, cyanomolgus monkeys, and humans. *Drug Metab. Disp.,* 22 (1994) 788-798.

1119 Saleh, M.I. and Yoong, C.S.: Determination of codeine, ephendrine and promethazine in cough mixture by reversed-phase high-performance liquid chromatography. *J. Phys. Sci.,* 4 (1993) 55-63; *C.A.,* 121 (1994) 187437e.

1120 Sam, E., Augustijns, P. and Verbeke, N.: Stability of apomorphine in plasma and its determination by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr. B,* 658 (1994) 311-317.

1121 Shihabi, Z.K. and Oles, K.S.: Felbamate measured in serum by two methods: HPLC and capillary electrophoresis. *Clin. Chem. (Washington),* 40 (1994) 1904-1908.

1122 Solans, A., Carnicero, M., de la Torre, R. and Segura, J.: Simultaneous detection of methylphenidate and its main metabolite, ritalinic acid, in doping control. *J. Chromatogr. B,* 658 (1994) 380-384.

1123 Surapaneni, S. and Khalil, S.K.W.: A sensitive HPLC method for the determination of terfenadine and its metabolite in human plasma. *J. Liq. Chromatogr.,* 17 (1994) 2419-2428.

1124 Takahara, E., Nagata, O., Kato, H., Ohta, S. and Hirobe, M.: Inter-individual differences of 4-[4-(4-methylphenyl)-phenylmethoxy-1-piperidinyl]butyric acid disposition in rats: possible involvement of genetic polymorphism. *Drug Metab. Disp.,* 22 (1994) 761-769.

1125 Tulaganov, A.A., Osikina, L.M., Mikhalev, A.V., Korotkov, M.G. and Arzamastsev, A.P.: (Use of high-performance liquid chromatography for quality contol of propyphenazone). *Farmatsiya (Moscow),* 41 (1992) 69-70; *C.A.,* 121 (1994) 117916m.

1126 Yin, D., Khanolkar, A.D., Makriyannis, A. and Froimowitz, M.: Chiral resolution of 1,3-dimethyl-4-phenylpiperidine derivatives using high-performance liquid chromatography with a chiral stationary phase. *J. Chromatogr. A,* 678 (1994) 176-179.

For additional information see *C.A.*:
121 (1994) 42856f, 141822y, 141858q, 187420u.

See also 31, 39, 171, 875, 960, 1200, 1208, 1212.

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

1127 Alhaique, F., Anchisi, C., Fadda, A.M., Maccioni, A.M. and Travagli, V.: Miconazole, ketoconazole and liposomal preparations: A reversed-phase HPLC determination. *Acta Technol. Legis Med.,* 4 (1993) 169-175; *C.A.,* 121 (1994) 42837a.

1128 Aoki, H., Ohshima, Y., Tanaka, M., Okazaki, O. and Hakusui, H.: High-performance liquid chromatographic determination of the new quinolone antibacterial agent DU-6859a in human serum and urine using solid-phase extraction with photolysis-fluorescence detection. *J. Chromatogr. B,* 660 (1994) 365-374.

1129 Arenas, R.V. and Johnson, N.A.: Liquid chromatographic fluorescence method for the determination of thiabendazole residues in green bananas and banana pulp. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 710-713.

1130 Balizs, G., Benesch-Girke, L. and Hewitt, S.A.: Determination of four sulfonamides and their N4-acetyl metabolites in swine muscle using liquid chromatography/thermospray mass spectrometry. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 155-159; *C.A.,* 121 (1994) 132498v.

1131 Beier, R.C., Rowe, L.D., Abd El-Aziz Nasr, M.I., Elissalde, M.H. and Stanker, L.H.: Extraction and HPLC analysis of halofuginone in chicken serum. *J. Liq. Chromatogr.,* 17 (1994) 2961-2970.

1132 Bernal, J.L., del Nozal, M.J., Salas, M., Galante, E. and Lumaret, J.P.: HPLC determination of residual ivermectin in cattle dung following subcutaneous injection. *J. Liq. Chromatogr.,* 17 (1994) 2429-2444.

1133 Blanchflower, W.J., Cannavan, A. and Kennedy, D.G.: Determination of fenbendazole and oxfendazole in tissues using liquid chromatography/thermospray mass spectrometry. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 1, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 191-195; *C.A.,* 121 (1994) 156004g.

1134 Boison, J.O.K. and Keng, L.J.-Y.: Determination of sulfamethazine in bovine and porcine tissues by reversed-phase liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 558-564.

1135 Clement, B. and Jung, F.: N-Hydroxylation of the antiprotozoal drug pentamidine catalyzed by rabbit liver cytochrome P-450 2C3 or human liver microsomes, microsomal retroreduction, and further oxidative transformation of the formed amidoximes. Possible relationship to the biological oxidation of arginine to $N^G$-hydroxyarginine, citrulline, and nitric oxide. *Drug Metab. Disp.,* 22 (1994) 486-497.

1136 Croteau, L.G., Akhtar, M.H., Bélanger, J.M.R. and Paré, J.R.J.: High performance liquid chromatography determination following microwave assisted extraction of 3-nitro-4-hydroxyphenylarsonic acid from swine liver, kidney, and muscle. *J. Liq. Chromatogr.,* 17 (1994) 2971-2981.

1137 Dua, V.K., Sarin, R. and Sharma, V.P.: Sulphadoxine concentrations in plasma, red blood cells and whole blood in healthy and *Plasmodium falciparum* malaria cases after treatment with Fansidar using high-performance liquid chromatography. *J. Pharm. Biomed. Anal.,* 12 (1994) 1317-1323.

1138 Furusawa, N. and Mukai, T.: Simultaneous high-performance liquid chromatographic determination of residual sulphamonomethoxine, sulphadimethoxine and their $N^4$-acetyl metabolites in foods of animal origin. *J. Chromatogr. A,* 677 (1994) 81-85.

1139 Grubb, M.F., Wong, Y.N., Burcham, D.L., Saxton, P.L., Quon, C.Y. and Huang, S.-M.: Pharmacokinetics of HIV protease inhibitor DMP 323 in rats and dogs. *Drug Metab. Disp.,* 22 (1994) 709-712.

1140 Guggisberg, D., Mooser, A.E. and Koch, H.: (Screening method for the quantitative determination of twelve sulfonamides in meat, liver, and kidney by HPLC with online post-column derivatization). *Mitt. Geb. Lebensmittelunters. Hyg.,* 84 (1993) 263-273; *C.A.,* 121 (1994) 177951d.

1141 Karim, E.I.A., Ibrahim, K.EE., Abdelrahman, A.N. and Fell, A.F.: Photodegradation studies on chloroquine phosphate by high-performance liquid chromatography. *J. Pharm. Biomed. Anal.,* 12 (1994) 667-674.

1142 Kristiansen, G.A., Brock, R. and Bojesen, G.: Comparison of flow injection/thermospray MS/MS and LC/thermospray MS/MS methods for determination of sulfonamides in meat and blood. *Anal. Chem.,* 66 (1994) 3253-3258.

1143 Kumar, L., Toothill, J.R. and Ho, K.-B.: Determination of nitrofuran residues in poultry muscle tissues and eggs by liquid chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 591-595.

1144 Law, D., Moore, C.B. and Denning, D.W.: Bioassay for serum itraconazole concentrations using hydroxyitraconazole standards. *Antimicrob. Agents Chemother.,* 38 (1994) 1561-1566; *C.A.,* 121 (1994) 72945b.

1145 Lee, T., Pyo, D., Shim, T.-H. and Jeong, E.-H.: High performance liquid chromatographic determination of residual sulfonamide antibacterials in meat using alumina cartridge. *Bull. Korean Chem. Soc.,* 15 (1994) 592-595; *C.A.,* 121 (1994) 156070a.

1146 Milner, N.P., Johnson, M.R. and Perry, K.J.: Determination of sulfadimethoxine and ormetoprim residues in channel carfish fillets after treatment with romet and evaluation of a commercially available rapid diagnostic test for drug residues in fish fillets. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 875-881.

1147 Mizutani, T., Yoshida, K. and Kawazoe, S.: Formation of toxic metabolites from thiabendazole and other thiazoles in mice. Identification of thioamides as ring cleavage products. *Drug Metab. Disp.,* 22 (1994) 750-755.

1148 Muhia, D.K., Mberu, E.K. and Watkins, W.M.: Differential extraction of artemether and its metabolite dihydroartemisinin from plasma and determination by high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 196-199.

1149 Nomeir, A.A., McComish, M.F., Mongan, A.L., Covey, J.M. and Ferrala, N.F.: Liquid chromatographic analysis, stability and protein binding studies of the anti-HIV agent benzoic acid, 2-chloro-5[[(1-methylethoxy)thioxomethyl]amino], 1-methylethyl ester. *J. Pharm. Biomed. Anal.,* 12 (1994) 693-698.

1150 Paulson, G.D., Feil, V.J., Zaylskie, R.G., Giddings, J.M. and Slanger, W.D.: Depletion of residues from milk and blood of cows dosed orally and intravenously with sulfamethazine. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 895-900.

1151 Pochopin, N.L., Charman, W.N. and Stella, V.J.: Pharmacokinetics of dapsone and amino acid produrgs of dapsone. *Drug Metab. Disp.,* 22 (1994) 770-775.

1152 Reuvers, T., Diaz, R., Gomez, J. and Ramos, M.: Determination of ivermectin residues in liver by HPLC-UV and fluorescence detection. Screening and confirmatory method. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B., *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 567-571; *C.A.,* 121 (1994) 203625x.

1153 Samuelsen, O.B.: Simultaneous determination of ormethoprim and sulphadimethoxine in plasma and muscle of Atlantic salmon (*Salmo salar*). *J. Chromatogr. B,* 660 (1994) 412-417.

1154 Scypinski, S. and Ross, A.J.: Liquid chromatographic separation of zalcitabine and its stereoisomers. *J. Pharm. Biomed. Anal.,* 12 (1994) 1271-1276.

1155 Steenbaar, J.G., Hajee, C.A.J. and Haagsma, N.: High-performance liquid chromatographic determination of mebendazole in eel tissue. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 642-645; *C.A.,* 121 (1994) 177974p.

1156 Stehly, G.R., Plakas, S.M. and El Said, K.R.: Liquid chromatographic determination of furazolidone in shrimp. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 901-904.

1157 Takeba, K., Itoh, T., Matsumoto, M. and Nakazawa, H.: Determination of dephosphate bromofenfos in milk by liquid chromatography with electrochemical detection. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 904-908.

1158 Vargas, F., Rivas, C. and Canudas, N.: Photosensitized lipid peroxidation by cinoxacin and its photoproducts. Involvement of a derived peroxide in its phototoxicity. *Pharmazie,* 49 (1994) 742-745.

1159 Vree, T.B., van der Ven, A.J.A.M., Verwey-van Wissen, C.P.W.G.M., van Ewijk-Beneken Kolmer, E.W.J., Swolfs, A.E.M., van Galen, P.M. and Amatdjais-Groenen, H.: Isolation, identification and determination of sulfamethoxazole and its known metabolites in human plasma and urine by high-performance liquid chromatography. *J. Chromatogr. B,* 658 (1994) 327-340.

1160 Walubo, A., Smith, P. and Folb, P.I.: Comprehensive assay for pyrazinamide, rifampicin and isoniazid with its hydrazine metabolites in human plasma by column liquid chromatography. *J. Chromatogr. B,* 658 (1994) 391-396.

1161 Woodcock, J.M., Andrews, J.M., Honeybourne, D. and Wise, R.: Determination of OPC-17116, a new fluoroquinolone, in human alveolar macrophages and other biological matrixes by high performance liquid chromatography (HPLC). *FEMS Microbiol. Lett.,* 119 (1994) 315-320; *C.A.,* 121 (1994) 49549s.

For additional information see *C.A.*:
121 (1994) 203651c.

See also 154, 925, 965, 996, 1177, 1211.

*32f. Cytostatics*

1162 Abu-Izza, K. and Lu, D.R.: Liquid chromatographic determination of sodium mercaptoundecahydrododecaborate in rat urine and plasma after precolumn derivatization. *J. Chromatogr. B,* 660 (1994) 347-352.

1163 Amorusi, P., Lessard, D., Bansal, S.K., Selinger, K., Yacobi, A. and Tonelli, A.P.: Analysis of enloplatin by liquid chromatography and of platinum by atomic absorption spectrometry in various biological fluids. *J. Pharm. Biomed. Anal.,* 12 (1994) 1023-1033.

1164 Barker, I.K., Crawford, S.M. and Fell, A.F.: Determination of altretamine in human plasma with high-performance liquid chromatography. *J. Chromatogr. B,* 660 (1994) 121-126.

1165 Camacho, M.A., Torres, A.I., Gil, M.E., Obregon, M.M. and Ruz, V.: Qualitative and quantitative determination of two new antitumor agents from 1,8-naphthalimides in tablets: validation of a high-performance liquid chromatography method. *Arzneim.-Forsch.,* 44 (1994) 659-662; *C.A.,* 121 (1994) 164111e.

1166 Cummings, J., Fielding, H. and Miller, W.R.: Pharmaceutical analysis of 8-chloroadenosine 3',5'-monophosphate. *J. Pharm. Biomed. Anal.,* 12 (1994) 1289-1294.

1167 De Forni, M., Bugat, R., Chabot, G.G., Culine, S., Extra, J.-M., Gouyette, A., Madelaine, I., Marty, M.E. and Mathieu-Boue, A.: Phase I and pharmacokinetic study of the camptothecin derivative irinotecan, administered on a weekly schedule in cancer patients. *Cancer Res.,* 54 (1994) 4347-4354.

1168 Dednarski, P.J., Kratochvil, N.A. and Otto, A.M.: Reversible and irreversible interactions of a cisplatin analog bearing a 1,2-diphenylethylenediamine ligand with plasma and plasma proteins *in vitro*. *Drug Metab. Disp.,* 22 (1994) 419-427.

1169 Funakoshi, K.-i., Yamashita, K., Chao, W.-f., Yamaguchi, M. and Yashiki, T.: High-performance liquid chromatographic determination of busulfan in human serum with on-line derivatization, column switching and ultraviolet absorbance detection. *J. Chromatogr. B,* 660 (1994) 200-204.

1170 Hanson, R.L., Wasylyk, J.M., Nanduri, V.B., Cazzulino, D.L., Patel, R.N. and Szarka, L.J.: Site-specific enzymatic hydrolysis of taxanes at C-10 and C-13. *J. Biol. Chem.,* 269 (1994) 22145-22149.

1171 Husain, S., Alvi, S.N. and Nageswara Rao, R.: Separation and determination of E- and Z-isomers of tamoxifen by ion-pair high-performance liquid chromatography. *Anal. Lett.,* 27 (1994) 2485-2497.

1172 Johansson, M. and Bielenstein, M.: Determination of 4-hydroxycyclophosphamide in plasma, as 2,4-dinitrophenylhydrazone derivative of aldophosphamide, by liquid chromatography. *J. Chromatogr. B,* 660 (1994) 111-120.

1173 Maas, B., Huber, C. and Krämer, I.: Stabilität von Bendamustinhydrochlorid in Infusionslösungen. *Pharmazie,* 49 (1994) 775-777.

1174 Noteborn, H.P.J.M., Varossieau, F.J., Monshouwer, M., Brands, R. and Pinedo, H.M.: A reversed-phase high-performance liquid chromatographic method for the determination of Clanfenur in rat and human plasma. *J. Pharm. Biomed. Anal.,* 12 (1994) 937-942.

1175 Proksch, B., Blanz, J., Zeller, K.-P. and Ehninger, G.: Detection and separation of the anthrapyrazole CI-941 and its metabolites in serum and urine by high-performance liquid chromatography. *J. Chromatogr. B,* 658 (1994) 349-353.

1176 Wafelman, A.R., Konings, M.C.P., Rosing, H., Hoefnagel, C.A., Taal, B.G., Maes, R.A.A. and Beijnen, J.H.: High-performance liquid chromatographic determination of metaiodobenzylguanidine in whole blood and plasma of cancer patients. *J. Pharm. Biomed. Anal.,* 12 (1994) 1173-1179.

For additional information see *C.A.*: 121 (1994) 163843h.

See also 891, 964, 1219, 1223.

*32g. Other drug categories*

1177 Barker, S.A. and Long, A.R.: Preparation of milk samples for immunoassay and liquid chromatographic screening using matrix solid-phase dispersion. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 848-854.

1178 Benesova, K. and Pavelek, Z.: Method for determining of 1-(4-amino-4-oxo-3,3-diphenylbutyl)-1-methylpiperidinium bromide and 2-(4-(2-(1-piperidinyl)ethoxy)benzoyl)benzoic acid methyl ester in pharmaceutical liquids. *Czech. Rep.* Cz 277,865 (Cl. G01N30/02), 16 Jun. 1993, Appl. 4,695, 07 Aug. 1989; 4 p.; *C.A.,* 121 (1994) 92025e.

1179 Beysens, A.J., Beuman, G.H., van der Heijden, J.J., Hoogtanders, K.E.J., Steijger, O.M. and Lingeman, H.: Determination of tacrolimus (FK 506) in whole blood using liquid chromatography and fluorescence detection. *Chromatographia,* 39 (1994) 490-496.

1180 Brownsill, R., Combal, J.P., Taylor, A., Bertrand, M., Luijten, W. and Walther, B.: The application of electrospray and neutral-loss mass spectrometry to the identification of the metabolites of S12813 in rat liver slices. *Rapid Commun. Mass Spectrom.,* 8 (1994) 361-365; *C.A.,* 121 (1994) 72997v.

1181 Chan, K.C., Majadly, F., McCloud, T.G., Muschik, G.M., Issaq, H.J. and Snader, K.M.: Micellar electrokinetic chromatography of the anti-human immunodeficiency virus (HIV) agent michellamine B with absorption and laser-induced fluorescence detection. *Electrophoresis (Weinheim),* 15 (1994) 1310-1315.

1182 Chellquist, E.M., Searle, R., Ladd, D.L. and Hollister, R.K.: Binding constant determination of WIN 22169, a novel polymeric ligand. *J. Pharm. Biomed. Anal.,* 12 (1994) 1015-1022.

1183 Constanzer, M.L., Chavez, C.M. and Matuszewski, B.K.: Picogram determination of finasteride in human plasma and semen by high-performance liquid chromatography with atmospheric-pressure chemical-ionization tandem mass spectrometry. *J. Chromatogr. B,* 658 (1994) 281-287.

1184 Crump, K.L., McIntyre, I.M. and Drummer, O.H.: Simultaneous determination of morphine and codeine in blood and bile using dual ultraviolet and fluorescence high-performance liquid chromatography. *J. Anal. Toxicol.,* 18 (1994) 208-212.

1185 Dou, L., Zeng, J.-N., Gerochi, D.D., Duda, M.P. and Stuting, H.H.: Chiral high-performance liquid chromatography methodology for quality control monitoring of dexfenfluramine. *J. Chromatogr. A,* 679 (1994) 367-374.

1186 Epemolu, R.O., Ackerman, R., Porter, J.B., Hider, R.C., Damani, L.A. and Singh, S.: HPLC determination of 1,2-diethyl-3-hydroxypyridin-4-one (CP94), its iron complex [Fe(III) $(CP94)_3$] and glucuronide conjugate [CP94-GLUC] in serum and urine of thalassaemic patients. *J. Pharm. Biomed. Anal.,* 12 (1994) 923-930.

1187 Ficarra, R., Ficarra, P., Tommasini, S., Calabro, M.L. and Carulli, M.: (Stability determination of roxatidine and release from pharmaceuticals by HPLC). *Acta Technol. Legis. Med.,* 4 (1993) 109-120; *C.A.,* 121 (1994) 42858h.

1188 Hand, E.L., Gilbert, J.D., Yuan, A.S., Olah, T.V. and Hichens, M.: Determination of MK-383, a non-peptide fibrinogen receptor antagonist, in human plasma and urine by radioimmunoassay. *J. Pharm. Biomed. Anal.,* 12 (1994) 1047-1053.

1189 Herráez-Hernández, R., Soriano-Vega, E. and Campíns-Falcó, P.: High-performance liquid chromatographic determination of spironolactone and its major metabolite canrenone in urine using ultraviolet detection and column-switching. *J. Chromatogr. B,* 658 (1994) 303-310.

1190 Jayewardene, A.L., Seneviratne, A.K. and Gambertoglio, J.G.: Paired ion reversed-phase HPLC assay for the simultaneous determination of iothalamic acid and para aminohippuric acid in plasma. *J. Liq. Chromatogr.,* 17 (1994) 2395-2412.

1191 Kishimoto, M., Kawamori, R., Kamada, T. and Inaba, T.: Carbonyl reductase activity for acetohexamide in human erythrocytes. *Drug Metab. Disp.,* 22 (1994) 367-370.

1192 Krieter, P.A., Colletti, A.E., Doss, G.A. and Miller, R.R.: Disposition and metabolism of the hypoglycemic agent pioglitazone in rats. *Drug Metab. Disp.,* 22 (1994) 625-630.

1193 Lai, C.-M., Brogdon, B., Quon, C.Y. and Pieniaszek, H.J., Jr.: Determination of DuP 128, an ACAT inhibitor and its sulphoxide and sulphone metabolites in human plasma by liquid chromatography. *J. Pharm. Biomed. Anal.,* 12 (1994) 1163-1172.

1194 Murata, Y., Hase, M., Tsunakawa, A., Kodama, H. and Abe, T.: (Identification of a metabolite of triethylene tetramine (TRIEN), a therapeutic drug of Wilson's disease). *Biomed. Res. Trace Elem.,* 4 (1993) 185-186; *C.A.,* 121 (1994) 148242t.

1195 Oertel, R., Richter, K., Dobrev, D., Berndt, A. and Gramatté, T.: Eine empfindliche HPLC-Methode zur Bestimmung von Triamteren im Serum. *Pharmazie,* 49 (1994) 700-702.

1196 Ohta, T., Shiotani, K., Takamiya, I. and Takitani, S.: (Column-switching HPLC determination of suphonamide diuretics using carbonic anhydrase-immobilized precolumn). *Kuromatogurafi,* 14 (1993) 34-35; *C.A.,* 121 (1994) 65686q.

1197 Oliva, A., Armas, H. and Fariña, J.B.: HPLC determination of polyethylene glycol 400 in urine: oligomeric profile in healthy and celiac disease subjects. *Clin. Chem. (Washington),* 40 (1994) 1571-1574.

1198 Perotti, B.Y.T., Prueksaritanont, T. and Benet, L.Z.: HPLC assay for FK 506 and two metabolites in isolated rat hepatocytes and rat liver microsomes. *Pharm. Res.,* 11 (1994) 844-847; *C.A.,* 121 (1994) 72920q.

1199 Pramar, Y.V. and das Gupta, V.: Solubilization of spironolactone by cosolvents. *Pharmazie,* 49 (1994) 661-665.

1200 Ring, B.J., Parli, C.J., George, M.C. and Wrighton, S.A.: *In vitro* metabolism of zatosetron. Interspecies comparison and role of CYP 3A. *Drug Metab. Disp.,* 22 (1994) 352-357.

1201 Seneviratne, A.K., Jayewardene, A.L. and Gambertoglio, J.G.: Paired ion reversed-phase HPLC assay for the determination of iothalamic acid and para aminohippuric acid in urine. *J. Pharm. Biomed. Anal.,* 12 (1994) 1311-1316.

1202 Thompson, R., Grinberg, N., Perpall, H., Bicker, G. and Tway, P.: Separation of organophosphonates by ion chromatography with indirect photometric detection. *J. Liq. Chromatogr.,* 17 (1994) 2511-2531.

1203 Tsai, E.W., Chamberlin, S.D., Forsyth, R.J., Bell, C., Ip, D.P. and Brooks, M.A.: Determination of bisphosphonate drugs in pharmaceutical dosage formulations by ion chromatography with indirect UV detection. *J. Pharm. Biomed. Anal.,* 12 (1994) 983-991.

1204 Turberg, M.P., Macy, T.D., Lewis, J.J. and Coleman, M.R.: Determination of ractopamine hydrochloride in swine, cattle, and turkey feeds by liquid chromatography with coulometric detection. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 840-847.

1205 Wilkes, A.J., Walraven, G. and Talbot, J.-M.: Determination of cocoamidopropyl betaine in raw materials and various cosmetic and detergent finished products by HPLC. *Commun. Jorn. Com. Esp. Deterg.,* 25 (1994) 209-220; *C.A.,* 121 (1994) 186756w.

1206 Xu, X.: (Methods to measure cyclosporine levels). *Zhongguo Yaoxue Zazhi,* 29 (1994) 193-195; *C.A.,* 121 (1994) 72879h - a review with 20 refs.

1207 Yamamoto, K., Fukada, N., Shiroi, S., Shiotsuki, Y., Nagata, Y., Tani, T. and Sakai, T.: Effects of dietary fat levels on the absorption and tissue accumulation of probucol in the rat. *Arzneim.-Forsch.,* 44 (1994) 1059-1062.

For additional information see *C.A.*:
121 (1994) 91995j, 117904f, 141868t.

See also 162, 164, 466, 872, 954, 968, 972, 1049, 1105, 1119, 1171.

*32h. Toxicological and forensic applications*

1208 Borggaard, B. and Joergensen, I.: Urinary screening for benzodiazepines with radioreceptor assay: comparison with EMIT® d.a.u. benzodiazepine assay and high-performance liquid chromatography. *J. Anal. Toxicol.,* 18 (1994) 243-246.

1209 Bouchard, M., Dodd, C. and Viau, C.: Improved procedure for the high-performance liquid chromatographic determination of monohydroxylated PAH metabolites in urine. *J. Anal. Toxicol.,* 18 (1994) 261-264.

1210 Cherton, J.C., Jellal, A., Lhommet, G., Loutelier, C., Dardoize, F., Lacoste, L. and Subileau, C.: Unexpected production of chaetoglobosins from maize incubated by *Phomopsis leptostromiformis.* I. Isolation and optimization of the production in liquid media by LC monitoring. *Analusis,* 22 (1994) 210-216; *C.A.,* 121 (1994) 101581n.

1211 Croes, K., McCarthy, P.T. and Flanagan, R.J.: Simple and rapid HPLC of quinine, hydroxychloroquinine, chloroquinine, and desethylchloroquinine in serum, whole blood, and filter paper-adsorbed dry blood. *J. Anal. Toxicol.,* 18 (1994) 255-260.

1212 Franssen, R.M.E., Stolk, L.M.L., van den Brand, W. and Smit, B.J.: Analysis of morphine and amphetamine in meconium with immunoassay and HPLC-diode-array detection. *J. Anal. Toxicol.,* 18 (1994) 294-295.

1213 Goergens, H.W., Hallier, E., Mueller, A. and Bolt, H.M.: Macromolecular adducts in the use of methyl bromide as fumigant. *Toxicol. Lett.,* 72 (1994) 199-203; *C.A.,* 121 (1994) 101347r.

1214 Margel, S. and Marcus, L.: Model systems employing affinity chromatography for extraction of toxic substances directly from whole blood. *Mol. Interact. Biosep.,* (1993) 433-450; *C.A.,* 121 (1994) 172366g.

1215 Roybal, J.E., Munns, R.K., Holland, D.C., Hurlbut, J.A. and Long, A.R.: A method for the determination of thionin, a metabolite of methylene blue, in milk by VIS/LC. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 601-605; *C.A.,* 121 (1994) 177972m.

For additional information see *C.A.*:
121 (1994) 51632g, 101385b, 127219a, 127220u, 150659c.

See also 151, 194, 206, 208, 213, 237, 832, 849, 859, 1090, 1281.

*32i. Plant extracts*

1216 Deutsch, H.F., Evenson, M.A., Drescher, P., Sparwasser, C. and Madsen, P.O.: Isolation and biological activity of aspidospermine and quebrachamine from an Aspidosperma tree source. *J. Pharm. Biomed. Anal.,* 12 (1994) 1283-1287.

1217 Grimminger, W. and Witthohn, K.: Analytics of senna drugs with regard to the toxicological discussion of anthranoids. *Pharmacology,* 47 (1993) 98-109; *C.A.,* 121 (1994) 98922s.

1218 Guillerault, L., Ollivier, E., Elias, R. and Balansard, G.: Determination of harpagide, 8-para-coumaroyl harpagide, and harpagoside by high performance liquid chromatography in *Harpagophytum procumbens* drugs and in a commercial extract. *J. Liq. Chromatogr.,* 17 (1994) 1951-1960.

1219 Kopycki, W.J., ElSohly, H.N. and McChesney, J.D.: HPLC determination of taxol and related compounds in *Taxus* plant extracts. *J. Liq. Chromatogr.,* 17 (1994) 2569-2591.

1220 Mayoral, A.M., Gutiérrez, C., Ruíz, M.L. and Castañera, P.: A high performance liquid chromatography method for quantification of DIBOA, DIMBOA, and MBOA from aqueous extracts of corn and winter cereal plants. *J. Liq. Chromatogr.,* 17 (1994) 2651-2665.

1221 Tsai, T.-H., Westly, J., Lee, T.-F. and Chen, C.-F.: Identification and determination of geniposide, genipin, gardenoside, and geniposidic acid from herbs by HPLC/photodiode-array detection. *J. Liq. Chromatogr.,* 17 (1994) 2199-2205.

For additional information see *C.A.*:
121 (1994) 91977e.

See also 217, 225, 419.

## 33. CLINICO-CHEMICAL APPLICATIONS

### *33a. General papers and reviews*

1222 Krull, I.S., Szulc, M.E., Bourque, A.J., Zhou, F.-X., Yu, J. and Strong, R.: Solid-phase derivatization reactions for biomedical liquid chromatography. *J. Chromatogr. B,* 659 (1994) 19-50 - a review with 116 refs.

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

1223 Harris, J.W., Rahman, A., Kim, B., Guengerich, F.P. and Collins, J.M.: Metabolism of taxol by human hepatic microsomes and liver slices: participation of cytochrome P450 3A4 and an unknown P450 enzyme. *Cancer Res.,* 54 (1994) 4026-4035.

For additional information see *C.A.*:
121 (1994) 33407h.

See also 240, 251, 264, 315, 339, 344, 347, 353, 358, 366, 386, 390, 406, 411, 412, 453, 455, 462, 477, 514, 619, 624, 626, 627, 629, 630, 633, 634, 716, 731, 751, 759, 782, 825, 826, 863, 866, 868, 874, 893, 899, 921.

## 34. FOOD ANALYSIS

### *34a. General papers and reviews*

1224 Shiao-Jun, Lima, J.L.F.C., Montenegro, M.C.B.S.M.: (Critical review on the determination of wine characteristics using ion chromatography). *Rev. Port. Farm.,* 43 (1993) 5-21; *C.A.,* 121 (1994) 132437z - a review with 76 refs.

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

1225 Czerwiecki, L. and Szymczyk, K.: (Simultaneous determination of aspartame and diketopiperazine in beverages by high performance liquid chromatography). *Pr. Inst. Lab. Badaw. Przem. Spozyw.,* 48 (1993) 31-42; *C.A.,* 121 (1994) 56057h.

1226 Fujinari, E.M.: HPLC-CLND application to quantitate aspartame and other nitrogen containing compounds in beverages. *Dev. Food Sci.,* 33(Shelf Life Studies of Foods and Beverages) (1993) 1038-1048; *C.A.,* 121 (1994) 56062f.

1227 Helle, N., Knopfe, C., Mischke, J., Gebhardt, G., Boegl, K.W. and Schreiber, G.A.: (ESR and HPLC investigations for the detection of γ-irradiated eggs). *Z. Lebensm.-Unters. Forsch.,* 197 (1993) 440-443; *C.A.,* 121 (1994) 203739n.

1228 Lamuela-Raventos, R.M. and Waterhouse, A.L.: A direct HPLC separation of wine phenolics. *Am. J. Enol. Vitic.,* 45 (1994) 1-5; *C.A.,* 121 (1994) 56065j.

1229 Lancas, F.M. and Galhiane, M.S.: Fast routine analysis of light components of alcoholic beverage using large-bore open tubular fused silica column. *Bol. Soc. Chil. Quim.,* 38 (1993) 177-181; *C.A.,* 121 (1994) 56064h.

1230 Marchetti, M., Laffi, R., Zucchi, M. and Ramazza, V.: Analytical and management factors concerning the control of pork meat production system. In: Haagsma, N., Ruiter, A. and Czedik-Eysenberg, P.B. (Editors), *Residues Vet. Drugs Food, Proc. EuroResidue Conf., 2nd 1993,* 2, Utrecht Univ. Fac. Vet. Med., Utrecht, 1993, pp. 479-484; *C.A.,* 121 (1994) 156016n.

1231 Mohan, S.B., Perry, L., Malhotra, J.M. and Lyddiatt, A.: Assessment of beer foam stability by high performance liquid immunoaffinity chromatography (HPLIAC). *J. Inst. Brew.,* 99 (1993) 231-236; *C.A.,* 121 (1994) 132658x.

1232 Redondo, A., Villanueva, M.J. and Rodríguez, M.D.: High-performance liquid chromatographic determination of dietary fibre in raw and processed carrots. *J. Chromatogr. A,* 677 (1994) 273-278.

1233 Sanchez-Muniz, F.J., Cuesta, C. and Garrido-Polonio, M.C.: Evaluation of a sunflower oil used for frying by different analytical indexes and column and gas chromatography. *Z. Ernaehrungswiss.,* 33 (1994) 16-23; *C.A.,* 121 (1994) 132507x.

1234 Winterhalter, P.: Application of countercurrent chromatographic techniques in flavor precursor studies. In: Schreier, P. and Winterhalter, P. (Editors), *Prog. Flavour Precursor Stud. Proc. Int. Conf., 1992,* Allured, Carol Stream, 1993, pp. 31-44; *C.A.,* 121 (1994) 106737c.

For additional information see *C.A.*:
121 (1994) 33423k.

See also 154, 211, 215, 220, 226, 227, 237, 241, 252, 259, 287, 318, 326, 329, 331, 336, 340, 341, 345, 357, 393, 395, 402, 421, 422, 428, 433, 445, 451, 454, 642, 644, 678, 821, 851, 869, 895, 897, 904, 910, 911, 919, 920, 924, 925, 927, 932, 933, 939, 941, 943, 945, 955, 962, 963, 966, 971, 976, 999, 1041, 1050, 1111, 1115, 1130, 1133, 1134, 1136, 1138, 1140, 1142, 1145, 1150, 1152, 1215, 1277.

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

1235 Full, G. and Schreier, P.: (Covalent chromatography. A valuable method for the aroma analysis of thiols at trace levels). *Lebensmittelchemie,* 48 (1994) 1-4; *C.A.,* 121 (1994) 81188j.

1236 Winterhalter, P., Full, G., Herderich, M. and Schreier, P.: Application of online coupled chromatographic techniques in flavor precursor studies. In: Schreier, P. and Winterhalter, P. (Editors), *Prog. Flavour Precursor Stud. Proc. Int. Conf., 1992,* Allured, Carol Stream, 1993, pp. 97-101; *C.A.,* 121 (1994) 104034x.

## 35. ENVIRONMENTAL ANALYSIS

*35a. General papers and reviews*

1237 Brumley, W.C., Brownrigg, C.M. and Grange, A.H.: Capillary liquid chromatography-mass spectrometry and micellar electrokinetic chromatography as complementary techniques in environmental analysis. *J. Chromatogr. A,* 680 (1994) 635-644.

1238 De Voogt, P.: Chromatographic clean-up methods for the determination of persistent organic compounds in aqueous environmental samples. *TrAC,* 13 (1994) 389-397 - a review with 70 refs.

See also 54, 194, 203, 1240, 1269, 1281.

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

For additional information see *C.A.*:
121 (1994) 169151c.

See also 236.

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

1239 Brinkman, U.A.T., Slobodnik, J. and Vreuls, J.J.: Trace-level detection and identification of polar pesticides in surface water: the SAMOS approach. *TrAC,* 13 (1994) 373-381.

1240 Hennion, M.-C., Pichon, V. nad Barceló, D.: Surface water analysis (trace-organic contaminants) and EC regulations. *TrAC,* 13 (1994) 361-372 - a review with 30 refs.

1241 Imai, K., Shizukuishi, K., Matsumura, K. and Ishikawa, M.: (Analysis of contaminated level of pesticides in water by LC an LC/MS (liquid chromatography/mass spectrometry)). *Hitachi Hyoron,* 76 (1994) 287-292; *C.A.,* 121 (1994) 90886n - a review with no refs.

1242 Kloster, G. and Schoester, M.: Determination of tensides in surface water. Development of methods. *CLB Chem. Labor Biotech.,* 44 (1993) 616-623; *C.A.,* 121 (1994) 140900k - a review with 21 refs.

1243 Kuehl, D.W., Serrano, J. and Naumann, S.: Identification of potentially mutagenic contaminants in the aquatic environment by liquid chromatographic-thermospray mass spectrometric characterization of *in vitro* DNA adducts. *J. Chromatogr. A,* 684 (1994) 113-119.

1244 Van der Wal, E.H.R., Brouwer, E.R., Lingeman, H. and Brinkman, U.A.T.: On-line trace enrichment-column liquid chromatography of polar pollutants in surface water using bifunctional membrane-based extraction-disk cartridges. *Chromatographia,* 39 (1994) 239-245.

1245 Van Hout, P.J.M. and Brinkman, U.A.T.: The Rhine Basin Program. *TrAC,* 13 (1994) 382-388.

For additional information see *C.A.*:
121 (1994) 117124b.

See also 210, 216, 423, 430, 975, 985, 987, 1238, 1267, 1271.

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

1246 Godoy, J.M., Godoy, M.L., Carvalho, Z.L. and Lauria, D.C.: Development of a so-called hour method for analysis of plutonium in soil samples. *J. Radioanal. Nucl. Chem.,* 177 (1994) 19-26; *C.A.,* 121 (1994) 107304w.

1247 Szabo, G. and Bulman, R.A.: Comparison of adsorption coefficient ($K_{OC}$) for soils and HPLC retention factors of aromatic hydrocarbons using a chemically immobilized humic acid column in RP-HPLC. *J. Liq. Chromatogr.,* 17 (1994) 2593-2604.

1248 Yamasaki, S.: (Development of instrumental techniques for the determination of major trace and ultra-trace elements in soils, plants, and water). *Nippon Dojo Niryogaku Zasshi,* 65 (1994) 240-243; *C.A.,* 121 (1994) 107290p - a review with 16 refs.

See also 333, 423, 430, 989.

## 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

*36a. Surfactants*

1249 Hendayana, S.: Selectivity in micellar liquid chromatography: adsorption of ionic surfactants on hydrophobic silicas. Avail. *Univ. Microfilms Int.,* Order No. DA9411223, 1993, 135 p.; *C.A.,* 121 (1994) 142391u.

1250 Hoeft, C.E. and Zollars, R.L.: Direct determination of anionic surfactants using ion chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2691-2704.

1251 Kida, T., Morishima, N., Masuyama, A. and Nakatsuji, J.: New cleavable surfactants derived from glucono-1,5-lactone. *J. Am. Oil Chem. Soc.,* 71 (1994) 705-710.

1252 Wigman, L.S., Abdel-Kader, H. and Menon, G.K.: Size exclusion chromatography of poloxalene poloxamers: polyethylene glycol-polypropylene glycol co-polymers used to control cattle bloat. *J. Pharm. Biomed. Anal.,* 12 (1994) 719-722.

For additional information see *C.A.*:
121 (1994) 159755p, 182412h.

See also 115, 217, 1242.

*36b. Antioxidants and preservatives*

1253 Tajima, K., Hashizaki, M., Yamamoto, K. and Mizutani, T.: Carbonyl reduction of 6-*tert*.-butyl-2,3-epoxy-1,4-benzoquinone, a metabolite of 3-*tert*.-butyl-4-hydroxyanisole, by rat liver microsomes and cytosol. *Drug Metab. Disp.,* 22 (1994) 815-818.

See also 130, 419.

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

1254 Daloze, D. and Braekman, J.C.: Separation methods: application to the isolation of sponge metabolites. In: Van Soest, R.W.M., van Kempen, T.M.G. and Braekman, J.-C. (Editors), *Sponges Time Space, Proc. Int. Porifera Congr., 4th 1993,* Balkema, Rotterdam, 1994, pp. 441-452; *C.A.,* 121 (1994) 199829x - a review with many refs.

1255 Elaev, N.R. and Baigil'dina, A.A.: (A neural membrane Na,K-ATPase inhibitor: isolation and general characteristics). *Biokhimiya (Moscow),* 59 (1994) 389-394.

1256 Faimon, J. and Ondracek, Z.: Gel filtration chromatography with HF detector-A useful tool for the study of natural colloids. *Scr.-Geol.,* 23 (1993) 3-15; *C.A.,* 121 (1994) 163508c.

1257 Lee, H.K.: HPLC of homologous series of simple organic anions and cations on an anion exchange column. Avail. *Univ. Microfilms Int.,* Order No. DA9325684, 1993, 123 p.; *C.A.,* 121 (1994) 49389q.

1258 Luk'yanov, V.I. and Beiko, O.A.: (Analysis of petroleum nitrogenous compunds by types by liquid adsorption chromatography with linear elution). In: Bol'shakov, G.F. (Editor), *Probl. Khim. Nefti,* Nauka, Sib Otd, Novosibirsk, 1992, pp. 56-64; *C.A.,* 121 (1994) 112906y.

1259 Perreault, H.: Development of chromatographic and mass spectrometric techniques for the analysis of complex mixtures containing aromatic compounds. Avail. *NLC* Order No. DANN76711, 1992, 345 p.; *C.A.,* 121 (1994) 49425y.

For additional information see *C.A.*:
121 (1994) 49346y, 49416w, 60999j, 124387t.

See also 56, 132, 196, 217, 431.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

1260 Kuboki, Y., Kanehira, T., Teraoka, K., Yamada, Y.-i. and Tani, H.: Separation of *Streptococcus mutans* MT8148 by hydroxyapatite column chromatography, a new evaluation of bacterial adhesion. *Shika Kiso Igakkai Zasshi,* 36 (1994) 1-8; *C.A.,* 121 (1994) 30136h.

1261 Levin, S., Klausner, E. and Muchtar, S.: Characterization of submicron MCT o/w emulsions using sedimentation field-flow fractionation (FFF) with power field programming. *J. Pharm. Biomed. Anal.,* 12 (1994) 1115-1121.

1262 Postnov, V.N., Bogomolova, N.G. and Novikov, A.G.: (Gel chromatography of influenza virus on macroporous glass modified by the chemical assembly method). *Zh. Prikl. Khim. (S.-Peterburg),* 67 (1994) 156-157; *C.A.,* 121 (1994) 174266y.

1263 Yue, V., Kowal, R., Neargarder, L., Bond, L., Muetterties, A. and Parsons, R.: Miniature field-flow fractionation system for analysis of blood cells. *Clin. Chem. (Washington),* 40 (1994) 1810-1814.

See also 1127, 1256.

38. INORGANIC COMPOUNDS

*38a. Cations*

1264 Alam, A.M.S., Hossain, A.K.M.A., Quyser, M.A. and Ahmed, E.: Cation-exchange separation of some metal ions in mixed solvents. *J. Bangladesh Chem. Soc.,* 6 (1993) 161-166; *C.A.,* 121 (1994) 194442f.

1265 Cammann, K., Robecke, M. and Bettmer, J.: Simultaneous determination of organic ionic lead and mercury species using HPLC. *Fresenius J. Anal. Chem.,* 350 (1994) 30-33.

1266 Chabaux, F., Ben Othman, D. and Birck, J.L.: A new Ra-Ba chromatographic separation and its application to Ra mass-spectrometric measurement in volcanic rocks. *Chem. Geol.,* 114 (1994) 191-197; *C.A.,* 121 (1994) 147853f.

1267 Edgell, K.W., Longbottom, J.E. and Joyce, R.J.: Ion chromatographic method for dissolved hexavalent chromium in drinking water, grandwater, and industrial wastewater effluents: collaborative study. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 994-1004.

1268 Fabbri, D. and Trombini, C.: A novel derivatisation procedure for inorganic mercury(II) for HPLC analysis. *Chromatographia,* 39 (1994) 246-248.

1269 Goetz, L.: Speciation of trace metals and radiotracers by ion chromatography applied to environmental studies. *J. Trace Microprobe Tech.,* 11 (1993) 159-178; *C.A.,* 121 (1994) 124155r.

1270 Gonzales Rodriguez, V., Castro Romero, J.M., Fernandez Solis, J.M., Perez Iglesias, J. and Seco Lago, H.M.: (Application of reverse-phase liquid chromatography in determination of metal ions). *Tec. Lab.,* 15 (1993) 704-705; *C.A.,* 121 (1994) 147941h.

1271 Gros, N. and Gorenc, B.: Ion chromatographic determination of alkali and alkaline earth metals in mineral waters. *Chromatographia,* 39 (1994) 448-452.

1272 Jakubowski, N., Jepkens, B., Stuewer, D. and Berndt, H.: Speciation analysis of chromium by inductively coupled plasma mass spectrometry with hydraulic high pressure nebulization. *J. Anal. At. Spectrom.,* 9 (1994) 193-198; *C.A.,* 121 (1994) 72632x.

1273 Kim, D.W., Kim, C.S., Choi, K.Y., Jeon, Y.S., Jeong, Y.K. and Park, S.U.: (Enrichment of lithium isotopes by cation exchange chromatography). *Anal. Sci. Technol.,* 7 (1994) 201-204; *C.A.,* 121 (1994) 165642r.

1274 Kuya, M.K., Ferronato, C.R. and Pinto, O.B.: (Reduction of matrix interference in nickel determination by ion chromatography in cadmium oxide samples). *Quim. Nova,* 17 (1994) 101-103; *C.A.,* 121 (1994) 98642a.

1275 Maslowska, J. and Zakrzewski, W.: (Difficulties and methods for overcoming them in the chromatographic separation of the $Fe^{3+}$, $Cr^{3+}$, and $Al^{3+}$ ion mixture). *Zesz. Nauk.-Politech. Lodz., Technol. Chem. Spozyw.,* 589 (1993) 107-114; *C.A.*, 121 (1994) 147761z - a review with 98 refs.

1276 Mohite, B.S. and Zambare, D.N.: Column chromatographic separation of molybdenum(VI) from hydrobromic acid medium using poly(dibenzo-18-crown-6). *Anal. Lett.,* 27 (1994) 2387-2401.

1277 Momplaisir, G.-M., Lei, T. and Marshall, W.D.: Performance of a novel silica T-tube interface for the AAS detection of arsenic and selenium compounds in HPLC column eluate. *Anal. Chem.,* 66 (1994) 3533-3539.

1278 Mongay, C., Olmos, C. and Pastor, A.: Prediction of inorganic and organic ion behaviour with polyvalent eluents in ion chromatography. *J. Chromatogr. A,* 683 (1994) 355-365.

1279 Moraes, N.M.P. and Shihomatsu, H.M.: Dynamic ion-exchange chromatography for the determination of lanthanides in rock standards. *J. Chromatogr. A,* 679 (1994) 387-391.

1280 Prokisch, J., Kovács, B., Györi, Z. and Loch, J.: Interfacing ion chromatography with inductively coupled plasma atomic emission spectrometry for the determination of chromium(III) and chromium(VI). *J. Chromatogr. A,* 683 (1994) 253-260.

1281 Sanz-Medel, A., Aizpun, B., Marchante, J.M., Segovia, E., Fernandez, M.L. and Blanco, E.: Vesicle-mediated high-performance liquid chromatography coupled to atomic detection for speciation of toxic elements. *J. Chromatogr. A,* 683 (1994) 233-243.

1282 Schlegel, D., Mattusch, J. and Dittrich, K.: Speciation of arsenic and selenium compounds by ion chromatography with inductively coupled plasma atomic emission spectrometry detection using the hydride technique. *J. Chromatogr. A,* 683 (1994) 261-267.

1283 Schoppenthau, J. and Dunemann, L.: Hyphenated HPLC/ICP-MS and HPLC/ICP-OES techniques for the characterisation of metal and non-metal species. *Fresenius J. Anal. Chem.,* 349 (1994) 794-799.

1284 Wood, D.J.: Complexation and separation of rare earth ions by solvent extraction and ion exchange chromatography with ionizable crown ethers. Avail. *Univ. Microfilms Int.,* Order No. DA9400809, 1993, 141 p.; *C.A.*, 121 (1994) 43676j.

1285 Wu, J. and Lu, W.: (Rapid determination of trace copper, manganase, and zinc in pharmaceuticals by ion-chromatography). *Sepu,* 12 (1994) 132-133; *C.A.*, 121 (1994) 65719c.

1286 Zappoli, S. and Bottura, C.: Interpretation of the retention mechanism of transition metal cations in ion interaction chromatography. *Anal. Chem.,* 66 (1994) 3492-3499.

For additional information see *C.A.*:
121 (1994) 53286w, 75443x, 124207j.

See also 102, 179, 886, 1246, 1248.

*38b. Anions*

1287 Chakraborty, D.K.: An accurate fluoride calibration in the presence of strong interference from carbonate in ion chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 607-608.

1288 Nishimura, M. and Hayashi, M.: Alcohols and carbohydrates in chromatographic mobile phase for boric acid determination. *Jpn. Kokai Tokkyo Koho* JP 06,167,485 [94,167,485] (Cl. GO1N30/88), 14 Jun. 1994, Appl. 92/319,576, 30 Nov. 1992; 3 pp.; *C.A.*, 121 (1994) 174650u.

1289 Saari-Nordhaus, R. and Anderson, J.M.: Ion chromatographic analysis of anions using a solid-phase chemical suppressor. *Am. Lab. (Shelton),* 26 (1994) 28C-28D, 28F, 28H-28I; *C.A.*, 121 (1994) 147854g.

For additional information see *C.A.*:
121 (1994) 49397r, 98565c, 124267d.

See also 322, 1278.

*38d. Volatile inorganic compounds*

1290 Nakashima, K., Wada, M., Kuroda, N., Akiyama, S. and Imai, K.: High-performance liquid chromatographic determination of hydrogen peroxide with peroxyoxalate chemiluminescence detection. *J. Liq. Chromatogr.,* 17 (1994) 2111-2126.

## 39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

1291 Koczorowski, T., Furmanek, B. and Sektas, M.: A method for removal of radioactive nucleotides from electrophoretic buffers. *BioTechniques,* 16 (1994) 1030-1031; *C.A.*, 121 (1994) 199904t.

See also 1273.

# Gas Chromatography

## 1. REVIEWS AND BOOKS

1 Gilbert, S.G.: Applications of IGC for research in kinetic and thermodynamic problems in food science. *Dev. Food Sci.,* 33 (1993) 1071-1079; *C.A.,* 121 (1994) 33356r - a review with 30 refs.

2 Kuznetsova, E.E. and Dolgushina, G.S.: (Gas-liquid chromatography in clinical medicine (review of literature).) *Klin. Lab. Diagn.,* 6 (1993) 4-7; *C.A.,* 121 (1994) 4181z - a review with 40 refs.

3 Modeste, F. and Caude, M.: (LC-GC online coupling. Principles, developments and applications.) *Analusis,* 22 (1994) 89-107; *C.A.,* 121 (1994) 72704x - a review with 109 refs.

4 Moskvin, L.N. and Rodinkov, O.V.: Analytical application of liquid-gas and liquid-gas-solid chromatography. *Crit. Rev. Anal. Chem.,* 24 (1994) 317-325; *C.A.,* 121 (1994) 169266u - a review with 28 refs.

5 Overton, E.B. and Carney, K.R.: New horizons in gas chromatography: Field aplications of microminiaturized gas chromatographic techniques. *TrAC,* 13 (1994) 252-257 - a review with 23 refs.

See also 21, 52, 107, 112, 129, 142, 150, 163, 169, 175, 190, 191, 193, 196, 217, 221, 438, 478, 490, 567, 647, 660, 662.

## 2. FUNDAMENTALS, THEORY AND GENERAL

### *2a. General*

6 Felinger, A.: Deconvolution of overlapping skewed peaks. *Anal. Chem.,* 66 (1994) 3066-3072.

7 Messadi, D., Ferchichi, L. and Nouar, L.: (Calculation of the dead time in gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Astron.,* 318, No. 7 (1994) 901-904; *C.A.,* 120 (1994) 338069u.

8 Meyer, V.R.: Generation and investigation of chromatographic peaks using a spreadsheet program. *LC-GC Int.,* 7 (1994) 590-596.

9 Wang Dongyuan, Sun Yunqing and Cai Hong: (Some problems of nonequilibrium plate theory.) *Chin. J. Chromatogr.,* 12 (1994) 247-248.

10 Woodbury, C.P., Jr.: A stochastic model of chromatography. *J. Chromatogr. Sci.,* 32 (1994) 339-348.

11 Zimmermann, H.J. and Meier, W.: (Fuzzy logic in analytical chemistry.) *GIT Fachz. Lab.,* 38 (1994) 502-505; *C.A.,* 121 (1994) 72513j.

See also 172.

### *2b. Thermodynamics and theoretical relationships*

12 Havelec, P. and Sevcík, J.G.K.: Concept of additivity for a nonpolar solute-solvent criterion log $L^{16}$. Non aromatic compounds. *J. Chromatogr. A,* 677 (1994) 319-329.

13 Li, P. and Xu, Z.: (A new equation of atate with mixing rule from group contribution model - GC-MCSPT.) *Huagong Xuebao,* 44 (1993) 298-308; *C.A.,* 120 (1994) 326711j.

14 Meyer, E.F. and Feil, J.: Thermodynamics of adsorption of $C(CH_3)_{4-n}Cl_n$ (n=0-4) on sterling FT graphite at zero coverage using gas-solid chromatography. *Langmuir,* 10 (1994) 2399-2402; *C.A.,* 121 (1994) 66894t.

15 Naito, K., Okabe, T. Moriguchi, S. and Takei, S.: Mixed retention mechanism of gas-liquid chromatography of hydrocarbons and dialkyl ethers on tricresyl phosphate-coated silica gel column. *Anal. Sci.,* 10 (1994) 731-736.

16 Wasiak, W.: Thermodynamic characterization of the specific interactions between alkenes and chromatographic packings with chemically bonded copper(II) complexes. *Chem. Anal. (Warsaw),* 39 (1994) 325-333.

17 Wilson, D.J., Cordero, T., Gómez-Lahoz, C., Delgado, R.G. and Rodríguez-Maroto, J.M.: Soil cleanup by *in-situ* aeration. XX. Mass transport of volatile organics in wet activated carbon. *Sep. Sci. Technol.,* 29 (1994) 2073-2095.

18 Xu Guowang, Liang Xiwu, Yang Li, Zhang Xiangmin, Zhang Yukui and Lu Peichang: (Discussion about repelling interaction in gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 310-312.

See also 118, 119, 185, 346.

### *2c. Relationship between structure and chromatographic behaviour*

19 Gerbino, T.C. and Costello, G.: Prediction of programmed temperature retention times on linked capillary columns of different polarity. *J. High Resolut. Chromatogr.,* 17 (1994) 597-602.

20 Kollie, T.O.: Characterization of solute-solvent interactions in gas-liquid chromatography and the application of multivariate analysis to the classification of stationary phase selectivity. (Volumes I and II). Avail. *Univ. Microfilms Int.,* Order No. DA9310679, 1992, 728 pp.; *C.A.,* 121 (1994) 92753r.

21 Peng, C.T.: Retrival of structure information from retention index. *J. Chromatogr. A,* 678 (1994) 189-200 - a review with 50 refs.

See also 12, 16, 111, 120, 123, 165, 222, 236, 301, 346, 372.

### *2d. Measurement of physico-chemical and related values*

22 Abdel-Azim, A.A.A.: Study by inverse gas chromatography of the interaction of polyisobutylene with various solvents. *Arabian. J. Sci. Eng.,* 18 (1993) 379-401; *C.A.,* 121 (1994) 158586x.

23 Balard, H. and Papirer, E.: Characterization and modification of fillers for paints and coatings. *Prog. Org. Coat.,* 22 (1993) 1-17; *C.A.,* 121 (1994) 85767v.

24 Burness, J.H. and Dillard, J.G.: An investigation of the surface properties of anodized aluminium by inverse gas chromatography. *Langmuir,* 10 (1994) 1894-1897; *C.A.,* 120 (1994) 331914g.

25 Chehimi, M.M. and Pigois-Landureau, E.: Determination of acid-base properties of solid materials by inverse gas chromatography at afinite dilution. A novel empirical method based on the dispersive contribution to the heat of vaporization of probes. *J. Mater Chem.,* 4 (1994) 741-745; *C.A.,* 121 (1994) 58427c.

26 Chen, H. and Wagner, J.: An efficient and reliable gas chromatographic method for measuring liquid-liquid mutual solubilities in alkylbenzene + water mixtures: Toluene + water from 303 to 373 K. *J. Chem. Eng. Data,* 39 (1994) 475-479; *C.A.,* 121 (1994) 43987m.

27 Dossi, C., Fusi, A. and Psaro, R.: A combined mass spectrometric/gas chromatographic approach for the thermostatical characterization of supported heterogenous catalysts. *Thermochim. Acta,* 236 (1994) 165-173; *C.A.,* 121 (1994) 43862s.

28 Genkin, A.N. and Petrova, N.A.: Reaction of CO with Rh(I) carbonyl complexes under the conditions of GLC. *Rhodium Express,* 3 (1994) 11-16; *C.A.,* 121 (1994) 109216t.

29 Giamarchi, P., Fakirian, A., Chaouch, A.A., Pouliquen, I., Lesgards, G., Sergent, M. and Phan, T.L.R.: (Dynamic head space system in experimental research methodology: use in analysis of ratio-induced hydrocarbons.) *Analusis,* 22 (1994) 127-134.

30 Jacob, P.N. and Berg, J.C.: Acid-base surface energy characterization of microcrystalline cellulose and two pulp fiber types using inverse gas chromatography. *Langmuir,* 10, No. 9 (1994) 3086-3093; *C.A.,* 121 (1994) 159586j.

31 Jagiello, J., Bandosz, T.J. and Schwarz, J.A.: Study of carbon microstructure by using inverse gas chromatography. *Carbon,* 32 (1994) 687-691; *C.A.,* 121 (1994) 142444p.

32 Koutek, B., Hoskovec, M., Vrkocová, P., Konecný, K. and Feltl, L.: Gas chromatographic determination of vapour pressures of pheromone-like compounds II. Alcohols. *J. Chromatogr. A,* 679 (1994) 307-317.

33 Kuang Yueping, He Nongyue, Shi Qihong and Gong Jian: (Study on acidity of ultrastable Y zeolites by frontal gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 270-272.

34 Letcher, T.M., Bayles, J.W. and Moollan, W.C.: The determination of activity coefficients at infinite dilution using GLC with moderately volatile solvents (*cis*- and *trans*-decalin) at the temperature 298.15 K. *J. Chem. Thermodyn.,* 26 (1994) 571-576; *C.A.,* 121 (1994) 19434h.

35 Liang, J., Drake, D. and Roselius, M.: Conformer analysis study of 1,2-diiodotetrafluoroethane by gas chromatography/Fourier transform Infrared spectroscopy. *Appl. Spectrosc.,* 48 (1994) 206-208.

36 Lin, H.-Y.: Water sorption properties of corn meal extrudates: thermodynamic approach by the methods of inverse gas chromatography and water sorption isotherms. Avail. *Univ. Microfilms Int.,* Order No. DA9412659, 1993, 376 pp.; *C.A.,* 121 (1994) 81442n.

37 Liu, Y., Chou, H.-C. and Stoffer, J.O.: Analysis of ultrasonically induced free radicals in the emulsion polymerization system by GC-MS. *J Appl. Polym. Sci.,* 53 (1994) 247-254; *C.A.,* 121 (1994) 58062e.

38 Liu, Y., Liu, L., Yun, K.S., Zhu, C., Yu, B. and Parcher, J.F.: Investigations of total adsorption in gas-solid systems by tracer pulse chromatography. *Anal. Chem.,* 66 (1994) 2852-2857.

39 Marinichev, A.N. and Stolyarov, B.V.: (Application of autoregression model in phosphoric-acid-catalyzed dehydration of 3-methyl-3-pentanol studied by reversed-flow gas chromatography.) *Zh. Obshch. Khim.,* 64 (1994) 101-106; *C.A.,* 121 (1994) 82225f.

40 Mazzei, J.L., de Aquino Neto, F.R. and Monteiro, J.L.F.: Absorption processes of *n*-butenes in sulfuric acid. 1. Determination of di-sec-butyl sulfate, di-sec-butyl ether, and sec-butyl alcohol by high-resolution gas chromatography. *Ind. Eng. Chem. Res.,* 33 (1994) 1259-1263; *C.A.,* 121 (1994) 98822j.

41 Monaghan, J.J. and Wagner, M.H.: Interconversion of chemical species during analysis by gas chromatography/mass spectrometry. *Rapid Commun. Mass. Spectrom.,* 8, No. 5 (1994) 432-434; *C.A.,* 121 (1994) 148035c.

42 Murakami, Y.: Studies on interaction between inorganic material and polymer by inverse gas chromatography. *Polym. J. (Tokyo),* 26 (1994) 607-612; *C.A.,* 121 (1994) 10519g.

43 Nesterova, I.P. and Rekhter, B.A.: (Determining the rate of release of the synthetic sexual insect attractants from preparative form using vapor-phase gas-liquid chromatography.) *Agrokhimiya,* 4 (1994) 98-100; *C.A.,* 121 (1994) 52333x.

44 Ryu, Y.H., Ri, U.M. and Ri, C.J.: (Study on the binding mode in absorbed molecules on the graphite surface.) *Choson Minjujuui Inmin Konghwaguk Kwahagwon Tongbo.,* 6 (1993) 31-33; *C.A.,* 120 (1994) 331938t.

45 Tian, M. and Hunk, P.: Characterization of polymer-solvent interactions and their temperature dependence using inverse gas chromatography. *J. Chem. Eng. Data,* 39 (1994) 742-755.

46 Vidal, A., Wang, W. and Donnet, J.B.: Study of surface activity of carbon black by inverse gas chromatography. Part I. Evolution of the surface properties of carbon blacks upon extraction. *Kautsch. Gummi, Kunstst.,* 46 (1993) 770; *C.A.,* 121 (1994) 159204h.

47 Wan-Badhi, W., Bloor, D.M. and Wyn-Jones, E.: The partitioning of *n*-hexanol into micelles of cetyltrimethylammonium bromide in aqueous solution. Ultrasonic relaxation and head-space analysis measurements. *Langmuir,* 10 (1994) 2219-2222; *C.A.,* 121 (1994) 66339r.

48 Yang, Y., Xie, J. and Fu, Z.: (Study on water glass aging mechanism by using TMS-GC method.) *Tongji Daxue Xuebao,* 21 (1993) 555-560; *C.A.,* 121 (1994) 41207h.

See also 160, 192, 458, 507, 554, 562, 565, 566.

## 3. GENERAL TECHNIQUES

### *3a. Apparatus and accessories*

49 Annino, R.: Industrial-grade field-mountable gas chromatograph for process monitoring and control. *J. Chromatogr. A,* 678 (1994) 279-288.

50 Chen, C.: (Self-installed refinery gas analyzer and its application.) *Shiyou Lianzhi Yu Huagong,* 25, No. 2 (1994) 59-62; *C.A.,* 121 (1994) 13467z.

51 David, P.A. and Pauls, R.E.: Applications of portable gas chromatography for air and water monitoring. *Process Control Qual.,* 5 (1993) 151-158; *C.A.,* 121 (1994) 26020y.

52 Grob, K.: Injection techniques in capillary GC. *Anal. Chem.,* 66 (1994) 1009A-1019A - a review with 49 refs.

53 Hara, K., Ito, A., Akiyama, A. and Itani, T.: (A new portable gas chromatography system for continuous measurement of airborne organic solvents and its application to workplaces.) *Rodo Kagaku,* 70 (1994) 299-306; *C.A.,* 121 (1994) 140382t.

54 Higdon, W.R.: Detachable column cartridge gas chromatograph. *U.S.* US 5,298,225 (Cl. 422-89; G01N30/54), 29 Mar. 1994, US Appl. 812, 532, 23 Dec. 1991, 10 pp.; *C.A.,* 121 (1994) 26044j.

55 Hinshaw, J.V.: Very-large-volume injection. *LC-GC Int.,* 7 (1994) 560-563.

56 Mol, J.G.J. and Gerstel, E.: (Method for gas chromatographic separation of substances.) *Ger.* DE 4,316,375 (Cl. G01N30/16), 30 Jun. 1994, Appl. 15 May 1993; 5 pp.; *C.A.,* 121 (1994) 147989e.

57 Mueller, F.: (Apparatus for gas chromatographic separation of components of a mixture.) *Ger. Offen.* DE 4,339,536 (Cl. G01N30/88), 01 Jun. 1994, DE Appl. 9,216,106, 26 Nov. 1992; 8 pp.; *C.A.,* 121 (1994) 147963s.

58 Muto, H.: Setting up of backflush time in gas chromatography. *Jpn. Kokai Tokkyo Koho* JP 06,148,158 [94,148,158] (Cl. G01N30/40), 27 May 1994, Appl. 92/324,717, 11 Nov. 1992; 5 pp.; *C.A.,* 121 (1994) 169342r.

59 Nishikawa, M. and Hayashi, Y.: Gas chromatograph using hydrogen as a carrier gas. *Jpn. Kokai Tokkyo Koho* JP 05,346,424 [93,346,424] (Cl. G01N30/54), 27 Dec. 1993, Appl. 92/178,979, 12 Jun. 1992; 4 pp.; *C.A.,* 121 (1994) 25854m.

60 Oohinata, H., Inoe, N. and Yonei, Y.: An effluent fraction collector for SFC system. *Jpn. Kokai Tokkyo Koho* JP 06,138,111 [94,138,111] (Cl. G01N30/02), 20 May 1994, Appl. 92/287,879, 29 Oct. 1992; 8 pp.; *C.A.,* 121 (1994) 98847w.

61 Penton, Z.: Applications of a GC autosampler modifier for headspace sampling. *J. High Resolut. Chromatogr.,* 17 (1994) 647-650.

62 Pyo, D.: Programmed two-stage flow controller for supercritical fluid chromatography. *Analyst (Cambridge),* 119 (1994) 1315-1318.

63 Rinkema, F.D., Louter, A.J.H. and Brinkman, U.A.T.: Large-volume injections in gas chromatography-atomic emission detection: an approach for trace-level detection in water analysis. *J. Chromatogr. A,* 678 (1994) 289-297.

64 Sacks, R.D. and Akard, M.: Gas chromatography system with column bifurcation and turnable selectivity. *U.S.* US 5,281,256 (Cl. 95-86; B01D15/08), 25 Jan. 1994, US Appl. 590,174, 28 Sep. 1990; 14 pp.; *C.A.,* 120 (1994) 338115f.

65 Tanaka, H., Hasegava, M. and Mitani, M.: (Gas chromatograph and its operation.) *Jpn. Kokai Tokkyo Koho* JP 06 27,096 [94 27,096] (Cl. G01N30/26), 04 Feb. 1994, Appl. 92/200,150, 06 Jul. 1992, 8 pp.; *C.A.,* 121 (1994) 49302f.

66 Tokieda, T., Watanabe, S., Namiki, K. and Tsunogai, S.: (Development of a clean sampler for the determination of chlorofluorocarbons.) *Bunseki Kagaku,* 43 (1994) 827-830.

67 Vejrosta, J., Ansorgová, Planeta, J., Breen, D.G., Bartle, K.D. and Clifford, A.A.: Solute trapping in off-line supercritical fluid extraction using controlled modifier condensation. *J. Chromatogr. A,* 683 (1994) 407-410.

68 Yozawa, S. and Kurita, S.: (Apparatus for injecting samples for gas chromatography.) *Jpn. Kokai Tokkyo Koho* JP 06 94,692 [94 94,692] (Cl. G01N30/18), 08 Apr. 1994, Appl. 92/15,939, 31 Jan. 1992; 3 pp.; *C.A.,* 121 (1994) 26041f.


See also 117, 122, 124, 127, 133, 139, 152, 179, 181, 182, 184, 187, 188, 189, 194, 202, 247, 418, 442.

*3b. Detectors and detection reagents*


69 Abdel-Rehim, M., Zhang, L. and Hassan, M.: Effect of ammonia carrier gas on the response of the flame ionization detector. *J. High Resolut. Chromatogr.,* 17 (1994) 723-726.

70 Barsan, N. and Ionescu, R.: $SnO_2$-Based gas sensors as chromatographic detectors. *Sens. Actuators, B,* 19 (1994) 470-473; *C.A.,* 121 (1994) 124107b.

71 Conte, E.D.: An aerosol alkali flame ionization detector for gas chromatography and high-performance liquid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9326186, 1993, 146 pp.; *C.A.,* 121 (1994) 493369h.

72 Dressler, M. and Cigánek M.: Effect of detector temperature on the flame ionization detector response. *J. Chromatogr. A,* 679 (1994) 299-305.

73 Ducatte, G.R. and Long, G.L.: Effect of carbon dioxide and hydrogen on nonmetal emission intensities in a helium microwave-induced plasma. *Appl. Spectrosc.,* 48 (1994) 493-501; *C.A.,* 121 (1994) 98491a.

74 Fukushima, T. and Tanabe, S.: Operating an electron-capture detector for gas chromatography. *U.S.* US 5,317,159 (Cl. 250-381; G01T1/185), 31 May 1994, JP Appl. 92/46,145, 31 Jan. 1992, 4 pp.; *C.A.,* 121 (1994) 98750j.

75 Hao, C., Shepson, P.B., Drummond, J.W. and Muthuramu, K.: Gas chromatographic detector for selective and sensitive detection of atmospheric organic nitrates. *Anal. Chem.,* 66 (1994) 3737-3743.

76 Koch, M.: On the conversion of mass selective detector from gas chromatography/mass spectrometry application to standalone, on-line, real-time mass spectrometry application. *Rev. Sci. Instrum.,* 65 (1994) 2808-2818.

77 Kumar, U.T.: Element selective detection for liquid and supercritical fluid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9329899, 1993, 122 pp.; *C.A.,* 120 (1994) 338066r.

78 Liu, Z. and Phillips, J.B.: Sensitivity and detection limit enhancement of gas chromatographic detection by thermal modulation. *J. Microcolumn Sep.,* 6 (1994) 229-235; *C.A.,* 121 (1994) 124355f.

79 Madabushi, J.V.: Development and characterization of discharge-induced detectors for gas chromatography analysis. Avail. *Univ. Microfilms Int.,* Order No. DA9324500, 1993, 150 pp.; *C.A.,* 121 (1994) 49370b.

80 Nagata, M., Kamiunten, S., Uchida, T. and Seita, M.: Thermal conductivity detector for a gas chromatograph. *U.S.* US 5,295,389 (Cl. 73-25.03; G01N31/00), 22 Mar. 1994, JP Appl. 91/232,461, 21 Aug. 1991; 8 pp.; *C.A.,* 121 (1994) 26045k.

81 Park, B.E., Kim, H.S., Park, D.S. and Son, M.R.: (Matrix effect on gas chromatographic analysis with flame ionization detector.) *Hwahak Konghak,* 31 (1993) 804-812; *C.A.,* 121 (1994) 25708s.

82 Thurbide, K.B. and Aue, W.A.: Reactive-flow luminiscence detector for gas chromatography. *J. Chromatogr. A,* 684 (1994) 259-268.

83 Wentworth, W.E., Cai, H., Madabushi, J. and Qin, Y.: Pulsed-discharge helium ionization/electron capture/emission detector of chlorinated compounds. *Process Control Qual.,* 5 (1993) 193-204; *C.A.,* 121 (1994) 49367f.

84 Yamada, T.: (Usefulness of gas chromatography with surface-ionization detection in forensic toxicology.) *Hochudoku,* 12 (1994) 108-111; *C.A.,* 121 (1994) 101386c.

See also 156, 173, 254, 292, 715.

*3c. Sorbents and columns, packing procedures*

85 Betts, T.J.: Comparison of two esterified γ-cyclodextrins with some other chirally selective gas chromatographic phases using volatile oil constituents. *J. Chromatogr. A,* 678 (1994) 370-374.

86 Butt, S.B., Riaz, M. and Ehsan-Ul-Haq: Thermally treated charcoal: a substitute to porous polymer packing material for the chromatographic analysis of permanent gases. *J. Chem. Soc. Pak.,* 16 (1994) 12-16; *C.A.,* 121 (1994) 162817r.

87 De Zeeuw, J., Buyten, J., Peene, J. and Mohnke, M.: Metal capillary PLOT columns coated with $Al_2O_3$, molsieve, and porous polymer adsorbents. *LC-GC Int.,* 7 (1994) 644-651.

88 Francotte, E., Grolimund, K. and Juvancz, Z.: Benzoylcellulose derivatives as chiral stationary phases for open tubular column chromatography. *Chirality,* 5 (1993) 232-237; *C.A.,* 121 (1994) 72734g.

89 Fu, R. and Ge, J.: (Application of capillary gas chromatography in industrial analysis ( VI ). Use of crown ether substituted polysiloxane as stationary phase for capillary gas chromatography.) *Beijing Ligong Daxue Xuebao,* 13 (1993) 485-490; *C.A.,* 121 (1994) 98796d.

90 Gavrilova, T.B., Nikitin, Y.S. and Rudnitskaya, T.A.: (Adsorbents based on symm-heptazine.) *Zh. Fiz. Khim.,* 68 (1994) 545-550.

91 Golovnya, R.V., Terenina, M.B. Ruchkina, E.L. and Karnatsevich, V.L.: Fullerene $C_{60}$ as a new stationary phase in capillary gas chromatography. *Mendeleev Commun.,* 6 (1993) 231-233; *C.A.,* 121 (1994) 72735h.

92 Heijmans, H., de Zeeuw, J., Buyten, J., Peene, J. and Mohnke, M.: The use of PLOT columns in gas chromatography. *Am. Lab. (Shelton),* 26 (1994) 28c-28h.

93 Kozlov, S., Trubnikov, V.I., Berezkin, V.G., Storozhuk, I.P., Popova, T.P. and Sunkovich, G.V.: (Stationary phase for gas chromatography.) *U.S.S.R.* SU 1,728,794 (Cl. G01N30/50), 23 Apr. 1992, Appl. 4,747,061, 11 Jul. 1989; *C.A.,* 121 (1994) 124376p.

94 Liu, Y., Miao, L. and Kong, J.: (Performance of modified alumina as chromatographic stationary phase and its efficiency in the separation of gaseous hydrocarbons.) *Shiyou Huagong,* 23 (1994) 396-399; *C.A.,* 121 (1994) 148052f.

95 Liu, Y., Yun, K.S. and Parcher, J.F.: Experimental method to distinguish column dead time from system dead time for the accurate determinaton of gas chromatographic void volumes: simultaneous pre- and postcolumn injection. *J. Chromatogr. A,* 679 (1994) 392-396.

96 Mori, R., Yamaguchi, H., Nakagama, T. and Hobo, T.: (Studies on stationary phase prepared with dimer acid and chiral amino acid for gas chromatography.) *Kuromatogurafi,* 14 (1993) 108-109; *C.A.,* 121 (1994) 25976c.

97 Mukhina, V.P., Levin, Ya.A., Berezkin, V.G. and Korolev, A.A.: (Hydroxyl-containing stationary phases for capillary gas chromatography.) *Zh. Anal. Khim.,* 49 (1994) 607-611.

98 Myano, S., Ooi, S. and Ochiai, Y.: Packing materials for gas chromatographic column for optical resolution. *Jpn. Kokai Tokkyo Koho* JP 05,256,836 [93,265,836] (Cl. G01N30/48), 08 Oct. 1993, Appl. 92/88,114, 12 Mar. 1992, 8 pp.; *C.A.,* 121 (1994) 49451d.

99 Nasuto, R., Rozylo, J.K., Musheghyan, A.V., Kamalyan, O.A. and Grigoryan, G.C.: Silica gel modified by styrene as a packing for gas chromatography. *Chem. Anal. (Warsaw),* 39 (1994) 309-317.

100 Petersson, P., Reese, S.L., Yi, G., Yun, H., Malik, A., Bradshaw, J.S., Rossiter, B.E., Lee, M.L. and Markides, K.E.: Evaluation of β-cyclodextrin-based chiral stationary phases for capillary column supercritical fluid chromatography. *J. Chromatogr. A,* 684 (1994) 297-309.

101 Pirkle, W.H. and Bowen, W.E.: Chiral stationary phase design: A study in optimization. *J. High Resolut. Chromatogr.,* 17 (1994) 629-633.

102 Reese, S.L.: Synthesis of novel stationary phases for use in gas and supercritical fluid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9405104, 1993, 115 pp.; *C.A.,* 121 (1994) 49399t.

103 Salehuddin, S.M. and Khan, A.H.: A comparative study of different stationary phases of gas-liquid chromatography for the determination of some phenolic compounds in tobacco condensate. *J. Bangladesh Acad. Sci.,* 17 (1993) 257-263; *C.A.,* 121 (1994) 51628k.

104 Schmidt, L.W.: Chemically modified polymeric resins for solid-phase extraction and group separation prior to analysis by liquid or gas chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9335017, 1993, 123 pp.; *C.A.,* 121 (1994) 49395p.

105 Shitangkoon, A. and Vigh, G.: Trichloroacetyl pentyl β-cyclodextrin as a chiral stationary phase for gas chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 727-728.

106 Song, X. and Gong, J.: (Studies of high-efficiency SE-54 crosslinked quartz capillary gas chromatographic column. Refit and application on Model 100 GC.) *Xiangtan Daxue Ziran Kexue Xuebao,* 16 (1994) 113-117; *C.A.,* 121 (1994) 148046g.

107 Watanabe, C., Hashimoto, K. and Jinno, K.: (Capillary column in gas chromatography.) *Bunseki,* 6 (1994) 441-449; *C.A.,* 121 (1994) 164443q - a review with 27 refs.

108 Wu, C., Hu, Z., Cheng, J., Lu, X. and Zeng, Z.: (Preparation, characteristics and separation mechanism of thio crown ether stationary phases.) *Gaodeng Xuexiao Huaxue Xuebao,* 15 (1994) 211-215; *C.A.,* 121 (1994) 148030x.

109 Wu, Z.: The development of metal capillary columns and the use of inclusion compounds as stationary phases in gas chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9324508, 1993, 157 pp.; *C.A.,* 121 (1994) 49391j.

110 Xu Hongsheng and Hong Hui: (Development on the gradient coated column in gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 255-258.

111 Yancey, J.A.: Review of liquid phases in gas chromatography, part I: Intermolecular forces. *J. Chromatogr. Sci.,* 32 (1994) 349-357.

112 Yancey, J.A.: Review of liquid phases in gas chromatography. Part II: Application. *J. Chromatogr. Sci.,* 32 (1994) 403-413 - a review with 90 refs.

113 Zeng Zhaorui, Fan Jianhong, Chen Lei, Han Huimin, Wu Caiying, Huang Zaifu and Xu Wei: (Synthesis and preparation of double active functional group crown ether stationary phase for capillary gas chromatography (GC).) *Chin. J. Chromatogr.,* 12 (1994) 227-230.

114 Zhou, W., Fu, R., Dai, R., Huang, Z. and Chen, Y.: Use of a long-spacer-side-chain liquid crystalline polysiloxane containing a crown ether as a stationary phase for capillary gas chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 719-722.

115 Zou, G., Hu, G. and Zheng, Q.: (Synthesis of cellulose tribenzoate as gas chromatographic stationary phase and its characterization.) *Fenxi Huaxue,* 22 (1994) 370-372; *C.A.,* 121 (1994) 49407u.

See also 16, 18, 20, 167, 168, 234, 335, 381.

*3d. Quantitative analysis*

116 Hachenberg, H.: Kalibrierung und Auswertung in der statischen Headspace-GC. *LaborPraxis,* 18, No. 4 (1994) 32-34.

See also 161, 353, 366, 388, 525, 572, 611, 672.

*3e. Preparative scale chromatography*

See 177, 307.

*3f. Programmed temperature, pressure, vapors, gradients*

117 Akard, M. and Sacks, R.: Pressure-turnable selectivity for high-speed gas chromatography. *Anal. Chem.,* 66 (1994) 3036-3041.

118 Al-Bajjari, T.I., Le Vent, S. and Taylor, D.R.: Calculation of programmed temperature gas chromatography characteristics from isothermal data IV. Prediction of peaks widths. *J. Chromatogr. A,* 683 (1994) 367-376.

119 Al-Bajjari, T.I., Le Vent, S. and Taylor, D.R.: Calculation of programmed temperature gas chromatography characteristics from isothermal data V. Prediction of peak asymmetries and resolution characteristics. *J. Chromatogr. A,* 683 (1994) 377-384.

120 Messadi, D., Ferchichi, L., Nouar, L. and Boughaloum, C.: (Comparison of some characteristic temperatures in programmed temperature gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Astron.,* 319, No. 1 (194) 53-56; *C.A.,* 121 (1994) 148054h.

121 Messadi, D., Ferchichi, L., Rebbani, N. and Chaouli, A.: (Simulation of peak widths in programmed temperature gas chromatography.) *C. R. Acad. Sci., Ser. II: Mec., Phys., Chim., Sci. Terre Univers,* 317, No. 10 (1993) 1293-1296; *C.A.,* 121 (1994) 169308j.

122 Rubey, W.A.: An instrumental assembly for studying operational behavior of thermal gradient programmed gas chromatography. *Rev. Sci. Instrum.,* 65 (1994) 2802-2807.

123 Vezzani, S., Moretti P. and Castello, G.: Fast and accurate method for the automatic prediction of programmed-temperature retention times. *J. Chromatogr. A,* 677 (1994) 331-343.

See also 174.

## 4. SPECIAL TECHNIQUES

*4a. Automation*

124 Bowlin, D., Hott, C. and Davis, J.M.: Influence of integrator parameters on estimates calculated with the statistical model of overlap. *J. Chromatogr. A,* 677 (1994) 307-318.

See also 50, 123, 418.

*4b. Computerization and modelling*

125 Arena, J.V., Mazzarella, C.R. and Gluodenis, R.J.: Software-based deconvolution of gas chromatograms: an experiment for the instrumental analysis laboratory. *J. Chem. Educ.,* 71 (1994) 483-486; *C.A.,* 121 (1994) 82034t.

126 Gonzales, C.: Computer system validation: A practical approach to an effective investment. *LC-GC Int.,* 7 (1994) 564-567.

See also 413.

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

127 Abraham, B.M.: Development of an on-site gas chromatography/mass spectrometer for rapid detection of polycyclic aromatic hydrocarbons and polychlorinated biphenyls at hazardous waste sites. Avail. *Univ. Microfilms Int.,* Order No. DA9324143, 1993, 165 pp.; *C.A.,* 121 (1994) 49368g.

128 Albert, K., Braumann, U., Tseng, L.-H., Nicholson, G., Bayer, E., Spraul, M., Hofman, M., Dowle, C. and Chippendale, M.: On-line coupling of supercritical fluid chromatography and proton high-field nuclear magnetic resonance spectroscopy. *Anal. Chem.,* 66 (1994) 3042-3046.

129 Baykut, G. and Franzen, J.: Mobile mass spectrometry: a decade of field applications. *TrAC,* 13 (1994) 267-275 - a review with 45 refs.

130 Brookes, S.T., Craig, K.S. and Cunnane, S.C.: Combined continuous-flow isotope-ratio mass spectrometry techniques for tracing the metabolism of $^{13}C$-labeled fatty acids. *Biochem. Soc. Trans.,* 22, No. 2 (1994) 164S; *C.A.,* 121 (1994) 53335m.

131 Doherty, S.J. and Winniford, W.L.: Rapid on-line analysis using a micromachined gas chromatograph coupled to a bench-top quadrupole mass spectrometer. *LC-GC Int.,* 12 (1994) 846-850.

132 Dworzanski, J.P., Kim M.-G., Snyder, A.P., Arnold, N.S. and Meuzelaar, H.L.C.: Performance advances in ion mobility spectrometry through combination with high speed vapor sampling, preconcentration and separation techniques. *Anal. Chim. Acta,* 293 (1994) 219-235.

133 Evans, E.H., Pretorius, W., Ebdon, L. and Rowland, S.: Low-pressure inductively coupled plasma ion source for molecular and atomic mass spectrometry. *Anal. Chem.,* 66 (1994) 3400-3407.

134 Gurka, D.F., Pyle, S., Titus, R. and Shafter E.: Direct-deposition infrared spectrometry with gas and supercritical fluid chromatography. *Anal. Chem.,* 66 (1994) 2521-2528.

135 Haefner, A.M.: Quantification of unidentified gas chromatographic eluites using infrared spectroscopy. Avail. *Univ. Microfilms Int.,* Order No. DA9402358, 1993, 133 pp.; *C.A.*, 121 (1994) 26025d.

136 Jedrzejewski, P.T. and Taylor, L.T.: Evaluation of the particle beam interface for packed-column supercritical fluid chromatography-mass spectrometry with pure and modified $CO_2$. *J. Chromatogr. A,* 677 (1994) 365-376.

137 Kirschner, C.H.: Supercritical fluid extraction/chromatography and Fourier transform infrared spectrometry:methods optimization and application. Avail. *Univ. Microfilms Int.,* Order No. DA9319777, 1993, 181 pp.; *C.A.*, 121 (1994) 49392k.

138 Krock, K.A. and Wilkins, C.L.: Quantitative aspects of a valve-based, multi-stage multidimensional gas chromatography-infrared spectroscopy-mass spectrometry system. *J. Chromatogr. A,* 678 (1994) 265-277.

139 Ligon, W.V. and Grade, H.: Adjustable open-split interface for a gas chromatograph and mass spectrometer. *U.S.* US 5,281,397 (Cl. 422-89; G01N30/02), 25 Jan. 1994, US Appl. 669,556, 14 Mar. 1991; 16 pp.; *C.A.*, 120 (1994) 338116g.

140 Matney, M.L. and Limero, T.F.: Pyrolysis-gas chromatography/mass spectrometry analyses of biological particulates collected during recent space shuttle missions. *Anal. Chem.,* 66 (1994) 2820-2828.

141 Matsumoto, K.: Simple determination of relative hydrogen atom affinities by supercritical fluid chromatography/atmospheric pressure chemical ionization mass spectrometry. *Org. Mass Spectrom.,* 29 (1994) 266-268; *C.A.*, 121 (1994) 34640r.

142 McClennen, W.H., Arnold, N.S. and Meuzelaar, H.L.C.: Field-portable hyphenated instrumentation: the birth of the tricorder? *TrAC,* 13 (1994) 286-293 - a review with 28 refs.

143 Meier-Augenstein, W., Brand, W. Hoffmann, G.F. and Rating, D.: Bridging the information gap between isotope ratio mass spectrometry and conventional mass spectrometry. *Biol. Mass Spectrom.,* 23, No. 6 (1994) 376-378; *C.A.*, 121 (1994) 30115a.

144 Nimz, E.L.: Capillary gas chromatography/mass spectrometry following analytical transformation of molecules of biological significance. Avail. *Univ. Microfilms Int.,* Order No. DA9400256, 1993, 150 pp.; *C.A.*, 121 (1994) 129292t.

145 Norton, K.L.: Direct deposition gas and supercritical fluid chromatography coupled with Fourier transform infrared spectrophotometry for the analysis of complex mixtures. Avail. *Univ. Microfilms Int.,* Order No. DA9414508, 1993, 182 pp.; *C.A.*, 121 (1994) 148006u.

146 Ombaba, J.M.: Investigation of an alternating current plasma as an element selective atomic emission detector for high-resolution capillary gas chromatography and as a source for atomic absorption and atomic emission spectrometry. Avail. *Univ. Microfilms Int.,* Order No. DA9305335, 1992, 223 pp.; *C.A.*, 121 (1994) 24600p.

147 Ootsuka, K., and Yamashita, Y.: (Analysis of microamount impurities.) *Jpn. Kokai Tokkyo Koho* JP 06 34,616 [94 34,616] (Cl. G01N30/72), 10 Feb. 1994, Appl. 92/185,518, 13 Jul. 1992, 5 pp.; *C.A.*, 121 (1994) 49306k.

148 Ragunathan, N., Sasaki, T.A., Krock, K.A. and Wilkins, C.L.: Multidimensional fast gas chromatography with matrix isolated infrared detection. *Anal. Chem.,* 66 (1994) 3751-3756.

149 Reeves, J.B., III. and Schmidt, W.F.: Solid state $^{13}C$ NMR analysis of forage and byproduct-derived fiber and lignin residues. Resolution of some discrepancies among chemical, infrared, and pyrolysis-gas chromatography-mass spectroscopic analysis. *J. Agric. Food Chem.,* 42 (1994) 1462-1468.

150 Smith, R.: Hyphenation - An overview. *LC-GC Int.,* 7 (1994) 505-516.

151 Toft, J., Kvalheim, O.M., Libnau, F.O. and Nodland, E.: Non-linear curve fitting of bilinear data using orthogonal projections for rank analysis. Applications to gas chromatography/infrared spectrometry and variable temperature infrared studies. *Vib. Spectrosc.,* 7 (1994) 125-137; *C.A.*, 121 (1994) 169276x.

152 Wach, F.: Performance comes in smaller packages. *Anal. Chem.,* 66 (1994) 927-930.

153 Yang, J.: Combined supercritical fluid extraction/supercritical fluid chromatography/Fourier transform infrared spectrometry for the analysis of polar compounds deposites on polymetric matrixes. Avail. *Univ. Microfilms Int.,* Order No. DA9312464, 1992, 368 pp.; *C.A.*, 120 (1994) 338099d.

See also 41, 63, 73, 76, 197, 211, 235, 326, 450, 464, 478, 482, 500, 695, 711, 715.

*4e. Functional analysis*

154 Panangadan, J.A.: Elemental analysis of organic compounds with fluorine combustion and gas chromatography separation. Avail. *Univ. Microfilms Int.,* Order No. DA9413093, 1993, 181 pp.; *C.A.*, 121 (1994) 49441a.

155 Platonov, A.Y., Maiorova, H.D. and Kurzin, A.V.: (Gas chromatography method of methoxyl group determination.) *Khim. Drev.,* 5 (1993) 80-83; *C.A.*, 121 (1994) 136409q.

156 Webster, C. and Cooke, M.: Use of microwave-induced plasma atomic emission detection for the quantification of oxygen containing compounds. *Anal. Proc.,* 31 (1994) 237-240.

See also 134.

*4f. Trace analysis and preseparation techniques*

157 Behzadi, H.: Trace organic analysis using GC/MS. Avail. *Univ. Microfilms Int.,* Order No. DA9221283, 1992, 139 pp.; *C.A.*, 121 (1994) 25958y.

158 Gerhards, P. and Szigan, J.: Probenvorbereitung für Drogenscreening per GC/MS. *LaborPraxis,* 18, No. 10 (1994) 44-50.

159 Hawthorne, S.B., Yang, Y. and Miller, D.J.: Extraction of organic polutants from environmental solids with sub- and supercritical water. *Anal. Chem.,* 66 (1994) 2912-2920.
160 Kaljurand, M. and Smit, H.C.: Comparison of sample concentration methods and correlation chromatography for polymer dynamic head-space studies. *Chromatographia,* 39 (1994) 210-215.
161 Mayer, M.L. and Poole, C.F.: Identification of the procedural steps that affects recovery of semi-volatile compounds by solid-phase extraction using cartridge and particle-loaded membrane (disk) devices. *Anal. Chim. Acta,* 294 (1994) 113-126.
162 Sommerville, B.A., Darling, F.M.C., McCormick, J.P., Waterhouse, J. and Broom, D.M.: A recirculating system for concentrating volatile samples. *Chromatographia,* 39 (1994) 469-474.
163 Starostin, I. and Witkiewicz, Z.: Environmental water samples preparation for chemical analysis. *Chem. Anal. (Warsaw),* 39 (1994) 263-279 - a review with 91 refs.
164 Zhang, M. and Phillips, J.B.: Trace analysis of organics in aqueous samples by concentration in plastic tubing and multiplex gas chromatography. *Chromatographia,* 39 (1994) 294-298.

See also 66, 132, 147, 186, 498, 519, 654, 665.

*4g. Enantiomers, separation*

165 Schleimer, M., Fluck, M. and Schurig, V.: Enantiomer separation by capillary SFC and GC on Chirasil-Nickel: Observation of unusual peak broadening phenomena. *Anal. Chem.,* 66 (1994) 2893-2897.
166 Zeng Su: (Synthesis of chiral derivatization reagent *N*-heptafluorobutyl-*L*-prolyl chloride for gas chromatography (GC) and its characteristic tests.) *Chin. J. Chromatogr.,* 12 (1994) 358-360.
167 Zeng Su, Zhang Li, Shen Xiangzhong and Liu Zhiqiang: (Stereoisomer separations by gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 259-262.
168 Zhou Xing, Wan Hong and Qu Qingyu: (Enantioselectivity and retention mechanisms of enantiomers on modified cyclodextrin derivatives in gas chromatography - A Discussion.) *Chin. J. Chromatogr.,* 12 (1994) 249-253.

See also 85, 88, 96, 98, 100, 101, 105, 214, 244, 270, 274, 275, 279, 318, 345, 367, 375, 379, 407, 443, 444, 514, 571, 579, 582, 586, 592, 612, 640.

*4h. Other special techniques*

169 Charmas, B., Gierak, A. and Leboda, R.: Dynamic techniques used in determination of traces of volatile substances in slightly volatile materials. *Chem. Anal. (Warsaw),* 39 (1994) 1-11.
170 Corkill, J.A. and Raymond, K.W.: Manual head space sampling for gas chromatographic analysis. *J. Chem. Educ.,* 71 (1994) A202-A203.
171 Liu, Z., Sirimanne, S.R., Patterson, D.C.Jr., Needman, L.L. and Phillips, J.B.: Comprehensive two-dimensional gas chromatography for the fast separation and determination of pesticides extracted from human serum. *Anal. Chem.,* 66 (1994) 3086-3092.
172 Yun, X., Kou, D., Tian, Z., Tao, K. and Li, H.: (Theoretical analysis of method for flow perturbation gas chromatography.) *Wuli Huaxue Xuebao,* 10 (1994) 565-569; *C.A.,* 121 (1994) 72760n.

See also 116, 567, 673.

*4i. Supercritical fluid chromatography*

173 Almquist, S.R., Nyholm, L. and Markides, K.E.: Electrochemical detection in open tubular column supercritical fluid chromatography using a platinum microelectrode and $CO_2$/water as mobile phase. *J. Microcolumn Separ.,* 6 (1994) 495-501.
174 Blackwell, J.A. and Schallinger, L.E.: Functional group selectivity using fluoroform as a mobile phase for supercritical fluid chromatography. *J. Microcolumn Separ.,* 6 (1994) 475-482.
175 Bond, P.M.: Supercritical fluid chromatography - finding a place in the chromatographers' arsenal? *Pestic. Sci.,* 41 (1994) 369-374; *C.A.,* 121 (1994) 152387m - a review with 9 refs.
176 Chimowitz, E.H. and Vanpuyvelde, F.: Optimized chromatography system. *U.S.* US 5,305,232 (Cl. 364-498; B01D15/08), 19 Apr. 1994, Appl. 882,321, 13 May 1992; 18 pp.; *C.A.,* 121 (1994) 12420s.
177 Crétier, G., Neffati, J. and Rocca, J.L.: Preparative LC and preparative SFC: Two complementary techniques in the fractionation of an impurity from a major component. *J. Chromatogr, Sci.,* 32 (1994) 449-454.
178 Dean, T.A.Jr.: Supercritical fluid chromatography: Investigations into retention, packed column design and instrumental developments. Avail. *Univ. Microfilms Int.,* Order No. DA9310642, 1992, 194 pp.; *C.A.,* 120 (1994) 338064p.
179 Francis, E.S., Lee, M.L. and Richter, B.E.: Modifier addition in microcolumn supercritical fluid chromatography with a high pressure pulsed valve. *J. Microcolumn Separ.,* 6 (1994) 449-457.
180 Giddings, L.D.: New concepts that may extend the useful range of supercritical fluid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA49411948, 1993, 148 pp.; *C.A.,* 121 (1994) 49195y.
181 Greibrokk, T.: Instrumentation for supercritical fluid chromatography. In: Dean, J.R. (Editor), *Appl. Supercrit. Fluids Ind. Anal.,* Blackie, Glasgow, 1993, pp. 12-45; *C.A.,* 121 (1994) 136750u.
182 Heglund, D.L., Tilotta, D.C., Hawthorne, S.B. and Miller, D.J.: Simple fiber-optic interface for on-line supercritical fluid extraction Fourier transform infrared spectrometry. *Anal. Chem.,* 66 (1994) 3543-3551.
183 Hills, J.W., Hill, H.H., Jr., Hansen, D.R. and Metcalf, S.G.: Carbon dioxide supercritical fluid extraction of incinerator fly ash with a reactive solvent modifier. *J. Chromatogr. A,* 679 (1994) 319-328.
184 Hirata, Y. and Pawliszyn, J.: Solvent-free sample introduction for supercritical fluid chromatography using polymer coated fibers. *J. Microcolumn Separ.,* 6 (1994) 443-447.
185 Köhler, U., Biermanns, P. and Klesper, E.: Influence of linear velocity, column length, and pressure drop in SFC. I. Capacity ratios, selectivities, and theoretical plate heights. *J. Chromatogr, Sci.,* 32 (1994) 461-470.
186 McDowall, R.D.: The universal SPE method. *LC-GC Int.,* 7 (1994) 638-642.

187 Mellor, F., Just, U. and Strumpf, T.: Supercritical fluid extraction using a new restictor design. *J. Chromatogr. A,* 679 (1994) 147-152.

188 Oudsema, J.W.: Innovate instrument design and applications in supercritical fluid chromatography and extraction. Avail. *Univ. Microfilms Int.,* Order No. DA9310700, 1992, 168 pp.; *C.A.,* 120 (1994) 338045h.

189 Page, S.H., Morrison, J.F., Christensen, R.G. and Choquette, S.J.: Instrument for evaluating phase behavior of mixtures for supercritical fluid experiments. *Anal. Chem.,* 66 (1994) 3553-3557.

190 Ray, M.S.: Supercritical extraction: A bibliographic guide (1980-1993). *Sep. Sci. Technol.,* 29 (1994) 2203-2213.

191 Saito, M., Yamauchi, Y. and Okuyama, T.: *Fractionation by Packed-Column SFE and SFC Principles and Applications.* VCH Weinheim, New York, Basel, Cabmridge, Tokyo, 1994, 276 p.

192 Stadler, M.P.: Prediction of carbon dioxide/hydrocarbon phase behavior using supercritical fluid chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9302317, 1992, 211 pp.; *C.A.,* 121 (1994) 19301n.

193 Suarez, J.J., Bueno, J.L. and Medina, I.: Present status of instrumentation and applications for supercritical chromatography. *Quim Anal. (Barcelona),* 12, No. 4 (1994) 192-204; *C.A.,* 121 (1994) 148003r - a review with 180 refs.

194 Vejrosta, J., Mikesova, M., Ansorgova, A., Zatorsky, J., Hajer, M. and Janda, V.: Multichanel restrictor for supercritical fluid chromatography. *J. Microcolumn Sep.,* 6 (1994) 23-25.

195 Walker, D.F.G., Bartle, K.D. and Clifford, A.A.: Determination of the oil content of rapeseed by supercritical fluid extraction. *Analyst (Cambridge),* 119 (1994) 1471-1474.

196 Westwood, S.A. (Editor): *Supercritical Fluid Extraction and Its Use in Chromatographic Sample Preparation.* Blackie, Glasgow, 1993, 186 p.

See also 60, 62, 73, 77, 100, 102, 128, 134, 136, 137, 141, 145, 150, 153, 304, 306, 313, 372, 376, 389, 410, 471, 476, 482, 489, 491, 492, 495, 521, 524, 535, 556, 559, 560, 581, 582, 592, 602, 625, 626, 681.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

### *5a. Aliphatic hydrocarbons*

197 Baylis, S.A., Hall, K. and Jumeau, E.J.: The analysis of the $C_1$-$C_5$ components of natural gas samples using gas chromatography-combustion-isotope ratio mass spectrometry. *Org. Geochem.,* 21 (1994) 777-785; *C.A.,* 121 (1994) 160439v.

198 Guilbaud, R., Ricard, A.C., Daniel, C., Boileau, S., Huu, V.T. and Chevalier, G.: A method to evaluate lipid peroxidation by an automated analysis of exhaled pentane in human and rat breath. *Toxicol. Methods,* 4 (1994) 1-11; *C.A.,* 120 (1994) 318481u.

199 Hou, X.: (Analysis of the gas in transformer oil by gas chromatography.) *Fenxi Shiyanshi,* 13 (1994) 79-82; *C.A.,* 121 (1994) 87137p.

200 Naeemi, E.D. and Al-Kandari, S.: An improved method for determination of light hydrocarbons in stabilized crude oil. *Chromatographia,* 39 (1994) 363-365.

201 Peters, A.J.: Instrumentation and strategies for the analysis of light hydrocarbons using high-speed gas chromatography. Avail. *Univ. Microfilms Int.,* Order No. DA9308419, 1992, 197 pp.; *C.A.,* 120 (1994) 338061k.

202 Sakamoto, S. and Ooya, T.: (Method and apparatus for separation of low-boiling-point hydrocarbons.) *Jpn. Kokai Tokkyo Koho* JP 06,148,166 [94,148,166] (Cl. G01N30/88), 27 May 1994, Appl. 92/316,660, 31 Oct. 1992; 4 pp.; *C.A.,* 121 (1994) 124368s.

203 Schreiber, G.A., Schulzki, G., Spiegelberg, A., Helle, N. and Bögl, K.W.: Evaluation of a gas chromatographic method to identify irradiated chicken, pork, and beef by detection of volatile hydrocarbons. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1202-1217.

204 Springfield, J.R. and Levitt, M.D.: Pitfalls in the use of breath pentane measurements to assess lipid peroxidation. *J. Lipid Res.,* 35 (1994) 1497-1504; *C.A.,* 121 (1994) 129071v.

205 Stronguiló, M.L., Vaquero, M.T., Comellas, L. and Broto-Puig, F.: The fate of petroleum aliphatic hydrocarbons in sewage sludge-amened soils. *Chemosphere,* 29 (1994) 273-282.

206 Yang Yuguo: (Determination of olefins and paraffins in products of Olex unit by capillary gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 375.

207 Zhu Junzhang and Wang Peirong: (The identification of $nC_4$-$nC_{14}$ fraction in crude oil and its preliminary geological applications.) *Chin. J. Chromatogr.,* 12 (1994) 336-341.

See also 16, 92.

### *5b. Cyclic hydrocarbons, fullerenes*

208 Bayer, C.W.: Advances in trapping procedures for organic indoor pollutants. *J. Chromatogr. Sci.,* 32 (1994) 312-316.

209 Bemgaard, A., Lundmark, B.O. and Colmsjoe, A.: Gas chromatographic analysis of PAHs with molecular weights exceeding 300 dalton. *Polycydic Aromat. Compd.,* 3 (1993) 603-610; *C.A.,* 120 (1994) 329947b.

210 Johnston, J.J., Wong, J.P., Feldman, S.E. and Ilnicki, L.P.: Purge and trap/gas chromatography/mass spectrometry method for determining smoke contamination of foods and packaging materials. *J. Agric. Food Chem.,* 42 (1994) 1954-1958.

211 Jones, A.D., Dunlap, M.R. and Gospe, S.M.Jr.: Stable-isotope dilution GC-MS for determination of toluene in sub-milliliter volumes of whole blood. *J. Anal. Toxicol.,* 18 (1994) 251-254; *C.A.,* 121 (1994) 150653w.

212 Jüttner, F.: Emission of aromatic hydrocarbons and aldehydes into the water by a four-strike outboard motor: Quantitative measurements. *Chemosphere,* 29 (1994) 191-200.

213 Kadowaki, S., Naito, H. and Mizoguchi, K.: (Gas chromatography/mass spectrometric analysis of polycyclic aromatic hydrocarbons in environmental samples (1): applicaton to airborne dust samples.) *Aichi-ken Kogai Chosa Senta Shoho,* 21 (1993) 7-14; *C.A.,* 121 (1994) 116338n.

214 Koenig, W.A., Gehrcke, B., Hochmuth, D.H., Mlynek, C. and Hopf, H.: Resolution of chiral [2,2]paracyclophanes by enantioselective gas chromatography. *Tetrahedron: Asymmetry,* 5 (1994) 347-350; *C.A.,* 121 (1994) 133659k.

215 Lien, W.F.J.C.: Gas chromatography techniques for studying polycyclic aromatic hydrocarbons in aqueous solution and organic volatiles in emissions from incineration of CFC-11 containing polyurethane foam. Avail. *Univ. Microfilms Int.,* Order No. DA9405122, 1993, 167 pp.; *C.A.,* 121 (1994) 49400m.

216 MacGillivray, B., Pawliszyn, J., Fowlie, P. and Sagara, C.: Headspace solid-phase microextraction *versus* purge and trap for the determination of substituted benzene compounds in water. *J. Chromatogr. Sci.,* 32 (1994) 317-322.

217 Ong, C.-N. and Lee, B.-L.: Determination of benzene and its metabolites: Application in biological monitoring of environmental and occupational exposure to benzene. *J. Chromatogr. B,* 660 (1994) 1-22 - a review with 89 refs.

218 Robert, E., Beboulene, J.-J., Codet, G. and Enache, D.: High-performance liquid chromatography coupled off-line with capillary gas chromatography. Application to the determination of the aromatics content in middle distillates. *J. Chromatogr. A,* 683 (1994) 215-222.

219 Saiz-Jimenez, C.: Production of alkylbenzenes and alkylnaphtalenes upon pyrolysis of unsaturated fatty acids. *Naturwissenschaften,* 81 (1994) 451-453.

220 Steele, D.H., Thornburg, M.J., Stanley, J.S., Miller, R.R., Brooke, R., Cushman, J.R. and Cruzan, G.: Determination of styrene in selected foods. *J. Agric. Food Chem.,* 42 (1994) 1661-1665; *C.A.,* 121 (1994) 106788v.

221 Van de Wiel, H.J., Bloemen, H.J.T. and Bos, H.P.: Determination of the long-term averaged concentration of volatile aromatic hydrocarbons in indoor air by charcoal adsorption, solvent extraction and gas chromatography. *IARC Sci. Publ.,* 109 (1993) 221-227; *C.A.,* 121 (1994) 41559z.

222 Wu Caiying, Zhu Tianqin, Cai Lingshuang and Zhou Xichun: (Retention mechanism of aromatic compounds on benzo-crown ether polysiloxane stationary phases.) *Chin. J. Chromatogr.,* 12 (1994) 320-323.

223 Yamada, S., Kuroki, H., Maeda, M., Takagi, M. and Yamashita, T.: Characterization of pyrene photoproducts in chloroform by gas chromatography and gas chromatography-mass spectrometry. *Microchem. J.,* 49 (1994) 117-125; *C.A.,* 120 (1994) 322567u.

224 Zhao, G., Li, Z., Liu, L. and Zhu, S.: (Control analysis in styrene production by 530-μm fused-silica capillary gas chromatography.) *Shiyou Huagong,* 22 (1993) 187-190; *C.A.,* 121 (1994) 84016n.

See also 26, 127, 141, 159, 225, 226, 233, 235, 311, 658.

*5c. Halogen derivatives*

225 Andronikashili, T., Eprikashvili, L., Pirtskalava, N. and Witkiewicz, Z.: Chromatographic separation of isomers of monofluorotoluene, monochlorotoluene and xylene. *Chem. Anal. (Warsaw),* 39 (1994) 509-513.

226 Barnabas, I.J., Dean, J.R. and Owen, S.R.: Supercritical fluid extraction of analytes from environmental samples. *Analyst (Cambridge),* 111 (1994) 2381-2394.

227 Bøwadt, S., Skejø-Andresen, H., Montanarella, L. and Larsen, B.: HRGC separations of 160 chlorobiphenyls in technical mixtures on four polar narrow-bore columns. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 87-107.

228 Bruner, F., Crescentini, G., Maione, M. and Mangani, F.: Chlorofluorocarbons measurement in the lower atmosphere of the Antarctica. *Intern. J. Environ. Anal. Chem.,* 55 (1994) 311-318.

229 Bruno, T.J. and Caciari, M.: Retention of halocarbons on a hexafluoropropylene epoxidemodified graphitized carbon black II. Ethane-based compounds. *J. Chromatogr. A,* 679 (1994) 123-132.

230 Bush, B., Dzurica, S., Wood, L. and Madrigal, E.C.: Sampling the Hudson River estuary for PCBs using multiplate artificial substrate samplers and congeren-specific gas chromatography in 1991. *Environ. Toxicol. Chem.,* 13, No. 8 (1994) 1259-1272; *C.A.,* 121 (1994) 141020k.

231 Desideri, P.G., Lepri, L., Checchini, L. and Santianni, D.: Organic compounds in surface and deep antarctic snow. *Intern. J. Environ. Anal. Chem.,* 55 (1994) 33-46.

232 Fingler, S., Tkalcevic, Fröbe, Z. and Drevenkar, V.: Analysis of polychlorinates biphenyls, organochlorine pesticides and chlorophenols in rain and snow. *Analyst (Cambridge),* 119 (1994) 1135-1140.

233 Ishizuka, S. and Hayakari, S.: Measurement of chemical substances in water and sediments by gas chromatography/mass spectrometry. *Aomori-ken Kankyo Hoken Senta Kenkyu Hokoku,* 4 (1994) 38-46; *C.A.,* 121 (1994) 42174g.

234 Järnberg, U., Asplund, L. and Jakobsson, E.: Gas chromatographic retention behaviour of polychlorinated naphtalenes on non-polar, polarizable, polar and smectic capillary columns. *J. Chromatogr. A,* 683 (1994) 385-396.

235 Kondoh, H., Okuyama, H. and Murata, K.: (Analysis for 23 volatile organic compounds by purge and trap capillary gas chromatography-mass spectrometry (GC/MS).) *Hokkaido Kankyo Kagaku Kenkyu Senta Shoho,* 20 (1993) 41-53; *C.A.,* 121 (1994) 49422v.

236 Konyukhova, S.V., Maksimov, B.N. and Zenkevich, I.G.: (Identification of fluorine-containing compounds by gas chromatographic retention indexes.) *Zh. Prikl. Khim. (S.-Peterburg),* 67 (1994) 135-137; *C.A.,* 121 (1994) 124348f.

237 Konyukhova, S.V., Zenkevich, I.G. and Maksimov, B.N.: (Formation of full data bases of gas-chromatographic retention indexes for halogen derivatives of the simplest hydrocarbons on standart sorbents.) *Zh. Anal. Khim.,* 49 (1994) 402-409; *C.A.,* 120 (1994) 338077v.

238 Kristiansen, N.K., Frøshaug, M., Aune, K.T. and Becher, G.: Identification of halogenated compounds in chlorinated seawater and drinking water produced offshore using *n*-pentane extraction and open-loop stripping technique. *Environ. Sci. Technol.,* 28 (1994) 1669-1673.

239 Kuznetsova, L.V. and Nogina, S.P.: (Gas chromatographic determination of 1,3-chlorobromopropane in air of populated areas.) *Gig. Sanit.,* 1 (1994) 40; *C.A.,* 121 (1994) 16606e.

240 Luotamo, M.: (Detection of exposure to polychlorinated biphenyls.) *Kem.-Kemi.,* 20 (1993) 616-618; *C.A.,* 121 (1994) 28674p.

241 Marquis, P.J., Hanson, R.L., Larsen, M.L., DeVita, W.M. Butterworth, B.C. and Kuehl, D.W.: Analytical methods for a national study of chemical residues in fish II: Pesticides and polychlorinated biphenyls. *Chemosphere,* 29 (1994) 508-521.

242 Patil, S.F. and Lonkar, S.T.: Evaluation of Tenax TA for the determination of chlorobenzene and chloronitrobenzenes in air using capillary gas chromatography and thermal desorption. *J. Chromatogr. A,* 684 (1994) 133-142.

243 Pauné, F., Rivera, J., Espadaler, I. and Caixach, J.: Determination of polychlorinated biphenyls in sewage sludges from Catalonia (N.E. Spain) by high-resolution gas chromatography with electrone-capture detection. *J. Chromatogr. A,* 684 (1994) 289-296.

244 Reinhardt, R., Engewald, W., Goj, O. and Haufe, G.: Enantiomer separation of side-chain fluorinated alkylbenzenes by capillary gas chromatography on cyclodextrin phases. *Chromatographia,* 39 (1994) 192-199.

245 Sacks, R. and Akard, M.: High-speed GC analysis of VOCs: Turnable selectivity and column selection. *Environ. Sci. Technol.,* 28 (1994) 428-433.

246 Schreitmüller, J., Vigneron, M., Bacher, R. and Ballschmiter, K.: Pattern analysis of polychlorinated biphenyls (PCB) in marine air of the Atlantic Ocean. *Intern. J. Environ. Anal. Chem.,* 57 (1994) 33-52.

247 Sippola, E., Himberg, K., David, F. and Sandra, P.: Real-time controlled multidimensional gas chromatography with electronic pressure control: application to chlorobiphenyl analysis. *J. Chromatogr. A,* 683 (1994) 45-50.

248 Tamilarasan, R., Morabito, P.L., Lamparski, L., Hazelwood, P. and Butt, A.: Determination of neutral chlorinated extractable organic compounds in water samples using large volume on-column injection capillary gas chromatography-mass spectrometry. *J. High Resolut. Chromatogr.,* 17 (1994) 689-694.

249 Zjawiony, I.: Chromatographic and polarographic determination of vinyl chloride evolved during the ageing process of polyvinyl chloride and its products. *Chem. Anal. (Warsaw),* 39 (1994) 645-649.

250 Zoccolillo, L. and Rellori, M.: Halocarbons in antarctic surface waters. *Intern. J. Environ. Anal. Chem.,* 55 (1994) 27-32.

251 Zupancic-Kralj, L., Marsel, J., Kralj, B. and □igon, D.: Application of tandem mass spectrometry to the analysis of chlorinated compounds. *Analyst (Cambridge),* 119 (1994) 1129-1134.

See also 19, 35, 41, 66, 83, 127, 208, 509, 512, 519, 521, 543, 655, 658, 668, 672, 687.

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

252 Ali, M.A. and Kosat, N.: Application of multicolumn valve switching gas chromatography for the analysis of naphta and kerosine fractions of Saudi Arabian light crude oil. *Fuel Sci. Technol. Int.,* 12 (1994) 567-580; *C.A.,* 120 (1994) 327111a.

253 Bartulewicz, J., Bartulewicz, E., Gawlowski, J. and Niedzielski, J.: Simple and rapid method for determination of petroleum products in water. *Chem. Anal. (Warsaw),* 39 (1994) 167-177.

254 Cao, X.-L., Hewitt, C.N. and Waterhouse, K.S.: Determination of reactive hydrocarbons by capillary gas chromatography with the reduction gas detector. *J. Chromatogr. A,* 679 (1994) 115-121.

255 Carlson, D.A., Milstrey, S.K. and Narang, S.K.: Classifications of tsetse flies *Glossina* spp. (Diptera: Glossinidae) by gas chromatographic analysis of cuticular components. *Bull. Entomol. Res.,* 83 (1993) 507-515; *C.A.,* 121 (1994) 78837q.

256 Ciccioli, P., Cecinato, A., Brancaleoni, E., Montagnoli, M. and Allegrini, I.: Chemical composition of particulate organic matter (POM) collected at Terra Nova bay in Antarctica. *Intern. J. Environ. Anal. Chem.,* 55 (1994) 47-59.

257 Furton, K.G., Huang, C.-W., Jaffé, R. and Sicre, M.A.: High temperature supercritical fluid extraction of hydrocarbons from geological samples and comparison to soxhlet extraction. *J. High Resolut. Chromatogr.,* 17 (1994) 679-681.

258 Garg, A.K. and Philp, R.P.: Pyrolysis-gas chromatography of asphaltenes/kerogens from source rocks of the Gandhar Field, Cambay Basin, India. *Org. Geochem.,* 21 (1994) 383-392; *C.A.,* 121 (1994) 87051f.

259 Jayatilaka, A. and Poole, C.F.: Identification of petroleum distillates from fire debris using multidimensional gas chromatography. *Chromatographia,* 39 (1994) 200-209.

260 Ken-ichi, A. and Kazuhiko, S.: (Analytical method of hydrocarbon composition in automotive exhaust gas by multi dimension GC with large volume gas loop.) *Bunseki Kagaku,* 17 (1994) 789.

261 Milligan, P.J.M., Phillips, A., Broomfield, G., Molyneux, D.H., Toure, Y. and Coluzzi, M.: A study of the use of gas chromatography of cuticular hydrocarbons for identifying of the *Anopheles gambiae* (Diptera: Culicidae) complex. *Bull Entomol. Res.,* 83 (1993) 613-624; *C.A.,* 121 (1994) 78838r.

262 Pakdel, H. and Roy, C.: Simultaneous gas chromatographic-Fourier transform infrared spectroscopic-mass spectrometric analysis of synthetic fuel derived from used tire vacuum pyrolysis oil, naphta fraction. *J. Chromatogr. A,* 683 (1994) 203-214.

263 Roques, D.E., Overton, E.B. and Henry, C.B.: Using gas chromatography/mass spectrometry fingerprint analyses to document process and progress of oil degradation. *J. Environ. Qual.,* 23 (1994) 851-855; *C.A.,* 121 (1994) 91102r.

264 Wang, Z., Fingas, M. and Li, K.: Fractionation of a light crude oil and identification and quantitation of aliphatic, aromatic, and biomarker compounds by GC-FID and GC-MS, Part I. *J. Chromatogr. Sci.,* 32 (1994) 361-366.

265 Wang, Z., Fingas, M. and Li, K.: Fractionation of a light crude oil and identification and quantitation of aliphatic, aromatic, and biomarker compounds by GC-FID and GC-MS, Part II. *J. Chromatogr. Sci.,* 32 (1994) 367-382.

266 Wineman, P.L. and Kote, R.O.: Target-compound method for the analysis of accelerant residues in fire debris. *Anal. Chim. Acta,* 288 (1994) 97-110.

267 Yokoyama, S., Mishima, H., Satou, M. and Sunada, Y.: Structural changes of oils estimated by GC-MS analyses method during upgrading of SRC-II coal liquid. *Sekiyu Gakkaishi,* 37 (1994) 419-427; *C.A.,* 121 (1994) 87331x.

268 Zhu, Z., Li, C., Wang, P. and Zhu, M.: (GC-MS analysis of saturated hydrocarbons and light aromatics in vacuum gas oil and its hydrogenated product.) *Huadong Huagong Xueyuan Xuebao,* 19 (1993) 746-753; *C.A.,* 121 (1994) 38858r.

See also 15, 34, 674.

6. ALCOHOLS

269 Ferrala, N.F., Burhan, I.G. and Nomeir, A.A.: Determination of 1-methoxy-2-propanol and its metabolite 1,2-propanediol in rat and mouse plasma by gas chromatography. *J. Chromatogr. B,* 660 (1994) 291-296.

270 Gamoh, K., Ketuly, K.A., Cole, W.J., Brooks, C.J.W. and Anderson, R.A.: Chromatographic and mass-spectrometric studies of cyclic 2-(N,N,-dimethylaminoethyl)ferroceneboronates and related esters. *Anal. Sci.,* 10 (1994) 705-711.

271 Huang, Z., Nie, H. and Pen, S.: (Determination of propanol-1 in industrial propanol and study of its impurities.) *Huaxue Shijie,* 34 (1993) 173-175; *C.A.,* 120 (1994) 338101y.

272 Jin, N., Zhao, R., Dai, J. and Chen, J.: (Simultaneous analysis of ethanol and acetate in blood by headspace gas chromatography.) *Nanjing Yixueyuan Xuebao,* 14 (1994) 146-148; *C.A.,* 121 (1994) 30160m.

273 Kirsch, N.H. and Stan, H.-J.: Gas chromatographic-mass spectrometric determination of chlorinated *cis*-1,2-dihydroxycyclohexadienes and chlorocatechols as their boronates. *J. Chromatogr. A,* 684 (1994) 277-287.

274 Koenig, W.A., Gehrcke, B. and Weseloh, G.: Determination of the absolute configuration of secondary alcohols with Horeau's method including enantioselective gas chromatography. *Chirality,* 6 (1994) 141-147; *C.A.,* 121 (1994) 82189x.

275 Küsters, E. and Portmann, A.: Enantiometric separation of amino alcohols by gas chromatography on a chiral stationary phase; influence of the perfluoroacylating reagent on the separation. *J. High Resolut. Chromatogr.,* 17 (1994) 639-642.

276 Linkiewicz, M. and Poskrobko, H.: Determination of impurities in 2-(2-ethoxyethoxy)ethanol by gas chromatography. *Chem. Anal. (Warsaw),* 39 (1994) 93-96; *C.A.,* 121 (1994) 72773u.

277 Minero, C., Vincenti, M. and Pelizzetti, E.: Determination of ethylene glycol in aqueous matrix by direct derivatization with hexyl chloroformate. *Ann. Chim. (Rome),* 83 (1993) 511-521; *C.A.,* 120 (1993) 338095z.

278 Pounder, D.J. and Kuroda, N.: Vitreous alcohol is of limited value in predicting blood alcohol. *Forensic. Sci. Int.,* 62, No. 5 (1994) 73-80; *C.A.,* 121 (1994) 75490k.

279 Powers, L., Ciraolo, S.T., Agarwal, K.C., Kumar, A., Bomont, C., Soloviev, M.V., David, F., Desrochers, S. and Brunengraber, H.: Assay of the enantiomers of 1,2-propanediol, l,3-butanediol, 1,3,-pentanediol and the corresponding hydroxyacids by gas chromatography-mass spectrometry. *Anal. Biochem.,* 221 (1994) 323-328.

280 Shen, Y., Cao, G., Sun, J. and Cheng, G.: (Gas chromatographic analysis of major alcohol and ester constituents in Baijiu.) *Niangjiu,* 2 (1994) 32-40; *C.A.,* 121 (1994) 81239b.

281 Xu, L.: (GC determination of ethanol in doxycycline hydrochloride.) *Yaowu Fenxi Zazhi,* 14 (1994) 35-36; *C.A.,* 121 (1994) 91998n.

282 Yablochkin, V.D.: (Determination of ethenol in urine by vapor-phase gas chromatography.) *Gig. Sanit.,* 5 (1993) 68-70; *C.A.,* 120 (1994) 317418s.

283 Zhou, Z., Zheng, E. and Feng, D.: (Determination of trace amount of organic solvent in water by freezing-preconcentration gas chromatography.) *Nanjing Huagong Xueyuan Xuebao,* 16, No.1 (1994) 67-71; *C.A.,* 121 (1994) 163548r.

See also 32, 40, 43, 115, 364, 381, 460, 675.

## 7. PHENOLS

284 Casabianca, H., Seiller, I. and Bigois, M.: (Use of supercritical fluid extraction (SFE) and gas chromatography with an atomic-emission detector (GC-AED) for determination of substitued phenolic compounds.) *Spectra Anal.,* 22 (1993) 31-35; *C.A.,* 121 (1994) 148049k.

285 Casais, C., Lorenzo, R.A., Rubi, E. and Cela, R.: Headspace gas-chromatography method for the rapid determination of phenol and cresols in soils. *Quim. Anal. (Barcelona),* 12 (1993) 173-176; *C.A.,* 121 (1994) 156426w.

286 Chopra, S.K., Kapoor, V.B., Vishnoi, S.C. and Bhagat, S.D.: Analysis of phenolic-type antioxidants. Capillary gas chromatography. *Erdoel Kohle, Erdgas, Petrochem.,* 47 (1994) 230-233; *C.A.,* 121 (1994) 112971r.

287 Cuartero, M., Gahery, R., van Doorn, M., L'her, E. and Declercq, B.: (Determination of pentachlorophenol in leather by liquid chromatography with electrochemical detection and by gas chromatography-mass spectrometry.) *Ann. Falsif. Expert. Chim. Toxicol.,* 86 (1993) 379-386; *C.A.,* 121 (1994) 2688w.

288 Cui, D., Chen, Y., Lu, J., Chen, W. and Wang, B.: (Gas chromatographic determination of *p*-chlorophenol in air.) *Zhonghua Yufang Yixue Zazhi,* 27 (1993) 360-362; *C.A.,* 121 (1994) 41599n.

289 Geissler, A. and Schoeler, H.F.: Gas-chromatographic determination of phenol, methylphenols, chlorophenols, nitrophenols and nitroquinones in water at 0.1 μg $L^{-1}$. *Water Res.,* 28 (1994) 2047-2053; *C.A.,* 121 (1994) 141126z.

290 Kurata, Y.: (Determination of phenols in water by direct acylation.) *Kankyo Kagaku,* 4, No. 1 (1994) 55-64; *C.A.,* 121 (1994) 163528j.

291 Lugowska, E.: Direct determination of hydroxybenzole acids by gas chromatography. *Chem. Anal. (Warsaw),* 39 (1994) 281-287.

292 Turnes, M.I., Rodriguez, I., Mejuto, M.C. and Cela, R.: Determination of chlorophenols in drinking water samples at the sub-nanogram per millilitre level by gas chromatography with atomic emission detection. *J. Chromatogr. A,* 683 (1994) 21-29.

293 Vilaplana, J., López, J. and Jiménez A.: Combined solvent extraction-mass spectrometry determination of free phenol traces in poly(vinyl chloride) products. *J. Chromatogr. A,* 679 (1994) 133-138.

See also 103, 232, 273, 364.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

### *8a. Flavonoids*

294 Yan, Y., Tan, H.S.I. and Guinchard, C.: (Determination of psoralens by gas chromatography.) *Ann Pharm. Fr.,* 52, No. 3 (1994) 160-167; *C.A.,* 121 (1994) 65715y.

*8b. Aflatoxins and other mycotoxins*

295 Pestka, J.J., Azcona-Olivera, J., Plattner, R.D., Minervini, F., Doko, M.B. and Visconti, A.: Comparative assessment of fumonisin in grain-based foods by ELISA, GC-MS, and HPLC. *J. Food Prot.*, 57 (1994) 169-172; *C.A.*, 120 (1994) 321629d.

296 Terai, T., Uda, T., Katakawa, J. and Tetsumi, T.: (Asssay of grayanotoxins by gas chromatography.) *Nippon Nogei Kagaku Kaishi*, 68 (1994) 979-981; *C.A.*, 121 (1994) 33452u.

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

297 Bonifazi, P., Mastrogiacomo, A.R., Pierini, E. and Bruner, F.: Solid phase extraction of polychlorodibenzodioxins and polychlorodibenzofurans dissolves in particle-free water containing humic substances. *Intern. J. Environ. Anal. Chem.*, 57 (1994) 21-31.

298 Chatkittikunwong, W. and Creaser, C.S.: Bromo-, bromochloro- and chloro-dibenzo-*p*-dioxins and dibenzofurans in incinerator fly ash. *Chemosphere*, 29 (1994) 559-566.

299 Espadaler, I., Sistach, M.C., Caixach, J., Cortina, M. and Rivera J.: (Application of mass spectrometry to the determination of gallic acid and sugars for characterization of ferrogallic inks (14th, 16th, 17th and 18th centuries). *Quim. Anal. (Barcelona)*, 13, No. 2 (1994) 59-62; *C.A.*, 121 (1994) 156624j.

300 Franzén, R. and Kronberg, L.: Determination of chlorinated 5-methyl-5-hydroxyfuranones in drinking water, in chlorinated humic water, and in pulp bleaching liquor. *Environ. Sci. Technol.*, 28 (1994) 2222-2227.

301 Luijk, R., Dorland, K., Smit, P. and Govers, H.A.J.: Prediction of the gas chromatographic retention behavior of polybrominated dibenzo-*p*-dioxins: Preliminary results. *Polycyclic Aromat. Compd.*, 3 (1994) 565-572; *C.A.*, 121 (1994) 116778f.

302 Marquis, P.J., Hackett, M., Holland, L.G., Larsen, M.L., Butterworth, B. and Kuehl, D.W.: Analytical methods for a national study of chemical residues in fish I: Polychlorinated dibenzo-*p*-dioxins/dibenzofurans. *Chemosphere*, 29 (1994) 495-508.

303 Matsueda, T., Takata, S., Nakamura, M., Kurokawa, Y., Hisadomi, K. and Fukamachi, K.: (Determination of nereistoxin and thiocyclam in environmental samples by gas chromatography/mass spectrometry.) *Kankyo Kagaku*, 4, No. 1 (1994) 19-27; *C.A.*, 121 (1994) 141071c.

304 Miao, Z., Zhang, Z. and Pawliszyn, J.: Supercritical fluid extraction and clean-up with temperature fractionation: Application to determination of polychlorinated dibenzo-*p*-dioxins. *J. Microcolumn Separ.*, 6 (1994) 459-465.

305 Novikova, M.B.: (Determination of polychlorinated dibenzodioxins and dibenzofurans. Environmental Protection Agency (EPA) methodology.) *Zh. Ekol. Khim.*, 3 (1993) 213-218; *C.A.*, 121 (1994) 169311e.

306 Walther, W. and Netscher, T.: Open-tubular column supercritical fluid chromatography: Analysis of thermolabile intermediates useful in natural product synthesis. *J. Chromatogr. Sci.*, 32 (1994) 418-425.

307 Zhou Yingcai, Wang Xiuying and Xu Peishu: (Preparative gas chromatography of ipomeamarone.) *Chin. J. Chromatogr.*, 12 (1994) 367-368.

See also 251.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

308 Boneva, S. and Toromanova-Petrova, P.: Capillary gas chromatography of $C_1$-$C_4$ alkyl *tert.*-butyl ethers. *Chromatographia*, 39 (1994) 224-227.

309 Chen, C.Y., Liao, C.N. and Tsai, K.H.: (Determination of oxygenates containing TAME in gasolines.) *Shiyou Jikan*, 29, No. 4 (1993) 37-52; *C.A.*, 120 (1994) 327077u.

310 Chernyshina, M.A. and Lar'kina M.V.: (Analysis of epichlorhydrin in biologic media by vapor-phase gas chromatography.) *Gig. Sanit.*, 2 (1993) 74-75; *C.A.*, 121 (1994) 2684s.

311 Chou, J. and Lu, Y.: (Study on GC analysis of phenyl etherbiphenyl mixture in air.) *Gongye Weisheng Yu Zhiyebing*, 16 (1993) 176-178; *C.A.*, 121 (1994) 162814n.

312 Felby, S. and Nielsen, E.: Determination of ketone bodies in *postmortem* blood by head-space gas chromatography. *Forensic Sci. Int.*, 64 (1994) 83-88; *C.A.*, 121 (1994) 28718f.

313 Hanson, M., Kabbara, J. and Junghans, K.: Packed column supercritical fluid chromatography with FID: Investigation of products from copper-catalyzed conjugate additions of trimethylaluminium to $\alpha,\beta$-unsaturated aldehydes. *Chromatographia*, 39 (1994) 299-305.

314 Katsuoka, M.: (Studies on determination of residual ethylene oxide in medical goods.) *Gijutsu Joho - Shiuzoka-ken Eisei Kankyo Senta*, 12, No. 1 (1994) 4-7; *C.A.*, 121 (1994) 42693a.

315 Mahungu, S.M., Hansen S.W., Steven, L. and Artz, W.E.: Quantitation of volatile compounds in heated triolein by static headspace capillary gas chromatography/infrared spectroscopy-mass spectroscopy. *J. Am. Oil Chem. Soc.*, 71 (1994) 453-455; *C.A.*, 120 (1994) 321744n.

316 Namiki, A., Hasegawa, T. and Furukawa, O.: (Studies on the analytical method of aliphatic aldehydes ($C_1$-$C_4$) in ambient air by the gas chromatography.) *Nippon Kankyo Eisei Senta Shoho*, 20 (1993) 25-34; *C.A.*, 121 (1994) 140373r.

317 Poskrobko, J., Linkiewicz, M. and Jaworski, M.: Analysis of high-boiling ethoxylates of methyl, ethyl, and butyl alcohols with the use of gas chromatography. *Chem. Anal. (Warsaw)*, 39 (1994) 153-159.

318 Shi, B., Keogh, R.A. and Davis, B.H.: Gas chromatographic separation of deuterated and optical isomers of di-2-butyl ethers. *J. Chromatogr. A*, 678 (1994) 97-102.

319 Teng, Y.: (Determination of acrolein and acrylonitrile in water with purge trap-head space gas chromatography method.) *Huanjing Wuran Yu Fangzhi*, 15, No. 4 (1993) 40-43; *C.A.*, 121 (1994) 141082g.

320 Zenkevich, I.G., Acevedo, J., Aguilera, I. and Giron, V.: (New data on retentoin indexes of aryl diketones, benzoins, furoins, $\alpha$-amino ketones, anils, and hydrazones.) *Rev. Cubana Quim.*, 6, No. 2 (1992) 77-88; *C.A.*, 120 (1994) 338049n.

321 Zhang, M., Danjou, J. and Rauzy, S.: (Quantification of vanilin formed from lignosulfonate degradation by gas chromatography with FID detection.) *Analusis*, 22 (1994) 287-289; *C.A.*, 121 (1994) 159585h.

See also 15, 40, 197, 212, 283, 649.

## 10. CARBOHYDRATES

### *10a. Mono and oligosaccharides. Structural studies*

322 Beynon, L.M. and Richards, J.C.: Determination of the absolute-configuration of the glycerol component in poly(glycosyl-glycerolphosphates) by GLC-MS. *Carbohydr. Res.,* 252 (1994) 263-268; *C.A.,* 121 (1994) 109492e.

323 Chang, L. and Yu, Z.: Microdetermination of monosaccharide in glycoconjugate by capillary gas chromatography with electron capture detector. *Fenxi Ceshi Xuebao,* 12, No. 3 (1993) 53-56; *C.A.,* 120 (1994) 318488b.

324 De Koning, A.J.: Determination of myo-inositol and phytic acid by gas chromatography using scyllitol as internal standard. *Analyst (Cambridge),* 119 (1994) 1319-1323.

325 Englyst, H.N., Quigley, M.E. and Hudson, G.J.: Determination of dietary fibre non-starch polysacharides with gas-liquid chromatographic, high-performance liquid chromatographic or spectrometric measurement of constituent sugars. *Analyst (Cambridge),* 119 (1994) 1497-1509.

326 Higgins, M.K., Bly, R.S. and Morgan, S.L.: Differentiation of isomeric alditol hexaacetates and identification of aldohexoses by electron impact mass spectrometry. *Anal. Chem.,* 66 (1994) 2656-2668.

327 Hionidou, T.E.: Carbohydrate identification in mollusk insoluble organic matrix by GC/MS. Avail. *Univ. Microfilms Int.,* Order No. DA9403228, 1993, 298 pp.; *C.A.,* 121 (1994) 129288w.

328 Leskovsek, H., Perko, S., □igon, D. and Faganeli, J.: Analysis of carbohydrates in marine particulates by gas chromatography and tandem mass spectrometry. *Analyst (Cambridge),* 119 (1994) 1125-1128.

329 Relva, A.M., Chaves Das Neves, H.J. and Ferreira, M.A.: (Lactulose and mannitol determination in urine using gas phase chromatography.) *Rev. Port. Farm.,* 43, No. 4 (1993) 37-41; *C.A.,* 121 (1994) 129038q.

330 Shetty, H.U. and Holloway, H.W.: Assay of myo-inositol in cerebrospinal fluid and plasma by chemical ionization mass spectromatry of the hexaacetate derivative. *Biol. Mass. Spectrom.,* 23, No. 7 (1994) 440-444; *C.A.,* 121 (1994) 103563g.

See also 299, 332.

### *10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides*

See 369.

### *10c. Glycoproteins and their constituents*

331 Karlsson, H., Karlsson, N. and Hansson, G.C.: High-temperature gas chromatography and gas chromatography-mass spectrometry of glycoprotein and glycosphingolipid oligosaccharides. *Mol. Biotechnol.,* 1 (1994) 165-180; *C.A.,* 121 (1994) 152695k.

332 Merkle, R.K. and Poppe, I.: Carbohydrate composition analysis of glycoconjugates by gas-liquid chromatography/mass spectrometry. *Methods Enzymol.,* 230 (1994) 1-15; *C.A.,* 121 (1994) 53411h.

See also 322, 323.

## 11. ORGANIC ACIDS AND LIPIDS

### *11a. Organic acids and simple esters*

333 Amelio, M., Amelotti, G., Cozzoli, O., Faraone, A., Mariani, C., Mattei, A., Marzo, S., Morchio, G., Serani, A. and Spinetti, M.: (Gas chromatographic determination of the trans unsaturated fatty acids in non-hydrigenated oils. Results of a collaborative study.) *Riv. Ital. Sostanze Grasse,* 70 (1993) 561-566; *C.A.,* 121 (1994) 156000c.

334 Battistutta, F., Buiatti, S., Zenarola C. and Zironi, R.: Rapid analysis of free medium-chain fatty acids and related ethyl esters in beer using SPE and HRGC. *J. High Resolut. Chromatogr.,* 17 (1994) 662-664.

335 Baykut, S. and Ornektekin, S.: A new method developed for the use of glass beads as supporting material in GLC. II. Separation of fatty acid methyl esters on this new supporting material. *Chim. Acta Turc.,* 21 (1993) 85-93; *C.A.,* 121 (1994) 159672j.

336 Bondia, E.M., Castellote, A.I., Lopez, M.C. and Rivero, M.: Determination of plasma fatty acid composition in neonates by gas chromatography. *J. Chromatogr. B,* 658 (1994) 369-374.

337 Bordier, C.G., Sellier, N., Foucault, A.P. and Le Goffic, F.: Characterization and purification of fatty acid methyl esters from the liver oil of the deep sea shark (*Centrophorus squamosus*) by gas chromatography-mass spectrometry and countercurrent chromatography. *Chromatographia,* 39 (1994) 329-338.

338 Chen, L. and Li, Q.: (Analysis of methyl methacrylate and impurities by capillary gas chromatography.) *Zhejiang Gongxueyuan Xuebao,* 1 (1993) 80-84; *C.A.,* 121 (1994) 110254k.

339 Chen, X., Wang, R., Gu, Y., Shen, G. and Tong, D.: Gas chromatography of whole-cell fatty acid in the discrimination of Lactobacilli and Leuconostocs. *Wuxi Qinggongye Xueyuan Xuebao,* 12 (1993) 14-22; *C.A.,* 121 (1994) 30457p.

340 Cocito, C. and Delfini, C.: Simultaneous determination by GC of free and combined fatty acids and sterols in grape musts and yeasts as silanized compounds. *Food Chem.,* 50 (1994) 297-305; *C.A.,* 121 (1994) 33478g.

341 Djarbusynov, B.U., Merkusheva, N.V. and Shalenkov, B.U.: (Chromatographic measurements of the Krebs' cycle carboxylic acids in ejaculate.) *Klin. Lab. Diagn.,* 6 (1993) 11-13; *C.A.,* 121 (1994) 129033j.

342 El-Shabiny, L.M. and Mcdonough, P.: Analysis of fatty acids of mycoplasma cell. *Vet. Med. J. Giza,* 41, No. 3 (1993) 5-7; *C.A.,* 121 (1994) 30135g.

343 Endres, G., Ebel, S. and Haller, B.: (Microdetermination of methacrylic acid esters by GC/MS.) *Arch. Pharm. (Weinheim),* 8 (1994) 503-507; *C.A.,* 121 (1994) 141903a.

344 Fujimori, M., Kajino, K., Kawamura, Y., Ito, Y. and Horitsu, H.: Simultaneous assay of eight preservations in imported fruit vinegars by solid-phase extraction gas-liquid chromatorgaphy. *Nippon Nogei Kagaku Kaishi,* 68 (1994) 967-972; *C.A.,* 121 (1994) 33451t.

345 Gangoiti, J.A., Alcaraz, C., Bernabé, M., Sanz, J. Jiménez, M.I. and Martínez-Castro, I.: GC separation of the enantiomers of 1-amino-1-cyclopropanecarboxylic acids as their alkyl (*N*-alkoxycarbonyl) derivates. *J. High Resolut. Chromatogr.,* 17 (1994) 619-620.

346 Guillaume, Y. and Guinchard, C.: Effect of ester molecular structure and column temperature on the retention of eight esters in gas chromatography. *Chromatographia,* 39 (1994) 438-442.

347 Haase-Aschoff, I., Haase-Aschoff, K. and Patz, C.-D.: Improved separation of γ- and δ-lactones on a popular phase. *J. High Resolut. Chromatogr.,* 17 (1994) 613-615.

348 Hall, L.: Quantitative determination of pivalic acid in dipivefrin containing ophthalmic solutions by gas chromatography. *J. Chromatogr. A,* 679 (1994) 397-401.

349 Han, L.M.T. and Szajer, G.: Analysis of epoxidized soybean oil by gas chromatography. *J. Am. Chem. Soc.,* 71 (1994) 660-670; *C.A.,* 121 (1994) 38021n.

350 Husain, S., Sarma, P.N. and Sajjad, S.M.: Separation and quantitative determination of reaction mixtures of dimethyl malonate by gas liquid chromatography. *Indian J. Technol.,* 31, No. 7 (1993) 542-544; *C.A.,* 121 (1994) 159683p.

351 Ishimata, Y., Mano, N., Oda, Y., Hiyoshi, H., Ikuta, H. and Yoshida, Y.: Simple and sensitive quantitation method for mevalonic acid in plasma using gas chromatography/mass spectrometry. *Rapid Commun. Mass Spectrom.* 8 (1994) 377-380; *C.A.,* 121 (1994) 30467s.

352 Ito, N., Kawasaki, T., Takanashi, T., Mizoguchi, K., Ito, M. and Hayakawa, K.: (Analysis of lower fatty acids in air by gas chromatography using thermal desorption method.) *Aichi-ken Kogai Chosa Senta Shoho,* 21 (1993) 15-19; *C.A.,* 121 (1994) 116339p.

353 Jacobsen, S.S., Becker, C.C. and Holmer, G.: A more accurate gas chromatographic method for the analysis of butter fatty acids by estimation of relative response factors. *Chemom. Intell. Lad. Syst.,* 23 (1994) 231-234; *C.A.,* 121 (1994) 7595y.

354 Kasukabe, H., Kawamura, K. and Barrie, L.A.: (Determination of water soluble compounds in Arctic aerosols by capillary GC and GC/MS.) *Bunseki Kagaku,* 43 (1994) 837-843.

355 Lambertini, P. and Della Casa, G.: Determination of free fatty acid contents and composition of pork fat. *Riv. Ital. Sostanze Grasse,* 71, No.1 (1994) 25-29; *C.A.,* 121 (1994) 81217t.

356 Lamberto, M. and Ackman, R.G.: Confirmation by gas chromatography/mass spectrometry of two unusual trans-3-monoethylenic fatty acids from the Nova Scotian seaweeds *Palmaria palmata* and *Chondrus crispus. Lipids,* 29 (1994) 441-444.

357 Lanchote, V.L., Cardozo dos Santos, A., Queiroz, R.H.C., Tozzato, E. and Carvalho, D.: An improved method for the simultaneous determination of mandelic and phenylglyoxic acids by gas chromatography. *J. Anal. Toxicol.,* 18 (1994) 143-146; *C.A.,* 121 (1994) 2717e.

358 Lin, L., Gao, W. and Huang, Y.: (Determination of fatty acids in oil and soap by GC and data process for making soap formulation.) *Riyong Huaxue Gongye,* 3 (1993) 147-150; *C.A.,* 120 (1994) 326187t.

359 Lindh, C.H. and Jönsson, B.A.G.: Method for analysis of methyltetrahydrophtalic acid in urine using gas chromatography and selected ion monitoring. *J. Chromatogr. B,* 660 (1994) 57-66.

360 Liu, J., Cheng, L., Zhou, F. and Yu, Y.: (Studies on the fatty acids of five midges with gas chromatography.) *Kunchong Xuebao,* 37 (1994) 78-83; *C.A.,* 121 (1994) 54231m.

361 Ma, Q., Chang, Z. and Zhang, Z.: (Determination of oxalic acid in Chinese herbal drugs by derivatization-gas chromatography.) *Taiyuan Gongye Daxue Xuebao,* 25 (1994) 108-112; *C.A.,* 121 (1994) 141819c.

362 Major, C. and Wolf, B.A.: Quantitation of the fatty acid composition of phosphatidic acid by capillary gas chromatography electron-capture detection with picomole sensitivity. *J. Chromatogr. B,* 658 (1994) 233-240.

363 Metges, C.C., Kempe, K. and Wolfram, G.: Enrichment of selected serum fatty acids after a small oral dosage of (1-$^{13}$C)- and (8-$^{13}$C)triolein in human volunteers analyzed by gas chromatography/combustion isotope ratio mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 295-301; *C.A.,* 121 (1994) 4474x.

364 Minero, C., Vincenti, M., Lago, S. and Pelizzetti, E.: Determination of trace amounts of higly hydrophilic compounds in water by direct derivation and gas chromatography-mas spectrometry. *Fresenius J. Anal. Chem,* 350 (1994) 403-409.

365 Mohyuddin, G.: The supercritical fluid extraction and chromatographic analysis of fatty acids in blue cheese. Avail. *Univ. Microfilms Int.,* Order No. DA9411720, 1993, 115 pp.; *C.A.,* 121 (1994) 81472x.

366 Nogueira, J.M.F. and Pereira, J.L.C.: Comparison of quantitative methods for analysis of resinic acids in crude Tall-Oil. *Fresenius J. Anal. Chem.,* 350 (1994) 379-383.

367 Przyborski, H., Wacha, C. and Bandion, F.: (Determination of D(+)-malic acid in wine.) *Mitt. Klosterneuburg,* 43 (1993) 215-218; *C.A.,* 121 (1994) 33406g.

368 Sanchez-Muniz, F.J., Cuesta, C. and Garrido-Polonio, M.C.: Evaluation of a sunflower oil used for frying by different analytical indexes and column and gas chromatography. *Z. Ernaehrungs Wiss.,* 33, No. 1 (1994) 16-23; *C.A.,* 121 (1994) 132507x.

369 Sanders, P. and Brunt, K.: Improved method for the determination of the total adipyl content in acetylated adipyl crosslinked starches. *Starch/Staerke,* 46 (1994) 255-259; *C.A.,* 121 (1994) 106800t.

370 Sera, R.K., McBride, J.H., Higgins, S.A. and Rodgerson, D.O.: Evaluation of reference ranges for fatty acids in serum. *J. Clin. Lab. Anal.,* 8 (1994) 81-85; *C.A.,* 120 (1994) 318505e.

371 Shao, X. and Zhang, Y.: Determination of (E)-10-hydroxy-2-decylenic acid in therapeutic royal jelly by GC and HPLC. *Zhongcaoyao,* 25, No. 4 (1994) 192-208; *C.A.,* 121 (1994) 117865u.

372 Shen, Y., Wang, Q., Zhu, D. and Zhou, L.: Retention behavior of carboxylic acid methyl esters in supercritical fluid chromatography. *Chin. J. Chem.,* 12 (1994) 129-137; *C.A.,* 120 (1994) 331891x.

373 Stan'kov, I.A., Beresnev, A.N. and Lanin, S.N.: (Gas chromatographic determination of organic acids in a medium of oleum of sulfuric acid.) *Zh. Anal. Khim.,* 49 (1994) 437-440.

374 Sun Dingyi, Cheng Chaoren, Wang Honglei and Li Kaisheng: (Study on the chemical constituents of the solid blocks formed in the production of $CCl_4$ by gas chromatography-mass spectrometry (GC-MS).) *Chin. J. Chromatogr.,* 12 (1994) 263-264.

375 Tambe, A.S., Biswas, S.S. and Zubaidha, P.K.: Gas chromatographic analysis of diastereomers and enantiomers of β,γ-unsaturated esters and various analogues of butenolides including mint and isomint lactone and comparison with the high-performance liquid chromatographic analysis of their diastereomers. *J. Chromatogr. A,* 683 (1994) 397-401.

376 Tanaka, I., Kadota, Y., Ohtsu, Y. and Yamaguchi, M.: (Purification of docosahexaenoic acid using silver-loaded spherical ceramics by supercritical fluid chromatography.) *Kuromatogurafi,* 14, No. 5 (1993) 48-49; *C.A.*, 121 (1994) 33651h.

377 Tomita, Y. and Yamanaka, S.: Determination of fatty acid composition in rat plasma by a new microanalytical method. *Bull. Tokyo Dent. Coll.,* 35 (1994) 1-7; *C.A.*, 121 (1994) 152445d.

378 Ulberth, F.: Detection of milk fat adulteration by linear discriminant analysis of fatty acid data. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1326-1334.

379 Wang Xiuhong, Jia Chongrong and Ou Qingyu: (The direct enantiomeric separation of optically active γ-lactones in foods by multidimensional gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 313-316.

380 Xu Zichao, Li Xiaoye, Jiang Jinxia and Yin Xun: (Determination of the concentration of free fatty acids in the plasma of patients with malignant hematopoietic diseases by gas chromatography.) *Chin. J. Chromatogr.,* 12 (1994) 268-269.

381 Xu, L.: (Series organic support GC column in determination of ethyl acetate and fusel oil in alcoholic beverages.) *Zhonghua Yufang Yixue Zazhi,* 27 (1993) 238-240; *C.A.*, 121 (1994) 7546h.

382 Zhang, S. and Chang, L.: (Determination of fatty acids in various phospholipids from erythrocyte membrane.) *Fenxi Huaxue,* 22 (1994) 346-350; *C.A.*, 121 (1994) 30147n.

383 Zhang, S. and Chang, L.: (Determination of very long chain fatty acids in plasma by capillary gas chromatography.) *Gaodeng Xuexiao Huaxue Xuebao,* 15 (1994) 364-366; *C.A.*, 121 (1994) 30161n.

384 Zheng, L., Wang, L, and Jiang, K.: Determination of eicosapentaenoic acid and docosahexenoic acid in fish oil by gas chromatography-Fourier transform infrared spectrometry. *Fenxi Huaxue,* 22, No. 4 (1994) 383-385; *C.A.*, 121 (1994) 117859v.

See also 130, 272, 291, 299, 385.

*11c. Lipids and their constituents*

385 Cardenas, M.S., Ballersteros, E., Callego, M. and Valcarcel, M.: Sequential determination of triglycerides and free fatty acids in biological fluids by use of a continuous pretreatment module coupled to a gas chromatograph. *Anal. Biochem.,* 222 (1994) 332-341.

386 Elenkov, I.J., Ivanova, A.P., Stefanov, K.L., Seizova, K.A. and Popov, S.S.: A quantitative determination of lipid classes in higher plants and algae by gas-chromatographic procedure. *Bulg. Chem. Commun.,* 26 (1993) 98-103; *C.A.*, 121 (1994) 152438d.

387 Huijberts, G.N.M., van der Wal, H., Wilkinson, C. and Eggink, G.: Gas-chromatographic analysis of poly(3-hydroxyalkanoates) in bacteria. *Biotechnol. Tech.,* 8 (1994) 187-192; *C.A.*, 121 (1994) 30132d.

388 Molkentin, J. and Precht, D.: Comparison of packed and capillary columns for quantitative gas chromatography of triglycerides in milk fat. *Chromatographia,* 39 (1994) 265-270.

389 Staby, A., Borch-Jensen, C., Balchen, S. and Mollerup, J.: Supercritical fluid chromatographic analysis of fish oil. *J. Am. Oil Chem. Soc.,* 71 (1994) 355-359; *C.A.*, 120 (1994) 321615w.

390 Takahashi, K. and Hirano, T.: Theoretical aspects of the chromatographic behavior of *cis-trans* isomers and omega isomers of lipids in polar stationary phase gas liquid chromatography and in reverse phase high performance liquid chromatography. *Hokkaido Daigaku Suisangakubu Kenkyu Iho,* 44 (1993) 209-219; *C.A.*, 120 (1994) 318479z.

See also 195, 644.

*11d. Lipoproteins and their constituents*

391 Kheifets, G.M., Alekseeva, E.M. and Vendik, O.O.: (Gas chromatographic microdetermination of blood plasma glycerophosphatides without their preseparation from a lipid extract.) *Zh. Anal. Khim.,* 49 (1994) 530-537.

See also 362, 382.

12. ORGANIC PEROXIDES

See 428.

13. STEROIDS

*13b. Pregnane and androstane derivatives*

392 Debruyckere, G., de Sagher, R., van Peteghem, C., van Vyncht, G., Maghuin-Rogister, G. and de Pauw, E.: Gas chromatographic-mass spectrometric confirmation of a clostebol metabolite in urine. *Anal. Chim. Acta,* 291 (1994) 155-160.

393 Gachancard-Bouya, J.-L. J. and Begue, R.-J.: Urinary steroids from a newborn human infant. Identification of 2α-hydroxy-4-pregnene-3,20-dione, 3β,15β-dihydroxy-5-pregnen-20-one and 3β,15α-dihydroxy-5-pregnen-20-one. *J. Steroid Biochem. Mol. Biol.,* 49 (1994) 213-226; *C.A.*, 121 (1994) 100005r.

394 Rossi, S.-A., Johnson, J.V. and Yost, R.A.: Short-column gas chromatography/tandem mass spectrometry for the detection of underivatized anabolic steroids in urine. *Biol. Mass Spectrom.,* 23, No. 3 (1994) 131-139; *C.A.*, 121 (1994) 28709d.

395 Van Vyncht, G., Gaspar, P., DePauw, E. and Maghuin-Rogister, G.: Multi-residue screening and confirmatory analysis of anabolic steroids in urine by gas chromatography coupled with tandem mass spectrometry. *J. Chromatogr. A,* 683 (1994) 67-74.

396 Varelis. P., Smythe, G.A., Hodgson, D. and Lazarus, L.: Measurement of urinary free cortisol by stable isotope dilution mass spectrometry using a new cortisol derivative. *J. Chromatogr. B,* 660 (1994) 151-157.

397 Zhou, J. and Wang, Y.: (Determination of non-derivative androgen by capillary gas chromatography.) *Hebei Daxue Xuebao, Ziran Kexueban,* 14, No. 2 (1994) 83-86; *C.A.*, 121 (1994) 125427t.

See also 270.

*13c. Estrogens*

398 Sepkovic, D.W., Bradlow, H.L., Michnowicz, J., Murtezani, S., Levy, I. and Osborne, M.P.: Catechol estrogen production in rat microsomes after treatment with indole-3-carbinol, ascorbigen, or β-naphthoflavone: a comparison of stable isotope dilution gas chromatography-mass spectrometry and radiometric methods. *Steroids,* 59 (1994) 318-323; *C.A.,* 121 (1994) 26429p.

*13d. Sterols*

399 Bortolomeazzi, R., Pizzale, L., Conte, L.S. and Lercker, G.: Identification of thermal oxidation products of cholesteryl acetate. *J. Chromatogr. A,* 683 (1994) 75-85.

400 Maurice, D.V., Lightsey, S.F., Hsu, K.T., Gaylord, T.G. and Reddy, R.V.: Cholesterol in eggs from different species of poultry determined by capillary GLC. *Food Chem.,* 50 (1994) 367-372; *C.A.,* 121 (1994) 106799z.

401 Molnar, J., Piretti, M.V. and Molnar, P.: (Investigation of the sterol fraction of olive oil by gas chromatography-mas spectrometry.) *Elelmiszervizsgalati Kozl.,* 40 (1994) 9-16; *C.A.,* 121 (1994) 7756b.

402 Movsumov, I.S., Aliev, A.M., Belov, B.I. and Belov, A.B.: (Gas-chromatographic determination of tocopherols in olive oil.) *Farmatsiya (Moscow),* 42, No. 1 (1993) 52-54; *C.A.,* 121 (1994) 156187u.

403 Nota, G., Naviglio, D., Romano, R., Sacchi, R., Spagna Musso, S. and Improta, C.: (Gas chromatographic evaluation of β-sitosterol, stigmasterol and trienanthin as denaturants of anhydrous butters.) *Riv. Ital. Sostanze Grasse,* 70 (1993) 605-608; *C.A.,* 121 (1994) 81207g.

404 Plank, C. and Lorbeer, E.: On-line liquid chromatography-gas chromatography for the analysis of free and esterified sterols in vegetable oil methyl esters used as diesel fuel substitutes. *J. Chromatogr. A,* 683 (1994) 95-104.

See also 340, 637.

*13e. Bile acids and alcohols*

405 Scalia, S., Cova, U., Fogagnolo, M., Landi, S. and Medici, A.: Determination of free bile acids in raw materials and bulk products by HPLC and GC. *Anal. Lett.,* 27 (1994) 1789-1804.

## 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

*15a. Terpenes*

406 Combariza, M.Y., Tirado, C.B., Stashenko, E. and Shibamoto, T.: Limonene concentration in lemon (*Citrus volkameriana*) peel oil as a function of ripeness. *J. High Resolut. Chromatogr.,* 17 (1994) 643-646.

407 Ravid, U., Putievski, E. and Katzir, I.: Chiral GC analysis of menthone and isomenthone with high enantiomeric purities in laboratory-made and commercial essential oils. *Flavour Fragrance J.,* 9 (1994) 139-142; *C.A.,* 121 (1994) 141180n.

408 Steinbrecher, R., Eichstädter, G., Schürmann, E., Torres, L., Clement, B., Simon, V., Kotzias, D., Daiber, R. and van Eijk, J.: Monoterpenes in air samples: European intercomprison experiments. *Intern. Environ. Anal. Chem.,* 54 (1994) 283-297.

409 Wang, Q., Yang, X. and Chen, J.: (Identification and analysis of borneol.) *Zhongcaoyao,* 25 (1994) 241-244; *C.A.,* 121 (1994) 141821x.

See also 85, 148.

*15b. Essential oils*

410 Adasoglu, N., Dinèer, S. and Bolat, E.: Supercritical-fluid extraction of essential oil from Turkish lavender flowers. *J. Supercrit. Fluids,* 7 (1994) 93-99.

411 Brunke, E.-J., Hammerschmidt, F.-J. and Schmaus, G.: Headspace analysis of hyacinth flowers. *Flavour Fragrance J.,* 9, No. 2 (1994) 59-69; *C.A.,* 121 (1994) 117287g.

412 Buchbauer, G., Jirovetz, L., Wasicky, M. and Nikiforov, A.: Volatile constituents of *Exacum affine* Balf. flowers obtained by dynamic headspace sampling and as the essential oil. *Flavour Fragrance J.,* 9, No. 2 (1994) 55-58; *C.A.,* 121 (1994) 117286f.

413 Chang, L., Qiu, J., Luo, G., Sheng, L. and An, D.: (Database management system (DBMS) of essential oil and essence by capillary column gas chromatography.) *Jisuanji Yu Yingyong Huaxue,* 10 (1993) 313-314; *C.A.,* 121 (1994) 34384k.

414 El-Sherei, M.M.: GC-MS analysis of the essential oil of *Cosmos bipinnatus* Cav. growing in Egypt. *Zagazig J. Pharm. Sci.,* 1 (1992) 120-127; *C.A.,* 120 (1994) 330783b.

415 Jin, Z., Qu, Y. and Lin, Y.: (Gas chromatographic retention index of volatile component of nutgrass rhizome (*Cyperus rotundus*).) *Zhongcaoyao,* 25 (1994) 12-16; *C.A.,* 120 (1994) 319450v.

416 Kamel, A. and Sandra, P.: Gas chromatography-mass spectrometry analysis of the volatile oils of two *Teucrium polium* varieties. *Biochem. Syst. Ecol.,* 22, No. 5 (1994) 529-532; *C.A.,* 121 (1994) 163670z.

417 Liu, Y. and Tan, H.: (GC-MS analysis of essential oils from roots and vines of *Aristolochia* and their allied drugs.) *Zhongguo Zhongyao Zazhi,* 19, No. 1 (1994) 34-36; *C.A.,* 121 (1994) 65658g.

418 Mondello, L., Bartle, K.D., Dugo, P. and Gans, P.: Automated LC-GC: a powerful method for essential oils analysis. Part IV. Coupled LC-GC-MS (ITD) for bergamot oil analysis. *J. Microcolumn Sep.,* 6 (1994) 237-244.

419 Ochocka, R.J., Asztemborska, M., Kowalczyk, J. and Lamparczyk, H.: Gas chromatographic evaluation of essential oils supported by principal component analysis. *Pharmazie,* 49 (1994) 287-288; *C.A.,* 121 (1994) 42388e.

420 Taylor, S.L., King, J.W. and Snyder, J.M.: Tandem supercritical fluid extraction/chromatographic studies of the desert botanical species, *Dalea spinosa. J. Microcolumn Separ.,* 6 (1994) 467-473.

421 Tazerouti, F., Badjah-Hadj-Ahmed, A.Y., Meklati, B.Y., Favre-Bonvin, J. and Bobenrieth, M.J.: (Analysis of essential oils from the leaves of *Pinus halepensis* by GC-MS.) *Plant. Med. Phytother.,* 26, No. 3 (1993) 161-176; *C.A.,* 121 (1994) 42373w.

422 Wang, X., Liao, G. and Hou, S.: Determination of the contents of bufadienolide and borneol in Liushenwan. *Zhongguo Zhongyao Zazhi,* 19, No. 1 (1994) 25-27; *C.A.,* 121 (1994) 331245q.

423 Wang, Y. and Wang, H.: Analysis of chemical constituents of essential oil from Dachengqi decoction. *Zhongguo Zhongyao Zazhi,* 19 (1994) 93-95; *C.A.,* 121 (1994) 18164h.

424 Wei, Y., An, Z., Zhang, Z. and Liu, Y.: Analysis of constituents of volatile oil of Chinese silvery ginseng by gas chromatography-mass spectrometry. *Fenxi Huaxue,* 22 (1994) 308-310; *C.A.,* 121 (1994) 17801b.

425 Zhang, J., Lu, D., Lin, Z. and Chen, C.: (Analysis of Xinjiang cumin oil by gas chromatography combined with infrared and mass spectrometry.) *Shanghai Keji Daxue Xuebao,* 16 (1993) 177-181; *C.A.,* 120 (1994) 321700v.

426 Zhang, L., Rashid, A., Zhang, Z. and An, D.: (Gas chromatographic determination of menthol and borneol in Zhenjiang plaster.) *Zhongguo Yaoke Daxue Xuebao,* 25, No.1 (1994) 24-25; *C.A.,* 120 (1994) 331238q.

427 Zou, D., Su, X. and Wu, A.: (Gas chromatographic determination of eugenol in *Ocimum gratissimum* cream.) *Zhongguo Yiyuan Yaoxue Zazhi,* 14 (1994) 19-20; *C.A.,* 120 (1994) 331227k.

See also 406, 633, 648.

## 16. NITRO AND NITROSO COMPOUNDS

428 Blanchard, P.: Development of a gas chromatograph for trace level measurement of peroxyacetyl nitrate (PAN) using chemical amplification. Avail *NLC,* Order No. DANN84189, 1993, 158 pp.; *C.A.,* 121 (1994) 116329k.

429 De Kock, A.C. and Anderson, C.R.: The measurement of $C_3$-$C_5$ alkyl nitrates at a coastal sampling site in the southern hemisphere. *Chemosphere,* 29 (1994) 299-310.

430 Fine, D.H., Rounbehler, D.P. and Goff, U.: Determination of airborne nitrosamines by means of air-sampling cartridges and GC-TEA. *Sci. Publ.,* 109 (1993) 269-274; *C.A.,* 120 (1994) 329955c.

431 Horng, J.-Y. and Huang, S.-D.: Determination of the semi-volatile compounds nitrobenzene, isophorone, 2,4-dinitrotoluene and 2,6-dinitrotoluene in water using solid-phase microextraction with a polydimethylsiloxanecoated fibre. *J. Chromatogr. A,* 678 (1994) 313-318.

432 Luxenhofer, O. and Ballschmiter, K.: $C_4$-$C_{14}$-Alkyl nitrates as organic trace compounds in air. *Fresenius J. Anal. Chem,* 350 (1994) 395-402.

433 Luxenhofer, O., Schneider, R. and Ballschmiter, K.: Separation, detection and occurrence of ($C_2$-$C_8$)-alkyl- and phenyl-alkyl nitrates as trace compounds in clean and polluted air. *Fresenius J. Anal. Chem,* 350 (1994) 384-394.

434 Ma Mingsheng and Xu Xiaobai: (The retention characteristics of heptafluorobutyric anhydride derivatives of the reduced products from nitro-polycyclic aromatic hydrocarbons.) *Chin. J. Chromatogr.,* 12 (1994) 238-240.

435 Sen, N.P., Baddoo, P.A., Weber, D. and Boyle, M.: A sensitive and specific method for determination of *N*-nitrosodimethylamine in drinking water and fruit drinks. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 149-163.

436 Sommer, C.: (Gas chromatographic determination of nitro musk compounds in cosmetics and detergents.) *Dtsch. Lebensm.-Rundsch.,* 89 (1994) 108-111; *C.A.,* 121 (1994) 42368y.

See also 242, 693.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

### *17a. Amines and polyamines*

437 Bryant, M.S., Skipper, P.L., Wishnok, J.S., Stillwell, W.G., Glogowski, J.A. and Tannenbaum, S.R.: Determination of hemoglobin adducts of aromatic amines by gas chromatography-mass spectrometry. *IARC Sci. Publ.,* 109 (1993) 281-292; *C.A.,* 121 (1994) 2701v.

See also 438, 710.

### *17b. Catecholamines and their metabolites*

438 Baker, G.L., Coutts, R.T. and Holt, A.: Derivatization with acetic anhydride: applications to the analysis of biogenic amines and psychiatric drugs by gas chromatography and mass spectrometry. *J. Pharmacol. Toxicol. Methods,* 31 (1994) 141-148; *C.A.,* 121 (1994) 148130e - a review with 70 refs.

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

439 Hu, H., Wang, Y. and Chen, B.: (Test method for triethylamine content in atmosphere.) *Shanghai Huagong,* 19, No. 2 (1994) 11-14; *C.A.,* 121 (1994) 140361k.

440 Jing, S., Yu, Z. and Zhou, H.: Determination of tetramine in *postmortem* specimens by GC-NDP. *J. Anal. Toxicol.,* 18 (1994) 275-277; *C.A.,* 121 (1994) 150679j.

441 Suzuki, S., Amemiya, T., Itoh, K. and Nakamura, H.: (Determination of alkyltrimethylammonium chlorides in cosmetics by injection port pyrolysis gas chromatography.) *Jpn. J. Toxicol. Environ. Health,* 40 (1994) 147-153; *C.A.,* 121 (1994) 65274d.

See also 702.

## 18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

### *18a. Amino acids and their derivatives*

442 Braga de Morais, Z., Vasconcelos, A.M.P. and Chaves das Neves, J.: Recovery of amino acids from resin- and silica-bonded cation exchangers in sample preparation for HRGC. *J. High Resolut. Chromatogr.,* 17 (1994) 735-738.

443 Brückner, H. and Westhauser, T.: Chromatographic determination of D-amino acids as native constituents of vegetables and fruits. *Chromatographia,* 39 (1994) 419-426.

444 Bruckner, H., Haasmann, S. and Friedrich, A.: Quantification of D-amino acids in human urine using GC-MS and HPLC. *Amino Acids,* 6 (1994) 205-211; *C.A.,* 121 (1994) 152698p.

445 Kumps, A., Duez, P. and Mardens, Y.: Gas chromatographic profiling and determination of urinary acylcarcinites. *J. Chromatogr. B,* 658 (1994) 241-248.

446 Lowes, S.: Development of gas chromatography/mass spectrometry analysis of urinary acylcarnitines: application to metabolism studies in humans. Avail. *Univ. Microfilms Int.,* Order No. BRDX95808, 1991, 257 pp.; *C.A.,* 120 (1994) 318769u.

447 Márquez, C.D., Weintraub, S.T. and Smith, P.C.: Femtomole detection of amino acids and dipeptides by gas chromatography-negative-ion chemical ionization mass spectrometry following alkylation with pentafluorobenzyl bromide. *J. Chromatogr. B,* 658 (1994) 213-221.

448 Nobile, L., Raggi, M.A. and Bugamelli, F.: Conductometric titration and gas chromatographic analysis of ketoprofen salts in pharmaceutical formulations. *Farmaco,* 40 (1993) 1569-1576; *C.A.,* 121 (1994) 18187t.

449 Ruttkat, A. and Erbersdobler, H.F.: Degradation of furosine during heptafluorobutyric anhydride derivatization for gas chromatographic determination. *J. Chromatogr. A,* 678 (1994) 103-107.

450 Vatankhah, M. and Moini, M.: Characterization of fluorinated ethylchloroformate derivatives of protein amino acids using positive and negative chemical ionization gas chromatography/mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 277-282; *C.A.,* 121 (1994) 4311s.

See also 84, 101.

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

See 447.

## 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

451 Chaudhary, A.K., Nokubo, M., Marnett, L.J. and Blair, I.A.: Analysis of the malondialdehyde-2'-deoxyguanosine adduct in rat liver DNA by gas chromatography/electron capture negative chemical ionization mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 457-464; *C.A.,* 121 (1994) 150641r.

452 O'Donoghue, K., Brown, T.A., Carter, J.F. and Evershed, R.P.: Detection of nucleotide bases in ancient seeds using gas chromatography/mass spectrometry and gas chromatography/mass spectrometry/mass spectrometry. *Rapid Commun. Mass Spectrom.,* 8 (1994) 503-508; *C.A.,* 121 (1994) 133150n.

453 Simek, P., Jegorov, A. and Dusbábek F.: Determination of purine bases and nucleosides by conventional and microbore high-performance liquid chromatography and gas chromatography with an ion-trap detector. *J. Chromatogr. A,* 679 (1994) 195-200.

*21c. Nucleic acids, DNA*

See 451.

## 22. ALKALOIDS

454 Mossoba, M.M., Lin, H.S., Andrzejewski, D., Sphon, J.A., Betz, J.M., Miller, L.J., Eppley, R.M., Trucksess, M.W. and Page, S.W.: Application of gas chromatography/matrix isolation/Fourier transform infrared spectroscopy to the identification of pyrrolizidine alkaloids from Comfrey root (*Symphytum officinale* L.). *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1167-1174.

See also 584.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

*23c. Indole derivatives and plant hormones (gibberelins)*

455 Mortiz, T. and Monteiro, A.M.: Analysis of endogenous gibberellins and gibberellin metabolites from *Dalbergia dolichopetala* by gas chromatography-mass spectrometry. *Planta,* 193 (1994) 1-8; *C.A.,* 120 (1994) 319376a.

*23d. Pyridine derivatives*

456 Allen, D.W., Clench, M.R. and Morris, J.: Investigation of the products of oxidation of methylpyridines under aqueous conditions by gas chromatography-mass spectrometry. *Analyst (Cambridge),* 119 (1994) 903-907.

457 Brunnemann, K.D.: Determination of nicotine and minor tobacco alkaloids in indoor air by absorption and gas chromatography. *IARC Sci. Publ.,* 109 (1993) 275-280; *C.A.,* 120 (1994) 329956d.

458 Husain, S., Sarma, P.N. and Swami, G.Y.S.K.: Thermodynamic properties of chloropyridine isomers by gas liquid chromatography using OV-17 and DEGA stationary phases. *Indian J. Chem. Toxicol.,* 1 (1994) 118-120; *C.A.,* 121 (1994) 142905q.

*23e. Other N-heterocyclic compounds*

459 Hernández, C.V. and Rutledge, D.N.: Multivariate statistical analysis of gas chromatograms to differentiate cocoa masses by geographical origin and roasting conditions. *Analyst (Cambridge),* 119 (1994) 1171-1176.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

460 Auger, J. and Ferary, S.: First results in trace identification of allelochemicals and pheromones by combining gas chromatography-mass spectrometry and direct deposition gas chromatography-Fourier transform infrared spectrometry. *J. Chromatogr. A,* 683 (1994) 87-94.

461 Boberg, F., Bruns, W. and Musshoff, D.: (Sulfur compounds in crude oil. Part XXI. Gas chromatographic studies of alkyldibenzothiophene and alkyldibenzothiophene-5,5-dioxides.) *Erdoel Kohle, Erdgas, Petrochem.,* 47 (1994) 187-191; *C.A.,* 121 (1994) 38788t.

462 Brown, P.D., Morra, M.J. and Borek, V.: Gas chromatography of allelochemicals produced during glucosinolate degradation in soil. *J. Agric. Food Chem.,* 42 (1994) 2029-2034.

463 Davidson, B.M. and Allen, A.G.: A method for sampling dimethyl sulfide in polluted and remote marine atmospheres. *Atmos. Environ.,* 28 (1994) 1721-1729; *C.A.,* 121 (1994) 90265j.

464 Deruaz, D., Soussan-Marchal, F., Joseph, I., Desage, M., Bannier, A. and Brazier, J.L.: Analytical strategy by coupling headspace gas chromatography, atomic emission spectrometric detection and mass spectrometry. Applications to sulfur compounds from garlic. *J. Chromatogr. A,* 677 (1994) 345-354.

465 Louter, A.J.H., Rinkema, F.D., Ghijsen, R.T. and Brinkman U.A.T.: Rapid identification of benzothiazole in river water with on-line solid-phase extraction-gas chromatography-mass selective detection. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 49-56.

466 Meiring, H.D. and de Jong, A.P.J.M.: Determination of ethylenethiourea in water by single-step extractive derivatization and gas chromatography-negative ion chemical ionization mass spectrometry. *J. Chromatogr. A,* 683 (1994) 156-165.

467 Misharina, T.A. and Golovnya, R.V.: (Spectral and gas-chromatographic characterization of 4-methyl-2-alkyl substitued 1,3-oxathiolanes and 1,3-dithiolanes.) *Zh. Anal. Khim.,* 49 (1994) 395-401.

468 Saito, I., Yamada, S., Oshima, H., Ikai, Y., Oka, H. and Hyakawa, J.: Analysis of methyl isothiocyanate in wine by gas chromatography with dual detection. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1296-1299.

469 Sakamoto, K., Hirota, Y., Nezu, T., Kimijima, K. and Okuyama, M.: (Determination of tire tread pyrolyzates thiophenes in suspended particulate matter.) *Taiki Osen Gakkaishi,* 29, No.1 (1994) 9-15; *C.A.,* 120 (1994) 329938z.

470 Yoshida, M., Sumimoto, T., Yoshida, A. and Nishimune, T.: (Determination of methyl isothiocyanate from wine by gas chromatography.) *Osaka-furitsu Koshu Eisei Kenkyusho Kenkyu Hokoku Shokuhin Eisei Hen,* 24 (1993) 61-66; *C.A.,* 120 (1994) 321598t.

See also 40, 306, 543, 561.

## 25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

471 De Geus, H., Zegers, B.N., Lingeman, H. and Brinkman, U.A.T.: Determination of trialkyl and triaryl phosphates in sediment using microwave extraction and packed-capillary supercritical fluid chromatography. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 119-132.

472 Kudzin, Z.H., Sochacki, M. and Drabowicz, J.: Carbocyclic anhydrides-orthoesters-novel reagent systems for derivatization of aminoalkanephosphonic acids for characterization by gas chromatography and mass spectrometry. III. *J. Chromatogr. A,* 678 (1994) 299-312.

473 Söderström, M.T. and Ketola, R.: Identification of nerve agents and their homologues and dialkyl methylphosphonates by gas chromatography/Fourier transform infrared spectrometry (GC-FTIR). Part 1.: Spectral interpretation. *Fresenius J. Anal. Chem.,* 350 (1994) 162-167.

474 Zou Yuping and Liu Zhaojie: (The chemical derivatization of *o*-alkyl phosphonyl dichloride in gas chromatographic analysis.) *Chin. J. Chromatogr.,* 12 (1994) 283-284.

See also 527, 680.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

### *26a. Organometallic compounds*

475 Aggarwal, S.K., Kinter, M. and Herold, D.A.: Mercury determination in blood by gas chromatography-mass spectrometry. *Biol. Trace Elem. Res.,* 41 (1994) 89-102; *C.A.,* 121 (1994) 101361r.

476 Bayona, J.M. and Cai, Y.: The role of supercritical fluid extraction and chromatography in organotin spetiation studies. *TrAC,* 13 (1994) 327-332.

477 Blake, E., Raynor, M.W. and Cornell, D.: Determination of organotin compounds by capillary supercritical fluid chromatography with inductively coupled plasma mass spectrometric detection. *J. Chromatogr. A,* 683 (1994) 223-231.

478 Byrdy, F.A. and Caruso, J.A.: Elemental analysis of environmental samples. Using chromatography coupled with plasma mass spectrometry. *Environ. Sci. Technol.,* 28 (1994) 528A-534A - a review with 53 refs.

479 Carro-Díaz, A.M., Lorenzo-Ferreira, R.A. and Cela-Torrijos, R.: Speciation of organomercurials in biological and environmental samples by gas chromatography with microwave-induced plasma atomic emission detection. *J. Chromatogr. A,* 683 (1994) 245-252.

480 Dirkx, W.M.R., de la Calle, M.B., Ceulemans, M. and Adams, F.C.: Speciation of butyltin compounds in sediments using gas chromatography interfaced with quartz furnace atomic absorption spectrometry. *J. Chromatogr. A,* 683 (1994) 51-58.

481 Feldmann, J., Grümping, R. and Hirner, A.V.: Determination of volatile metal and metaloid compounds in gases from domestic waste deposits with GC/ICP-MS. *Fresenius J. Anal. Chem.,* 350 (1994) 228-234.

482 Liu, Y., Lopez-Avila, V. and Alcaraz, M.: Off-line complexation/supercritical fluid extraction and gas chromatography with atomic emission detection for the determination and speciation of organotin compounds in soils and sediments. *Anal. Chem.,* 66 (1994) 3788-3796.

483 Ohfuji, M., Kamada, I., Chatani, Y., Tsutsui, T. and Adachi, T.: (Simultaneous determination of organotin compounds in fish and shellfish by capillary GC.) *Kyoto-fu Eisei Kogai Kenkyusho Nenpo,* 38 (1993) 12-22; *C.A.,* 121 (1994) 156113s.

484 Ombaba, J.M. and Barry, E.F.: Determination of (methylcyclopentadienyl)manganesetricarbonyl in gasoline by capillary gas chromatography with alternating current plasma emission detection. *J. Chromatogr. A,* 678 (1994) 319-325.

485 Tutschku, S., Mothes, S. and Dittrich, K.: Determination and speciation of organotin compounds by gas chromatography-microwave induced plasma atomic emission spectrometry. *J. Chromatogr. A,* 683 (1994) 269-276.

See also 133, 550.

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

486 Bai, W., Deng, B. and Cai, X.: Study on the CGC/AAS and analysis of the species of trace selenium in garlic oil. *Fenxi Shiyanshi,* 13, No. 1 (1994) 9-12; *C.A.,* 121 (1994) 92022b.

487 Ballin, U., Kruse, R. and Rüssel, H.A.: Determination of total arsenic and speciation of arsene-betaine in marine fish by means of reaction-headspace gas chromatography utilizing flame-ionisation detection and elemental specific spectrometric detection. *Fresenius J. Anal. Chem.,* 350 (1994) 54-61.

488 Blazsó, M.: Pyrolysis-gas chromatography-mass spectrometry of poly(dialkylsilylenes). *J. Chromatogr. A,* 683 (1994) 115-124.

489 Just, U., Mellor, F. and Keidel, F.: Supercritical fluid chromatography-mass spectrometry and matrix-assisted laser-desorption ionization mass spectrometry of cyclic siloxanes in technical silicone oils and silicone rubbers. *J. Chromatogr. A,* 683 (1994) 105-113.

See also 48.

*26c. Coordination compounds*

490 Kumar, M.: Recent trends in chromatographic procedures for separation and determination of rare earth elements. A review. *Analyst (Cambridge),* 119 (1994) 2013-2024 - a review with 210 refs.

491 Laintz, K.E., Iso, S., Meguro, Y., and Yoshida, Z.: A brief study of the supercritical fluid chromatographic behavior of lanthanide β-diketonates. *J. High Resolut. Chromatogr.,* 17 (1994) 603-606.

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

492 Pfander, H., Riesen, R. and Niggli, U.: HPLC and SFC of carotenoids - scope and limitations. *Pure Appl. Chem.,* 66 (1994) 947-954; *C.A.,* 121 (1994) 77516x - a review with 36 refs.

493 Thienpont, L.M., de Brabandere, V.L., Stoeckl, D. and de Leenheer, A.P.: Development of a new method for the determination of thyroxine in serum based on isotope dilution gas chromatography mass spectrometry. *Biol. Mass Spectrom.,* 23 (1994) 475-482; *C.A.,* 121 (1994) 125445x.

494 Wilson, R.T., Wong, J., Johnston, J., Epstein, R. and Heller, D.N.: Confirmation of leucogentian violet in chicken fat by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1137-1142.

495 Yarita, T., Nomura, A., Abe, K. and Takeshita, Y.: Supercritical fluid chromatographic determination of tocopherols on an ODS-silica gel column. *J. Chromatogr. A,* 679 (1994) 329-334.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

*29a. General techniques*

496 Barcelo, D.: Official methods of analysis of priority pesticides in water using gas chromatographic techniques. *Tech. Instrum. Anal. Chem.,* 13 (1993) 149-180; *C.A.,* 121 (1994) 17114e - a review with 67 refs.

497 Barceló, D., Chiron, S., Lacorte, S., Martinez, E., Salau, J.S. and Hennion, M.-C.: Solid-phase sample preparation and stability of pesticides in water using empore disks. *TrAC,* 13 (1994) 352-360.

498 Brinkman, U.A.T., Slobodnik, J. and Vreuls, J.J.: Trace-level detection and identification of polar pesticides in surface water: the SAMOS approach. *TrAC,* 13 (1994) 373-381.

499 Dreyfuss, M.F., Lofti, H., Marquet, P., Debord, J., Daguet, J.L. and Lachatre, G.: (Pesticide residue determination in honey and apples by HPLC and GC.) *Analusis,* 22 (1994) 273-280; *C.A.,* 121 (1994) 132532b.

500 Eisert, R., Levsen, K. and Wünsch, G.: Element-selective detection of pesticides by gas chromatography-atomic emission detection and solid-phase microextraction. *J. Chromatogr. A,* 683 (1994) 175-183.

501 Haraguchi, K., Kitamura, E., Yamashita, T. and Kido, A.: Simultaneous determination of trace pesticides in urban air. *Atmos. Environ.,* 28, No. 7 (1994) 1319-1325; *C.A.,* 121 (1994) 16636q.

502 Holstege, D.M., Scharberg, D.L., Tor, E.R., Hart, L.C. and Galey, F.D.: A rapid multiresidue screen for organophosphorus, organochlorine, and *N*-methyl carbamate insecticides in plant and animal tissues. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1263-1274.

503 Linkerhaegner, M. and Stan, H.J.: Screening analysis of pesticide residues in plant foodstuffs by capillary gas chromatography using the DFG multiresidue method S19. A comparison of customary detection by ECD/NPD with the novel atomic emission detector (AED). *Z. Lebensm.-Unters. Forsch.,* 198 (1994) 473-479; *C.A.,* 121 (1994) 156040r.

504 Okamoto, K., Hirahara, Y., Narida, M., Miyada, M., Hasegawa, M., Koiguchi, S., Kamakura, K., Sotomi, Y. and Yamana, T.: (Studies on simultaneous determination of pyrethroid and organophosphorus pesticides and carbamate pesticides in agricultural products.) *Shokuhin Eisei Kenkyu,* 44, No. 6 (1994) 57-64; *C.A.,* 121 (1994) 132512v.

505 Pico, Y., Louter, A.J.H., Vreuls, J.J. and Brinkman, U.A.T.: On-line trace-level enrichment gas chromatography of triazine herbicides, organophosphorus pesticides, and organosulfur compounds from drinking and surface waters. *Analyst (Cambridge),* 119 (1994) 2025-2031.

506 Schachterle, S., Brittain, R.D. and Mills, J.D.: Analysis of pesticide residues in food using gas chromatography-tandem mass spectrometry with a benchtop ion trap mass spectrometer. *J. Chromatogr. A,* 683 (1994) 185-193.

See also 171, 173.

*29b. Chlorinated insecticides*


507 Brodsky, E.S., Klyuev, N.A., Smirnova, O.B., Dovgilievitz, A.V. and Grandberg, I.I.: GC-MS analysis of photodegradation products of dichlophop-methyl. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 11-21.

508 Driss, M.R., Zafzouf, M., Sabbah, S. and Bouguerra, M.L.: Simplified procedure for organochlorine pesticides residue analysis in honey. *Intern. J. Environ. Anal. Chem.,* 57 (1994) 63-71.

509 Lewis, R.G.: Determination of pesticides and polychlorinated biphenyls in indoor air by gas chromatography. *IARC Sci. Publ.,* 109 (1993) 353-376; *C.A.,* 120 (1994) 329961b.

510 Luna, A., Molina, C., Barba, A., Garcia, S.N. and Camara, M.A.: (Organochlorinated insecticide residues in human fat. Comparison of analytical methods.) *Rev. Toxicol.,* 10 (1993) 129-132; *C.A.,* 121 (1994) 51606b.

511 Mortimer, R.D., Black, D.B. and Dawson, B.A.: Pesticide residue analysis in foods by NMR. 3. Comparison of $^{19}F$ NMR and GC-ECD for analysing trifluralin residues in field-grown carrots. *J. Agric. Food Chem.,* 42 (1994) 1713-1716.

512 Mössner., S., Barudio, I., Spraker, T.S., Antonelis, G., Early, G., Geraci, J.R., Becker, P.R. and Ballschmiter, K.: Determination of HCHs, PCBs and DDTs in brain tissues of marine mammals of different age. *Fresenius J. Anal. Chem.,* 349 (1994) 708-716.

513 Nam, K.-S. and King, J.W.: Coupled SFE/SFC/GC for the trace analysis of pesticide residues in fatty food samples. *J. High Resolut. Chromatogr.,* 17 (1994) 577-582.

514 Oehme, M., Kallenborn, R., Wiberg, K. and Rappe, C.: Simultaneous enantioselective separation of chlordanes, a nonachlor compound, and *o,p'*-DDT in environmental samples using tandem capillary columns. *J. High Resolut. Chromatogr.,* 17 (1994) 583-588.

515 Picó, Y., Maòez, J. and Font, G.: Optimization of experimental conditions for the identification of pesticide mixtures on six GLC columns. *J. Chromatogr. Sci.,* 32 (1994) 386-392.

516 Shan, T.-H., Hopple, J.A. and Foster, G.D.: Alternative tissue analysis method developed for organochlorine contaminants in aquatic organisms. *Bull. Environ. Contam. Toxicol.,* 53 (1994) 382-389; *C.A.,* 121 (1994) 75462c.

517 Sukul, P.: Extraction and clean up procedures for the analysis of permethrin, cypermethrin, deltamethrin and fenvalerate in crops by GLC-ECD. *Toxicol. Environ. Chem.,* 44 (1994) 217-223; *C.A.,* 121 (1994) 156080d.

518 Van der Velde, E.G., Dietvorst, M., Swart, C.P., Ramlal, M.R. and Kootstra, P.R.: Optimization of supercritical fluid extraction of organochlorine pesticides from real soil samples. *J. Chromatogr. A,* 683 (1994) 167-174.

519 Viana, E., Moltó, J.C., Mañes, J. and Font, G.: Clean-up and confirmatory procedures for gas chromatographic analysis of pesticide residues. Part II. *J. Chromatogr. A,* 678 (1994) 109-117.

520 Vidal, L.H., Trevelin, W.R., Landgraf, M.D. and Rezende, M.O.O.: Determination of organochlorine pesticides dissolved in water: A comparison between solid phase and solvent extraction. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 23-31.

521 Wenclawiak, B.W., Maio, G., v. Holst, C. and Darskus, R.: Solvent trapping of some chlorinated hydrocarbons after supercritical fluid extraction from soil. *Anal. Chem.,* 66 (1994) 3581-3586.

522 Wennrich, L., Efer, J., Mueller, S. and Engewald, W.: (Determination of trichlorfon in drinking water by solid-phase extraction and on-column capillary GC. Problems with real samples.) *Vom Wasser,* 82 (1994) 281-288; *C.A.,* 121 (1994) 91119b.

523 Xu, Y., Zhang, Y., Oxynos, K., Schmitzer, J. and Kettrup, A.: Hexachlorocyclohexane (HCH) residues in Ya-er Lake area, China. *Intern. J. Environ. Anal. Chem.,* 57 (1994) 53-61.

524 Yarita, T., Nomura, A., Horimoto, Y. and Yamada, J.: Determination of chlorinated pesticides by packed column supercritical fluid chromatography/electron-capture detector. *Microchem. J.,* 49 (1994) 145-149; *C.A.,* 120 (1994) 317694d.


See also 231, 232, 241.

*29c. Phosphorus insecticides*


525 Barrio, C.S., Asensio J.S. and Bernal, J.G.: GC-NPD investigation of the recovery of organonitrogen and organophosphorus pesticides from apple samples: The effect of the extraction solvent. *Chromatographia,* 39 (1994) 320-324.

526 Drevenkar, V., Štengl, B. and Fröbe, Z.: Microanalysis of dialkylphosphorus metabolites if organophosphorus pesticides in human blood by capillary gas chromatography and by phosphorus-selective and ion trap detection. *Anal. Chim. Acta,* 290 (1994) 277-286.

527 Ferrario, J.B., DeLeon, I.R. and Peuler, E.A.: Bioaccumulation of chemical markers as a means for the field detection and verification of organophosphorus warfare agents. *Environ. Sci. Technol.,* 28 (1994) 1893-1897.

528 Hagmann, M. and Mohl, B.: (Determination of traces of nitrogen- and phosphorus pesticides.) *LaborPraxis,* 17, No. 5 (1993) 56-62; *C.A.,* 121 (1994) 117097v.

529 Kadowaki, S. and Naitoh, H.: (Determination of ethylthiometon residues in environmental sample by gas chromatography/mass spectrometry.) *Kankyo Kagaku,* 3 (1993) 747-759; *C.A.,* 121 (1994) 26013y.

530 Lentza-Rizos, C.: Monitoring pesticide residues in olive products: Organophosphorus insecticides in olives and oil. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1096-1100.

531 Li, H. and Wang, X.: Analysis of organophosphorus agrochemical residues in foods by capillary gas chromatography. *Zhonghua Yufang Yixue Zazhi,* 27 (1993) 356-359; *C.A.,* 121 (1994) 33446v.


*29d. Carbamates*


532 Haddon, W.F., Mancini, M.L., McLaren, M., Effio, A., Harden, L.A., Degre, R.L. and Bradford, J.L.: Occurence of ethyl carbamate (urethane) in U.S. and Canadian breads: measurements by gas chromatography-mass spectrometry. *Cereal Chem.,* 71 (1994) 207-215; *C.A.,* 121 (1994) 7633j.

533 Kadenczki, L. and Szucs, E.: (Determination of dithio-carbamate residues by gas chromatography, using head space techniques.) *Novenyvedelem (Budapest),* 30 (1994) 19-21; *C.A.,* 121 (1994) 3131w.


See also 466.

*29e. Herbicides*

534 Alcaraz, R., Caixach, J., Garcia-Raurich, J., Espadaler, I. and Rivera, J.: Comparison of extraction methods for phenoxyacid herbicides in water samples using gas chromatography coupled to mass spectrometry (HRGC/MS). *Quim. Anal. (Barcelona),* 13, No. 2 (1994) 55-58; *C.A.,* 121 (1994) 141095p.

535 Berdeaux, O., De Alencastro, L.F., Grandjean, D. and Tarradellas, J.: Supercritical fluid extraction of sulfonylurea herbicides in soil samples. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 109-117.

536 Färber, H., Nick, K. and Schöler, H.F.: Determination of hydroxy-s-triazines in water using HPLC or GC-MS. *Fresenius J. Anal. Chem.,* 350 (1994) 145-149.

537 Hayakawa, S., Sarai, E. and Araki, K.: (Analysis of pesticides in sediment. Pretreatment method for sediment samples.) *Mieken Kankyo Kagaku Senta Kenkyu Hokoku,* 14 (1993) 49-53; *C.A.,* 121 (1994) 52246w.

538 Lee, A.S., Hong, M.-K. and Smith, A.E.: Improved esterification of mecoprop for sensitive detection on capillary gas chromatography with mass selective and electron capture detection. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1077-1083.

539 Lee, X., Kumazawa, T., Sato, K. and Suzuki, O.: (Solid-phase extraction and capillary gas chromatography of diazine herbicides.) *Hochudoku,* 12 (1994) 118-119; *C.A.,* 121 (1994) 101357u.

540 Tarasov, V.V. and Khalmatova, R.K.: (Gas chromatographic detection of reiser in environmental objects.) *Gig. Sanit.,* 8 (1993) 79-80; *C.A.,* 120 (1994) 338050f.

541 Van der Velde, E.G., Ramlal, M.R., van Beuzekom, A.C. and Hoorgerbrugge, R.: Effects of parameters on supercritical fluid extraction of triazines from soil by use of multiple linear regression. *J. Chromatogr. A,* 683 (1994) 125-139.

*29f. Fungicides*

542 Asilbekova, K.T. and Khasanova, V.M.: (Gas-chromatographic determination of triadimenol fungicide in environment and biological materials.) *Gig. Sanit.,* 2 (1993) 66-67; *C.A.,* 120 (1994) 330000u.

543 Gan, J., Yates, S.R., Spencer, W.F. and Yates, M.V.: Automated headspace analysis of fumigants 1,3-dichloropropene and methyl isothiocyanate on charcoal sampling tubes. *J. Chromatogr. A,* 684 (1994) 121-131.

544 Gao, N., Sun, M. and Wang, Y.: (GC-MS separation and identification of Yekuling and its metabolites in rat liver perfusate.) *Zhongguo Huanjing Kexue,* 13 (1993) 127-131; *C.A.,* 121 (1994) 2923u.

545 Oishi, M., Onishi, K., Kano, I., Nazakawa, H. and Tanabe, S.: Capillary gas chromatographic determination of thiabendazole in citrus and apple juices. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1293-1296.

546 Rietveld, R. and Quirijns, J.: On-line liquid chromatography-gas chromatography for determination of fenarimol in fruiting vegetables. *J. Chromatogr. A,* 683 (1994) 151-155.

547 Salau, J.S., Alonso, R., Batlló, G. and Barceló, D.: Application of solid-phase disk extraction followed by gas and liquid chromatography for the simultaneous determination of the fungicides: captan, captafol, carbendazim cholorothalonil, ethirimol, folpet, metalaxyl and vinclozolin in environmental waters. *Anal. Chim. Acta,* 293 (1994) 109-117.

548 Sato, K.: (Simultaneous determination of imazalil and thiabendazole by gas chromatography.) *Nippon Juishikai Zasshi,* 47 (1994) 213-216; *C.A.,* 121 (1994) 56068n.

*29g. Other types of pesticides and various agrochemicals*

549 Nowacka-Krukowska, H., Czajka, M. and Sledzinski, B.: (Determination of fluvalinate residues in honey and wax after using of some mite infestation control products.) *Pestycydy (Warsaw),* 1 (1994) 31-37; *C.A.,* 121 (1994) 106795v.

550 Shosunova, A.F., Sanyagina, N.A. and Makin, G.I.: (Use of gas-liquid chromatography for determination of organotin pesticides in plants and in soil.) *Zh. Org. Khim.,* 4 (1993) 698-702; *C.A.,* 121 (1994) 29112r.

551 Xiang, W. and Su, S.: (Gas chromatographic method for the determination of chlorsulfuron residues in soil.) *Fenxi Huaxue,* 22, No. 6 (1994) 605-608; *C.A.,* 121 (1994) 127699g.

## 31. PLASTICS AND THEIR INTERMEDIATES

552 Buzanowski, W.C., Cutié, S.S., Howel, R., Papenfuss, R. and Smith, C.G.: Determination of sodium polyacrylate by pyrolysis-gas chromatography. *J. Chromatogr. A,* 677 (1994) 355-364.

553 Ding, M., Xu, Z., Zhang, J. and Meng, H.: (Pyrolysis gas chromatographic study on reaction process of PMR-type polyimide precursors.) *Yingyong Huaxue,* 11 (1994) 107-111; *C.A.,* 121 (1994) 135350b.

554 Etxeberria, A., Uriarte, C., Fernandez-Berridi, M.J. and Iruin, J.J.: Estimation of interaction parameters of a poly(hydroxy ether of bisphenol A)/poly(vinyl methyl ether) blend by inverse gas chromatography. *Polymer,* 35, No. 10 (1994) 2128-2132; *C.A.,* 121 (1994) 10570s.

555 Gronova, G.L., Shukurina, K.N., Korolev, A.A., Kabarova, E.Y., Martynenko, A.T., Sycheva, T.I., Mikaya, A.I., Topchiev, D.A. and Berezkin, V.G.: (Evaluation of the purity of some water-soluble monomers by gas-liquid chromatography and chromatography-mass spectrometry.) *Zavod. Lab.,* 59, No. 12 (1993) 13-16.

556 Holzbauer, H.R. and Just, U.: Adducts by supercritical fluid chromatography. *Tenside, Surfactants, Deterg.,* 31 (1994) 79-82; *C.A.,* 121 (1994) 10437d.

557 Jackson, P.L. and Huglin, M.B.: Use of inverse gas chromatography to assess the compatibility of polyurethane foam with liquids at different temperatures. *Polym Int.,* 33, No. 4 (1994) 409-411; *C.A.,* 120 (1994) 324807w.

558 Kaya, I. and Ceylan, K.: Estimation of glass transition temperature and heat of adsorption of polyvinyl chloride by inverse phase gas chromatography. *Turk. J. Chem.,* 17 (1993) 1-6; *C.A.,* 121 (1994) 84450z.

559 Kinugasa, S., Ida, S. and Takeuchi, M.: (Separation of poly(ethyleneglycol)s by supercritical fluid chromatography.) *Busshitsu Kogaku Kogyo Gijutsu Kenkyusho Hokoku,* 2 (1994) 219-222; *C.A.,* 120 (1994) 324596b.

560 MacKay, G.A. and Smith, R.M.: Supercritical fluid extraction-supercritical fluid chromatography/mass spectrometry for the analysis of additives in polyurethanes. *J. Chromatogr, Sci.,* 32 (1994) 455-460.

561 Montaudo, G., Puglisi, C., Blazso, M., Kishore, K. and Ganesh, K.: Thermal degradation products of poly(styrenesulfides) investigated by direct pyrolysis-mass spectrometry and flash pyrolysis-gas chromatography/mass spectrometry. *J. Anal. Appl. Pyrolysis,* 29 (1994) 207-222; *C.A.,* 121 (1994) 158334p.

562 Mukhopadhyay, P. and Schreiber, H.P.: Aspects of polymer surface characterization by inverse gas chromatography. *J. Polym. Sci., Part B: Polym. Phys.,* 32, No. 9 (1994) 1653-1656; *C.A.,* 121 (1994) 58441c.

563 Nishe, M. and Okai, F.: (Analysis of polyester components by pyrolytic gas chromatography.) *Jpn. Kokai Tokkyo Koho* JP 05,322,865 [93,322,865] (Cl.G01N30/06), 07 Dec. 1993, Appl. 91/142,513, 17 May 1991; 3 pp; *C.A.,* 120 (1994) 324694g.

564 O'Connor, M.J., Bigger, S.W., Scheirs, J., Janssens, J.L.G.M. and Linssen, J.P.H.: Some aspects of odor characterization in polyethylene resins. *Polym. Prepr.,* 34 (1993) 247-248; *C.A.,* 121 (1994) 10840e.

565 Petri, H-M. and Wolf, B.A.: Concentration-dependent thermodynamic interaction parameters for polymer solutions: Quick and reliable determination *via* normal gas chromatography. *Macromolecules,* 27 (1994) 2714-2718; *C.A.,* 120 (1994) 324674a.

566 Tan, Z., Jaeger, R. and Vancso, G.J.: Crosslinking studies of poly(dimethylsiloxane) networks: a comparison of inverse gas chromatography, swelling experiments and mechanical analysis. *Polymer,* 35 (1994) 3230-3236; *C.A.,* 121 (1994) 134963s.

567 Watanabe, C.: Characterization of polymers. Development of analytical Py-GC system of polymeric materials. *Kobunshi,* 43 (1994) 110-111; *C.A.,* 121 (1994) 110025m.

568 Yamada, T., Okumodo, T., Ohtani, H. and Tsuge, S.: (Characterization of polymers by pyrolysis gas chromatography. Application to EPDM rubbers.) *Nippon Gomu Kyokaishi,* 66 (1993) 530-540; *C.A.,* 121 (1994) 11444r.

See also 22, 37, 42, 45, 249, 293, 488, 679.

## 32. DRUG ANALYSIS

### *32a. Drug analysis, general techniques*

569 Chen, X.H., Franke, J.P., Wijsbeek, J. and de Zeeuw, R.A.: Determination of basic drugs extracted from biological matrixes by means of solid-phase extraction and wide-bore capillary gas chromatography with nitrogen-phosphorus detection. *J. Anal. Toxicol.,* 18 (1994) 150-153; *C.A.,* 121 (1994) 26135q.

570 Hara, K., Kageura, M., Kashimura, S., Hieda, Y. and Tanaka, K.: (Screening of drugs and poisons by REMEDi and GC/MS.) *Hochudoku,* 12 (1994) 154-155; *C.A.,* 121 (1994) 127225z.

571 Kot, A., Sandra, P. and Venema, A.: Sub- and supercritical fluid chromatography on packed columns: A versatile tool for the enantioselective separation of basic and acidic drugs. *J. Chromatogr, Sci.,* 32 (1994) 439-448.

572 Wynia, G., Post, P., Broersen, J. and Maris, F.A.: Ruggedness testing of gas chromatographic method for residual solvents in pharmaceutical substances. *Chromatographia,* 39 (1994) 355-362.

573 Zygmunt, B. and Wardencki, W.: Some aspects of (GC-MS) application in environmental organic analysis. *Pol. J. Chem.,* 67 (1993) 369-378; *C.A.,* 121 (1994) 90259k.

See also 314, 448, 478.

### *32b. Antirheumatics and antiinflammatory drugs*

574 Avadhanulu, A.B., Pantulu, A.R.R. and Anjaneyulu, Y.: Gas liquid chromatographic estimation of (1) chlorzoxazone and paracetamol (2) chlormezanone and paracetamol in single and combined dosage forms. *Indian Drugs,* 31 (1994) 201-204; *C.A.,* 121 (1994) 141884v.

575 Giachetti, C., Assandri, A, Zanolo, G. and Tenconi, A.: MSD, ECD and NPD performances compared in the assay of six non steroidal anti-inflammatory drugs in plasma samples. *Chromatographia,* 39 (1994) 162-169.

576 Giachetti, C., Assandri, A., Zanolo, G. and Brembilla, E.: Gas chromatography-mass spectrometry determination of etodolac in human plasma following single epicutaneous administration. *Biomed. Chromatogr.,* 8 (1994) 180-183.

577 Myung, S.-W., Kim, M.-S., Yoon, C.-N., Park, J.-S. and Ahn, W.-S.: Gas chromatographic-electron-impact chemical ionization mass spectrometric identification of cinmetacin and its metabolites in human urine. *J. Chromatogr. B,* 660 (1994) 75-84.

578 Wang, H., Deng, Z., Jiang, W. and Song, L.: (Analysis of volatile organic pollutants with Curie point desorption gas chromatographic method. 3. Quantitative analysis.) *Huanjing Wuran Yu Fangzhi,* 15, No. 4 (1993) 34-36; *C.A.,* 121 (1994) 140383u.

579 Wilson, W.H.: Direct enantiomeric resolution of ibuprofen and flurbiprofen by packed column SFC. *Chirality,* 6 (1994) 216-219; *C.A.,* 121 (1994) 92004x.

580 Wu Lanjun, Li Zhi, Hu Wenhao and Jiang Yaozhong: (Study on synthesis reaction of 6-methoxy-2-acetonaphthalene - A key intermediate of Naproxen by gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS).) *Chin. J. Chromatogr.,* 12 (1994) 361-363.

### *32c. Autonomic and cardiovascular drugs*

581 Bailey, C.J., Ruane, R.J. and Wilson, I.D.: Packed-column supercritical fluid chromatography of β-blockers. *J. Chromatogr, Sci.,* 32 (1994) 426-429.

582 Bargmann-Leyder, N., Siret, L., Tambute, A. and Caude, M.: (Direct and rapid enantiomeric separation of β-blockers by supercritical carbon dioxide chromatography coupled with ChyRoSine-A.) *Spectra Anal.,* 22, No. 171 (1993) 27-30; *C.A.,* 121 (1994) 164097e.

583 Carreras, D., Imaz, C., Navajas, R., Garcia, M.A., Rodriguez, C., Rodriguez, A.F. and Cortes, R.: Comparison of derivatization procedures for the determination of diuretics in urine by gas chromatography-mass spectrometry. *J. Chromatogr. A,* 683 (1994) 195-202.

584 Deutsch, J., Hegedus, L. Greig, N.H., Rapoport, S.I. and Soncrant, T.T.: Evidence of transacylation of scopolamine in the gas-chromatograph inlet. *Anal. Lett.,* 27 (1994) 671-679.

585 Hooijerink, H., Schilt, R., van Bennekom, E.O. and Huf, F.A.: Determination of beta-sympathomimetics in liver and urine by immunoaffinity chromatography and gas chromatography-mass-selective detection. *J. Chromatogr. B,* 660 (1994) 303-313.

586 Li, F., Cooper, S.F., Côté, M. and Ayotte, C.: Determination of the enantiomers of bunolol in human urine by high-performance liquid chroamtography on a chiral AGP stationary phase and identification of their metabolites by gas chromatography-mass spectrometry. *J. Chromatogr. B,* 660 (1994) 327-339.

587 Martens, J., Banditt, P. and Meyer, F.P.: Determination of nifedipine in human serum by gas chromatography-mass spectrometry: validation of the method and its use in bioavailability studies. *J. Chromatogr. B,* 660 (1994) 297-302.

588 Oertel, R., Richter, K., Trausch, B., Berndt, A., Gramatté, T. and Kirch, W.: Elucidation of the structure of talinolol metabolites in man. Determination of talinolol and hydroxylated talinolol metabolites in urine and analysis of talinolol in serum. *J. Chromatogr. B,* 660 (1994) 353-363.

589 Tenczer, J., Lappenberg-Pelzer, M., Schneider, V., Demme, U. and Köppel, C.: Fatal poisoning with detajmium: identificaton of detajmium and its metabolites and artifacts by gas chromatography-mass spectrometry and quantification by high-performance liquid chromatography. *J. Chromatogr. B,* 661 (1994) 47-55.

590 Toba, F., Ando, M., Hamada, T., Awata, N., Tuda, T. and Kinoshita, K.: A sensitive determination of eperisone in plasma by GC/MS. *J. Mass Spectrom. Soc. Jpn.,* 41 (1993) 235-243; *C.A.,* 121 (1994) 26133n.

591 Yang, X. and Chen, X.: (Determination of clonidine in plasma by gas chromatography.) *Yaowu Fenxi Zazhi,* 14, No. 2 (1994) 24-26; *C.A.,* 121 (1994) 148204g.

*32d. Central nervous system drugs*

592 Almquist, S.R., Petersson, P., Walther, W. and Markides, K.E.: Direct and indirect approaches to enantiomeric separation of benzodiazepines using micro column techniques. *J. Chromatogr. A,* 679 (1994) 139-146.

593 Black, D.A., Clark, G.D., Haver, V.M., Garbin, J.A. and Saxon, A.J.: Analysis of urinary benzodiazepines using solid-phase extraction and gas chromatography-mass spectrometry. *J. Anal. Toxicol.,* 18 (1994) 185-188; *C.A.,* 121 (1994) 101389f.

594 Feng, L., Xuying, H. and Yi, L.: Investigation of meperidine and its metabolites in urine of an addict by gas chromatography-flame ionization detection and gas chromatography-mass spectrometry. *J. Chromatogr. B,* 658 (1994) 375-379.

595 Fenton, J., Mummert, J. and Childers, M.: Hydromorphone and hydrocodone interference in GC/MS assays for morphine and codeine. *J. Anal. Toxicol.,* 18 (1994) 159-164; *C.A.,* 121 (1994) 2744m.

596 Hu, X.Y., Liu, F. and Luo, Y.: (Analysis of meperidine and its metabolites in urine of an addict GC/FID and GC/MS.) *Yaoxue Xuebao,* 29 (1994) 116-121; *C.A.,* 121 (1994) 124458s.

597 Huo, J.-Z., van Bocxlaer, J., Lambert, W.E. and de Leenheer, A.P.: Determination of embutramine in biological matrices by gas chromatography with nitrogen-phosphorus detection. *J. Chromatogr. B,* 661 (1994) 69-74.

598 Ishii, A., Hattori, H., Seno, H., Kumazawa, T. and Suzuki, O.: Determination of aminopyrine in body fluids by gas chromatography with surface ionization detection. *Hochudoku,* 11 (1993) 182-186; *C.A.,* 121 (1994) 2698z.

599 Koga, S., Hayama, Y. and Kouta, M.: (Application of gas chromatography-mass spectrometry for qualitative analysis of methamphetamine and its raw materials, etc. by chemical ionization method.) *Kanzei Chuo Bunsekishoho,* 33 (1994) 55-63; *C.A.,* 121 (1994) 75481h.

600 Kurazono, K., Matuzaki, R., Nagai, M., Inde, S. and Yagasaki, K.: (Analysis of psychotropic drugs by gas chromatography.) *Kanzei Chuo Bunsekishoho,* 33 (1994) 49-53; *C.A.,* 121 (1994) 141857p.

601 Labroo, R. and Kharasch, E.D.: Gas chromatographic-mass spectrometric analysis of alfentanil metabolites. Application to human liver microsomal alfetanil biotransformation. *J. Chromatogr. B,* 660 (1994) 85-94.

602 Lawrence, J.K, Larsen, A.K., Jr. and Tebbett, I.R.: Supercritical fluid extraction of benzodiazepines in solid dosage forms. *Anal. Chim. Acta,* 288 (1994) 123-130.

603 Lin, Z., Lafolie, P. and Beck, O.: Evaluation of analytical procedures for urinary codeine and morphine measurements. *J. Anal. Toxicol.,* 18 (1994) 129-133; *C.A.,* 121 (1994) 2742j.

604 Liu, F., Hu, X. and Li, Q.: (Quantitative analysis of ketamine and xylazine in plasma and brain homogenates of rats by GC-MS.) *Fenxi Ceshi Xuebao,* 12 (1993) 26-30; *C.A.,* 120 (1994) 315063y.

605 Moeller, M.R., Fey, P. and Wennig, R.: Simultaneous determination of drugs of abuse (opiates, cocaine and amphetamine) in human hair by GC/MS and its application to a methadone treatment program. *Forensic Sci. Int.,* 63 (1993) 185-206; *C.A.,* 120 (1994) 317421n.

606 Nihira, M., Hayashida, M., Hirakawa, K., Uekusa, K., Ohno, Y. and Nakahara, Y.: (Morphine on the urine after ingestion of poppy seed food.) *Hochudoku,* 12 (1994) 140-141; *C.A.,* 121 (1994) 127222w.

607 Polettini, A., Groppi, A. and Montagna, M.: Rapid and highly selective GC/MS/MS detection of heroin and its metabolites in hair. *Forensic Sci. Int.,* 63 (1993) 217-225; *C.A.,* 120 (1994) 317423q.

608 Rao, M.L., Staberock, U., Baumann, P. Hiemke, C., Deister, A., Cuendet, C., Amey, M., Haertter, S. and Kraemer, M.: Monitoring tricyclic antidepressant concentrations in serum by fluorescence polarization immunoassay compared with gas chromatography and HPLC. *Clin. Chem. (Washington),* 40 (1994) 929-933.

609 Riggs, K.W., Szeitz, A., Rurak, D.W., Mutlib, A.E., Abbott, F.S. and Axelson, J.E.: Determinaton of metoclopramide and two of its metabolites using a sensitive and selective gas chromatographic-mass spectrometric assay. *J. Chromatogr. B,* 660 (1994) 315-325.

610 Romanyshyn, L.A., Wagner, M.C., Wichmann, J.K., Kucharczyk, N. and Sofia, R.D.: Determination fo valproate of felbamate in human plasma by narrow bore capillary gas chromatography. *Epilepsia (N.Y.),* 35, No. 2 (1994) 406-410; *C.A.,* 121 (1994) 148206j.

611 Sachs, H. and Raff, I.: Comparison of quantitative results of drugs in human hair by GC/MS. *Forensic Sci. Int.,* 63 (1993) 207-216; *C.A.,* 120 (1994) 317422p.

612 Sieveret, H.J.P.: Determination of amphetamine and methamphetamine enantiomers by chiral derivatization and gas chromatography-mass spectrometry as a test case for an automated sample preparation system. *Chirality,* 6 (1994) 295-301; *C.A.,* 121 (1994) 141862m.

613 Song, D., Zhang, S. and Kohlhof, K.: Determination of chlordiazepoxide in mouse plasma by gas chromatography-negative-ion chemical ionization mass spectrometry. *J. Chromatogr. B,* 660 (1994) 95-101.

614 Terada, M. and Wagasugi, C.: (Simultaneous determination of oxazolobenzodiazepine drugs by wide bore column gas chromatography with nitrogen-phosphorus detection.) *Hochudoku,* 12 (1994) 116-117; *C.A.,* 121 (1994) 141878w.

615 Tsuchihashi, H., Nishikawa, M., Katagi, M. and Tatsuno, M.: (Determination of triazolam and its metabolites in human urine by EMIT, gas chromatography-mass spectrometry and liquid chromatography-mass spectrometry.) *Hochudoku,* 12 (1994) 134-135; *C.A.,* 121 (1994) 127220u.

616 Uges de Medewerkers, D.R.A.: (Determination of some xenobiotics in body fluids. XXVII Amphetamine.) *Ziekenhuisfarmacie,* 10 (1994) 31-35; *C.A.,* 121 (1994) 101365v.

617 Wang, W.-L., Darwin, W.D. and Cone, E.J.: Simultaneous assay of cocaine, heroin and metabolites in hair, plasma, saliva and urine by gas chromatography-mass spectrometry. *J. Chromatogr. B,* 660 (1994) 279-290.

618 Woestenborghs, R.J.H., Timmerman, P.M.M.B.L., Cornelissen, M.-L. J.E., Van Rompaey, F.A.M.B.S., Gepts, E., Camu, F., Heykants, J.J.P. and Stanski, D.R.: Assay methods for sufentanil in plasma: Radioimmunoassay *versus* gas chromatography-mass spectrometry. *Anesthesiology,* 80 (1994) 666-670; *C.A.,* 121 (1994) 132m.

619 Yuan, C. and Zhu, J.: (Identification of fifteen hypnotic sedative drugs by UV and GC.) *Zhongguo Yiyao Gongye Zazhi,* 25 (1994) 18-20; *C.A.,* 121 (1994) 117891z.

See also 156, 158, 580, 635.

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

620 Blanchflower, W.J., Hughes, P.J., Cannavan, A. and Kennedy, G.: Determination of diclazuril in avian feed and premixes with gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.,* 77 (1994) 1061-1065.

621 Utsui, Y.: (Bacterial action of beta-lactam microbial drugs and gas chromatographical identification of anaerobic bacteria.) *Bunseki,* 10 (1993) 791-795; *C.A.,* 121 (1994) 53732p.

See also 294.

*32f. Cytostatics*

622 Momerency, G., van Cauwenberghe, K., de Bruijn, E.A., van Oosterom, A.T., Highley, M.S. and Harper, P.G.: Determination of iphosphamide and seven metabolites in blood plasma, as stable trifluoracetyl derivates, by electron capture chemical ionization GC-MS. *J. High Resolut. Chromatogr.,* 17 (1994) 655-661.

See also 357, 607, 611.

*32g. Other drug categories*

623 Ishii, A., Seno, H., Kumazawa, T. and Suzuki, O.: Determination of tertiary amino antitussives in body fluids by gas chromatography with surface ionization detection. *Hochudoku,* 11 (1993) 176-181; *C.A.,* 121 (1994) 133n.

624 Lessard, D., Comeau, B., Charlebois, A., Letarte, L. and Davis, I.M.: Quantification of GR90291 in human blood by high resolution gas chromatography-mass selective detection (HRGC-MSD). *J. Pharm. Biomed. Anal.,* 12 (1994) 659-665; *C.A.,* 121 (1994) 98948e.

625 Smith, M.S., Oxford, J. and Evans, M.B.: Improved method for the separation of raniditine and its metabolites based on supercritical fluid chromatography. *J. Chromatogr. A,* 683 (1994) 402-406.

626 Wong, S.H.Y., Ghodgaonkar, B., Fong, P., Campbell, B., Burdick, J.F and Boctor, F.: Supercritical fluid chromatography for therapeutic drug monitoring of immunosuppressants: selectivity for cyclosporine A, FK 506 (tacrolimus), and rapamycin. *J. Liq. Chromatogr.,* 17 (1994) 2093-2109.

See also 348, 371.

*32h. Toxicological and forensic applications*

627 Clarc, C.R., DeRuiter, J., Andurkar, S. and Noggle, F.T.: Analysis of 3,4-methylenedioxyphenyl-2-propanone and 3,4-methylenedioxyamphetamine prepared from isosafrole. *J. Chromatogr. Sci.,* 32 (1994) 393-402.

628 DiGregorio, G.J., Ferko, A.P., Barbieri, E.J., Ruch, E.K., Chawla, H., Koehane, D., Rosenstock, R. and Aldano, A.: Determination od cocaine usage in pregnant women by a urinary EMIT drug screen and GC-MS analyses. *J. Anal. Toxicol.,* 18 (1994) 247-250; *C.A.,* 121 (1994) 150677g.

629 Drummer, O.H., Horomidis, S., Kourtis, S., Syrjanen, M. and Tippett, P.: Capillary gas chromatographic drug screen for use in forensic toxicology. *J. Anal. Toxicol.,* 18 (1994) 134-138; *C.A.,* 121 (1994) 28720a.

630 Hernandez, A., Andollo, W. and Hearn, W.L.: Analysis of cocaine and metabolites in brain using solid phase extraction and full-scanning gas chromatography/ion trap mass spectrometry. *Forensic Sci. Int.,* 65 (1994) 149-156; *C.A.,* 121 (1994) 150667d.

631 Kudo, K., Nagata, T., Imamura, T., Jitsufuchi, N. and Kimura K.: (Quantitative analysis of $\Delta^9$-tetrahydrocannabinil (THC) in human solid tissues by GC/MS.) *Hochudoku,* 12 (1994) 136-137; *C.A.,* 121 (1994) 127221v.

632 Logan, B.K., Friel, P.N. and Case, G.A.: Analysis of sertraline (Zoloft) and its major metabolite in *postmortem* specimens by gas and liquid chromatography. *J. Anal. Toxicol.,* 18 (1994) 139-142; *C.A.,* 121 (1994) 26134p.

See also 84, 217, 278, 617.

*32i. Plant extracts*

633 Feng, L., Liu, Q. and Sun, X.: (Quantitative determination of paeonol in Nujinwan by gas chromatograph.) *Zhongguo Zhongyao Zazhi,* 19, No. 2 (1994) 92-93; *C.A.*, 121 (1994) 331244p.

634 Feng, Y., Huang, C. and Ye, C.: (Determination of paeonol in guizhi-fuling capsule by GC.) *Zhongguo Yaoke Daxue Xuebao,* 25, No. 1 (1994) 15-17; *C.A.*, 121 (1994) 91974b.

635 Gasparri de Vasquez, A., Najera, M., Sala, G., Baldini, O., Mandrile, E. and Cafferata, L.F.R.: (Gas-chromatographic analysis and pharmacodynamic action of the volatile compounds of "mataojo" (*Pouteria salicifolia* (Spreng.) Radlk).) *Acta Farm. Bonaerense,* 12 (1993) 5-14; *C.A.*, 12 (1994) 91975c.

636 Vilegas, J.H.Y., Lancas, F.M. and Cervi, A.C.: High resolution gas chromatography analysis of "espinheira santa" (*Maytenus ilicifolia* and *M. aquifolium*): Analysis of crude drug adulterations. *Phytoter. Res.,* 8 (1994) 241-244; *C.A.*, 121 (1994) 141843f.

See also 416, 417.

33. CLINICO-CHEMICAL APPLICATIONS

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

See 198, 336, 380, 445, 446.

34. FOOD ANALYSIS

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

637 Calapaj, R., Chiricosta, S., Saija, G. and Bivona, V.: (Comparison of gas chromatographic and spectrophotometric data for the detection of seed oils an olive oil samples.) *Riv. Ital. Sostanze Grasse,* 70 (1993) 585-594; *C.A.*, 121 (1994) 81206p.

638 Galletti, G.C., Mincione, B., Mellon, F.A. and Waldron, K.W.: Application of pyrolysis/gas chromatography/mass spectrometry to the analysis of kiwi mucilage. *Ital J. Food Sci.,* 5 (1993) 379-386; *C.A.*, 121 (1994) 81194h.

639 Lagoudaki, M. and Demertzis, P.G.: Equilibrium moisture characteristics of dehydrated food constituents as studied by a modified inverse gas chromatographic method. *J. Sci. Food Agric.,* 65 (1994) 101-109; *C.A.*, 121 (1994) 7623f.

See also 203, 210, 220, 241, 295, 302, 315, 333, 337, 340, 344, 353, 355, 365, 368, 374, 378, 379, 384, 388, 401, 402, 403, 435, 468, 470, 483, 487, 499, 503, 506, 508, 513, 517, 525, 530, 531, 532, 545, 546, 549, 606, 696.

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

640 Casabianca, H. and Graff, J.B.: Enantiomeric and isotopic analysis of flavour compounds of same raspberry cultivars. *J. Chromatogr. A,* 684 (1994) 360-365.

641 Coleman, W.M.III., White, J.L. and Perfetti, T.A.: A hyphenated GC-based quantitative analysis of volatile materials from natural products. *J. Chromatogr. Sci.,* 32 (1994) 323-327.

642 Da Silva, M.A.A.P., Elder, V., Lederer, C.L., Lundahl, D.S. and McDaniel, M.R.: Flavor properties and stability of a corn-based snack: relating sensory, gas chromatography, and mass spectrometry data. *Dev. Food Sci.,* 33 (1993) 707-738; *C.A.*, 121 (1994) 81433k.

643 De Maria, C.A.B., Trugo, L.C., Moreira, R.F.A. and Werneck, C.C.: Composition of green coffee fractions and their contribution to the volatile profile formed during roasting. *Food Chem.,* 50, No. 2 (1994) 141-145; *C.A.*, 121 (1994) 7601x.

644 Herraiz, T. and Ough, C.S.: Separation and characterization of 1,2,3,4-tetrahydro-β-carboline-3-carboxylic acids by HPLC and GC-MS. Identification in wine samples. *Am. J. Enol. Vitic.,* 45 (1994) 92-101; *C.A.*, 121 (1994) 81198n.

645 Jirovetz, L., Buchbauer, G. and Nikiforov, A.: (Applications of gas chromatography-FTIR-mass spectrometry in analysis of natural products.) *GIT Fachz. Lab.,* 38 (1994) 449-450; *C.A.*, 121 (1994) 72707a - a review with 10 refs.

646 Karwowska, K. and Wilczynska, G.: (Interactions between plant aroma extracts and soybean protein during three basic thermal treatments. II. Gas chromatographic studies of the interactions between extracts of natural spices and soybean protein.) *Pr. Inst. Lab. Badaw. Przem. Spozyw.,* 48 (1993) 69-90; *C.A.*, 121 (1994) 56172s.

647 Michel, G., Tsaconas, C., Guyot, J.-L. and Prost, M.: Analytical methodology in expert evaluation. Abnormal taste problems in wines. *Ann. Falsif. Expert. Chim. Toxicol.,* 86 (1993) 337-356; *C.A.*, 121 (1994) 7518a - a review with 11 refs.

648 Moshonas, M.G. and Shaw, P.E.: Quantitative determination of 46 volatile constituents in fresh, unpasteurized orange juices using dynamic headspace gas chromatography. *J. Agric. Food Chem.,* 42 (1994) 1525-1528.

649 Raghavan, S.K., Connell, D.R. and Khayat, A.: Canola oil flavor quality evaluation by dynamic headspase gas chromatography. *ACS Symp. Ser.,* 558 (1994) 292-300; *C.A.*, 121 (1994) 132620d.

650 Raghavan, S.K., Connell, D.R. and Khayat, A.: Capillary gas chromatography procedure for determining olive oil flavor. *ACS Symp. Ser.,* 558 (1994) 315-324; *C.A.*, 121 (1994) 132622f.

651 Salinas, M.R., Alonso, G.L. and Esteban-Infantes, F.J.: Adsorption-thermal desorption gas chromatography applied to the determination of wine aromas. *J. Agric. Food Chem.,* 42 (1994) 1328-1331.

652 Xiong, Y., Zhang, Y. and Li, X.: (Rapid headspace gas chromatographic determination of ester aroma of Shanxi old vinegar.) *Shipin Yu Faijao Gongye,* 6 (1993) 45-48; *C.A.*, 121 (1994) 56069p.

653 Zhou Yu, Wei Hong, Wu Tiansong and Lin Yaping: (Analysis of aroma components of oolong tea "TIKUANYIN" by gas chromatography/mass spectrometry (GC/MS).) *Chin. J. Chromatogr.,* 12 (1994) 355-357.

See also 334, 459.

## 35. ENVIRONMENTAL ANALYSIS

### *35a. General papers and reviews*

654 Abeel, S.M., Vickers, A.K. and Decker, D.: Trends in purge and trap. *J. Chromatogr. Sci.,* 32 (1994) 328-338.

655 Alcock, R.E., Halsall, C.J., Harris, *C.A.*, Johnston, A.E., Lead, W.A., Sanders, G. and Jones, K.C.: Contamination of environmental samples prepared for PCB analysis. *Environ. Sci. Technol.,* 28 (1994) 1838-1842.

656 Hennion, M.-C., Pichon, V. and Barceló: Surface water analysis (trace-organic contaminants) and EC regulations. *TrAC,* 13 (1994) 361-372.

657 Voice, T.C. and Kolb, B.: Comparison of European and American techniques for the analysis of volatile organic compounds in environmental matrices. *J. Chromatogr. Sci.,* 32 (1994) 306-311.

See also 17, 51, 303.

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

658 Gehrig, R., Herzog, A. and Hofer, P.: (Volatile organic compounds (VOC) in air. Measurement and data interpretation.) *Chimia,* 48 (1994) 182-186; *C.A.*, 121 (1994) 116347q.

659 Hildemann, L.M., Mazurek, M.A., Cass, G.R. and Simoneit, B.R.T.: Seasonal trends in Los Angeles ambient organic aerosol observed by high-resolution gas chromatography. *Aerosol Sci. Technol.,* 20 (1994) 303-317; *C.A.*, 121 (1994) 64348u.

660 Leichnitz, K.: Determination of organic solvent vapors in indoor air using charcoal adsorption and gas chromatography. *IARC Sci. Publ.,* 109 (1993) 211-220; *C.A.*, 121 (1994) 41558y.

661 Pavlov, V.N., Nikolaeva, T.D., Nazarov, A.G. and Troitskaya, O.E.: (Determination of micro-impurities of organic substances and their physical properties.) *Gig. Sanit.,* 9 (1993) 69-70; *C.A.*, 120 (1994) 338096a.

662 Pellizzari, E.D., Sheldon, L., Keever, J., Whitaker, D. and Wallace, L.: Determination of airborne organic compounds using Tenax GC and gas chromatography-mass spectrometry. *IARC Sci. Publ.,* 109 (1993) 196-210; *C.A.*, 121 (1994) 41557x.

663 Pozhidaev, V.M., Pozhidaeva, K.A. and Orlova, L.A.: (Gas-chromatographic determination of methyl chlorocarbonate in ambient air.) *Gig. Sanit.,* 6 (1993) 69-70; *C.A.*, 120 (1994) 329941v.

664 Smith, D.F., Kleindienst, T.E., Hudgens, E.E. and Bufalini, J.J.: Measurement of organic atmospheric transformation products by gas chromatography. *Intern. Environ. Anal. Chem.,* 54 (1994) 265-281.

See also 53, 208, 213, 215, 221, 228, 239, 242, 245, 246, 256, 260, 288, 298, 311, 316, 352, 354, 408, 430, 432, 433, 439, 457, 463, 501, 509, 677, 713.

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

665 De Voogt, P.: Chromatographic clean-up methods for the determination of persistent organic compounds in aqueous environmental samples. *TrAC,* 13 (1994) 389-397.

666 Gawlowski, J., Gierczak, T. and Niedzielski, J.: Identification of volatile organics in Warsaw tap water. *Chem. Anal. (Warsaw),* 39 (1994) 423-430.

667 Hu, X., Guo, H. and Cao, J.: (Identification of chemical warfare agents and their hydrilysis products in water.) *Junshi Yixue Kexueyuan Yuankan,* 18 (1994) 28-29; *C.A.*, 121 (1994) 2696x.

668 Klemp, M., Peters, A. and Sacks, R.: High-speed GC analysis of VOCs: Sample collection and inlet systems. *Environ. Sci. Technol.,* 28 (1994) 369-377.

669 Reemtsma, T. and Jekel, M.: Improving GC-MS screening analysis by functional-group-related silica gel fractionation of industrial wastewater extracts. *J. High Resolut. Chromatogr.,* 17 (1994) 589-592.

670 Schlegelmilch, F.: Purge and Trap-Apparatur. Online-Anreicherung von Schadstoffen aus Wasser. *LaborPraxis,* 18, No. 4 (1994) 18-24.

671 Young, M.S. and Uden, P.C.: Byproducts of the aqueous chlorination of purines and pyrimidines. *Environ. Sci. Technol.,* 28 (1994) 1755-1758.

See also 66, 163, 164, 212, 215, 216, 231, 232, 233, 235, 248, 250, 253, 283, 289, 290, 292, 297, 300, 319, 364, 435, 465, 496, 497, 498, 505, 520, 522, 523, 528, 534, 547, 676, 697.

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

672 Kimbrough, D.E., Chin, R. and Wakakuwa, J.: Wide-spread and systematic errors in the analysis of soils for polychlorinated biphenyls. Part 3. Gas chromatography. *Analyst (Cambridge),* 119 (1994) 1293-1301.

673 Saiz-Jimenez, C., Hermosin, B. and Ortega-Calvo, J.J.: Pyrolysis/methylation: A microanalytical method for investigating polar organic compounds in cultural properties. *Intern. J. Environ. Anal. Chem.,* 56 (1994) 63-71.

674 Wang, Z., Fingas, M. and Sergy, G.: Study of 22-year-old *Arrow* oil samples using biomarker compounds by GC/MS. *Environ. Sci. Technol.,* 28 (1994) 1733-1745.

See also 183, 205, 226, 230, 233, 238, 243, 257, 285, 328, 462, 471, 480, 482, 518, 521, 535, 537, 541, 550, 551, 684.

## 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

### *36a. Surfactants*

675 Rasmussen, H.T., Pinto, A.M., DeMouth, M.W., Tourezky, P. and McPherson, B.P.: High temperature gas chromatography of trimethylsilyl derivatives of alcohol ethoxylates and ethoxysulfates. *J. High Resolut. Chromatogr.,* 17 (1994) 593-596.

676 Yamini, Y. and Ashraf-Khorassani, M.: Extraction and determination of linear alkylbenzenesulfonate detergents from the aquatic environment using a membrane disk and gas chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 634-638.

*36b. Antioxidants and preservatives*

677 Pfäffli, P.: Determination of low concentrations of trimellitic anhydride in air. *J. Chromatogr. A,* 684 (1994) 269-275.

678 Pleshkova, A.P. and Volkovich, S.V.: (Gas chromatographic-mass spectrometric identification of impurities in recycled 2-ethylhexanol of di-2-ethylhexyl phthalate plasticizer production.) *Zh. Anal. Khim.,* 48 (1993) 1999-2007.

679 Van Leuken, R., Mertens, M., Janssen, H.-G., Sandra, P., Kwakkenbos, G. and Deelder, R.: Optimization of capillary SFC-MS for the determination of additives in polymers. *J. High Resolut. Chromatogr.,* 17 (1994) 573-576.

680 Yasuhara, A.: Determination of tris(2-chloroethyl) phosphate in leachates from landfills by capillary gas chromatography using flame photometric detection. *J. Chromatogr. A,* 684 (1994) 366-369.

See also 286, 441, 560.

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

681 Anton, K., Bach, M., Berger, C., Walch, F., Jaccard, G. and Carlier, Y.: From potential to practice: Relevant industrial applications of packed-column supercritical fluid chromatography. *J. Chromatogr, Sci.,* 32 (1994) 430-438.

682 Breas, O., Fourel, F. and Martin, G.J.: $^{13}C$ Analysis of aromas and perfumes by a coupled GC-IRMS technique. The case of vanillin and leaf alcohol extracts. *Analusis,* 22 (1994) 268-272.

683 Buchbauer, G., Nikiforov, A. and Remberg, B.: Headspace constituents of opium. *Planta Med.,* 60 (1994) 181-183; *C.A.,* 121 (1994) 51653q.

684 Chiavari, G., Torsi, G., Fabbri, D. and Galletti, G.C.: Comparative study of humic substances in soil using pyrolytic techniqeus and other conventional chromatographic methods. *Analyst (Cambridge),* 119 (1994) 1141-1150.

685 Gerard, L., Elie, M. and Landais, P.: Analysis of confined pyrolysis effluents by thermodesorption-multidimensional gas chromatography. *J. Anal. Appl. Pyrolysis,* 29 (1994) 137-152; *C.A.,* 121 (1994) 160417m.

686 Grob, K. and Siegrist, C.: Determination of mineral oil on jute bags by 20-50 µl splitless injection onto a 3 m capillary column. *J. High Resolut. Chromatogr.,* 17 (1994) 674-675.

687 Hu Guodong, Cheng Jinsong and Zhu Ye: (Quantitative determination of free organic acids in Chinese liquors.) *Chin. J. Chromatogr.,* 12 (1994) 265-267.

688 Kubias, B., Wolf, H. and Jacobi., B.: (Online GC analysis of the products formed in the catalytic oxidation of $n$-$C_4$ hydrocarbons under steady-state and non-stationary conditions.) *Chem. Tech. (Leipzig),* 46 (1994) 63-70; *C.A.,* 121 (1994) 38003g.

689 Matsuyama, Y., Sakamo, T., Ohnishi, K., Fujiwara, N. and Matsuyama, K.: (Examination of several factors relative to the volatilization and fixation of perfume using headspace gas chromatography.) *J. SCCJ,* 28, No. 1 (1994) 31-37; *C.A.,* 121 (1994) 141199a.

690 Pruitt, D.S. and Hardy, D.R.: Analysis of reactants that lead to thermal instability deposits in aviation jet fuels. *Fuel Sci. Technol. Int.* 12, No. 7-8 (1994) 1035-1049; *C.A.,* 121 (1994) 61029e.

691 Salz-Jimenez, C.: Analytical pyrolysis of humic substances: Pittfalls, limitations, and possible solutions. *Environ. Sci. Technol.,* 28 (1994) 1773-1780.

692 Sommerville, B.A., McCormick, J.P. and Broom, D.M.: Analysis of human sweat volatiles: an example of pattern recognition in the analysis and interpretation of gas chromatograms. *Pestic. Sci.,* 41 (1994) 365-368; *C.A.,* 121 (1994) 152473m.

693 Srinivasan, S.K. and Reddy, G.O.: GC-MS analysis of the nitration products in the preparation of the nitro musk. *Indian Perfum.,* 37 (1993) 344-363; *C.A.,* 121 (1994) 141198z.

694 Takekoshi, Y., Mitsui, T., Kanno, S., Kawase, S., Kiho, T. and Ukai, S.: (Determination of blending ratio cotton and polyester blended yarn by means of multivariate analysis of acid-catalysed pyrolysis gas chromatography data.) *Jpn. J. Toxicol. Environ. Health,* 40 (1994) 55-60; *C.A.,* 120 (1994) 317414n.

695 Xie, K.-C., Li, W.-Y. and Zhu, S.-Y.: Pyrolysis studies on coal macerals using DTA-GC, $^{13}C$-NMR and SEM techniques. *Fuel Sci. Technol. Int.,* 12 (1994) 1159-1168; *C.A.,* 121 (1994) 160526w.

See also 23, 30, 140, 149, 199, 200, 206, 210, 218, 219, 224, 252, 262, 264, 265, 267, 268, 287, 309, 343, 349, 358, 373, 404, 436, 441, 489, 638.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

696 Salvadores, M.P., Diaz, M.E. and Cardell, E.: (Autochthonous yeasts isolated in Tenerife wines and their influence on ethyl acetate and higher alcohol concentrations analyzed by gas chromatography.) *Microbiologia (Madrid),* 9, No. 2 (1993) 107-112; *C.A.,* 121 (1994) 53573n.

See also 339, 387.

38. INORGANIC COMPOUNDS

*38b. Anions*

697 Cui, X., Wang, Z., Xu, G. and Jia, Y.: (Determination of bromide concentration in seawater by gas chromatographic method.) *Haiyang Yu Huzhao,* 24 (1993) 414-419; *C.A.,* 121 (1994) 65070j.

698 Kage, S., Nagata, T. and Kudo, K.: (Determination of cyanide in blood by GC-ECD and GC-MS.) *Hochudoku,* 12 (1994) 130-131; *C.A.,* 121 (1994) 101388e.

699 Odoul, M., Fouillet, B., Nouri, B., Chambon, R. ana Chambon, P.: Specific determination of cyanide in blood by headspace gas chromatography. *J. Anal. Toxicol.,* 18 (1994) 205-207; *C.A.,* 121 (1994) 101360q.

See also 75.

*38c. Permanent and rare gases*

700 Cardeal, Z.L., Pradeau, D. and Hamon, M.: (Analysis of carbon monoxide and hydrocyanic acid by gas chromatography using chemical generators for standardization.) *Ann. Falsif. Expert. Chim. Toxicol.,* 87, No. 925 (1994) 49-63; *C.A.,* 121 (1994) 101338p.

701 Gao, X.: (Gas chromatography-flame ionization device for detection of microquantity oxygen.) *Faming Zhuanli Shenqing Gongkai Shuomingsu,* CN 1,080,724 (Cl. G01N30/02), 12 Jan. 1994, Appl. 92,104,833, 22 Jun. 1992; 7 pp.; *C.A.,* 120 (1994) 337993d.

702 Lechner-Fish, T.J., Lund, M.J. and Ryder, S.L.: Analysis of highly reactive process streams using multidimensional GC. *Int. Lab.,* 24, No. 8 (1994) 4-10.

703 Nagamine, K.: Origin and coseismic behavior of mineral spring gas at Byakko, Japan, studied by automated gas chromatographic analyses. *Chem. Geol.,* 114 (1994) 3-17; *C.A.,* 121 (1994) 14315k.

704 Shinozaki, T., Tsunemi, A., Isomura, S., Nagasaka, K. and Tashiro, H.: (Measurements of the *ortho-para* ratio in the *para*-hydrogen Raman laser by gas chromatography.) *Reza Kagaku Kenkyu,* 15 (1993) 85-87; *C.A.,* 121 (1994) 25754d.

See also 27, 70, 86, 92, 199, 710, 716.

*38d. Volatile inorganic compounds*

705 Arakelyan, V.G.: (Gas chromatography in diagnostic of high-voltage equipment.) *Elektrotekhnika,* 2 (1994) 8-17; *C.A.,* 121 (1994) 72759u.

706 Burdge, J.R., Cai, Z., Papillon, J. and Farwell, S.: A novel focusing injection technique for chemiluminescent detection of volatile sulfur compounds separated by HRGC. *J. High Resolut. Chromatogr.,* 17 (1994) 695-699.

707 Fu, Z., Feng, D., Ren, J., Wu, M. and Xie, X.: (Determination of trace iodine in table salt by head space gas chromatography.) *Zhonghua Yufang Yixue Zazhi,* 28, No. 1 (1994) 44-46; *C.A.,* 121 (1994) 107027h.

708 Fujiwara, Y., Tosaka, S. and Ito, T.: (A method of $NO_x$ analysis using small quantities sample gas.) *Kenkyu Kiyo - Hokkaido Kogyo Daigaku,* 22 (1994) 75-82; *C.A.,* 121 (1994) 116350k.

709 Kadkhodayan, B.: Online gas chromatographic studies of rutherfordium (element 104), hahnium (element 105) and homologs. Avail. *Univ. Microfilms Int.,* Order No. DA9408023, 1993, 176 pp.; *C.A.,* 121 (1994) 25720q.

710 Lechner-Fish, T.J., Lund, M.J. and Ryder, S.L.: Analysis of highly reactive process streams using multidimensional GC. *Am. Lab. (Shelton),* 26 (1994) 28S-28W.

711 Leone, A.M., Gustafsson, L.E., Francis, P.L., Persson, M.G., Wiklund, N.P. and Moncada, S.: Nitric oxide is present in exhaled breath in humans: direct GC-MS confirmation. *Biochem. Biophys. Res. Commun.,* 201 (1994) 883-887; *C.A.,* 121 (1994) 31679z.

712 Nishizawa, T.: (Analysis of gas in a liquid.) *Jpn. Kokai Tokkyo Koho* JP 05,264,526 [93,264,526] (Cl. G01N30/04), 12 Oct. 1993, Appl. 92/64,363, 23 Mar. 1992, 4 pp.; *C.A.,* 120 (1994) 338126k.

713 Wang, G., Cao, Y., Jiang, X. and Xian, Y.: (Determination of phosphine in air by flame-photometric gas chromatography.) *Weisheng Yanjiu,* 23, No. 2 (1994) 65-67; *C.A.,* 121 (1994) 116336k.

714 Yu, A., Yang, G., Wang, R. and Jin, Q.: (A new method for on-site determination of carbon dioxide in air.) *Gaodeng Xuexiao Huaxue Xuebao,* 15, No. 1 (1994) 47-48; *C.A.,* 121 (1994) 16773g.

See also 27, 36, 38, 92, 481, 700, 702.

## 39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

715 Leclerc, F., Deruaz, D., Bannier, A. and Brazier, J.L.: Limit of detection of $^{13}C$ using an atomic emission detector (MIP) coupled to gas chromatography. *Anal. Lett.,* 27 (1994) 1325-1338.

716 Sohns, E., Gerling, P. and Faber, E.: Improved stable nitrogen isotope ratio measurements of natural gases. *Anal. Chem.,* 66 (1994) 2614-2620.

See also 38, 130, 363.

# Planar Chromatography

## 1. REVIEWS AND BOOKS

1 An, D. and Liu, W.: (Pharmaceutical analysis in China). *Fenxi Shiyanshi,* 13 (1994) 83-110; *C.A.,* 121 (1994) 117841h - a review with 935 refs.

2 Maslowska, J. and Zakrzewski, W.: (Difficulties and methods for overcoming them in the chromatographic separation of $Fe^{3+}$, $Cr^{3+}$, and $Al^{3+}$ ion mixtures). *Zesz. Nauk.-Politech. Lodz., Technol. Chem. Spozyw.,* 589, No. 46 (1993) 107-144; *C.A.,* 121 (1994) 147761z - review with 98 refs.

3 Potuzak, M., Turan, J. and Matejek, S.: (Use of chromatography on a thin layer for pharmaceutical control. I. Technique of thin-layer chromatography). *Ceska Slov. Farm.,* 43 (1994) 128-135; *C.A.,* 121 (1994) 141802s - a review with 55 refs.

See also 35, 165.

## 2. FUNDAMENTALS, THEORY AND GENERAL

### *2a. General*

4 Busch, K.L.: Cost analysis of determinations with planar chromatography and column chromatography. *J. Planar Chromatogr.,* 7 (1994) 318-321.

5 Nyiredy, S. and Fatér, Z.: The elimination of typical problems associated with overpressured layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 329-333.

See also 169.

### *2b. Thermodynamics and theoretical relationships*

6 Kowalska, T. and Klama, B.: On the mechanism of retention in adsorption TLC with aliphatic alcohol - *n*-hexane eluents. *J. Planar Chromatogr.,* 7 (1994) 147-152.

7 Soczewinski, E. and Maciejewicz, W.: The eluent strength of homologous series of ethers and ketones in normal phase thin layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 153-156.

See also 24, 147.

### *2c. Relationship between structure and chromatographic behaviour*

8 Biagi, G.L., Barbaro, A.M. and Recanatini, M.: Determination of lipophilicity by means of reversed-phase thin-layer chromatography. III. Study of the TLC equations for a series of ionizable quinolone derivatives. *J. Chromatogr. A,* 678 (1994) 127-137.

9 Pyka, A.: The topological indices and $R_M$ values of benzoic acid derivatives: a structure - activity investigation, part IV. *J. Planar Chromatogr.,* 7 (1994) 108-116.

10 Yang, W., Han, S., Liu, Y., Wang, J. and Xie, H.: (Relationship between structure of porphyrin derivatives and its $R_f$ values in thin-layer chromatography). *Sepu,* 12 (1994) 134-136; *C.A.,* 121 (1994) 169297e.

See also 118, 210.

### *2d. Measurement of physico-chemical and related values*

11 Merkku, P., Yliruusi, J., Vuorela, H. and Hiltunen, R.: Determination of specific heats and adsorption energies of ternary TLC eluents and silica gel. *J. Planar Chromatogr.,* 7 (1994) 305-308.

See also 149.

## 3. GENERAL TECHNIQUES

### *3a. Apparatus and accessories*

See 192.

### *3b. Detectors and detection reagents*

12 Bonnier, H., Delvordre, P. and Postaire, E.: Preliminary results of a collaborative study of overpressured derivatization. *J. Planar Chromatogr.,* 7 (1994) 117-121.

13 Nagatsuka, S., Ueda, K., Ninomiya, S. and Esumi, Y.: (Application of bioimage analyzer on drug metabolism studies using thin layer chromatography. (I). Performance of the system coupled to an image analyzer). *Yakubutsu Dotai,* 8 (1993) 1261-1271; *C.A.,* 121 (1994) 103106k.

14 Wu, N. and Huie, C.W.: Factors influencing peroxyoxalate chemiluminescence detection in thin layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 88-94.

15 Zhang, B., Shen, H. and Li, L.: (Use of ninhydrin as a spray reagent for the detection of 33 common basic drugs of thin-layer chromatograms). *Huaxi Yaoxue Zazhi,* 8 (1993) 26-28; *C.A.,* 121 (1994) 164109k.

See also 34, 96, 206.

### *3c. Sorbents and columns, packing procedures*

16 Kriz, D., Kriz, C.B., Andersson, L.I. and Mosbach, K.: Thin-layer chromatography based on the molecular imprinting technique. *Anal. Chem.,* 66 (1994) 2636-2639.

See also 52, 101, 207.

*3d. Quantitative analysis*

17 Aginsky, V.N.: A new version of the internal standard method in quantitative thin layer chromatography. *J. Planar Chromatogr.*, 7 (1994) 309-314.
18 Sun, S.W., Fabre, H. and Maillols, H.: Test procedure validation for the TLC assay of a degradation product in a pharmaceutical formulation. *J. Liq. Chromatogr.*, 17 (1994) 2495-2509.

See also 152.

*3e. Preparative scale chromatography*

19 Matysik, G., Soczewinski, E. and Polak, B.: Improvement of separation in zonal preparative thin-layer chromatography by gradient elution. *Chromatographia*, 39 (1994) 497-504.

See also 83, 95, 187.

*3f. Programmed temperature, pressure, vapors, gradients*

See 19, 25.

*3g. High performance procedures*

See 26, 27, 116.

4. SPECIAL TECHNIQUES

*4a. Automation*

20 Buhlmann, R., Carmona, J., Donzel, A., Donzel, N. and Gil, J.: An open software environment to optimize the productivity of robotized laboratories. *J. Chromatogr. Sci.*, 32 (1994) 243-248.

See also 116.

*4b. Computerization and modelling*

21 Dessy, R.E.: Chromatography and computers: a decade of direction and discontent. *J. Chromatogr. Sci.*, 32 (1994) 209-212.
22 Lysakowski, R.: Standards for chromatographic data communications, storage, and archiving. *J. Chromatogr. Sci.*, 32 (1994) 236-242.
23 Podgórny, A. and Kowalska, T.: Physico-chemical modeling of solute retention in reversed phase liquid chromatography with acetonitrile - phosphate buffer eluents. *J. Planar Chromatogr.*, 7 (1994) 291-293.
24 Podgórny, A. and Kowalska, T.: Physico-chemical modeling of solute retention in reversed phase liquid chromatography with tetrahydrofuran-phosphate buffer and acetone-phosphate buffer eluents. *J. Planar Chromatogr.*, 7 (1994) 217-220.
25 Qin-Sun, W., Bing-Wen, Y. and Zhi-Chao, Z.: Computer-assisted optimization of mobile phase composition in stepwise gradient HPTLC. *J. Planar Chromatogr.*, 7 (1994) 229-232.

See also 110, 193.

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

26 Fong, A. and Hieftje, G.M.: Near-IR spectroscopic examination of thin-layer chromatography plates in the diffuse transmittance mode. *Appl. Spectrosc.*, 48 (1994) 394-399; *C.A.*, 121 (1994) 98678s.
27 Koglin, E.: Combining TLC (HPTLC) and SERS. *GIT Fachz. Lab.*, 38 (1994) 627-632; *C.A.*, 121 (1994) 72718e.
28 Yamamoto, H., Ichimura, K., Nakamura, K., Maeda, T., Tajima, T. and Wada, K.: (Concentration and transfer methods for a thin-layer chromatography plate, and a liquid-chromatography/IR measuring method. *U.S.* US 5,306,645 (Cl. 436-162; G01N30/94), 26 Apr. 1994, JP Appl. 90/23,409, 31 Jan. 1990; 10 pp.; *C.A.*, 121 (1994) 49339y.
29 Yao, Z., Wen, H., Zha, Q., He, W. and Zhao, S.: Direct analysis of samples on paper by fast-atom bombardment mass spectrometry. *Rapid Commun. Mass Spectrom.*, 8 (1994) 481-483; *C.A.*, 121 (1994) 169322j.

See also 41, 56, 87, 143, 150, 159, 211.

*4g. Enantiomers, separation*

30 Lepri, L., Coas, V. and Desideri, P.G.: Planar chromatography of optical and structural isomers with eluents containing modified β-cyclodextrins. *J. Planar Chromatogr.*, 7 (1994) 322-326.
31 Lepri, L., Coas, V., Desideri, P.G. and Zocchi, A.: The mechanism of retention of enantiomeric solutes on silanized silica plates eluted with albumin solutions. *J. Planar Chromatogr.*, 7 (1994) 103-107.

See also 16, 37, 121.

*4h. Other special techniques*

32 Sorice, M., Griggi, T., Circella, A., Garofalo, T., d'Agostino, F., Pittoni, V., Pontieri, G.M., Lenti, L. and Valesini, G.: Detection of antiphospholipid antibodies by immunostaining on thin layer chromatography plates. *J. Immunol. Methods*, 173 (1994) 49-54; *C.A.*, 121 (1994) 154999m.

See also 13, 212.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

*5b. Cyclic hydrocarbons, fullerenes*

33 Baranowska, I., Szeja, W. nad Wasilewski, P.: The analysis of polycyclic aromatic hydrocarbons in soil extracts by adsorption and reversed phase thin layer chromatography. *J. Planar Chromatogr.*, 7 (1994) 137-141.
34 Guilleux, J.C., Barnouin, K.N., Ricchiero, F.A. and Lerner, D.A.: Two-dimensional TLC and fluorescence analysis with CCD video camera used to determine the dissociation of diphenylhexatriene included in β-cyclodextrin. *J. Liq. Chromatogr.*, 17 (1994) 2821-2831.

See also 117.

*5c. Halogen derivatives*

See 53.

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

35 Herold, A.: A review of the uses of planar chromatography in the coal and oil industries. *J. Planar Chromatogr.,* 7 (1994) 180-196 - a review with 137 refs.

36 Marynowski, L., Fabianska, M. and John, A.: TLC study of the compound groups present in bituminous substrances. *J. Planar Chromatogr.,* 7 (1994) 122-125.

6. ALCOHOLS

37 Kim, J.-H., Uzawa, H., Nishida, Y., Ohrui, H. and Meguro, H.: Highly sensitive high-performance liquid chromatographic method for the determination of the absolute configuration and the optical purity of di-O-acylglycerols using a chiral derivatizing agent, (S)-(+)-2-*tert.*-butyl-2-methyl-1,3-benzodioxole-4-carboxylic acid. *J. Chromatogr. A,* 677 (1994) 35-43.

38 Multzsch, R., Lokotsch, W., Steffen, B., Lang, S., Metzger, J.O., Schäfer, H.J., Warwel, S. and Wagner, F.: Enzymatic production and physicochemical characterization of uncommon wax esters and monoglycerides. *J. Am. Oil Chem. Soc.,* 71 (1994) 721-725.

See also 54.

7. PHENOLS

See 30.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

*8a. Flavonoids*

39 Kurkin, V.A., Braslavsky, V.B. and Zapesochnaya, G.G.: (Determination of flavonoids in propolis). *Farmatsiya (Moscow),* 41, No. 1 (1992) 35-39; *C.A.,* 121 (1994) 164088c.

*8b. Aflatoxins and other mycotoxins*

40 Fernandez, C., Stack, M.E. and Musser, S.M.: Determination of deoxynivalenol in 1991 U.S. winter and spring wheat by high-performance thin-layer chromatography. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 628-630.

41 Florianowicz, T.: (Occurence of some mycotoxins in home foods. Part II. A trial of patulin assay in tomato products). *Bromatol. Chem. Toksykol.,* 26 (1993) 307-309; *C.A.,* 121 (1994) 177988w.

42 Mallmann, C.A., Aanturio, J.M., Baldissera, M.A. and von Mickwitz, G.: Determination of ochratoxin A in blood serum of pigs by using thin-layer chromatography. *Rev. Microbiol.,* 25 (1994) 107-111; *C.A.,* 121 (1994) 172378n.

43 Park, D.L., Trucksess, M.W., Nesheim, S., Stack, M. and Newell, R.F.: Solvent-efficient thin-layer chromatographic method for the determination of aflatoxins $B_1$, $B_2$, $G_1$, and $G_2$ in corn and peanuts products: collaborative tudy. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 637-646.

44 Quiroga, N.M., Sola, I. and Varsavsky, E.: Selection of a simple and sensitive method for detecting zearalenone in corn. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 939-941.

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

45 L'vov, Yu.N., Pisareva, N.A. and Sapozhnikov, Yu.M.: (Use of thin-layer chromatography in determination of trace amounts of furan derivatives in insulating oil of electrical equipment). *Elektr. Stn.,* No. 8 (1993) 48-51; *C.A.,* 121 (1994) 112970q.

See also 204.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

46 Neidigh, K.A., Kingston, D.G.I. and Lewis, N.G.: Synthesis of stereospecifically deuterated metaisresinol, podorhizol, epopodorhizol and yatein. *J. Natural Prod.,* 57 (1994) 791-800.

47 Schuck, D.F. and Pavlina, T.M.: Rapid detection of 5-(hydroxymethyl)-2-furfural in parenteral solutions with high-performance thin-layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 242-246.

48 Zhao, C., Li, C. and Ma, P.: (TLC-scanning determination of the rate of decocted cinnamaldehyde in Guizi-liquid compound). *Xibei Daxue Xuebao, Ziran Kexueban,* 24 (1994) 147-150; *C.A.,* 121 (1994) 141375e.

See also 7, 41, 203, 204.

10. CARBOHYDRATES

*10a. Mono and oligosaccharides. Structural studies*

49 Hitomi, J., Park, J.-S., Nishiyama, M., Horinouchi, S. and Beppu, T.: Substrate-dependent change in the pH-activity profile of alkaline endo-1,4-β-glucanase from an alkaline *Bacillus* sp. *J. Biochem. (Tokyo),* 116 (1994) 554-559.

50 Oliveira, F.W., Chavante, S.F., Santos, E.A., Dietrich, C.P. and Nader, H.B.: Appearance and fate of a β-galactanase, α,β-galactosidases, heparan sulfate and chondroitin sulfate degrading enzymes during embryonic development of the mollusc *Pomacea sp. Biochim. Biophys. Acta,* 1200 (1994) 241-248.

See also 12, 61, 82.

11. ORGANIC ACIDS AND LIPIDS

*11a. Organic acids and simple esters*


51 Aarney, D.B., Kapeller, H., Fregapane, G. and Vulfson, E.N.: Chemo-enzymatic synthesis of disaccharide fatty acid esters. *J. Am. Oil Chem. Soc.,* 71 (1994) 711-714.

52 Jozeph, M., Kader, J.-C., Dubacq, J.-P. and Galle, A.-M.: (Facilitation of the separation of fatty acid methyl esters using thin-layer chromatography). *Rev. Fr. Corps Gras.,* 40 (1993) 383-386; *C.A.,* 121 (1994) 103309d.

53 Leont'eva, L.B., Tselinskij, I.V., Biochinova, E.S. and Krauklish, I.V.: (Determination of o-chlorobenzoic acid by peak precipitation paper chromatography). *Izv. Vyssh. Uchebn. Zaved., Khim. Tekhnol.,* 36, No. 12 (1993) 24-26; *C.A.,* 121 (1994) 124373k.

54 Nielsen, M.S., Olsen, C.E., Dich, J., Christensen, S.B. and Grunnet, N.: Metabolism of thapsigargin in rat hepatocytes. *Drug Metab. Disp.,* 22 (1994) 433-437.

55 Robinson, B.S., Johnson, D.W., Ferrante, A. and Poulos, A.: Differences in the metabolism of eicosatetraenoic (20:4(*n*-6)), tetracosatetraenoic (24:4(*n*-6)) and triacontatetraenoic (30:4(*n*-6)) acids in human neutrophils. *Biochim. Biophys. Acta,* 1213 (1994) 325-334.

56 Wolff, S.C. and Kovar, K.-A.: Determination of edetic acid (EDTA) in water by on-line coupling of HPTLC and FTIR. *J. Planar Chromatogr.,* 7 (1994) 286-290.


See also 9, 38, 77, 89.

*11b. Prostaglandins*


57 Barbieri, B., Papadogiannakis, N., Eneroth, P., Hansson, C., Roepstorff, P. and Olding, L.B.: Identification of a substance, previously shown to enhance mitogenesis of human lymphocytes, as the acetamide of *p*-aminobenzoic acid. *Biochim. Biophys. Acta,* 1214 (1994) 309-316.


*11c. Lipids and their constituents*


58 Acquotti, D., Cantu, L., Ragg, E. and Sonnino, S.: Geometrical and conformational properties of ganglioside GalNAc-$G_{D1a}$, IV$^4$GalNAcIV$^3$Neu5AcII$^3$Neu5AcGgOse$_4$Cer. *Eur. J. Biochem.,* 225 (1994) 271-288.

59 Artashov, D.K., Gevantmakher, S.V., Vagina, O.N., Rozmukhamedova, B. and Davranov, K.D.: (Purification and properties of *Penicillium* sp. lipase in aqueous solutions and in reversed micelles in benzene). *Biokhimiya (Moscow),* 59 (1994) 425-433.

60 Avakyan, S.A., Boyaiyan, A.S., Pogosyan, A.G. and Karagezyan, K.G.: (Prostaglandin $D_2$-synthase from bovine brain: purification and physico-chemical properties). *Biokhimiya (Moscow),* 59 (1994) 251-258.

61 Bassi, R., Riboni, L. and Tettamanti, G.: Cultured cerebellar granule cells, but not astrocytes, produce an ester of ganglioside $G_{D1b}$, presumably $G_{D1b}$ monolactone, from exogenous $G_{D1b}$. *Biochem. J.,* 302 (1994) 937-942.

62 Basu, S.S., Dastgheib-Hosseini, S., Hoover, G., Li, Z. and Basu, S.: Analysis of glycosphingolipids by fluorophore-assisteed carbohydrate electrophoresis using ceramide glycanase from *Mercenaria mercenaria. Anal. Biochem.,* 222 (1994) 270-274.

63 Chang, L., Guo, Q., Yu, Z. and Xu, G.: (Chromatographic microanalysis of gangliosides in serum). *Sepu,* 12 (1994) 189-191; *C.A.,* 121 (1994) 152477r.

64 Chiu, T.-h. and Baker, J.J.: Lipoteichoic acid from *Streptococcus sanguis* is a natural glucosyl acceptor for glucosyltransferases. *Biochem. Biophys. Res. Commun.,* 202 (1994) 1407-1412.

65 Deshmukh, G.D., Radin, N.S., Gattone, II, V.H. and Shayman, J.A.: Abnormalities of glycosphingolipid, sulfatide, and ceramide in the polycystic (cpk/cpk) mouse. *J. Lipid Res.,* 35 (1994) 1611-1618.

66 Diez, E., Chilton, F.H., Stroup, G., Mayer, R.J., Winkler, J.D. and Fonteh, A.N.: Fatty acid and phospholipid selectivity of different phospholipase $A_2$ enzymes studied by using a mammalian membrane as substrate. *Biochem. J.,* 301 (1994) 721-726.

67 Dove, S.K., Lloyd, C.W. and Drobak, B.K.: Identification of a phosphatidylinositol 3-hydroxy kinase in plant cells: association with the cytoskeleton. *Biochem. J.,* 303 (1994) 347-350.

68 Dutta, P.C., Helmersson, S., Kebudu, E., Aleman, G. and Appelquist, L.-A.: Variation in lipid composition of niger seed (*Guizotia abyssinica* Cass.) samples from different regions in Ethiopia. *J. Am. Oil Chem. Soc.,* 71 (1994) 839-843.

69 Hechtberger, P., Zinser, E., Saf, R., Hummel, K., Paltauf, F. and Daum, G.: Characterization, quantification and subcellular localization of inositol-containing sphingolipids of the yeast, *Saccharomyces cerevisiae. Eur. J. Biochem.,* 225 (1994) 641-649.

70 Heller, M., Bitikofer, P. and Brodbeck, U.: Generation by limited proteolysis of a catalytically active 39-kDa protein from the 115-kDa form of phosphatidylinositol-glycan-specific phospholipase D from bovine serum. *Eur. J. Biochem.,* 224 (1994) 823-833.

71 Horie, S., Ishii, H., Hara, H. and Kazama, M.: Enhancement of thrombin-thrombodulin-catalysed protein C activation of phosphatidylethanolamine containing unsaturated fatty acids: possible physiological significance of phosphatidylethanolamine in anticoagulant activity of thrombodulin. *Biochem. J.,* 301 (1994) 683-691.

72 Ilinov, P.P., Deleva, D.D., Zaprianova, E.T. and Dimov, S.I.: A method for determination of lipid-bound sialic acid after chromatographic isolation of brain gangliosides. *J. Liq. Chromatogr.,* 17 (1994) 2871-2879.

73 Iwasaki, Y., Niwa, S., Nakano, H., Nagasawa, T. and Yamane, T.: Purification and properties of phosphatidylinositol-specific phospholipase C from *Streptomyces antibioticus. Biochim. Biophys. Acta,* 1214 (1994) 221-228.

74 Jamdar, S.C. and Cao, W.F.: Properties of phosphatidate phosphohydrolase in rat adipose tissue. *Biochem. J.,* 301 (1994) 793-799.

75 Jennemann, R., Schulze, M., Bauer, B.L., Kurtz, C. and Wiegandt, H.: Serum immunoglobulins in Heymann's experimental nephritis modulate binding of properdin and factor-H to sulpho-glycosphingolipids II$^3$SO$_3^{(-)}$-Gg$_3$Cer and III$^3$SO$_3^{(-)}$-,II$^3$SO$_3^{(-)}$-Gg$_3$Cer. *J. Biochem. (Tokyo),* 116 (1994) 450-456.

76 Johnston, N.C. and Goldfine, H.: Isolation and characterization of new phosphatidylglycerol acetals of plasmalogens. A family of ether lipids in Clostridia. *Eur. J. Biochem.,* 223 (1994) 957-963.

77 Kang, J.X., Man, S.F.P., Hirsh, A.J. and Clandinin, M.T.: Characterization of platelet-activating factor binding to human airway epithelial cells: modulation by fatty acids and ion-channel blockers. *Biochem. J.,* 303 (1994) 795-802.

78 Kazuya, I.-P., Hidari, J., Ichikawa, S., Furukawa, K., Yamasaki, M. and Hirabayashi, Y.: β1-4N-Acetylgalactosaminyltransferase can synthesize both asialoglycosphingolipid $G_{M2}$ and glycosphingolipid $G_{M2}$ *in vitro* and *in vivo*: isolation and characterization of a α1-4N-acetylgalactosaminyltransferase cDNA clone from rat ascites hepatoma cell line AH7974F. *Biochem. J.,* 303 (1994) 957-965.

79 Kusunoki, S., Chiba, A., Shimizu, T. and Kanazawa, I.: Unique localization of fucosyl GM1 in rabbit spinal cord and peripheral nerve: Immunohistochemical study using monoclonal anti-fucosyl GM1 antibody CRD73-6. *Biochim. Biophys. Acta,* 1214 (1994) 27-31.

80 Liepkalns, V.A., Myher, J.J., Kuksis, A., Leli, U., Freysz, N. and Hauser, G.: Complementary chromatographic analysis of free diacylglycerols and potential glycerophospholipid precursors in human SH-SY5Y neuroblastoma cells following incubation with lithium chloride. *J. Chromatogr. B,* 658 (1994) 223-232.

81 Lin, L., Zhang, J., Huang, S., He, C., Xu, G. and Tang, J.: (One-dimensional thin-layer chromatographic determination of several phospholipids in amniotic fluid for identifying fetal lung maturity). *Sepu,* 112 (1994) 171-172; *C.A.,* 121 (1994) 152476q.

82 Marquez-Ruiz, G., Perez-Camino, M.C., Rios, J.J. and Dobarganes, M.C.: Characterization of sucrose polyesters-triacylglycerols mixtures. *J. Am. Oil Chem. Soc.,* 71 (1994) 1017-1020.

83 Matsubara, T., Iida-Tanaka, N., Kamekura, M., Moldoveanu, N., Ishizuka, I., Onishi, H., Hayashi, A. and Kates, M.: Polar lipids of a non-alkaliphilic extremely halophilic Archaebacterium strain 172: a novel bis-sulfated glycolipid. *Biochim. Biophys. Acta,* 1214 (1994) 97-108.

84 Meivar-Levy, I., Horowitz, M. and Futerman, A.H.: Analysis of glucocerebrosidase activity using N-(1-[$^{14}$C]hexanoyl)-D-*erythro*-glucosylspingosine demonstrates a correlation between levels of residual enzyme activity and the type of Gaucher disease. *Biochem. J.,* 303 (1994) 377-382.

85 Momoeda, M., Cui, Y., Sawada, Y., Taketani, Y., Mizuno, M. and Iwamori, M.: Pseudopregnancy-dependent accumulation of cholesterol sulfate due to up-regulation of cholesterol sulfotransferase and concurrent down-regulation of cholesterol sulfate sulfatase in the uterine endometria of rabbits. *J. Biochem. (Tokyo),* 116 (1994) 657-662.

86 Parr, M.J., Ansell, S.M., Choi, L.S. and Cullis, P.R.: Factors influencing the retention and chemical stability of poly(ethylene glycol)-lipid conjugates incorporated into large unilamellar vesicles. *Biochim. Biophys. Acta,* 1195 (1994) 21-30.

87 Przybylski, R. and Eskin, N.A.M.: Two simplified approaches to the analysis of cereal lipids. *Food Chem.,* 51 (1994) 231-235; *C.A.,* 121 (1994) 178048b.

88 Ragolia, L. and Tropp, B.E.: The effects of phosphoglycerides on *Escherichia coli* cardiolipin synthase. *Biochim. Biophys. Acta,* 1214 (1994) 323-332.

89 Ranheim, T., Gedde-Dahl, A., Rustan, A.C. and Drevon, C.A.: Effect of chronic incubation of CaCo-2 cells with eicosapentanenoic acid (20:5, *n*-3) and oleic acid (18:1, *n*-9) on triacylglycerol production. *Biochem. J.,* 303 (1994) 155-161.

90 Reddy, S.Y. and Prabhakar, J.V.: Confectionery fat from Phulwara (*Madhuca butyracea*) butter. *Fat Sci. Technol.,* 96 (1994) 387-390.

91 Robson, K.J., Stewart, M.E., Michelsen, S., Lazo, N.D. and Downing, D.T.: 6-Hydroxy-4-sphingenine in human epidermal ceramides. *J. Lipid Res.,* 35 (1994) 2060-2068.

92 Rüstow, B., Kolleck, I., Guthmann, F., Haupt, R., Kunze, D. and Stvens, P.: Synthesis and secretion of plasmalogens by type-II pneumocytes. *Biochem. J.,* 302 (1994) 665-668.

93 Shimada, Y., Maruyama, K., Okazaki, S., Nakamura, M., Sugihara, A. and Tominaga, Y.: Enrichment of polyunsaturated fatty acids with *Geotrichum candidum* lipase. *J. Am. Oil Chem. Soc.,* 71 (1994) 951-954.

94 Shishikura, A., Fujimoto, K., Suzuki, T. and Arai, K.: Improved lipase-catalyzed incorporation of long-chain fatty acids into medium-cain triglycerides assisted by supercritical carbon dioxide extraction. *J. Am. Oil Chem. Soc.,* 71 (1994) 961-967.

95 Sprott, G.D., Ferrante, G. and Ekiel, I.: Tetraether lipids of *Methanospirillum hungatei* with head groups consisting of phospho-N,N-dimethylaminopentanetetrol, phospho-N,N,N-trimethylaminopentanetetrol, and carbohydrates. *Biochim. Biophys. Acta,* 1214 (1994) 234-242.

96 Taki, T., Handa, S. and Ishikawa, D.: Blotting of glycolipids and phospholipids from a high-performance thin-layer chromatogram to a polyvinylidene difluoride membrane. *Anal. Biochem.,* 221 (1994) 312-316.

97 Teneberg, S., Jovall, P.-A., Karlsson, H., Sjögren, H.-O. and Brodin, T.: Isolation and characterization of a rat testis glycosphingolipid based on gangliotetraosylceramide and having a blood group B determinant extended with β3-linked N-acetylgalactosamine. *J. Biochem. (Tokyo),* 116 (1994) 697-703.

98 Teneberg, S., Willemsen, P.T.J., de Graaf, F.K., Stenhagen, G., Pimlott, W., Jovall, P.-A., Angström, J. and Karlsson, K.-A.: Characterization of gangliosides of epithelial cells of calf small intestine, with special reference to receptor-active sequences for enteropathogenic *Escherichia coli* K99. *J. Biochem. (Tokyo),* 116 (1994) 560574.

99 Yohe, H.C.: Removal of borate from tritiated gangliosides *via* the mannitoborate complex. *J. Lipid Res.,* 35 (1994) 2100-2102.

See also 32, 55, 131.

## 12. ORGANIC PEROXIDES

100 Esser, Q. and Klockow, D.: Detection of hydroperoxides in combustion aerosols by supercritical fluid extraction coupled to thin-layer chromatography. *Mikrochim. Acta,* 113 (1994) 373-379; *C.A.,* 121 (1994) 116452v.

See also 187.

## 13. STEROIDS

### *13a. General techniques*

101 Srinivas, B. and Srinivasulu, K.: Thin layer chromatographic studies of some steroid hormones using heulandite, a zeolite as an adsorbent. *J. Indian Chem. Soc.,* 70 (1993) 853-854; *C.A.,* 121 (1994) 170718z.

*13b. Pregnane and androstane derivatives*

102 Krynetsky, E.Yu., Kovaleva, I.E. and Luzikov, V.N.: (Heterological expression of functionally active human cytochromes P450. Cytochrome P450IIIA4 catalyzes the biotransformation of the anabolic steroid hormone methandrostenolone). *Biokhimiya (Moscow),* 59 (1994) 282-287.

103 Mody, V.D., Patel, R.B. and Chakravarthy, B.: HPTLC detection and determination of clobetasol propionate in topical cream. *J. Planar Chromatogr.,* 7 (1994) 164-165.

*13d. Sterols*

104 Mindham, M.A. and Mayes, P.A.: Application of simultaneous spleen and liver perfusion to the study of reverse cholesterol transport. *Biochem. J.,* 302 (1994) 207-213.

105 Salen, G., Batta, A.K., Tint, G.S., Shefer, S. and Ness, G.C.: Inverse relationship between plasma cholestanol concentrations and bile acid synthesis in sitosterolemia. *J. Lipid Res.,* 35 (1994) 1878-1887.

See also 68.

*13e. Bile acids and alcohols*

106 Hagey, L.R., Schteingart, C.D., Ton-Nu, H.-T. and Hofmann, A.F.: Biliary bile acids of fruit pigeons and doves (Columbiformes): presence of 1β-hydroxy-chenodeoxycholic acid and conjugation with glycine as well as taurine. *J. Lipid Res.,* 35 (1994) 2041-2048.

107 Lin, J., Yan, D. and Lu, J.: (Quality of bile salts. I. Use TLC-densitometry to determine bile acids in commercial bile salts). *Yaowu Fenxi Zazhi,* 14, No. 2 (1994) 27-30; *C.A.,* 121 (1994) 117861q.

108 Rivas-Nass, A. and Müllner, S.: The influence of critical parameters on the TLC separation of bile acids. *J. Planar Chromatogr.,* 7 (1994) 278-285.

109 Yoshii, M., Une, M., Kihira, K., Kuramoto, T., Akizawa, T., Yoshioka, M., Butler, V.P., Jr. and Hoshita, T.: Bile salts of the toad, *Bufo marinus*: characterization of a new unsaturated higher bile acid, 3α,7α,12α,26-tetrahydro-5β-cholest-23-en-27-oic acid. *J. Lipid Res.,* 35 (1994) 1646-1651.

See also 105.

14. STEROID GLYCOSIDES AND SAPONINS

110 Di, X., Wu, W., Sun, Y. and Hu, Y.: (Separation and quantitation of ginseng saponins by two-dimensional TLC-densitometry). *Sepu,* 12 (1994) 173-174; *C.A.,* 121 (1994) 164095c.

111 Luo, G., Tang, F., Liu, X. and Xu, Z.: (Dynamic analysis of crude saponins in crude drugs and callus of five-leaf Gunostemma *(Gynostemma pentaphyllum)*). *Zhongcaoyao,* 25 (1994) 266-268; *C.A.,* 121 (1994) 141824a.

112 Matysik, G., Kowalski, J., Strzelecka, H. and Soczewinski, E.: Investigation of the accumulation of lanatosides in *Digitalis lanata* by gradient elution TLC and densitometry. *J. Planar Chromatogr.,* 7 (1994) 129-132.

113 Ponder, G.W. and Stewart, J.T.: Recovery of digoxin and related glycosides from an injection dosage form by liquid-liquid and solid-phase extraction. *J. Pharm. Biomed. Anal.,* 12 (1994) 713-717.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

*15a. Terpenes*

114 Yamaguchi, T., Caldwell, J. and Farmer, P.B.: Metabolic fate of $^{3}H$ menthol in the rat. *Drug Metab. Disp.,* 22 (1994) 616-624.

*15b. Essential oils*

115 Lamarti, A., Badoc, A., Deffieux, G. and Carde, J.-P.: Study on the arylpropanoids of the essential oil of parsely fruits [*Petroselinum erispum* (Mill.) A.W. Hill]. *Bull. Soc. Pharm. Bordeaux,* 132, No. 1-2-3-4 (1993) 90-98; *C.A.,* 121 (1994) 42524w.

16. NITRO AND NITROSO COMPOUNDS

116 Steuckart, C., Berger-Preiss, E. and Levsen, K.: Determination of explosives and their biodegradation products in contaminated soil and water from former ammunition plants by automated high-performance thin-layer chromatoagraphy. *Anal. Chem.,* 66 (1994) 2570-2577.

117 Tyrpien, K., Warzecha, L. and Bodzek, D.: Identification of PAHs nitro derivatives in air-borne particulate matter by TLC method. *Chem. Anal. (Warsaw),* 39 (1994) 389-393; *C.A.,* 121 (1994) 140371p.

See also 177.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

*17a. Amines and polyamines*

118 Bazylak, G.: Chemometric characterization of alkanolamines using molecular descriptors and planar chromatography data. *J. Planar Chromatogr.,* 7 (1994) 202-210.

119 Kalligas, G., Kaniou, I., Zachariadis, G., Tsoukali, H. and Epivatianos, P.: Thin layer and high pressure liquid chromatographic determination of histamine in fish tissues. *J. Liq. Chromatogr.,* 17 (1994) 2457-2468.

See also 186.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

*18a. Amino acids and their derivatives*

120 Anderson, S.A., Jiang, S. and Mukkada, A.J.: The β-aspartyl phosphate intermediate in a *Leishmania donovani* promastigote plasma membrane P-type ATPase. *Biochim. Biophys. Acta,* 1195 (1994) 81-88.

121 Bhushan, R., Reddy, G.P. and Joshi, S.: TLC resolution of DL amino acids on impregnated silica gel plates. *J. Planar Chromatogr.,* 7 (1994) 126-128.

122 Das, A., Elmendorf, H.G., Li, W.I. and Haldar, K.: Biosynthesis, export and processing of a 45 kDa protein detected in membrane clefts of erythrocytes infected with *Plasmodium falciparum. Biochem. J.,* 302 (1994) 487-496.

123 Oliveros, L., Puertolas, P.F., Minguillon, C., Camacho-Frias, E., Foucault, A. and le Goffic, F.: Donor-acceptor chiral centrifugal partition chromatography: complete resolution of two pairs of amino-acid derivatives with a chiral II donor selector. *J. Liq. Chromatogr.,* 17 (1994) 2301-2318.

124 Saqib, K.M., Hay, S.M. and Rees, W.D.: The expression of *Escherichia coli* diaminopimelate decarboxylase in mouse 3T3 cells. *Biochim. Biophys. Acta,* 1219 (1994) 398-404.

125 Sarbach, C., Postaire, E. and Sauzieres, J.: Simultaneous determination of ε-caprolactam and ε-aminocaproic acid by planar chromatography. *J. Liq. Chromatogr.,* 17 (1994) 2737-2749.

126 Schilcher, H. and Naeimi, M.M.: Quantitative determination of amino acids from various cultivars from *Cucurbita pepo* L. using HPLC. *Pharm. Pharmacol. Lett.,* 3 (1994) 253-255; *C.A.,* 121 (1994) 164086a.

127 Van der Geer, P. and Hunter, T.: Phosphopeptide mapping and phosphoamino acid analysis by electrophoresis and chromatography on thin-layer cellulose plates. *Electrophoresis (Weinheim),* 15 (1994) 544-554.

128 You, L., Fan, J. and Jia, Y.: (Improvement on the paper chromatography and paper electrophoresis of amino acids). *Huaxue Tongbao,* No. 3 (1994) 34-35; *C.A.,* 121 (1994) 124347e.

See also 12, 30, 136, 160, 161.

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

129 Marklund, U., Larsson, N., Brattsand, G., Osterman, O., Chatila, T.A. and Gullberg, M.: Serine 16 of oncoprotein 18 is a major cytosolic target for the $Ca^{2+}$/calmodulin-dependent kinase-Gr. *Eur. J. Biochem.,* 225 (1994) 53-60.

130 Newman, R.A., Fuentas, A., Covey, J.M. and Benvenuto, J.A.: Preclinical pharmacology of the natural marine product dolastatin 10 (NSC 376128). *Drug Metab. Disp.,* 22 (1994) 428-432.

131 Redman, C.A., Thomas-Oate, J.E., Ogata, S., Ikehara, Y. and Ferguson, M.A.: Structure of the glycosylphosphatidylinositol membrane anchor of human placental alkaline phosphatase. *Biochem. J.,* 302 (1994) 861-865.

132 Rupp, E., Siegbah, A., Rönnstrand, L., Wernstedt, C., Claesson-Welsh, L. and Heldin, C.-H.: A unique autophosphorylation site in the platelet-derived growth factor α receptor from a heterodimeric receptor complex. *Eur. J. Biochem.,* 225 (1994) 29-41.

133 Stambolic, V. and Woodgett, J.R.: Mitogen inactivation of glycogen synthase kinase-3β in intact cells *via* serine 9 phosphorylation. *Biochem. J.,* 303 (1994) 701-704.

See also 122, 136.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

134 Arabshahi, A. and Frey, P.A.: A simplified procedure for synthesizing nucleoside 1-thiotriphosphates: $dATP_{\alpha}S$, $dGTP_{\alpha}S$, $UTP_{\alpha}S$ and $dTTP_{\alpha}S$. *Biochem. Biophys. Res. Commun.,* 204 (1994) 150-155.

135 Chen, Y.-M., Shall, S. and O'Farrell, M.: Poly(ADP-ribose) polymerase in plant nuclei. *Eur. J. Biochem.,* 224 (1994) 135-142.

136 Morris, N.J., Bushfield, M., Lavan, B.E. and Houslay, M.D.: Multi-site phosphorylation of the inhibitory guanine nucleotide regulatory protein $G_i$-2 occurs in intact rat hepatocytes. *Biochem. J.,* 301 (1994) 693-702.

137 Perin, F., Perin, O., Barat, N., Plessis, M.-J., Saran, A., Piolo, C., Covelli, V., Biozzi, G. and Mouton, D.: Comparison of 7,12-dimethylbenz(*a*)anthracene-DNA adduction in the epidermis of two lines of mice selected for resistance (CAR-R) or susceptibility (CAR-S) to skin carcinogenesis. *Cancer Res.,* 54 (1994) 4635-4640.

138 Sun, Y., Palasingam, K. and Nicholson, W.L.: High-pressure liquid chromatography assay for quantitatively monitoring spore photoproduct repair mediated by spore photoproduct lyase during germination of UV-irradiated *Bacillus subtilis* spores. *Anal. Biochem.,* 221 (1994) 61-65.

139 Szabados, E. and Christopherosn, R.I.: Radioassay of bifunctional 5-aminoimidazole-4-carboxamide ribotide transformylase-IMP cyclohydrolase by thin-layer chromatography. *Anal. Biochem.,* 221 (1994) 401-404.

22. ALKALOIDS

140 Bailey, D.N.: Thin-layer chromatographic detection of cocaethylene in human urine. *Am. J. Clin. Pathol.,* 101 (1994) 342-345; *C.A.,* 121 (1994) 169551h.

141 Chen, H., Jin, R. and Xu, L.: (Determination of aristolochic acid I and total alkaloids in Fangji). *Zhongguo Zhongyao Zazhi,* 19 (1994) 323-324; *C.A.,* 121 (1994) 164089d.

142 Chen, Q., He, Y., Liu, Z. and Zhong, Z.: (Quantitative determination of berberine in rhizoma coptidis and its pharmaceutical preparations by fluorometric thin-layer chromatography). *Shenyang Yaoxueyuan Xuebao,* 11, No. 1 (1994) 34-37; *C.A.,* 121 (1994) 117849s.

143 Lemire, S.W. and Busch, K.L.: Chromatographic separations of the constituents derived from *Sanguinaria canadensis*: thin-layer chromatography and capillary zone electrophoresis. *J. Planar Chromatogr.,* 7 (1994) 221-228.

144 Shinde, V.M., Tendolkar, N.M. and Desai, B.S.: Simultaneous determination of theophylline and etofylline in pharmaceutical dosage forms by quantitative TLC. *J. Planar Chromatogr.,* 7 (1994) 133-136.

145 Volkov, S.K. and Grodnitskaya, E.I.: Application of high-performance liquid chromatography to the determination of vinblastine in *Catharanthus roseus*. *J. Chromatogr. B,* 660 (1994) 405-408.
146 Wu, H., Cai, B., Zheng, P., Zhao, C. and Yuan, Z.: (Effect of processing on the alkaloids in *Strychnos nux-vomica* L.). *Zhongguo Zhongyao Zazhi,* 19 (1994) 277-279; *C.A.*, 121 (1994) 141328s.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

### *23a. Porphyrins and other pyrroles*

See 10.

### *23e. Other N-heterocyclic compounds*

147 Baranowska, I. and Swierczek, S.: On the mechanism of retention of azines and diazines in adsorption TLC with *n*-propanol - *n*-hexane eluents. *J. Planar Chromatogr.,* 7 (1994) 251-253.
148 Seidler, E. and Noorden Cornelis, J.F.: One the mechanism of the multistep reduction of tetrazolium salts with special reference to the involvement of tetrazolium radicals. *Acta Histochem.,* 96 (1994) 43-49; *C.A.*, 121 (1994) 152447f.
149 Tani, E., Rekka, E. and Kourounakis, P.N.: Synthesis and effect on free radical processes of some substituted morpholine derivatives with potential biologic activity. *Arzneim.-Forsch.,* 44 (1994) 992-994.

See also 151.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

150 Betti, A., Lodi, G., Bighi, C., Chiorboli, G. and Coppi, S.: Use of overpressured layer chromatography and coupled OPLC-GC-MS for the analysis of acetylenic thiophene derivatives in extracts of *Tagete patula*. *J. Planar Chromatogr.,* 7 (1994) 301-304.
151 Liu, X. and Yang, X.: (Determination of the content of sulfadiazine with a thin-layer chromatographic scanner). *Fenxi Shiyanshi,* 13 (1994) 75-76; *C.A.*, 121 (1994) 117882x.

See also 175, 190.

## 25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

See 120, 122, 127, 133, 136.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

### *26a. Organometallic compounds*

152 Hassouna, M.E.M., Sayyah, S.M. and Abd El-Salam, H.M.: Oxygen flask-TLC microdetermination of binary and ternary mixtures of Hg(II), Cu(II) and Cd in their organic compounds and some pharmaceutical preparations. *Anal. Lett.,* 27 (1994) 2535-2550.

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

153 Das, B.: Quantitative HPTLC determination of vitamin D analogs. *J. Planar Chromatogr.,* 7 (1994) 162-164.
154 Kocjan, B. and Sliwiok, J.: Chromatographic and spectroscopic comparison of the hydrophobicity of vitamins $D_2$ and $D_3$. *J. Planar Chromatogr.,* 7 (1994) 327-328.

## 28. ANTIBIOTICS

155 Izer, K., Torok, I. and Pinter-Magyar, G.: Stability of oxytetracycline hydrochloride in eye drops prepared in pharmacies. *Acta Pharm. Hung.,* 64 (1994) 63-66; *C.A.*, 121 (1994) 91523d.
156 Manohar, A. and Anwar, R.A.: Evidence for the presence of a functional TATA box (ATAAAA) sequence in the gene for bovine elastin. *Biochim. Biophys. Acta,* 1219 (1994) 233-236.
157 Morishita, A., Ishikawa, S., Ito, Y., Ogawa, K., Takada, M., Yaginuma, S. and Yamamoto, S.: AM4299 A and B, novel thiol protease inhibitors. *J. Antibiot.,* 47 (1994) 1065-1068.
158 Naidong, W., Hua, S., Roets, E. and Hoogmartens, J.: Purity control of six tetracyclines by semi-quantitative TLC with fluorescence detection. *J. Planar Chromatogr.,* 7 (1994) 297-300.
159 Oka, H., Ikai, Y., Hayakawa, J., Masuda, K., Harada, K.-I. and Suzuki, M.: Improvement of chemical analysis of antibiotics. Part XIX: determination of tetracycline antibiotics in milk by liquid chromatography and thin-layer chromatography/fast atom bombardment mass spectrometry. *J. Assoc. Off. Anal. Chem.,* 77 (1994) 891-895.
160 Peypoux, F., Bonmatin, J.-M., Labbe, H., Grangemard, I., Das, B.C., Ptak, M., Wallach, J. and Michel, G.: [Ala4]Surfactin, a novel isoform from *Bacillus subtilis* studied by mass and NMR spectroscopies. *Eur. J. Biochem.,* 224 (1994) 89-96.
161 Suzuki, K., Toda, S., Furumai, T., Fukagawa, Y. and Oki, T.: Eurystatins A and B, new prolyl endopeptidase inhibitors. III. Fermentation and controlled biosynthesis of eurystatin analogs by *Streptomyces eurythermus*. *J. Antibiot.,* 47 (1994) 982-991.
162 Triggs-Raine, B.L., Benoit, G., Salo, T.J., Trasler, J.M. and Gravel, R.A.: Characterization of the murine β-hexosaminidase (HEXB) gene. *Biochim. Biophys. Acta,* 1227 (1994) 79-86.
163 Vega, M., García, G., Saelzer, R. and Villegas, R.: HPTLC analysis of antibiotics in fish feed. *J. Planar Chromatogr.,* 7 (1994) 159-162.
164 Velten, R., Klostermeyer, D., Steffan, B., Steglich, W., Kuschel, A. and Anke, T.: The mniopetals, new inhibitors of reverse transcriptase from a *Mniopetalum* spores (basidomycetes). II. Structure elucidation. *J. Antibiot.,* 47 (1994) 1017-1024.

See also 8, 167.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

### *29a. General techniques*

165 Sherma, J.: Determination of pesticides by thin layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 265-272 - a review with 138 refs.

### *29c. Phosphorus insecticides*

166 Gorbachyova, N.A.: (Isolation and detection of actellic by thin-layer chromatography in forensic chemical examination of cadaveric organs). *Sud.-Med. Ekspert.,* 37 (1994) 28-30; *C.A.,* 121 (1994) 127238f.

### *29g. Other types of pesticides and various agrochemicals*

167 Stepanovic, R.D., Howell, C. and Hedin, P.A.: Biosynthesis of gliovirin: incorporation of L-phenylalanine (1-$^{13}$C). *J. Antibiot.,* 47 (1994) 942-944.

## 30. SYNTHETIC AND NATURAL DYES

### *30a. Synthetic dyes*

168 Peischl, R.J., Sabo, M., Dugan, G.E. and Puerschner, G.: Evaluation of spectrodensitometry for the quantitative analysis of dye components contained in hair color formulas. *J. Planar Chromatogr.,* 7 (1994) 211-216.

## 32. DRUG ANALYSIS

### *32a. Drug analysis, general techniques*

169 Bliesner, D.M.: Graphical correlation of TLC and HPLC data in the development of pharmaceutical compounds. *J. Planar Chromatogr.,* 7 (1994) 197-201.

See also 1, 3, 13, 15, 18, 31, 172.

### *32b. Antirheumatics and antiinflammatory drugs*

170 Agbaba, D., Vladimirov, S., Brboric, J., Solomun, L. and Zivanov-Stakic, D.: Stability of enteric-coated tablets of sodium diclofenac. *Acta Pol. Pharm.,* 50 (1993) 513-515; *C.A.,* 121 (1994) 141383f.

171 Parimoo, P., Bharathi, A. and Shajahan, M.: Determination of oxyphenbutazone and ibuprofen in the presence of paracetamol and dextropropoxyphene in dosage forms by quantitative thin-layer chromatography. Part I. *Indian Drugs,* 31 (1994) 139-143; *C.A.,* 121 (1994) 42885q.

172 Parimoo, P., Mounisswamy, M., Bharathi, A. and Lakshmi, N.: Determination of paracetamol, dextropropoxyphene hydrochloride and dicyclomine hydrochloride in pharmaceutical formulations by quantitative thin layer chromatography (Part - II). *Indian Drugs,* 31 (1994) 211-214; *C.A.,* 121 (1994) 141886x.

173 Rani, K.N.S., Goundalkar, A.G. and Prakasam, K.: Preparation and evaluation of microspheres of diclofenac sodium. *Indian J. Pharm. Sci.,* 56, No. 2 (1994) 45-50; *C.A.,* 121 (1994) 91504y.

See also 18.

### *32c. Autonomic and cardiovascular drugs*

174 Liu, J., Ponder, G.W. and Stewart, J.T.: Quantitative analysis of polythiazide and its major impurity in drug substance and tablet dosage form by HPTLC and scanning densitometry. *J. Planar Chromatogr.,* 7 (1994) 247-248.

175 Shinde, V.M., Desai, B.S. and Tendolkar, N.M.: Simultaneous determination of propranolol hydrochloride and hydrochloride and hydrochlorothiazide in tablets by quantitative TLC. *Indian Drugs,* 31 (1994) 192-196; *C.A.,* 121 (1994) 117923m.

176 Stankovicova, M., Bachrata, M., Bezakova, Z., Belsova, M., Cizmarik, J. and Sveda, P.: Study of the stability and the kinetics of hydrolysis on the new potential antiarrhytmic "substance H + B". *Pharmazie,* 49 (1994) 579-583.

177 Zell, C., Neidlein, R. and Strein, K.: Biotransformation of the organic nitrate *trans*-N-(4-nitroxycyclohexyl)acetamide in dogs. *Arzneim.-Forsch.,* 44 (1994) 1021-1028.

See also 12, 113.

### *32d. Central nervous system drugs*

178 Chandrashekhar, T.G., Rao, P.S.N., Sneth, D., Vyas, S.K. and Dutt, C.: Determination of buprenorphine hydrochloride by HPTLC: a reliable assay method for pharmaceutical preparations. *J. Planar Chromatogr.,* 7 (1994) 249-250.

179 Fujimura, T., Akieda, T. and Inoma, S.: (Analysis of psychotropic drugs by high performance liquid chromatography and thin layer chromatography). *Kanzei Chuo Bunsekishoho,* 33 (1994) 65-74; *C.A.,* 121 (1994) 141858q.

180 McKown, L.A., Wu, W.-N. and O'Neill, P.J.: Characterization and identification of the metabolites of fenoctimine using *in vitro* drug metabolizing systems. *J. Pharm. Biomed. Anal.,* 12 (1994) 771-775.

181 Parkhomenko, D.V., Goizman, M.S. and Ivanova, L.A.: (Ketamine hydrochloride + sibazon suppositories: composition, procedure and methods of analysis). *Farmatsiya (Moscow),* 42, No. 1 (1993) 24-29; *C.A.,* 121 (1994) 141881s.

182 Rochholz, G., Ahrens, B. and Schuetz, H.: Modified screening procedure with fluorescence detection for flunitrazepam and its metabolites *via* acidine derivatives. *Arzneim.-Forsch.,* 44 (1994) 469-471; *C.A.,* 121 (1994) 172390k.

### *32e. Chemotherapeutics (exc. cytostatics and antibiotics)*

183 Cenni, B. and Betschart, B.: The determination of halofantrine in biological samples by high performance thin layer chromatography. *J. Planar Chromatogr.,* 7 (1994) 294-296.

184 Karim, E.I.A., Ibrahim, K.E.E., Abdelrahman, A.N. and Fell, A.F.: Photodegradation studies on chloroquine phosphate by high-performance liquid chromatography. *J. Pharm. Biomed. Anal.*, 12 (1994) 667-674.

185 Morgado, M., Juarez, M., Ramos, M. and Gomez, J.: (Veterinary drugs which interfere with the thin layer chromatographic detection of β-agonists). *Alimentaria (Madrid)*, (1993) 25-28; *C.A.*, 121 (1994) 75430r.

186 Paesen, J., Quintens, I., Thoithi, G., Roets, E., Reybrouck, G. and Hoogmartens, J.: Quantitative analysis of quaternary ammonium antiseptics using thin-layer densitometry. *J. Chromatogr. A*, 677 (1994) 377-384.

187 Vargas, F., Rivas, C. and Canudas, N.: Photosensitized lipid peroxidation by cinoxacin and its photoproducts. Involvement of a derived peroxide in its phototoxicity. *Pharmazie*, 49 (1994) 742-745.

See also 151, 164.

*32f. Cytostatics*

188 Cserhati, T.: Charge-transfer chromatographic study of the interaction of anticancer drugs with acetyl-beta-cyclodextrin. *Fresenius J. Anal. Chem.*, 349 (1994) 751-755.

189 Cserhati, T. and Hollo, J.: Interaction of taxol and other anticancer drugs with hydroxypropyl-β-cyclodextrin. *Int. J. Pharm.*, 108 (1994) 69-75; *C.A.*, 121 (1994) 91546p.

See also 130.

*32g. Other drug categories*

190 Gajewska, M. and Somogi, A.: Analytical investigations of Glipolamid - a new antidiabetic drug. *Acta Pol. Pharm.*, 50 (1993) 297-300; *C.A.*, 121 (1994) 117879f.

191 Zhou, B., Zhou, Y. and Cai, H.: (Determination of nitrendipine injection by thin-layer chromatographic densitometry). *Zhongguo Yiyao Gongye Zazhi*, 25, No. 1 (1994) 33-34; *C.A.*, 121 (1994) 42898q.

See also 179.

*32h. Toxicological and forensic applications*

192 Jeger, A.N. and Briellmann, T.A.: Quantitative applications of TLC in forensic science. *J. Planar Chromatogr.*, 7 (1994) 157-159.

193 Romano, G., Caruso, G., Musumarra, G., Pavone, D. and Cruciani, G.: Qualitative organic analysis. Part 3. Identification of drugs and their metabolites by PCA of standardized TLC data. *J. Planar Chromatogr.*, 7 (1994) 233-241.

*32i. Plant extracts*

194 Chen, Y., Shen, L. and Yang, Y.: (Determination of emodin in *Caulis polygoni multiflori* and Huangshen infusion by TLC-scanning). *Zhongguo Zhongyao Zazhi*, 19 (1994) 284-285; *C.A.*, 121 (1994) 141828e.

195 Chen, Y., Tao, X., Wang, L., Chen, G., Zheng, J. and Zhang, G.: (Assay of triptolide contained in Yoliten by dual-wavelength thin-layer scanning technique). *Zhongguo Yaoke Daxue Xuebao*, 25 (1994) 100-102; *C.A.*, 121 (1994) 141856n.

196 Gizella, P. and Lemberkovics, E.: (Instrumental analysis of medicinal plants and their drug products). *Acta Pharm. Hung.*, 64 (1994) 87-93; *C.A.*, 102 (1994) 141818b.

197 Lin, Y., Feng, P., Huang, C. and Chen, Y.: (Preparation and quality standard of Zengyetang oral liquids). *Zhongguo Yiytuan Yaoxue Zazhi*, 14 (1994) 165-166; *C.A.*, 121 (1994) 163817c.

198 Ni, L., Zeng, X., Ma, S., Chen, D., Wang, B. and Liang, Q.: (Quantitative determination of tetrandrine in Zhitong Ruanjiaonang an analgesic soft gelatine capsule preparation). *Zhongcaoyao*, 25 (1994) 245-266; *C.A.*, 121 (1994) 141822y.

199 Shi, J., Peng, Y., Gong, L. and Liu, Y.: (Identification of fruits of *Xanthium sibricum* Patr. and *X. mongolicum* Kitag). *Zhongguo Zhongyao Zazhi*, 19 (1994) 264-266; *C.A.*, 121 (1994) 141827d.

200 Smith, W.T.: Identification of toxic herbs using TLC active constituent "fingerprints". *J. Planar Chromatogr.*, 7 (1994) 95-97.

201 Su, J. and Wang, B.: (Qualitative and quantitative method of Bixiang medicinal wine). *Yaowu Fenxi Zazhi*, 14, No. 2 (1994) 35-37; *C.A.*, 121 (1994) 117863e.

202 Takeshita, T., Nakasumi, T., Yoshizawa, T., Nohara, T. and Yahara, S.: Jatrophone-containing extract from *Mandevilla velutina*. *Ger Offen.* DE 4,344,726 (Cl. A61K31/34), 16 Jun. 1994, JP Appl. 92/352, 609, 10 Dec. 1992; 3 pp.; *C.A.*, 121 (1994) 91786s.

203 Wawrzynowicz, T., Waksmundzka-Hajnos, M. and Mulak-Banaszek, K.: Isolation of aloine and aloeemodine from Aloë (Liliaceae) by micropreparative TLC. *J. Planar Chromatogr.*, 7 (1994) 315-318.

See also 19, 48, 112, 126, 141, 142, 143, 146, 150.

33. CLINICO-CHEMICAL APPLICATIONS

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

See 32, 42, 63, 81, 91, 105, 140, 182, 185.

34. FOOD ANALYSIS

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

See 41, 87, 119, 163, 200.

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

204 Kiridena, W., Poole, S.K. and Poole, C.F.: Identification of 5-(hydroxymethyl)-2-furfural in vanilla extracts. *J. Planar Chromatogr.*, 7 (1994) 273-277.

35. ENVIRONMENTAL ANALYSIS

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

See 100, 117.

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

See 56, 116.

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

See 33, 116.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

*36a. Surfactants*

205 Fartushny, A.F., Sergheyeva, Ye.E. and Kvasov, E.B.: (Forensic chemical analysis of some synthetic detergents). *Sud.-Med. Ekspert.*, 37 (1994) 30-32; *C.A.*, 121 (1994) 127239g.

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

See 45.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

See 63.

38. INORGANIC COMPOUNDS

*38a. Cations*

206 Jogadankar, D.M., Patil, V.B. and Katkar, H.N.: Thin layer chromatographic detection of copper with 2-thiobarbituric acid. *J. Planar Chromatogr.*, 7 (1994) 166.

207 Mohammad, A., Fatima, N. and Khan, M.A.K.: New surface-modified sorbent layer for chromatographic analysis of some inorganic pollutants. *J. Planar Chromatogr.*, 7 (1994) 142-146.

208 Sharma, S.D. and Misra, S.: Separation of $Pd^{2+}$ from metal ions: cation chromatography on stannic phosphate and stannic arsenate impregnated papers. *J. Chromatogr. Sci.*, 32 (1994) 275-278.

209 Shimizu, T., Jindo, S., Iwata, N. and Tamura, Y.: Reversed phase TLC of inorganic ions on silica impregnated with a high molecular weight amine, using sulfuric acid and sulfuric acid - ammonium sulfate mobile phases. *J. Planar Chromatogr.*, 7 (1994) 98-102.

210 Vuckovic, G., Tesic, Z.L. and Celap, M.B.: Correlation between the composition and structure of transition metal complexes and their $R_F$ values obtained by planar chromatography. *Facets Coord. Chem.*, (1993) 143-181; *C.A.*, 121 (1994) 48857d.

See also 152.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

211 Green, M.J., Donohoe, M.E., Foster, M.E. and Glajch, J.L.: Thin-layer chromatographic procedures for the characterization of Technetium-99m bicisate. *J. Nucl. Med. Technol.*, 22 (1994) 21-26; *C.A.*, 121 (1994) 152250m.

212 Okuyama, M., Hatori, Y. and Shigematsu, A.: Autoradioluminography, a novel quantitative method of TLC-autoradiography. *Biol. Pharm. Bull.*, 17 (1994) 559-563; *C.A.*, 121 (1994) 72944a.

See also 13.

# Electrophoresis

## 1. REVIEWS AND BOOKS

1 Celis, J.E. (Editor): *Paper Symposium: Electrophoresis in Cancer Research. Electrophoresis (Weinheim),* Vol. 15, VCH, Weinheim, 1994, 556 p.; *C.A.*, 121 (1994) 53460y.

2 Chrambach, A., Dunn, M.J. and Radola, B.J.: *Advances in Electrophoresis.* VCH, Weinheim, 1993, 382 pp.; *C.A.*, 121 (1994) 53454z.

3 Krull, I.S., Deyl, Z. and Lingeman, H.: General strategies and selection of derivatization reactions for liquid chromatography and capillary electrophoresis. *J. Chromatogr. B,* 659 (1994) 1-17 - a review with 175 refs.

4 Sadecka, J., Polonsky, J. and Shintani, H.: Current advancement of pharmaceutical analysis by capillary zone electrophoresis, micellar electrokinetic chromatography and isotachophoresis. *Pharmazie,* 49 (1994) 631-641 - a review with 233 refs.

5 Smith, N.W. and Evans, M.B.: Capillary zone electrophoresis in pharmaceutical and biomedical analysis. *J. Pharm. Biomed. Anal.*, 12 (1994) 579-611 - a review with 127 refs.

6 Viovy, J.L. and Lesec, J.: Separation of macromolecules in gels: permeation chromatography and electrophoresis. *Adv. Polym. Sci.*, 114(Polymer Analysis and Characterization) (1994) 1-41; *C.A.*, 121 (1994) 199812m - a review with 186 refs.

See also 54, 68, 79, 86, 87, 98, 113, 136, 137, 165, 171, 202, 283, 346, 453, 748, 806, 849, 965, 989, 1001, 1011.

## 2. FUNDAMENTALS, THEORY AND GENERAL

### *2a. General*

7 Ahuja, E.S. and Foley, J.P.: Separation of very hydrophobic compounds by hydrophobic interaction electrokinetic chromatography. *J. Chromatogr. A,* 680 (1994) 73-83.

8 Anderson, J.L. and Solomentsev, Y.: Electrophoresis of nonuniformly charged chains. *ACS Symp. Ser.,* 548 (1994) 67-85; *C.A.*, 121 (1994) 110036r.

9 Behnke, B. and Bayer, E.: Pressurized gradient electro-high-performance liquid chromatography. *J. Chromatogr. A,* 680 (1994) 93-98.

10 Budde, A., Knippel, E., Grümmer, G. and Nitzsche, R.: Electrophoretic mobility profiles: new aspects of characterization and discrimination of biological surfaces. *Electrophoresis (Weinheim),* 15 (1994) 577-579.

11 Busch, K.L.: Cost analysis of determinations with planar chromatography and column chromatography. *J. Planar Chromatogr.,* 7 (1994) 318-321.

12 Feng, J. and Wu, W.: Electrophoretic motion of an arbitrary prolate body of revolution toward an infinite conducting wall. *J. Fluid Mech.,* 264 (1994) 41-58; *C.A.*, 121 (1994) 43696r.

13 Ferard, G. and Ferard, G.: Quantities and units for electrophoresis in the clinical laboratory. *Pure Appl. Chem.,* 66 (1994) 891-896; *C.A.*, 121 (1994) 72919w.

14 Fishman, H.A., Scheller, R.H. and Zare, R.N.: Microcolumn sample injection by spontaneous fluid displacement. *J. Chromatogr. A,* 680 (1994) 99-107.

15 Gombocz, E., Cortez, E. and Rammler, D.: Use of fluorescent pH-markers in moving boundary gel electrophoresis systems. *PCT Int.* Appl. WO 94 12,691 (Cl. C25G7/00), 09 Jun. 1994, US Appl. 984,902, 02 Dec. 1992; 12 pp.; *C.A.*, 121 (1994) 77767e.

16 Knox, J.H.: Terminology and nomenclature in capillary electroseparation systems. *J. Chromatogr. A,* 680 (1994) 3-13.

17 Liao, J.-L. and Zhang, R.: Simple approach to eliminating disturbances in isoelectric focusing caused by the presence of salts. *J. Chromatogr. A,* 684 (1994) 143-148.

18 Molinari, R.J., Connors, M. and Shorr, R.G.L.: HydroLink gels for electrophoresis. *Adv. Electrophor.,* 6 (1993) 43-60; *C.A.*, 121 (1994) 174389r.

19 Rilbe, H.: On the use of dimensionless parameters in acid-base theory: VI. The buffer capacities of equimolar binary mixtures of monovalent weak protolytes as compared to that of bivalent protolytes. *Electrophoresis (Weinheim),* 15 (1994) 580-583.

See also 24, 75, 88, 91, 140, 173, 332.

### *2b. Thermodynamics and theoretical relationships*

20 Egorova, E.M.: The validity of the Smoluchowski equation in electrophoretic studies of lipid membranes. *Electrophoresis (Weinheim),* 15 (1994) 1125-1131.

21 Miller, N.P.: Electroacoustic and electrophoretic determination of zeta potential: effect of a polymer adlayer and particle porosity. Avail. *Univ. Microfilms Int.,* Order No. DA9312722, 1992, 90 p.; *C.A.*, 121 (1994) 66359x.

22 Rilbe, H.: On the use of dimensionless parameters in acid-base theory. VII. The pH of solutions of salts of a strong acid and a weak base or *vice versa. Electrophoresis (Weinheim),* 15 (1994) 932-935.

23 Slais, K.: Model of electrophoretic focusing in a natural pH gradient moving in a tapered capillary. *J. Chromatogr. A,* 684 (1994) 149-161.

24 Slais, K.: Suggested definition of zone resolution and zone capacity in separations of weak electrolytes or ampholytes by steady-state electrophoretic methods. *J. Chromatogr. A,* 679 (1994) 335-344.

See also 93, 161.

### *2c. Relationship between structure and electrophoretic behaviour*

25 Chen, N., Zhang, Y., Terabe, S. and Nakagawa, T.: Effect of physico-chemical properties and molecular structure on the micelle-water partition coefficient in micellar electrokinetic chromatography. *J. Chromatogr. A,* 678 (1994) 327-332.

*2d. Measurement of physico-chemical and related values*

26 Arvanitidou, E.S.: Electrophoretic transport mechanisms in highly charged polyelectrolytes. Avail. *Univ. Microfilms Int.*, Order No. DA9408250, 1993, 124 p.; *C.A.*, 121 (1994) 43726a.

27 Cleveland, J.A., Jr., Martin, C.L. and Gluck, S.J.: Spectrophotometric determination of ionization constants by capillary zone electrophoresis. *J. Chromatogr. A*, 679 (1994) 167-171.

28 Duggleby, R.G.: Calculation of the molecular weight of proteins from electrophoretic and gel exclusion chromatographic experiments. *Comput. Appl. Biosci.*, 10 (1994) 133-135; *C.A.*, 121 (1994) 152710m.

29 Gluck, S.J. and Cleveland, J.A., Jr.: Capillary zone electrophoresis for the determination of dissociation constants. *J. Chromatogr. A*, 680 (1994) 43-48.

30 Gluck, S.J. and Cleveland, J.A., Jr.: Investigation of experimental approaches to the determination of $pK_a$ values by capillary electrophoresis. *J. Chromatogr. A*, 680 (1994) 49-56.

See also 465.

3. GENERAL TECHNIQUES

*3a. Apparatus and accessories*

31 Dadoo, R., Colon, L.A., Fishman, H.A., Shear, J.B. and Zare, R.N.: Sample separation method and apparatus. *U.S.* US 5,310,463 (Cl. 204-180.1; G01N27/26), 10 May 1994, Appl. 975,850, 13 Nov. 1992; 10 p.; *C.A.*, 121 (1994) 49340s.

32 Dasgupta, P.K.: Method and apparatus for chromatographic analysis. *U.S.* US 5,316,630 (Cl. 204-180; G01N27/26), 31 May 1994, Appl. 40,014, 30 Mar. 1993; 14 p.; *C.A.*, 121 (1994) 98753n.

33 Ewing, A.G., Hayes, M.A., Kheterpal, I. and Herrick, S.S.: Capillary electrophoresis apparatus with improved electroosmotic flow control. *U.S.* US 5,320,730 (Cl. 204-299R; C25B9/00), 14 Jun. 1994, Appl. 7,677, 22 Jan. 1993; 10 pp.; *C.A.*, 121 (1994) 103581m.

34 Jacobson, S.C., Koutny, L.B., Hergendröder, R., Moore, A.W., Jr. and Ramsey, J.M.: Microchip capillary electrophoresis with an integrated postcolumn reactor. *Anal. Chem.*, 66 (1994) 3472-3476.

35 Kolner, D.E.: Electrophoresis plates with grooves. *U.S.* US 5,324,412 (Cl. 204-299R; G01N27/26), 28 Jun. 1994, Appl. 908,688, 02 Jul. 1992; 6 pp.; *C.A.*, 121 (1994) 129372u.

36 Raymond, D.E., Manz, A. and Widmer, H.M.: Continuous sample pretreatment using a free-flow electrophoresis device integrated on a silicon chip. *Anal. Chem.*, 66 (1994) 2858-2865.

37 Seiler, K., Fan, Z.H., Fluri, K. and Harrison, D.J.: Electroosmotic pumping and valveless control of fluid flow within a manifold of capillaries on a glass chip. *Anal. Chem.*, 66 (1994) 3485-3491.

38 Shigeura, J., Bridgham, J.A. and Hoff, L.B.: Horizontal polyacrylamide gel electrophoresis apparatus. *U.S.* US 5,338,426 (Cl. 204-299R; C25B9/00), 16 Aug. 1994, Appl. 936,979, 28 Aug. 1992; 21 pp.; *C.A.*, 121 (1994) 174641s.

39 Singer, P.A.: Sample-well forming comb for horizontal gel electrophoresis device. *U.S.* US 5,318,682 (Cl. 204-182.8; G01N27/26), 07 Jun. 1994, Appl. 118,008, 08 Sep. 1993; 9 pp.; *C.A.*, 121 (1994) 77747y.

40 Sorge, J.: Electrophoresis temperature feedback controller. *U.S.* US 5,328,581 (Cl. 204-182.8; G01N27/26), 12 Jul. 1994, Appl. 643,398, 18 Jan. 1991; 11 pp.; *C.A.*, 121 (1994) 129375x.

See also 55, 62, 96, 97, 99, 107, 118, 124, 135, 142, 338, 715, 793, 840.

*3b. Detectors and detection procedures*

41 Beckers, J.L.: UV detection in capillary zone electrophoresis. Peaks or dips - that is the question. *J. Chromatogr. A*, 679 (1994) 153-165.

42 Cassidy, R.M., Lu, W. and Tse, V.-P.: Ausiliary electroosmotic flow for postcapillary reaction detection in capillary electrophoresis. *Amal. Chem.*, 66 (1994) 2578-2583.

43 Flint, C.D., Grochowicz, P.R. and Simpson, C.F.: Design, construction and evaluation of an ultraviolet absorbance detector for capillary electrophoresis. *Anal. Proc.*, 31 (1994) 117-121; *C.A.*, 121 (1994) 124323u.

44 Glazer, A.N. and Benson, S.C.: Dyes designed for high sensitivity detection of double-stranded DNA. *U.S.* US 5,312,921 (Cl. 546-108; CO7D215/38), 17 May 1994, US Appl. 493,347, 14 Mar. 1990; 13 pp.; *C.A.*, 121 (1994) 77765c.

45 Hitchman, M.L. and Ekstrom, B.: An investigation of the factors controlling the staining and destaining of electrophoresis gels. *Electrophoresis (Weinheim)*, 15 (1994) 200-208.

46 Kambara, H., Nagai, K., Simada, T., Nishikawa, T. and Sumitani, T.: Fluorescence detection type electrophoresis apparatus. *U.S.* US 5,307,148 (Cl. 356-344; GO1N21/64), 26 Apr. 1994, US Appl. 505,323, 05 Apr. 1990; 12 pp.; *C.A.*, 121 (1994) 30496a.

47 Kar, S., Dasgupta, P.K., Liu, H. and Hwang, H.: Computer-interfaced bipolar pulse conductivity detection for capillary systems. *Anal. Chem.*, 66 (1994) 2537-2543.

48 Kim, S., Kim, W. and Hahn, J.H.: Extended path length post-column flow cell for UV-visible absorbance detection in capillary electrophoresis. *J. Chromatogr. A*, 680 (1994) 109-116.

49 Lin, B.L., Colón, L.A. and Zare, R.N.: Dual electrochemical detection of cysteine and cystine in capillary zone electrophoresis. *J. Chromatogr. A*, 680 (1994) 263-270.

50 Roberts, R.E. and Johnson, D.C.: Fast-pulsed electrochemical detection at noble metal electrodes: the frequency-dependent response at gold electrodes for chromatographically separated carbohydrates. *Electroanalysis (N.Y.)*, 6 (1994) 269-273; *C.A.*, 121 (1994) 124353d.

51 Shear, J.B., Dadoo, R. and Zare, R.N.: Field programming to achieve uniform sensitivity for on-line detection in electrophoresis. *Electrophoresis (Weinheim)*, 15 (1994) 225-227.

52 Taylor, J.A.: An axial approach to detection in capillary electrophoresis. Avail. *Univ. Microfilms Int.*, Order No. DA9321217, 1993, 128 p.; *C.A.*, 121 (1994) 43660z.

53 Xue, Y. and Yeung, E.S.: Laser-based ultraviolet absorption detection in capillary electrophoresis. *Appl. Spectrosc.*, 48 (1994) 502-506; *C.A.*, 121 (1994) 53252g.

54 Yao, Y.J. and Li, S.F.Y.: Fluorescence detection in capillary electrophoresis. *Bull. Singapore Natl. Inst. Chem.,* 21 (1993) 11-22; *C.A.,* 121 (1994) 98769x - a review with 51 refs.

55 Yeung, E.S. and Taylor, J.A.: Multiplexed fluorescence detector system for capillary electrophoresis. *U.S.* US 5,324,401 (Cl. 204-180.1; G01N27/26), 28 Jun. 1994, Appl. 13,960, 05 Feb. 1993; 20 pp.; *C.A.,* 121 (1994) 129400b.

See also 34, 103, 104, 107, 110, 111, 120, 218, 271, 284, 287, 289, 296, 299, 343, 607, 730, 828, 851, 901, 991, 1019.

*3c. Stabilization media for electrophoresis*

56 Bossi, A., Righetti, P.G. and Chiari, M.: Immobilized pH gradients: new p*K* values of acrylamido buffers in poly(N-acryloylaminoethoxyethanol) matrices. *Electrophoresis (Weinheim),* 15 (1994) 1112-1117.

57 Buzás, Z., Wheeler, D.L., Garner, M.M., Tietz, D. and Chrambach, A.: Transverse pore gradient gel electrophoresis, using the PhastSystem. *Electrophoresis (Weinheim),* 15 (1994) 1028-1031.

58 Chiari, M., Micheletti, C., Nesi, M., Fazio, M. and Righetti, P.G.: Towards new formulations for polyacrylamide matrices: N-Acryloylaminoethoxyethanol, a novel monomer combining high hydrophilicity with extreme hydrolytic stability. *Electrophoresis (Weinheim),* 15 (1994) 177-186.

59 Chrambach, A. and Wheeler, D.L.: Capabilities and potentialities of transverse pore gradient gel electrophoresis. *Electrophoresis (Wenheim),* 15 (1994) 1021-1027.

60 Harrington, M.G. and Zewert, T.E.: Poly(ethylene glycol)methacrylate-acrylamide copolymer media for hydrophobic protein and low temperature electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 195-199.

61 Harrington, M.G., Lee, K.H., Bailey, J.E. and Hood, L.E.: Sponge-like electrophoresis media: mechanically strong materials compatible with organic solvents, polymer solutions and two-dimensional electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 187-194.

62 Jasrai, Y.T., Mehta, A.R. and Bhatt, P.N.: Protocol for fabrication of inexpensive vertical slab gel apparatus and gel dryer. *Natl. Acad. Sci. Lett. (India),* 16 (1993) 201-206; *C.A.,* 121 (1994) 152407t.

63 Miertus, S., Righetti, P.G. and Chiari, M.: Molecular modeling of acrylamide derivatives: the case of N-acryloylaminoethoxyethanol *versus* acrylamide and trisacryl. *Electrophoresis (Wenheim),* 15 (1994) 1104-1111.

64 Mizuno, M. and Tochigi, K.: Capillary electrophoresis column for protein separation. *Jpn. Kokai Tokkyo Koho* JP 06 43,137 [94 43,137] (Cl. G01N27/447), 18 Feb. 1994, Appl. 92/196,739, 23 Jul. 1992; 6 pp.; *C.A.,* 121 (1994) 103606y.

65 Righetti, P.G. and Giaffreda, E.: Immobilized buffers for isoelectric focusing: from gradient gels to membranes. *Electrophoresis (Weinheim),* 15 (1994) 1040-1043.

66 Righetti, P.G., Bossi, A., Giglio, M., Vailati, A., Lyubimova, T. and Briskman, V.A.: Is gravity on our way? The case of polyacrylamide gel polymerization. *Electrophoresis (Weinheim),* 15 (1994) 1005-1013.

67 Schwarz, T., Sindern, S., Bartholmes, P. and Kaufmann, M.: The use of a hollow fiber membrane module in sample conditioning prior to electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1118-1119.

68 Shainoff, J.R.: Electrophoresis and direct immunoprobing on glyoxyl agarose and polyacrylamide composites. *Adv. Electrophor.,* 6 (1993) 61-177; *C.A.,* 121 (1994) 174124a - a review with 69 refs.

69 Soane, D.S. and Bae, Y.C.: Separation media for electrophoresis device. *PCT Int.* Appl. WO 94 10,561 (Cl. G01N27/447), 11 May 1994, US Appl. 971,956, 05 Nov. 1992; 34 pp.; *C.A.,* 121 (1994) 53491j.

70 Yamamoto, M.: Storage of acrylamide gel for electrophoresis analysis apparatus. *Jpn. Kokai Tokkyo Koho* JP 06 74,935 (94 74,935) (Cl. G01N27/447), 18 Mar. 1994, Appl. 92/229,033, 28 Aug. 1992; 3 p.; *C.A.,* 121 (1994) 110887u.

71 Yoshioka, H., Mori, Y. and Tsuchida, E.: Crosslinked poly(N-isopropylacrylamide) gel for electrophoretic separation and recovery of substances. *Polym. Adv. Technol.,* 5 (1994) 221-224; *C.A.,* 121 (1994) 152581v.

72 Zakharov, S.F. and Chrambach, A.: The relative separation efficiencies of highly concentrated, uncrosslinked or low-crosslinked polyacrylamide gels compared to conventional gels of moderate concentration and crosslinking. *Electrophoresis (Weinheim),* 15 (1994) 1101-1103.

73 Zewert T. and Harrington, M.G.: Acrylic polymer electrophoresis support media. *U.S.* US 5,290,411 (Cl. 204-128.8; C25B1/00), 01 Mar. 1994, US Appl. 913,234, 14 Jul. 1992; 11 pp.; *C.A.,* 121 (1994) 174661y.

See also 115, 117, 119, 144, 158.

*3d. Quantitative analysis*

74 Karger, B.L. and Shimura, K.: Quantifying trace analytes by affinity capillary electrophoresis. *PCT Int.* Appl. WO 94 17,409 (Cl. G01N33/561), 04 Aug. 1994, US Appl. 6,922, 22 Jan. 1993; 32 pp.; *C.A.,* 121 (1994) 200399r.

See also 218, 986.

*3e. Preparative scale electrophoresis*

75 Chiari, M., Nesi, M., Roncada, P. and Righetti, P.G.: Preparative isoelectric focusing in multicompartment electrolyzers: novel, hydrolytically stable and hydrophilic isoelectric membranes. *Electrophoresis (Weinheim),* 15 (1994) 953-959.

76 Nyormoi, O., Schneider, T. and Smith, R.G.: A large scale preparative gel electrophoresis separation of $\alpha_1$ and $\alpha_2$ subunits of the voltage-gated $Ca^{2+}$ channel from rabbit skeletal muscle. *Electrophoresis (Weinheim),* 15 (1994) 1186-1190.

77 Raj, C.B.C.: Preparative electrophoresis: on the estimation of maximum temperature. *Bioprocess Eng.,* 11 (1994) 65-71; *C.A.,* 121 (1994) 200309m.

## 4. SPECIAL TECHNIQUES

### *4a. Automation*

See 112.

### *4b. Computerization and modelling*

78 Toda, T.: (Applications of computerized image processing for analyzing two-dimensional electrophoretograms in the field of molecular biology). *Seibutsu Butsuri Kagaku,* 38 (1994) 183-188; *C.A.,* 121 (1994) 174157p.

See also 23, 135, 177, 302, 332, 414, 470, 479, 813, 878, 880, 923.

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

79 Holz, M.: Electrophoretic NMR. *Chem. Soc. Rev.,* 23 (1994) 165-174; *C.A.,* 121 (1994) 123321e - a review with 32 refs.

80 Kostiainen, R.: (Capillary electrophoresis-mass spectrometry). *Kem.-Kemi,* 20 (1993) 596-599; *C.A.,* 121 (1994) 49424x.

81 Perkins, J.R. and Tomer, K.B.: Capillary electrophoresis/electrospray mass spectrometry using a high-performance magnetic sector mass spectrometer. *Anal. Chem.,* 66 (1994) 2835-2840.

82 Vestling, M.M. and Fenselau, C.: Polyvinylidene difluoride (PVDF): an interface for gel electrophoresis and matrix-assisted laser desorption/ionization mass spectrometry. *Biochem. Soc. Trans.,* 22 (1994) 547-551; *C.A.,* 121 (1994) 30483u.

83 Wu, N., Peck, T.L., Webb, A.G., Magin, R.L. and Sweedler, J.V.: Nanoliter volume sample cells for $^1$H NMR: application to online detection in capillary electrophoresis. *J. Am. Chem. Sco.,* 116 (1994) 7929-7930; *C.A.,* 121 (1994) 129011a.

See also 103, 149, 318, 331, 349, 351, 353, 931, 968, 1011, 1012.

### *4d. Affinity electrophoresis*

84 Chu, Y.H.: Affinity electrophoresis in capillaries and gels: quantitative measurement of binding of ligands to proteins. Avail. *Univ. Microfilms Int.,* Order No. DA9330884, 1993, 340 pp.; *C.A.,* 121 (1994) 30406w.

85 Heegaard, N.H.H.: Determination of antigen-antibody affinity by immunocapillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 405-412.

See also 74, 370.

### *4e. Capillary zone electrophoresis and electrokinetic chromatography*

86 Anonymous: (Capillary electrophoresis). *Boll. Chim. Farm.,* 133 (1994) 96-98; *C.A.,* 121 (1994) 128977h - a review with 19 refs.

87 Belenkii, B.G.: (Capillary electrophoresis-new possibilities of analytical chemistry. Review). *Zavod. Lab.,* 59 (1993) 1-13; *C.A.,* 121 (1994) 124319x.

88 Bello, M.S., de Besi, P., Rezzonico, R., Righetti, P.G. and Casiraghi, E.: Electroosmosis of polymer solutions in fused silica capillaries. *Electrophoresis (Weinheim),* 15 (1994) 623-626.

89 Buchberger, W.: (Ion analysis by capillary zone electrophoresis). *GIT Fachz. Lab.,* 38 (1994) 635-636; *C.A.,* 121 (1994) 98705y.

90 Caglio, S., Chiari, M. and Righetti, P.G.: Gel polymerization in detergents: conversion efficiency of methylene blue *vs.* persulfate catalysis, as investigated by capillary zone electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 209-214.

91 Cammann, K., Kleiboehmer, W. and Mussenbrock, E.: (Micellar electrokinetic capillary chromatography, a concurence for HPLC)? *GIT Fachz. Lab.,* 38 (1994) 162-170; *C.A.,* 121 (1994) 49385k.

92 Chen, Y., Höltje, J.-V. and Schwarz, U.: Preparation of highly condensed polyacrylamide gel-filled capillaries. *J. Chromatogr. A,* 680 (1994) 63-71.

93 Cifuentes, A. and Poppe, H.: Rectangular capillary electrophoresis: some theoretical considerations. *Chromatographia,* 39 (1994) 391-404.

94 Cohen, N. and Grushka, E.: Controlling electroosmotic flow in capillary zone electrophoresis. *J. Chromatogr. A,* 678 (1994) 167-175.

95 Cole, R.O'conor: Applications of nontraditional organized media in capillary electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9221745, 1991, 132 pp.; *C.A.,* 121 (1994) 30366h.

96 Dasgupta, P.K. and Liu, S.: Ausiliary electroosmotic pumping in calipary electrophoresis. *Anal. Chem.,* 66 (1994) 3060-3065.

97 Datta, R. and Beardsley, R.A.: Capillary bed electrophoresis device for large-scale samples. *U.S.* US 5,332,480 (Cl. 204-180.1; GO1N27/26), 26 Jul. 1994, Appl. 78,577, 16 Jun. 1993; 7 pp.; *C.A.,* 121 (1994) 174631p.

98 Deyl, Z., Tagliaro, F. and Miksik, I.: Capillary electrophoretic techniques: a new tool in clinical chemistry. *Eur. J. Lab. Med.,* 1 (1993) 161-171; *C.A.,* 121 (1994) 152354y - a review with 45 refs.

99 Effenhauser, C.S. and Manz, A.: Miniaturizing a whole analytical laboratory down to chip size. *Int. Lab.,* 24, No. 9 (1994) 10-12.

100 Emmer, A. and Roeraade, J.: Micro enzymatic assay coupled to capillary electrophoresis *via* liquid junction. *Chromatographia,* 39 (1994) 271-278.

101 Ermakov, S.V., Zhukov, M.Yu., Capelli, L. and Righetti, P.G.: Quantitative studies of different injection systems in capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1158-1166.

102 Esaka, Y., Yamaguchi, Y., Kano, K., Goto, M., Haraguchi, H. and Takahashi, J.-i.: Separation of hydrogen-bonding donors in capillary electrophoresis using polyethers as matrix. *Anal. Chem.,* 66 (1994) 2441-2445.

103 Ferris, S.S.: Development of electrochemical detection schemes for capillary electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9414275, 1993, 165 p.; *C.A.,* 121 (1994) 147871k.

104 Fishman, H.A., Shear, J.B., Colon, L.A., Zare, R.N. and Sweedler, J.V.: On-column derivatization in capillary electrophoresis. *U.S.* US 5,318,680 (Cl. 204-180.1; GO1N27/26), 07 Jun. 1994, US Appl. 235,953, 24 Aug. 1988; 13 pp.; *C.A.,* 121 (1994) 77766d.

105 Fujimoto, C., Fujikawa, AT. and Jinno, K.: Electrolyte buffer solution-containing polyacrylamide gel for filling crack in capillary electrophoresis column. *Jpn. Kokai Tokkyo Koho,* JP 06 50,938 [94 50,938] (Cl. GO1N27/447), 25 Feb. 1994, Appl. 92/248,502, 03 Aug. 1992; 5 pp.; *C.A.,* 121 (1994) 129398g.

106 Fujimoto, C., Matsui, H., Sawada, H. and Jinno, K.: The use of a microconcentric column in capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 33-42.

107 Garner, T.W.: Instrumental development of novel detection and separation methods for capillary electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9334982, 1993, 120 p.; *C.A.,* 121 (1994) 43673f.

108 Gordon, G.B.: Capillary electrophoresis with tracking separation field. *U.S.* US 5,328,578 (Cl. 204-180.1; GO1N27/26), 12 Jul. 1994, Appl. 77,576, 15 Jun. 1993; 16 pp.; *C.A.,* 121 (1994) 129374w.

109 Greenaway, M., Okafo, G., Manallack, D. and Camilleri, P.: Micellar electrokinetic chromatographic studies in $D_2O$ based buffer solutions. *Electrophoresis (Weinheim),* 15 (1994) 1284-1289.

110 Hayes, M.A.: Development of new separation and detection schemes for capillary electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9414297, 1993, 224 p.; *C.A.,* 121 (1994) 142530p.

111 Heiger, D.N., Kaltenbach, P. and Sievert, H.-J.P.: Diode array detection in capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1234-1247.

112 Herold, M. and Wu, S.-l.: Automated peptide fraction collection in CE. *LC-GC Int.,* 7, No. 10 (1994) 554-558.

113 Hirokawa, T. and Kiso, Y.: (Capillary electrophoresis). *Tanpakushitsu Kakusan Koso,* 39 (1994) 1723-1733; *C.A.,* 121 (1994) 174169u - a review with 19 refs.

114 Huang, M.: Column technology for capillary electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9310450, 1992, 181 p.; *C.A.,* 121 (1994) 66363u.

115 Jones, R.F.D., Camilleri, P., Kirby, A.J. and Okafo, G.N.: The synthesis and micellar properties of a novel anionic surfactant. *J. Chem. Soc., Chem. Commun.,* (1994) 1311-1312; *C.A.,* 121 (1994) 86270q.

116 Kaneta, T., Yamashita, T. and Imasaka, T.: Effect of organic modifier on resolution of hydrophobic compounds by micellar electrokinetic chromatography. *Electrophoresis (Weinheim),* 15 (1994) 1276-1279.

117 Karger, B.L., Schmalzing, D. and Foret, F.: Siloxanediol coating for capillary electrophoresis and for general surface modification. *U.S.* US 5,322,608 (Cl. 204-299R; C25B9/00), 21 Jun. 1994, Appl. 994,832, 23 Dec. 1992; 12 pp.; *C.A.,* 121 (1994) 129399h.

118 Keely, C.A., McManigill, D. and Holloway, R.R.: Capillary electrophoresis flow control system. *Eur. Pat.* Appl. EP 608,120 (Cl. GO1N27/447), 27 Jul. 1994, US Appl. 6,353, 19 Jan. 1993; 9 pp.; *C.A.,* 121 (1994) 152775m.

119 Kerr, R.R. and Verdeguer, P.: (Interest and utilization of treated capillary columns in capillary electrophoresis). *Spectra 2000,* 168 (1992) 37-41; *C.A.,* 121 (1994) 199860a.

120 Kohn, A.: The application of peak purity analysis in liquid chromatography and capillary electrophoresis. *LC-GC Int.,* 7, No. 11 (1994) 652-660.

121 Kuhn, R., Wagner, J., Walbroehl, Y. and Bereuter, T.: Potential and limitations of an optically active crown ether for chiral separation in capillary zone electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 828-834.

122 Larsson, M. and Naagaard, S.: On-column ITP focusing in CZE for the quantitation of low-molecular-weight basic solutes in biological samples. *J. Microcolumn Sep.,* 6 (1994) 107-113; *C.A.,* 121 (1994) 129186m.

123 Lee, T.T., Dadoo, R. and Zare, R.N.: Real-time measurement of electroosmotic flow in capillary zone electrophoresis. *Anal. Chem.,* 66 (1994) 2694-2700.

124 Lukkari, P., Jussila, M. and Riekkola, M.-L.: Home-made temperature-control unit for the Waters Quanta 4000 capillary electrophoresis system. *J. High Resolut. Chromatogr.,* 17 (1994) 651-654.

125 Mazereeuw, M., Tjaden, U.R. and van der Greef, J.: In-line isotachophoretic focusing of very large injection volumes for capillary zone electrophoresis using a hydrodynamic counterflow. *J. Chromatogr. A,* 677 (1994) 151-157.

126 Mazzeo, J.R., Grover, E.R., Swartz, M.E. and Petersen, J.S.: Novel chiral surfactant for the separation of enantiomers by micellar electrokinetic capillary chromatography. *J. Chromatogr. A,* 680 (1994) 125-135.

127 Moore, A.W., Jr.: Theory and applications of optically gated high speed capillary zone electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9415360, 1993, 240 p.; *C.A.,* 121 (1994) 147863j.

128 Nagaoka, T., Nakao, N., Tabusa, K., Yano, J. and Ogura, K.: Dynamic elution control in electrochemical ion chromatography using pulse perturbation of stationary phase potential. *J. Electroanal. Chem.,* 371 (1994) 283-286; *C.A.,* 121 (1994) 169140y.

129 Nashabeh, W.A.H.: New approaches in high performance capillary electrophoresis of biological substances. Avail. *Univ. Microfilms Int.,* Order No. DA9327957, 1993, 249 pp.; *C.A.,* 121 (1994) 129187n.

130 Nielsen, K.R. and Foley, J.P.: Effect of the dodecyl sulphate counterion on selectivity and resolution in micellar electrokinetic chromatography. II. Organic counterions. *J. Microcolumn Sep.,* 6 (1994) 139-149; *C.A.,* 121 (1994) 72739n.

131 Nilsson, K., Lindell, J., Norrlöw, O. and Sellergren, B.: Imprinted polymers as antibody mimetics and new affinity gels for selective separations in capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 57-61.

132 Ong, C.P., Ng, C.L., Lee, H.K. and Li, S.F.Y.: The use of mixed surfactants in micellar electrokinetic chromatography. *Electrophoresis (Weinheim),* 15 (1994) 1273-1275.

133 Otsuka, K., Higashimori, M., Koike, R., Karuhaka, K., Okada, Y. and Terabe, S.: Separation of lipophilic compounds by micellar electrokinetic chromatography with organic modifiers. *Electrophoresis (Weinheim),* 15 (1994) 1280-1283.

134 Ozaki, H., Terabe, S. and Ichihara, A.: Micellar electrokinetic chromatography using high-molecular surfactants. Use of butyl acrylate-butyl methacrylate-methacrylic acid copolymers sodium salts as pseudo-stationary phases. *J. Chromatogr. A,* 680 (1994) 117-123.

135 Polesello, A.: (Capillary-electrophoresis system HP $^{3D}$CE). *Lab. 2000,* 7 (1993) 12-16; *C.A.,* 121 (1994) 49168s.

136 Sakai, T.: (Capillary electrophoresis). *Kagaku to Saibutsu,* 32 (1994) 456-462; *C.A.,* 121 (1994) 152378j - a review with 22 refs.

137 Satow, T.: (Capillary electrophoresis. Instrumentation and applications). *Seibutsu Butsuri Kagaku,* 38 (1994) 189-194; *C.A.,* 121 (1994) 128974e - a review with 14 refs.

138 Schiewe, J., Dabrunz, M. and Abicht, H.P.: (Capillary zone electrophoresis. A modern method for the characterization of starting materials of ceramics). *GIT Fachz. Lab.,* 38 (1994) 304-306; *C.A.,* 121 (1994) 40918d.

139 Shartle, R.J. and Dubrow, R.S.: Single use separation cartridge for a capillary electrophoresis instrument. *U.S.* US 5,338,427 (Cl. 204-299R; C25B9/00), 16 Aug. 1994, Appl. 23,088, 26 Feb. 1993; 14 pp.; *C.A.,* 121 (1994) 174642t.

140 Shimura, K.: (Looking at activities of biomolecules by capillary electrophoresis). *Tanpakushitsu Kakusan Koso,* 39 (1994) 1625-1637; *C.A.,* 121 (1994) 152379k.

141 Smith, J.T. and El Rassi, Z.: Micellar electrokinetic capillary chromatography with *in situ* charged micelles: 3. Evaluation of alkylglucoside surfactants as anionic butylboronate complexes. *Electrophoresis (Weinheim),* 15 (1994) 1248-1259.

142 Spohn, U., Beckmann, D. and Gruber, R.: Method and system for sample preparation and delivery for capillary electrophoresis. *Ger. Offen.* DE 4,305,731 (Cl. GO1N27/447), 25 Aug. 1994, Appl. 22 Feb. 1993; 8 pp.; *C.A.,* 121 (1994) 174637v.

143 Stathakis, C. and Cassidy, R.M.: Ionic polymers for selectivity control in the capillary electrophoretic separations of small ions. *Int. Lab.,* 24, No. 10 (1994) P18-P22.

144 Swedberg, S.A.: Capillary tube with reversible protein interaction and method of preparing the electrophoresis capillary. *U.S.* US 5,314,593 (Cl. 204-180.1; GO1N27/26), 24 May 1994, Appl. 32,913, 18 Mar. 1993; 11 pp.; *C.A.,* 121 (1994) 53472d.

145 Tomlinson, A.J., Benson, L.M., Oda, R.P., Braddock, W.D., Strausbauch, M.A., Wettstein, P.J. and Naylor, S.: Modification of electroosmotic flow in preconcentration-capillary electrophoresis (PC-CE). *J. High Resolut. Chromatogr.,* 17 (1994) 669-671.

146 Tsai, P., Patel, B. and Lee, C.S.: Micellar electrokinetic chromatographay with electroosmotic step gradient elution. *Electrophoresis (Weinheim),* 15 (1994) 1229-1233.

147 Weber, P.L. and Buck, D.R.: Capillary electrophoresis: a fast and simple method for the determination of the amino acid composition of proteins. *J. Chem. Educ.,* 71 (1994) 609-612; *C.A.,* 121 (1994) 156653t.

148 Wu, C.T.: Direct control of electroosmosis in capillary electrophoresis by using a radial electric potential gradient. Avail. *Univ. Microfilms Int.,* Order No. DA9400521, 1993, 129 pp.; *C.A.,* 121 (1994) 152567v.

149 Wu, N.: Peroxyoxalate chemiluminescence and capillary electrophoresis: new methods for bioanalytical chemistry. Avail. *Univ. Microfilms Int.,* Order No. DA9402951, 1993, 194 pp.; *C.A.,* 121 (1994) 30446j.

150 Zhang, H.-W., Chen, X.-G. and Hu, Z.-D.: Influence of sample injection time of ions on migration time in capillary zone electrophoresis. *J. Chromatogr. A,* 677 (1994) 159-167.

151 Zhao, Z.: Polymer-coated fused silica columns for capillary electrophoresis of proteins, peptides, and nucleotides. Avail. *Univ. Microfilms Int.,* Order No. DA9405107, 1993, 196 p.; *C.A.,* 121 (1994) 49376h.

152 Zhu, T., Sun, Y., Zhang, C., Ling, D. and Sun, Z.: Variation of the pH of the background electrolyte as a result of electrolysis in capillary electrophoresis. *J. High Resolut. Chromatogr.,* 17 (1994) 563-564.

See also 3, 4, 5, 7, 9, 14, 16, 25, 27, 29, 30, 32, 34, 37, 41, 42, 43, 47, 48, 49, 52, 53, 54, 55, 64, 74, 75, 80, 81, 83, 84, 85, 153, 154, 155, 156, 157, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 184, 185, 186, 187, 188, 190, 191, 192, 193, 195, 196, 201, 202, 203, 205, 206, 207, 208, 209, 210, 211, 212, 216, 217, 230, 235, 237, 240, 241, 242, 243, 244, 245, 248, 249, 250, 277, 278, 279, 280, 281, 283, 285, 287, 288, 289, 290, 291, 292, 293, 295, 296, 297, 299, 300, 301, 302, 303, 305, 306, 307, 310, 311, 312, 313, 318, 321, 325, 329, 330, 331, 335, 336, 341, 351, 352, 370, 436, 437, 440, 441, 442, 450, 455, 456, 461, 464, 465, 500, 501, 591, 630, 648, 653, 713, 714, 717, 718, 719, 720, 722, 726, 727, 728, 730, 788, 790, 799, 810, 820, 838, 843, 851, 860, 863, 870, 871, 875, 876, 877, 887, 890, 894, 900, 902, 924, 930, 931, 932, 933, 934, 935, 936, 937, 939, 940, 942, 943, 945, 946, 947, 948, 949, 950, 951, 952, 953, 955, 956, 957, 958, 959, 960, 961, 963, 964, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 980, 981, 982, 983, 984, 985, 987, 988, 989, 991, 993, 995, 996, 997, 998, 1009, 1010, 1013, 1014, 1015, 1016, 1018, 1019, 1020, 1021, 1022.

*4f. Isotachophoresis*

See 4, 125, 269, 441, 649, 941, 979, 1011, 1012.

*4g. Enantiomers, separation*

153 Altria, K.D., Goodall, D.M. and Rogan, M.M.: Quantitative applications and validation of the resolution of enantiomers by capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 824-827.

154 Aturki, Z. and Fanali, S.: Use of β-cyclodextrin polymer as a chiral selector in capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 137-146.

155 Chankvetadze, B., Endresz, G. and Blaschke, G.: About some aspects of the use of charged cyclodextrins for capillary electrophoresis enantioseparation. *Electrophoresis (Weinheim),* 15 (1994) 804-807.

156 D'Hulst, A. and Verbeke, N.: Quantitation in chiral capillary electrophoresis: theoretical and practical considerations. *Electrophoresis (Weinheim),* 15 (1994) 854-863.

157 Dette, C. and Wätzig, H.: Separation of enantiomers of N-acetylcysteine by capillary electrophoresis after derivatization by o-phthaldialdehyde. *Electrophoresis (Weinheim),* 15 (1994) 763-768.

158 Jung, M., Mayer, S. and Schurig, V.: Enantiomer separation by GC, SFC, and CE on immobilized polysiloxane-bonded cyclodextrins. *LC-GC,* 12 (1994) 458-466; *C.A.,* 121 (1994) 124313r - a review with 46 refs.

159 Lloyd, D.K., Li, S. and Ryan, P.: Investigation of enantioselective ligand-protein binding and displacement interactions using capillary electrophoresis. *Chirality,* 6 (1994) 230-238; *C.A.*, 121 (1994) 200123w.

160 Mayer, S. and Schurig, V.: Enantiomer separation using mobile and immobile cyclodextrin derivatives with electromigration. *Electrophoresis (Weinheim),* 15 (1994) 835-841.

161 Penn, S.G., Bergström, E.T., Goodall, D.M. and Loran, J.S.: Capillary electrophoresis with chiral selectors: optimization of separation and determination of thermodynamic parameters for binding of tioconazole enantiomers to cyclodextrins. *Anal. Chem.,* 66 (1994) 2866-2873.

162 Penn, S.G., Liu, G., Bergström, E.T., Goodall, D.M. and Loran, J.S.: Systematic approach to treatment of enantiomeric separations in capillary electrophoresis and liquid chromatography. I. Initial evaluation using propranolol and dansylated amino acids. *J. Chromatogr. A,* 680 (1994) 147-155.

163 Quang, Cc. and Khaledi, M.G.: Chiral separations of acidic compounds by dextrin-mediated capillary zone electrophoresis. *J. High Resolut. Chromatogr.,* 17 (1994) 609-612.

164 Rawjee, Y.Y.: Cyclodextrin-mediated chiral separations *via* capillary zone electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9410860, 1993, 206 p.; *C.A.*, 121 (1994) 43752f.

165 Schurig, V., Schleimer, M., Jung, M., Mayer, S. and Glausch, A.: Enantiomer separation by GLC, SFC and CZE on high-resolution capillary columns coated with cyclodextrin derivatives. In: Schreier, P. and Winterhalter, P. (Editors), *Prog. Flavour Precursor Stud. Proc. Int. Conf. 1992,* Allured, Carol Stream, 1993, pp. 63-75; *C.A.*, 121 (1994) 56047e - a review with 25 refs.

166 Schützner, W., Caponecchi, G., Fanali, S., Rizzi, A. and Kenndler, E.: Improved separation of diastereomeric derivatives of enantiomers by a physical network of linear polyvinylpyrolidone applied as pseudophase in capillary zone electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 769-773.

167 Soini, H., Stefansson, M., Riekkola, M.-L. and Novotny, M.: Maltooligosaccharides as chiral selectors for the separation of pharmaceuticals by capillary electrophoresis. *Anal. Chem.,* 66 (1994) 3477-3484.

168 Stalcup, A.M. and Agyel, N.M.: Heparin: a chiral mobile-phase additive for capillary zone electrophoresis. *Anal. Chem.,* 66 (1994) 3054-3059.

169 Tanaka, Y., Matsubara, N. and Terabe, S.: Separation of enantiomers by affinity electrokinetic chromatography using avidin. *Electrophoresis (Weinheim),* 15 (1994) 848-853.

170 Terebe, S.: (Separation of optical isomers by capillary electrophoresis). *Kagaku (Kyoto),* 49 (1994) 374-375; *C.A.*, 121 (1994) 49356b.

171 Vespalec, R. and Bocek, P.: Chiral separations by capillary electrophoresis: present state of the art. *Electrophoresis (Weinheim),* 15 (1994) 755-762.

172 Vindevogel, J. and Sandra, P.: On the possibility of performing chiral wall-coated open-tubular electrochromatography in 50 μm internal diameter capillaries. *Electrophoresis (Weinheim),* 15 (1994) 842-847.

173 Wren, S.A.C., Rowe, R.C. and Payne, R.S.: A theoretical approach to chiral capillary electrophoresis with some practical implications. *Electrophoresis (Weinheim),* 15 (1994) 774-778.

174 Yang, J. and Hage, D.S.: Chiral separations in capillary electrophoresis using human serum albumin as a buffer additive. *Anal. Chem.,* 66 (1994) 2719-2725.

See also 115, 121, 126, 240, 265, 280, 285, 291, 292, 297, 930, 946, 952, 954, 958, 959, 960, 966, 969, 974, 976.

*4h. Two dimensional electrophoresis*

175 Dean, D.P., Cronan, M.T., Merenda, J.M., Gardner, J.P., Connelly, P.A. and Celis, J.E.: "Spot transfer", elution and comigration with known proteins allows accurate transferral of protein identifications between distinct two-dimensional electrophoretic systems. *Electrophoresis (Weinheim),* 15 (1994) 540-543.

176 Monardo, P.J., Boutell, T., Garrels, J.I. and Latter, G.I.: A distributed system for two-dimensional gel analysis. *Comput. Appl. Biosci.,* 10 (1994) 137-143; *C.A.*, 121 (1994) 152711n.

177 Rovensky, P. and Lefkovits, I.: Data management in a two-dimensional gel electrophoresis laboratory: "gelscript 1" software. *Electrophoresis (Weinheim),* 15 (1994) 977-983.

178 Schickle, H.: High-resolution two-dimensional electrophoresis. *Ger. Offen.* DE 4,244,082 (Cl. B01D57/02), 30 Jun. 1994, Appl. 24 Dec. 1992; 10 p.; *C.A.*, 121 (1994) 112549j.

See also 61, 78, 189, 220, 236, 252, 317, 324, 327, 332, 349, 350, 353, 358, 360, 364, 365, 367, 372, 375, 382, 406, 413, 414, 416, 425, 426, 427, 429, 430, 434, 435, 438, 441, 457, 470, 471, 473, 475, 476, 492, 493, 494, 497, 508, 511, 513, 514, 522, 523, 528, 532, 533, 534, 535, 536, 538, 539, 553, 557, 558, 606, 636, 642, 643, 676, 684, 990, 1007.

*4i. Other special techniques*

179 Fukuda, T., Naka, W., Tajima, S. and Nishikawa, T.: (New antimycotic susceptibility test using neutral red to measure minimum fungicidal concentration). *Nippon Ishinkin Gakkai Zasshi,* 35 (1994) 175-178; *C.A.*, 121 (1994) 200254q.

180 Guo, Y. and Guo, Q.: (A current breakthrough electrophoresis technique with supermost resolution: immobilized pH gradients isoelectrofocusing). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan,* 21 (1994) 143-146; *C.A.*, 121 (1994) 200126z.

181 Hayes, D.B.: Equilibrium electrophoresis: results from the second prototype. Avail. *Univ. Microfilms Int.,* Order No. DA9309836, 1993, 76 pp.; *C.A.*, 121 (1994) 129183h.

182 Roman, M.C.: A new method of scaling up free flow electrophoresis. Avail. *Univ. Microfilms Int.,* Order No. DA9405832, 1993, 226 pp.; *C.A.*, 121 (1994) 30445h.

183 Shmidt, J.L.E.: Free flow electrophoresis in an alternating electric field along a semipermeable membrane. Avail. *Univ. Microfilms Int.,* Order No. DA9313682, 1990, 117 p.; *C.A.*, 121 (1994) 66361s.

See also 36, 556, 838.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

### *5b. Cyclic hydrocarbons, fullerenes*

184 Brumley, W.C. and Jones, W.J.: Comparison of micellar electrokinetic chromatography (MEKC) with capillary gas chromatography in the separation of phenols, anilines and polynuclear aromatics. Potential field-screening applications of MEKC. *J. Chromatogr. A,* 680 (1994) 163-173.

185 Whitaker, K.W. and Sepaniak, M.J.: Nonaqueous packed capillary electrokinetic chromatographic separations of large polycyclic aromatic hydrocarbons and fullerenes. *Electrophoresis (Weinheim),* 15 (1994) 1341-1345.

See also 7, 133, 935.

## 7. PHENOLS

186 Chen, I.-C. and Whang, C.-W.: Capillary zone electrophoresis of eleven priority phenols with amperometric detection. *J. Chin. Chem. Soc. (Taipei),* 41 (1994) 419-425; *C.A.,* 121 (1994) 163550k.

187 Harms, J. and Schwedt, G.: Applications of capillary electrophoresis in element speciation analysis of plant and food extracts. *Fresenius J. Anal. Chem.,* 350 (1994) 93-100.

See also 184.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

### *8a. Flavonoids*

188 Liu, Y.-M. and Sheu, S.-J.: Capillary electrophoresis determination of baicalein, baicalin, wogonin and wogonin-7-O-glucuronide in traditional Chinese medicinal preparations. *J. High Resolut. Chromatogr.,* 17 (1994) 559-560.

189 McGhie, T.K. and Markham, K.R.: Separation of flavonols by capillary electrophoresis: the effect of structure on electrophoretic mobility. *Phytochem. Anal.,* 5 (1994) 121-126; *C.A.,* 121 (1994) 152566u.

190 Pietta, P., Mauri, P., Bruno, A. and Gardana, C.: Influence of structure on the behavior of flavonoids in capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1326-1331.

191 Pietta, P.G., Mauri, P.L. and Gardana, C.: Identification of the main flavonoids by use of chromatographic, electrophoretic, and 'on-line' spectral data. *J. High Resolut. Chromatogr.,* 17 (1994) 616-618.

192 Pietta, P.G., Mauri, P.L., Zini, L. and Gardana, C.: Optimization of separation selectivity in capillary electrophoresis of flavonoids. *J. Chromatogr. A,* 680 (1994) 175-179.

193 Shihabi, Z.K., Kute, T., Garcia, L.L. and Hinsdale, M.: Analysis of isoflavones by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 181-185.

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

194 Verschaeve, L., Gilles, J., Schoeters, J., van Cleuvenbergen, R. and de Fre, R.: The single cell gel electrophoresis technique or comet test for monitoring dioxin pollution and effects. *Organohalogen Compd.,* 11 (1993) 213-216; *C.A.,* 121 (1994) 185965b.

See also 187.

## 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

195 Takeda, S., Wakida, S.-i., Yamane, M. and Higashi, K.: Analysis of lower aliphatic aldehydes in water by micellar electrokinetic chromatography with derivatization to 2,4-dinitrophenylhydrazones. *Electrophoresis (Weinheim),* 15 (1994) 1332-1334.

See also 7.

## 10. CARBOHYDRATES

### *10a. Mono and oligosaccharides. Structural studies*

196 Chiesa, C. and O'Neill, R.A.: Capillary zone electrophoresis of oligosaccharides derivatized with various aminonaphthalene sulfonic acids. *Electrophoresis (Weinheim),* 15 (1994) 1132-1140.

197 Greenaway, M., Okafo, G.N., Camilleri, P. and Dhanak, D.: A sensitive and selective method for the analysis of complex mixtures of sugars and linear oligosaccharides. *J. Chem. Soc., Chem. Commun.,* (1994) 1691-1692; *C.A.,* 121 (1994) 103333g.

198 Hermentin, P., Doenges, R. and Brazel, D.: Method for one-dimensional separation and identification of glycans as well as the use of these methods for the establishment of data banks and for structure determination of glycans. *Ger. Offen.* DE 4,237,105 (Cl. CO7K15/14), 05 May 1994, Appl. 03 Nov. 1992; 14 pp.; *C.A.,* 121 (1994) 77764b.

199 Ito, H., Ogawa, Y. and Maruyama, N.: Electrophoresis and malto-oligosaccharide containing modified fructose for α-amylase isoenzyme determination. *Jpn. Kokai Tokkyo Koho* JP 06,160,351 [94,160,351] (Cl. GO1N27/447), 07 Jun. 1994, Appl. 92/335,119, 20 Nov. 1992; 12 pp.; *C.A.,* 121 (1994) 152783n.

200 Jackson, P.: High-resolution polyacrylamide gel electrophoresis of fluorophore-labeled reducing saccharides. *Methods Enzymol.,* 230(Guide to Techniques in Glycobiology) (1994) 250-265; *C.A.,* 121 (1994) 77641j.

201 Klockow, A., Paulus, A., Figueiredo, V., Amadò, R. and Widmer, H.M.: Determination of carbohydrates in fruit juices by capillary electrophoresis and high-performance liquid chromatography. *J. Chromatogr. A,* 680 (1994) 187-200.

202 Linhardt, R.J.: Capillary electrophoresis of oligosaccharides. *Methods Enzymol.,* 230(Guide to Techniques in Glycobiology) (1994) 265-280; *C.A.,* 121 (1994) 77491k - a review with 26 refs.

203 Mao, Q. and Zhu, S.: (Capillary zone electrophoresis of pyridylamino derivatives on monosaccharides). *Sepu,* 12 (1994) 194-196; *C.A.*, 121 (1994) 194598m.

204 Mazid, M.A. and Klock, J.C.: Rapid synthesis and analysis of carbohydrates. *U.S.* US 5,308,460 (Cl. 204-180.1; C25B3/00), 03 May 1994, Appl. 968,980, 30 Oct. 1992; 12 pp.; *C.A.*, 121 (1994) 205889k.

205 Mechref, Y. and El Rassi, Z.: Capillary zone electrophoresis of derivatized acidic monosaccharides. *Electrophoresis (Weinheim),* 15 (1994) 627-634.

206 Pervin, A., Al-Hakim, A. and Linhardt, R.J.: Separation of glycosaminoglycan-derived oligosaccharides by capillary electrophoresis using reverse polarity. *Anal. Biochem.,* 221 (1994) 182-188.

207 Schwaiger, H., Oefner, P.J., Huber, C., Grill, E. and Bonn, G.K.: Capillary zone electrophoresis and micellar electrokinetic chromatography of 4-aminobenzonitrile carbohydrate derivatives. *Electrophoresis (Weinheim),* 15 (1994) 941-952.

208 Stefansson, M. and Novotny, M.: Resolution of the branched forms of oligosaccharides by high-performance capillary electrophoresis. *Carbohydr. Res.,* 258 (1994) 1-9; *C.A.*, 121 (1994) 134607d.


See also 50, 230, 995.

*10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides*


209 Damm, J.B.L. and Overklift, G.T.: Indirect UV detection as a non-selective detection method in the qualitative and quantitative analysis of heparin fragments by high-performance capillary electrophoresis. *J. Chromatogr. A,* 678 (1994) 151-165.

210 Grimshaw, J., Kane, A., Trocha-Grimshaw, J., Douglas, A., Chakravarthy, U. and Archer, D.: Quantitative analysis of hyaluronan in vitreous humor using capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 936-940.

211 Hepler, R.W. and Ip, C.C.Y.: Application of capillary ion electrophoresis and ion chromatography for the determination of O-acetate groups in bacterial polysaccharides. *J. Chromatogr. A,* 680 (1994) 201-208.

212 Hermentin, P., Doenges, R., Witzel, R., Hokke, C.H., Vliegenthart, J.F.G., Kamerling, J.P., Conradt, H.S., Nimtz, M. and Brazel, D.: A strategy for the mapping of N-glycans by high-performance capillary electrophoresis. *Anal. Biochem.,* 221 (1994) 29-41.

213 Jackson, P., Pluskal, M.G. and Skea, W.: The use of polyacrylamide gel electrophoresis for the analysis of acidic glycans labeled with the fluorophore 2-aminoacridone. *Electrophoresis (Weinheim),* 15 (1994) 896-902.

214 Lee, H.G.: An agarose gel electrophoretic method for hyaluronan molecular weight analysis and its application to osteoarthritic synovial hyaluronan. Avail. *Univ. Microfilms Int.,* Order No. DA9412198, 1994, 127 pp.; *C.A.*, 121 (1994) 53440s.

215 Oliveira, F.W., Chavante, S.F., Santos, E.A., Dietrich, C.P. and Nader, H.B.: Appearance and fate of a β-galactanase, α,β-galactosidases, heparan sulfate and chondroitin sulfate degrading enzymes during embryonic development of the mollusc *Pomacea sp. Biochim. Biophys. Acta,* 1200 (1994) 241-246.

216 Penn, S.G., Chiu, R.W. and Monnig, C.A.: Separation and analysis of cyclodextrins by capillary electrophoresis with dynamic fluorescence labelling and detection. *J. Chromatogr. A,* 680 (1994) 233-241.

217 Stefansson, S.C. and Novotny, M.: Modification of the electrophoretic mobility of neutral and charged polysaccharides. *Anal. Chem.,* 66 (1994) 3466-3471.

218 Van de Lest, C.H.A., Versteg, W.M.M., Veerkamp, J.H. and van Kuppevelt, T.H.: Quantitation and characterization of glycosaminoglycans at the nanogram level by a combined azure A-silver staining in agarose gels. *Anal. Biochem.,* 221 (1994) 356-361.


*10c. Glycoproteins and their constituents*


219 Akasaki, K., Michihara, A., Fukuzawa, M., Kinoshita, H. and Tsuji, H.: Cycling of an 85-kDa lysosomal membrane glycoprotein between the cell surface and lysosomes in cultured rat hepatocytes. *J. Biochem. (Tokyo),* 116 (1994) 670-676.

220 Aoki, N., Ujita, M., Kuroda, H., Urabe, M., Noda, A., Adachil, T., Nakamura, R. and Matsuda, T.: Immunologically cross-reactive 57 kDa and 53 kDa glycoprotein antigens of bovine milk fat globule membrane: isoforms with different N-linked sugar chains and differential glycosylation at early stages of lactation. *Biochim. Biophys. Acta,* 1200 (1994) 227-234.

221 Avichezer, D., Gilboa-Garber, N., Garber, N.C. and Katcoff, D.J.: *Pseudomonas aeruginosa* PA-I lectin gene molecular analysis and expression in *Escherichia coli. Biochim. Biophys. Acta,* 1218 (1994) 11-20.

222 Belew, M., Zhou, Y., Wang, S., Nyström, L.-E. and Janson, J.-C.: Purification of recombinant human granulocyte-macrophage colony-stimulating factor from the inclusion bodies produced by transformed *Escherichia coli* cells. *J. Chromatogr. A,* 679 (1994) 67-83.

223 Caeiro, J.L.B., Liste, I., Vogt, U. and Ribeiro, J.C.T.: Analysis of the inter-alpha-trypsin inhibitor polymorphism in West Africa: description of a new allele, ITI*7. *Electrophoresis (Weinheim),* 15 (1994) 1191-1192.

224 Crouch, E., Chang, D., Rust, K., Persson, A. and Heuser, J.: Recombinant pulmonary surfactant protein D. Post-franslational modification and molecular assembly. *J. Biol. Chem.,* 269 (1994) 15808-15813.

225 Durchschlag, H., Binder, S., Christl, P. and Jaenicke, R.: SDS-electrophoresis of glycoproteins. *Comun. Jorn. Com. Esp. Deterg.,* 25 (1994) 407-422; *C.A.*, 121 (1994) 200144d.

226 Elliot, S., Bartley, T., Delorme, E., Derby, P., Hunt, R., Lorenzini, T., Parker, V., Rohde, M.F. and Stoney, K.: Structural requirements for addition of O-linked carbohydrate to recombinant erythropoietin. *Biochemistry,* 33 (1994) 11237-11245.

227 Fife, R.S., Moody, S., Houser, D. and Proctor, C.: Studies of copper transport in cultured bovine chondrocytes. *Biochim. Biophys. Acta,* 1201 (1994) 19-22.

228 Girardet, J.M., Saulnier, F., Driou, A., Linden, G., Coddeville, B. and Spik, G.: High performance electrophoresis chromatography of bovine milk component 3 glycoproteins. *J. Dairy Sci.,* 77 (1994) 1205-1215; *C.A.*, 121 (1994) 33454w.

229 Gravel, P., Golaz, O., Walzer, C., Hochstrasser, D.F., Turler, H. and Balant, L.P.: Analysis of glycoproteins separated by two-dimensional gel electrophoresis using lectin blotting revealed by chemiluminiscence. *Anal. Biochem.,* 221 (1994) 66-71.

230 Kakehi, K., Susami, A., Taga, A., Suzuki, S. and Honda, S.: High-performance capillary electrophoresis of O-glycosidically linked sialic acid-containing oligosaccharides in glycoproteins as their alditol derivatives with low-wavelength UV monitoring. *J. Chromatogr. A,* 680 (1994) 209-215.

231 Konska, G., Guillot, J., Dusser, M., Damez, M. and Botton, B.: Isolation and characterization of an N-acetyllactosamine-binding lectin from the mushroom *Laetiporus sulfureus. J. Biochem. (Tokyo),* 116 (1994) 519-523.

232 Kozma, E. and Ryszka, F.: (Electrophoretic mobility of porcine follitropin and its degradation or aggregation products). *Ann. Acad. Med. Silesiensis,* 26 (1992) 89-97; *C.A.,* 121 (1994) 117847q.

233 Lelong, I.H., Carderelli, C.O., Gottesman, M.M. and Pastan, I.: GTP-Stimulated phosphorylation of P-glycoprotein in transporting vesicles from KB-V1 multidrug resistant cells. *Biochemistry,* 33 (1994) 8921-8929.

234 Milne, E.M., Pemberton, A.D., McGorum, B.C., Dixon, P.M. and Miller, H.R.P.: Molecular weight alterations of alpha-1 proteinase inhibitor in equine bronchoalveolar lavage fluid. *Electrophoresis (Weinheim),* 15 (1994) 1193-1197.

235 Morbeck, D.E., Madden, B.J. and McCormick, D.J.: Analysis of the microheterogeneity of the glycoprotein chorionic gonadotropin with high-performance capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 217-224.

236 Noguchi, S., Yonezawa, N., Katsumata, T., Hashizume, K.-i., Kuwayama, M., Hamano, S., Watanabe, S. and Nakano, M.: Characterization of the zona pellucida glycoproteins from bovine ovarian and fertilized eggs. *Biochim. Biophys. Acta,* 1201 (1994) 1-14.

237 Oda, R.P., Madden, B.J., Spelsberg, T.C. and Landers, J.P.: α,β-Bis-quaternary ammonium alkanes as effective buffer additives for enhanced capillary electrophoretic separation of glycoproteins. *J. Chromatogr. A,* 680 (1994) 85-92.

238 Qian, R., Shi, W.X., Shen, Z.M. and Sun, C.: A mannose-specific lectin from *Vicia villosa* seeds. *Biochim. Biophys. Acta,* 1201 (1994) 61-68.

239 Zenteno, E., Ortega, M., Qin, Z., Montreuil, J. and Debray, H.: Fast purification of *Phaseolus vulgaris* isolectins. *Prepar. Biochem.,* 24 (1994) 175-183.

See also 295, 397, 450, 461, 757.

## 11. ORGANIC ACIDS AND LIPIDS

### *11a. Organic acids and simple esters*

240 Desiderio, C., Aturki, Z. and Fanali, S.: Separation of α-hydroxy acid enantiomers by high performance capillary electrophoresis using copper(II)-L-amino acid and copper(II)-aspartame complexes as chiral selectors in the background electrolyte. *Electrophoresis (Weinheim),* 15 (1994) 864-869.

241 Devevre, O., Putra, D.P., Botton, B. and Garbaye, J.: Sensitive and selective method for the separation of organic acids by capillary zone electrophoresis. *J. Chromatogr. A,* 679 (1994) 349-357.

242 Dolnik, V.: Capillary zone electrophoresis of pathological metabolites in phenylketonuria. *J. Microcolumn Sep.,* 6 (1994) 63-67; *C.A.,* 121 (1994) 152578z.

243 Gassner, B., Friedl, W. and Kenndler, E.: Wall adsorption of small anions in capillary zone electrophoresis induced by cationic trace constituents of the buffer. *J. Chromatogr. A,* 680 (1994) 25-31.

244 Hiraoka, A., Akai, J., Tominaga, I., Hattori, M., Sasaki, H. and Arato, T.: Capillary zone electrophoretic determination of organic acids in cerebrospinal fluid from patients with central nervous system diseases. *J. Chromatogr. A,* 680 (1994) 243-246.

245 Hiraoka, A., Miura, I., Tominaga, I., Hattori, M. and Sasaki, H.: Capillary-zone electrophoretic determination of lactate in cerebrospinal fluid from patients with central nervous system diseases. *Seibutsu Butsuri Kagaku,* 38 (1994) 233-236; *C.A.,* 121 (1994) 174414v.

246 Kitaoka, Y., Kobayashi, M., Kirihata, M. and Ichimoto, I.: Studies of the complexation of boric acid with carboxylate using paper electrophoresis. *Annu. Rep. Res., React. Inst., Kyoto Univ.,* 26 (1993) 143-147; *C.A.,* 121 (1994) 35665q.

247 Kobayashi, M., Kitaoka, Y., Tanaka, Y. and Kawamoto, K.: Electrophoretic behaviour and infrared spectra of dihydroxyboryl compounds in aqueous di- and tricarboxylic acids: paper electrophoresis as a tool for determining the chemical states of a substance in solution. *J. Chromatogr. A,* 678 (1994) 351-358.

248 Shirao, M., Furuta, R., Suzuki, S., Nakazawa, H., Fujita, S. and Maruyama, T.: Determination of organic acids in urine by capillary zone electrophoresis. *J. Chromatogr. A,* 680 (1994) 247-251.

249 Tomita, M., Okuyama, T., Watanabe, S. and Watanabe, H.: Quantitation of the hydroxyl radical adducts of salicylic acid by micellar electrokinetic capillary chromatography: oxidizing species formed by a Fenton reaction. *Arch. Toxicol.,* 68 (1994) 428-433; *C.A.,* 121 (1994) 172368j.

250 Valkó, I.E., Billiet, H.A.H., Frank, J. and Luyben, K.C.A.M.: Effect of the degree of substitution of (2-hydroxy)propyl-β-cyclodextrin on the enantioseparation of organic acids by capillary electrophoresis. *J. Chromatogr. A,* 678 (1994) 139-144.

See also 89, 102, 999, 1019.

### *11c. Lipids and their constituents*

251 Kakehi, K., Ikeda, S., Hirose, A. and Honda, S.: (An approach to ganglioside analysis by capillary electrophoresis). *Kuromatogurafi,* 14 (1993) 86-87; *C.A.,* 121 (1994) 30252t.

### *11d. Lipoproteins and their constituents*

252 Araki, K., Sasaki, J., Matsunaga, A., Takada, Y., Moriyama, K., Hidaka, K. and Arakawa, K.: Characterization of two new human apolipoprotein A-I variants: Apolipoprotein A-I Tsushima (Trp-108→Arg) and A-I Hita (Ala-95→Asp). *Biochim. Biophys. Acta,* 1214 (1994) 272-278.

253 Bonnefont-Rousselot, D., Arrio, B., Catudioc, J. and Packer, L.: Oxidization of human low density lipoproteins measured by laser Doppler electrophoresis. In: Pasquier, C. (Editor), *Oxid. Stress. Cell Act. Viral Infect.,* Birkhaeuser, Basel, 1994, pp. 165-171; *C.A.,* 121 (1994) 200143c.

254 Campos, E., Fiévet, P., Cacès, E., Fruchart, J.-C. and Fiévet, C.: A screening method for abnormally high lipoprotein(a) concentrations by agarose lipoprotein electrophoresis. *Clin. Chim. Acta,* 230 (1994) 43-50.

255 Chen, M., Breslow, J.L., Li, W. and Leff, T.: Transcriptional regulation of the apoC-III gene by insulin in diabetic mice: correlation with changes in plasma triglyceride levels. *J. Lipid Res.,* 35 (1994) 1918-1924.

256 Csako, G., Nagy, B., Costello, R., Castelli, J.A.C. and Hruszkewycz, A.M.: Pulsed-field gel electrophoresis for the separation of large protein molecules exemplified by the isoforms of apolipoprotein (a). *Electrophoresis (Weinheim),* 15 (1994) 926-929.

257 Evans, G.F., Bensch, W.R., Apelgren, L.D., Bailey, D., Kauffman, R.F., Bumol, T.F. and Zuckerman, S.H.: Inhibition of cholesteryl ester transfer protein in normocholesterolemic hamsters: effects on HDL subspecies, quantity, and apolipoprotein distribution. *J. Lipid Res.,* 35 (1994) 1634-1645.

258 Gong, E.L., Tan, C.S., Shoukry, M.I., Rubin, E.M. and Nichols, A.V.: Structural and functional properties of human and mouse apolipoprotein A-I. *Biochim. Biophys. Acta,* 1213 (1994) 335-342.

259 Ikewaki, K., Rader, D.J., Zech, A. and Breweer, H.B., Jr.: *In vivo* metabolism of apolipoproteins A-I and E in patients with a betalipoproteinemia: implications for the roles of apolipoproteins B and E in HDL metabolism. *J. Lipid Res.,* 35 (1994) 1809-1819.

260 Ishigami, M., Yamashita, S., Sakai, N., Arai, T., Hirano, K.-i., Hiraoka, H., Kameda-Takemura, K. and Matsuzawa, Y.: Large and cholesteryl ester-rich high-density lipoproteins in cholesteryl ester transfer protein (CETP) deficiency can not protect macrophages from cholesterol accumulation induced by acetylated low-density lipoproteins. *J. Biochem. (Tokyo),* 116 (1994) 257-262.

261 Kaptein, A., de Wit, E.C.M. and Princen, H.M.G.: Butyrate stimulates the secretion of apolipoprotein B-100-containing lipoproteins from HepG2 cells by inhibiting the intracellular degradation. *Biochim. Biophys. Acta,* 1213 (1994) 349-356.

262 Kraemer, F.B., Sather, S.A., Park, B., Sztalryd, C., Natu, V., May, K., Nishimura, H., Simpson, I., Cooper, A.D. and Cushman, S.W.: Low density lipoprotein receptors in rat adipose cells: subcellular localization and regulation by insulin. *J. Lipid Res.,* 35 (1994) 1760-1772.

263 Li, Z., McNamara, J.R., Ordovas, J.M. and Schaefer, E.J.: Analysis of high density lipoproteins by a modified gradient gel electrophoresis method. *J. Lipid Res.,* 35 (1994) 1698-1711.

264 Lopez-Miranda, J., Ordovas, J.M., Mata, P., Lichtenstein, A.H., Clevidence, B., Judd, J.T. and Schaefer, E.J.: Effect of apolipoprotein E phenotype on diet-induced lowering of plasma low density lipoprotein cholesterol. *J. Lipid Res.,* 35 (1994) 1965-1975.

265 Mishima, Y., Kamisaka, K., Takahashi, K., Kibata, M., Ando, M., Kikuchi, M. and Okada, K.: (Clinical application of polyacrylamide gel disc electrophoretic analysis of serum lipoproteins). *Iryo,* 48 (1994) 354-359; *C.A.,* 121 (1994) 103416m.

266 Mishima, Y., Kibata, M., Syoji, K., Okada, K., Kamisaka, K., Fujiwara, M. and Isioka, T.: (Polyacrylamide gel electrophoretic analysis of serum lipoproteins in the patients with old myocardial infarction). *Domyaku Koka,* 21 (1994) 661-667; *C.A.,* 121 (1994) 80005k.

267 Ohta, T., Nakamura, R., Ikeda, Y., Frohlich, J., Takata, K., Saito, Y., Horiuchi, S. and Matsuda, I.: Evidence for impaired cellular cholesterol removal mediated by apo A-I containing lipoproteins in patients with familial lecithin: cholesterol acyltransferase deficiency. *Biochim. Biophys. Acta,* 1213 (1994) 295-301.

268 Ragolia, L. and Tropp, B.E.: The effects of phosphoglycerides on *Escherichia coli* cardiolipin synthase. *Biochim. Biophys. Acta,* 1214 (1994) 323-332.

269 Schmitz, G. and Möllers, C.: Analysis of lipoproteins with analytical capillary isotachophoresis. *Electrophoresis (Weinheim),* 15 (1994) 31-39.

270 Singh, T.K.A., Liu, H., Bradley, R., Scraba, D.G. and Ryan, R.O.: Effect of phospholipase C and apolipophorin III on the structure and stability of lipophorin subspecies. *J. Lipid Res.,* 35 (1994) 1561-1569.

271 Smejkal, G.B. and Hoff, H.F.: Filipin staining of lipoproteins in polyacrylamide gels: sensitivity and photobleaching of the fluorophore and its use in a double staining method. *Electrophoresis (Weinheim),* 15 (1994) 922-925.

272 Smith, A.F., Owen, L.M., Strobel, L.M., Chen, H., Kanost, M.R., Hanneman, E. and Wells, M.A.: Exchangeable apolipoproteins of insect share a common structural motif. *J. Lipid Res.,* 35 (1994) 1976-1984.

273 Tarugi, P., Nicolini, S., Marchi, L., Ballarini, G. and Calandra, S.: Apolipoprotein B-100 production and cholesteryl ester content in the liver of developing chick. *J. Lipid Res.,* 35 (1994) 2019-2031.

274 Wallaert, C. and Babin, P.J.: Age-related, sex-related, and seasonal changes of plasma lipoprotein concentrations in trout. *J. Lipid Res.,* 35 (1994) 1619-1633.

275 Wilkinson, J., Munro, L.H. and Higgins, J.A.: Apolipoprotein[a] is not associated with apolipoprotein B in human liver. *J. Lipid Res.,* 35 (1994) 1896-1901.

276 Zolfaghari, R. and Ross, A.C.: Effect of vitamin A deficiency and retinoic acid repletion on intestinal and hepatic apolipoprotein A-I mRNA levels of adult rats. *J. Lipid Res.,* 35 (1994) 1985-1992.

See also 550.

## 13. STEROIDS

### *13a. General techniques*

277 Bumgarner, J.G. and Khaledi, M.G.: Mixed micellar electrokinetic chromatography of corticosteroids. *Electrophoresis (Weinheim),* 15 (1994) 1260-1266.

278 Jumppanen, J.H., Wiedmer, S.K., Sirén, H., Riekkola, M.-L. and Haario, H.: Optimized separation of seven corticosteroids by micellar electrokinetic chromatography. *Electrophoresis (Weinheim),* 15 (1994) 1267-1272.

14. STEROID GLYCOSIDES AND SAPONINS

279 Chen, F.-T. and Pentoney, S.L., Jr.: Characterization of digoxigenin-labeled B-phycoerythrin by capillary electrophoresis with laser-induced fluorescence. Application to homogeneous digoxin immunoassay. *J. Chromatogr. A,* 680 (1994) 425-430.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

*17a. Amines and polyamines*

280 Walbroehl, Y. and Wagner, J.: Enantiomeric resolution of primary amines by capillary electrophoresis and high-performance liquid chromatography using chiral crown ethers. *J. Chromatogr. A,* 680 (1994) 253-261.

See also 132, 184, 321, 935.

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

281 Lai, G. and Pachlatko, J.P.: Identification of cycloheximide in microbial extracts with micellar electrokinetic chromatography. *J. High Resolut. Chromatogr.,* 17 (1994) 565-566.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

*18a. Amino acids and their derivatives*

282 Barbieri, G., Velazquez, L., Scorobogna, M., Fellous, M. and Pellegrini, S.: Activation of the protein kinase tyk2 by interferon αβ. *Eur. J. Biochem.,* 223 (1994) 427-435.

283 Bovingdon, M.E. and Webster, R.A.: Derivatization reactions for neurotransmitters and their automation. *J. Chromatogr. B,* 659 (1994) 157-183 - a review with 106 refs.

284 Camilleri, P., Dhanak, D., Druges, M. and Okafo, G.N.: High sensitive detection of amino acids using a new fluorogenic probe. *Anal. Proc.,* 31 (1994) 99-102; *C.A.,* 121 (1994) 148055j.

285 Copper, C.L., Davis, J.B., Cole, R.O. and Sepaniak, M.J.: Separations of derivatized amino acid enantiomers by cyclodextrin-modified capillary electrophoresis: mechanistic and molecular modeling studies. *Electrophoresis (Weinheim),* 15 (1994) 785-792.

286 Jug, R.A. and Hale, J.E.: On-line procedures for alkylation of cysteine residues with 3-bromopropylamine prior to protein sequence analysis. *Anal. Biochem.,* 221 (1994) 374-378.

287 Lee, Y.-H. and Lin, T.-I.: Capillary electrophoretic determination of amino acids with indirect absorbance detection. *J. Chromatogr. A,* 680 (1994) 287-297.

288 Matsubara, N. and Terabe, S.: Separation of 24 dansylamino acids by capillary electrophoresis with a non-ionic surfactant. *J. Chromatogr. A,* 680 (1994) 311-315.

289 Mattusch, J. and Dittrich, K.: Improvement of laser-induced fluorescence detection of amino acids in capillary zone electrophoresis. *J. Chromatogr. A,* 680 (1994) 279-285.

290 Michaelsen, S., Møller, P. and Sørensen, H.: Analysis of dansyl amino acids in feedstuffs and skin by micellar electrokinetic capillary chromatography. *J. Chromatogr. A,* 680 (1994) 299-310.

291 Otsuka, K., Karuhaka, K., Higashimori, M. and Terabe, S.: Optical resolution of amino acid derivatives by micellar electrokinetic chromatography with N-dodecanoyl-L-serine. *J. Chromatogr. A,* 680 (1994) 317-320.

292 Sun, P., Barker, G.E., Mariano, G.J. and Hartwick, R.A.: Enhanced chiral separation of dansylated amino acids with cyclodextrin-dextran polymer network by capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 793-798.

293 Tagliaro, F., Moretto, S., Valentini, R., Gambaro, G., Antonioli, C., Moffa, M. and Tatò, L.: Capillary zone electrophoresis determination of phenylalanine in serum: a rapid, inexpensive and simple method for the diagnosis of phenylketonuria. *Electrophoresis (Weinheim),* 15 (1994) 94-97.

294 Van der Geer, P. and Hunter, T.: Phosphopeptide mapping and phosphoamino acid analysis by electrophoresis and chromatography on thin-layer cellulose plates. *Electrophoresis (Weinheim),* 15 (1994) 544-554.

295 Weber, P.L., Bramich, C.J. and Lunte, S.M.: Determination of the number and distribution of oligosaccharide linkage positions in O-linked glycoproteins by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 225-232.

296 Ye, J. and Baldwin, R.P.: Determination of amino acids and peptides by capillary electrophoresis and electrochemical detection at a copper electrode. *Anal. Chem.,* 66 (1994) 2669-2674.

297 Yoshinaga, M. and Tanaka, M.: Use of selectively methylated β-cyclodextrin derivatives in chiral separation of dansylamino acids by capillary zone electrophoresis. *J. Chromatogr. A,* 679 (1994) 359-365.

298 You, L., Fan, J. and Jia, Y.: (Improvement on the paper chromatography and paper electrophoresis of amino acids). *Huaxue Tongbao,* (1994) 34-35; *C.A.,* 121 (1994) 124347e.

299 Zhao, J.Y., Labbe, J. and Dovichi, N.J.: Use of a sheath flow cuvette for chemiluminescence detection of isoluminol thiocarbamyl-amino acids separated by capillary electrophoresis. *J. Microcolumn Sep.,* 5 (1993) 331-339; *C.A.,* 121 (1994) 148017y.

300 Zhou, J., O'Shea, T.J. and Lunte, S.M.: Simultaneous detection of thiols and disulfides by capillary electrophoresis-electrochemical detection using a mixed-valence ruthenium cyanide-modified microelectrode. *J. Chromatogr. A,* 680 (1994) 271-277.

See also 34, 49, 51, 99, 146, 147, 157, 162, 163, 396, 532, 632, 636, 642, 937, 986.

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

301 Adams, G. McKinley, Jr.: The application of capillary electrophoresis to proteins and peptides containing τ-carboxyglutamic acids. Avail. *Univ. Microfilms Int.,* Order No. DA9309836, 1992, 260 pp.; *C.A.,* 121 (1994) 129183h.

302 Cifuentes, A. and Poppe, H.: Simulation and optimization of peptide separation by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 321-340.

303 Denoroy, L.: Detection of neurotensin in tissues by capillary zone electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 46-50.

304 Dionne, R., Forest, J.-C., Moutquin, J.-M., de Grandpre, P. and Masse, J.: Electrophoretic method for separating small peptides in serum without extraction of macromolecules: application to the detection of preeclampsia. *Clin. Biochem.,* 27 (1994) 99-103; *C.A.,* 121 (1994) 174392m.

305 Gidrol, X., Lin, W.S., Degousee, N., Yip, S.F. and Kush, A.: Accumulation of reactive oxygen species and oxidation of cytokinin in germinating soybean seeds. *Eur. J. Biochem.,* 224 (1994) 21-28.

306 Greve, K.F., Nashabeh, W. and Karger, B.L.: Use of zwitterionic detergents for the separation of closely related peptides by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 15-24.

307 Grimm, R., Graf, A. and Heiger, D.N.: Identification of tryptophan and tyrosine residues in peptides separated by capillary electrophoresis by their second-derivative spectra using diode-array detection. *J. Chromatogr. A,* 679 (1994) 173-180.

308 Gutierrez, L.M., Zhao, X.-l. and Hosey, M.M.: Protein kinase C-mediated regulation of L-type Ca channels from skeletal muscle requires phosphorylation of the $\alpha_1$ subunit. *Biochem. Biophys. Res. Commun.,* 202 (1994) 857-865.

309 King, A.J., Andjelkovic, N., Hemmings, B.A. and Akhtar, M.: The phospho-opsin phosphatase from bovine rod outer segments. An insight into the mechanism of stimulation of type-2A protein phosphatase activity of protamine. *Eur. J. Biochem.,* 225 (1994) 383-394.

310 Lenz, V.J., Gattner, H.-G., Leithäuser, M., Brandenburg, D., Wollmer, A. and Höcker, H.: Proteolyses of a fluorogenic insulin derivative and native insulin in reversed micelles monitoried by fluorescence emission reversed-phase high-performance liquid chromatography and capillary zone electrophoresis. *Anal. Biochem.,* 221 (1994) 85-93.

311 Meyer, S., Jabs, A., Schutkowski, M. and Fischer, G.: Separation of *cis/trans* isomers of a prolyl peptide bond by capillary zone electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1151-1157.

312 Oda, R.P., Madden, B.J., Morris, J.C., Spelsberg, T.C. and Landers, J.P.: Multiple-buffer-additive strategies for enhanced capillary electrophoretic separation of peptides. *J. Chromatogr. A,* 680 (1994) 341-351.

313 Qi, S., Zhu, T., Zhao, T., Fang, X. and Sun, Y.: Purity control of different bee venom melittin preparations by capillary zone electrophoresis. *J. Chromatogr. B,* 658 (1994) 397-403.

314 Rupp, E., Siegbahn, A., Rönnstrand, L., Werstedt, C., Claesson-Welsh, L. and Heldin, C.-H.: A unique autophosphorylation site in the platelet-derived growth factor $\alpha$ receptor from a heterodimeric receptor complex. *Eur. J. Biochem.,* 225 (1994) 29-41.

315 Smit, V.: Native electrophoresis to monitor chemical modifications of human interleukin-3. *Electrophoresis (Weinheim),* 15 (1994) 251-254.

316 Stambolic, V. and Woodgett, J.R.: Mitogen inactivation of glycogen synthase kinase-3$\beta$ in intact cells *via* serine 9 phosphorylation. *Biochem. J.,* 303 (1994) 701-704.

317 Toda, T., Ishijima, Y., Matsushita, H., Yoshida, M. and Kimura, N.: Detection of thymopoietin-responsive proteins in nude mouse spleen cells by two-dimensional polyacrylamide gel electrophoresis and image processing. *Electrophoresis (Weinheim),* 15 (1994) 984-987.

318 Weinmann, W., Parker, C.E., Baumeister, K., Maier, C., Tomer, K.B. and Przybylski, M.: Capillary electrophoresis combined with $^{252}Cf$ plasma desorption and electrospray mass spectrometry for the structural characterization of hydrophobic polypeptides using organic solvents. *Electrophoresis (Weinheim),* 15 (1994) 228-233.

See also 81, 145, 151, 232, 296, 300, 392, 569, 577, 653, 721, 931.

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

319 Aoubala, M., Bonicel, J., Bénicourt, C., Verger, R. and de Caro, A.: Tryptic cleavage of gastric lipases: location of the single disulfide bridge. *Biochim. Biophys. Acta,* 1213 (1994) 319-324.

320 Bailin, G.: Reaction of 7-chloro-4-nitrobenzo-2-oxa-1,3-diazole with the ($Ca^{2+}$ + $Mg^{2+}$)-ATPase protein of sarcoplasmic reticulum at low temperature. *Biochim. Biophys. Acta,* 1208 (1994) 197-203.

321 Chen, M., Waldron, K.C., Zhao, Y. and Dovichi, N.J.: Micellar capillary electrophoresis separation and thermo-optical absorbance detection of products from manual peptide sequencing. *Electrophoresis (Weinheim),* 15 (1994) 1290-1294.

322 Yao, Z.J., Kao, M.C.C., Loh, K.C. and Chung, M.C.M.: Antibody against branched epitope as an affinity ligand to separate the parent protein. *J. Chromatogr. A,* 679 (1994) 190-194.

See also 112, 220, 349, 380, 437, 477, 581, 596, 608, 612, 642, 684.

## 19. PROTEINS

*19a. General techniques*

323 Akins, R.E. and Tuan, R.S.: Separation of proteins using cetyltrimethylammonium bromide discontinuous gel electrophoresis. *Mol. Biotechnol.,* 1 (1994) 211-228; *C.A.,* 121 (1994) 200128b.

324 Baumgartner, B.G., Murach, K.-F., Schlegel, E., Praxmayer, C. and Illmensee, K.: Comparison of protein analysis between embryonic and extraembryonic tissues during the 11th day of gestation of the mouse. *Electrophoresis (Weinheim),* 15 (1994) 992-1000.

325 Benedek, K. and Guttman, A.: Ultra-fast high-performance capillary sodium dodecyl sulfate gel electrophoresis of proteins. *J. Chromatogr. A,* 680 (1994) 375-381.

326 Bhavsar, J.H., Remmler, J. and Lobel, P.: A method to increase efficiency and minimize anomalous electrophoretic transfer in protein blotting. *Anal. Biochem.,* 221 (1994) 234-242.

327 Bjellqvist, B., Basse, B., Olsen, E. and Celis, J.E.: Reference points for comparisons of two-dimensional maps of proteins from different human cell types defined in a pH scale where isoelectric points correlate with polypeptide compositions. *Electrophoresis (Weinheim),* 15 (1994) 529-539.

328 Bonaventura, C., Bonaventura, J., Stevens, R. and Millington, D.: Acylamide in polyacrylamide gels can modify proteins during electrophoresis. *Anal. Biochem.,* 222 (1994) 44-48.

329 Chen, F.-T. and Sternberg, J.C.: Characterization of proteins by capillary electrophoresis in fused-silica columns: review on serum protein analysis and application to immunoassays. *Electrophoresis (Weinheim),* 15 (1994) 13-21.

330 Chu, Y., Lees, W.J., Stassinopoulos, A. and Walsh, C.T.: Using affinity capillary electrophoresis to determine binding stoichiometries of protein-ligand interactions. *Biochemistry,* 33 (1994) 10616-10621.

331 Cole, R.B., Varghese, J., McCormick, R.M. and Kadlecek, D.: Evaluation of a novel hydrophilic derivatized capillary for protein analysis by capillary electrophoresis-electrospray mass spectrometry. *J. Chromatogr. A,* 680 (1994) 363-373.

332 Corbett, J.M., Dunn, M.J., Posch, A. and Görg, A.: Positional reproducibility of protein spots in two-dimensional polyacrylamide gel electrophoresis using immobilised pH gradient isoelectric focusing in the first dimension: an interlaboratory comparison. *Electrophoresis (Weinheim),* 15 (1994) 1205-1211.

333 Desnoyers, S., Bourassa, S., West, M.H.P. and Poirier, G.G.: One-step protein purification using micropreparative electrophoresis fully compatible with protein microsequencing. *Anal. Biochem.,* 221 (1994) 418-420.

334 Fernandez, E., Bienvenu, T., Desclaux, F., Beldjord, K., Kaplan, J.C. and Beldjord, C.: Use of chemical clamps in denaturing gradient gel electrophoresis: application in the detection of the most frequent Mediterranean β-thalassemic mutations. *PCR Methods Appl.,* 3 (1993) 122-124; *C.A.,* 121 (1994) 149856h.

335 Guttman, A. and Nolan, J.: Comparison of the separation of proteins by sodium dodecyl sulfate-slab electrophoresis and capillary sodium dodecyl sulfate-gel electrophoresis. *Anal. Biochem.,* 221 (1994) 285-289.

336 Guttman, A., Shieh, P., Hoang, D., Horváth, J. and Cooke, N.: Effect of operational variables on the separation of proteins by capillary sodium dodecyl sulfate-gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 221-224.

337 Hilt, C.R.: Apparatus and process for the large-scale separation and retrieval of proteins from cellular extracts. *U.S.* US 5,332,484 (Cl. 204-301; GO1N27/26), 26 Jul. 1994, Appl. 100,836, 02 Aut. 1993; 13 pp.; *C.A.,* 121 (1994) 174632q.

338 Horvath, Z.S., Corthals, G.L., Wrigley, C.W. and Margolis, J.: Multifunctional apparatus for electrokinetic processing of proteins. *Electrophoresis (Weinheim),* 15 (1994) 968-971.

339 Houri, A. and Starita-Geribaldi, M.: Pulsed field electrophoresis for the separation of protein-sodium dodecyl sulfate-complexes in polyacrylamide gels. *Electrophoresis (Weinheim),* 15 (1994) 1032-1039.

340 Kaczorowski, T., Furmanek, B. and Sektas, M.: A method for removal of radioactive nucleotides from electrophoretic buffers. *BioTechniques,* 16 (1994) 1030-1031; *C.A.,* 121 (1994) 199904t.

341 Karim, M.R., Shinagawa, S. and Takagi, T.: Electrophoretic mobilities of the complexes between sodium dodecyl sulfate and various peptides or proteins determined by free solution electrophoresis using coated capillaries. *Electrophoresis (Weinheim),* 15 (1994) 1141-1146.

342 Lobert, S. and Correia, J.J.: Method for rapid electrophoretic transfer of isoelectric focusing gels to polyvinylidene difluoride. *Electrophoresis (Weinheim),* 15 (1994) 930-931.

343 Neumann, U., Khalaf, H. and Rimpler, M.: Quantitation of electrophoretically separated proteins in the submicrogram range by dye elution. *Electrophoresis (Weinheim),* 15 (1994) 916-921.

344 O'Keefe, D.O.: Quantitative electrophoretic analysis of proteins labeled with monobromobimane. *Anal. Biochem.,* 222 (1994) 86-94.

345 Park, J.K. and Kim, J.K.: (Protein migration in the high electrical field using the microaqueous system). *Hwahak Konghak,* 32 (1994) 206-212. *C.A.,* 121 (1994) 60384e.

346 Patterson, S.D.: From electrophoretically separated protein to identification: strategies for sequence and mass analysis. *Anal. Biochem.,* 221 (1994) 1-15 - a review with 132 refs.

347 Patton, W.F., Lam, L., Su, Q., Lui, M., Erdjument-Bromage, H. and Tempst, P.: Metal chelates as reversible stains for detection of electroblotted proteins: application to protein microsequencing and immunoblotting. *Anal. Biochem.,* 220 (1994) 324-335.

348 Raj, C.B.C.: Protein purification by counteracting chromatographic electrophoresis: quantitative focusing limits and protein selection at the interface. *J. Biochem. Biophys. Methods,* 28 (1994) 161-172; *C.A.,* 121 (1994) 152575w.

349 Rasmussen, H.H., Mørtz, E., Mann, M., Roepstorff, P. and Celis, J.E.: Identification of transformation sensitive proteins recorded in human two-dimensional gel protein databases by mass spectrometric peptide mapping alone and in combination with microsequencing. *Electrophoresis (Weinheim),* 15 (1994) 406-416.

350 Rose, D.J. and Opiteck, G.J.: Two-dimensional gel electrophoresis/liquid chromatography for the micropreparative isolation of proteins. *Anal. Chem.,* 66 (1994) 2529-2536.

351 Weinmann, W., Parker, C.E., Deterding, L.J., Papac, D.I., Hoyes, J., Przybylski, M. and Tomer, K.B.: Capillary electrophoresis-matrix assisted laser-desorption ionization mass spectrometry of proteins. *J. Chromatogr. A,* 680 (1994) 353-361.

352 Yao, Y.J., Khoo, K.S., Chung, M.C.M. and Li, S.F.Y.: Determination of isoelectric points of acidic and basic proteins by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 431-435.

353 Zhang, W., Czernik, A.J., Yungwirth, T., Aebersold, R. and Chait, B.T.: Matrix-assisted laser desorption mass spectrometric peptide mapping of proteins separated by two-dimensional gel electrophoresis: determination of phosphorylation in synapsin I. *Protein Sci.,* 3 (1994) 677-686; *C.A.,* 121 (1994) 103357t.

See also 17, 28, 60, 64, 75, 77, 84, 85, 131, 151, 175, 179, 286, 494, 554.

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

354 Akopov, S.B., Bazarnova, T.M., Zemskov, E.A., Abramova, E.B. and Mikhailov, V.S.: (Induction of virus-specific proteins in cultured silkworm cells BmN after infection with nuclear polyhedrosis virus). *Biokhimiya (Moscow),* 59 (1994) 23-30.

355 Andreyev, A.Yu., Skulachev, V.P. and Tikhonova, I.M.: (Palmitic acid interaction with the ADP/ATP antiporter reconstituted into proteoliposomes). *Biokhimiya (Moscow),* 59 (1994) 3-10.

356 Asiedu, C.K., Scotto, L., Assoian, R.K. and Ehrlich, M.: Binding of AP-1/CREB proteins and of MDBP to continuous sites downstream of the human TGF-β1 gene. *Biochim. Biophys. Acta,* 1219 (1994) 55-63.

357 Baumgärtner, B., Heiland, S., Kunze, N., Richter, A. and Knippers, R.: Conserved regulatory elements in the type I DNA topoisomerase gene promoters of mouse and man. *Biochim. Biophys. Acta,* 1218 (1994) 123-127.

358 Boutell, T., Garrels, J.I., Franza, B.R., Monardo, P.J. and Latter, G.I.: REF52 on Global Gel Navigator: an Internet-accessible two-dimensional gel electrophoresis database. *Electrophoresis (Weinheim),* 15 (1994) 1487-1490.

359 Dessauer, C.W. and Bartlett, S.G.: Identification of a chaperonin binding site in a chloroplast precursor protein. *J. Biol. Chem.,* 269 (1994) 19766-19776.

360 Faxén, M., Walles-Granberg, A. and Isaksson, L.A.: Antisuppression by a mutation in rpsM(S13) giving a shortened ribosomal protein S13. *Biochim. Biophys. Acta,* 1218 (1994) 27-34.

361 Fishman, A., Bar-Kana, Y., Steinberger, I. and Lorberboum-Galski, H.: Increased cytotoxicity of interleukin 2-pseudomonas exotoxin (IL2-PE) chimeric proteins containing a targeting signal for lysosomal membranes. *Biochemistry,* 33 (1994) 6235-6243.

362 Gasnier, F., Ardail, D., Lermé, F., Simonot, C., Vaganay, E., Louisot, P. and Gateau-Roesch, O.: Further characterization of mitochondrial outer membrane: evidence for the presence of two endogenous sialylated glycoproteins. *J. Biochem. (Tokyo),* 116 (1994) 643-648.

363 Gold, M.R., Yungwirth, T., Sutherland, C.L., Ingham, R.J., Vianzon, D., Chiu, R., van Oostveen, I., Morrison, H.D. and Aebersold, R.: Purification and identification of thyrosine-phosphorylated proteins from B lymphocytes stimulated through the antigen receptor. *Electrophoresis (Weinheim),* 15 (1994) 441-453.

364 He, C., Merrick, B.A. and Selkirk, J.K.: Two-dimensional gel electrophoretic analysis of cytoplasmic proteins from mouse embryonic fibroblasts treated with $^{3}$H-benzo(a)pyrene. *Polycyclic Aromat. Compd.,* 3(Suppl.) (1993) 773-780; *C.A.,* 121 (1994) 28952c.

365 He, C., Merrick, B.A., Witcher, L.L., Patterson, R.M., Daluge, D.R. and Selkirk, J.K.: Phenotypic change and altered protein expression in X-ray and methylcholanthrene-transformed C3H10T1/2 fibroblasts. *Electrophoresis (Weinheim),* 15 (1994) 726-734.

366 Hubbard, M.J. and Carne, A.: Differential feeding-related regulation of ubiquitin and calbindin$_{9kDa}$ in rat duodenum. *Biochim. Biophys. Acta,* 1200 (1994) 191-196.

367 Krauzewicz, N.S.: Studying the interaction of polyoma virus middle T antigen with cellular proteins. *Electrophoresis (Weinheim),* 15 (1994) 491-502.

368 Kutuzova, G.D., Leontyeva, O.V., Skripkin, E.A. and Ugarova, N.N.: (Kinetics of *Photinus pyralis* and *Luciola mingrelica* firefly luciferases gene expression in *Escherichia coli* cells. I. Kinetics of recombinant luciferases transformation into enzyme active conformers). *Biokhimiya (Moscow),* 59 (1994) 102-112.

369 Leontyeva, O.V., Kutuzova, G.D., Turovetsky, V.B. and Ugarova, N.N.: (Kinetics of *Photinus pyralis* and *Luciola mingrelica* firefly luciferases genes expression in *Escherichia coli* cells. II. The role of pH in protein biosynthesis and transformation into active conformers). *Biokhimiya (Moscow),* 59 (1994) 113-117.

370 Liu, J., Volk, K.J., Lee, M.S., Kerns, E.H. and Rosenberg, I.E.: Affinity capillary electrophoresis applied to the studies of interactions of a member of heat shock protein family with an immunosuppressant. *J. Chromatogr. A,* 680 (1994) 395-403.

371 Maekawa, S., Matsuura, Y. and Nakamura, S.: Expression and myristoylation of NAP-22 using a Baculovirus transfer vector system. *Biochim. Biophys. Acta,* 1218 (1994) 119-122.

372 Mansbridge, J., Murphy, B., Morhenn, V., Hillman, K., Hillman, K., Sutherland, R. and Karasek, M.: The response of human dermal microvascular endothelial cells to hypoxia. *Biochim. Biophys. Acta,* 1223 (1994) 209-218.

373 Michetti, M., de Tullio, R., Melloni, E. and Pontremoli, S.: Identification of a novel neutrophil membrane protein involved in modulation of oxidative burst. *Biochim. Biophys. Acta,* 1194 (1994) 296-302.

374 Monzini, N., Legname, G., Marcucci, F., Gromo, G. and Modena, D.: Identification and cloning of human chaperonin 10 homologue. *Biochim. Biophys. Acta,* 1218 (1994) 478-480.

375 Niederreiter M., Gimona, M., Streichsbier, F., Celis, J.E. and Small, J.V.: Complex protein composition of isolated focal adhesions: a two-dimensional gel and database analysis. *Electrophoresis (Weinheim),* 15 (1994) 511-519.

376 Nolta, K.V., Rodriguez-Paris, J.M. and Steck, T.L.: Analysis of successive endocytic compartments isolated from *Dictyostelium discoideum* by magnetic fractionation. *Biochim. Biophys. Acta,* 1224 (1994) 237-246.

377 Ogata, K., Kurahashi, A., Nishiyama, C. and Terao, K.: Presence and role of the 5SrRNA-L5 protein complex (5SRNP) in the threonyl- and histidyl-tRNA synthetase complex in rat liver cytosol. *Biochim. Biophys. Acta,* 1218 (1994) 388-400.

378 Pingoud, V., Zinck, R., Hipskind, R.A., Janknecht, R. and Nordheim, A.: Heterogeneity of ternary complex factors in HeLa cell nuclear extracts. *J. Biol. Chem.,* 269 (1994) 23310-23317.

379 Plakidou-Dymock, S. and McGivan, J.D.: Amino acid deprivation-induced stress response in the bovine renal epithelial cell line NBL-1: induction of HSP 70 by phenylalanine. *Biochim. Biophys. Acta,* 1224 (1994) 189-197.

380 Radominska, A., Berg, C., Treat, S., Little, J.M., Lester, R., Gollan, J.L. and Drake, R.R.: Characterization of UDP-glucuronic acid transport in rat liver microsomal vesicles with photoaffinity analogs. *Biochim. Biophys. Acta,* 1195 (1994) 63-70.

381 Ravaoarinoro, M., Ciurli, C., Toma, E. and Morisset, R.: Rapid method for isolating detergent-insoluble outer membrane proteins from *Pseudomonas aeruginosa*. *Electrophoresis (Weinheim),* 15 (1994) 594-596.

382 Robaye, B., Døskeland, A.P., Suarez-Huerta, N., Døskeland, S.O. and Dumont, J.E.: Apoptotic cell death analyzed at the molecular level by two-dimensional gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 503-510.

383 Soleimani, M., Bookstein, C., Bizal, G.L., Musch, M.W., Hattabaugh, Y.J., Rao, M.C. and Chang, E.B.: Localization of the $Na^+/H^+$ exchanger isoform NHE-3 in rabbit and canine kidney. *Biochim. Biophys. Acta,* 1195 (1994) 89-95.

384 Swaim, W.D., Minoguchi, K., Oliver, C., Hamawy, M.M., Kihara, H., Stephan, V., Berenstein, E.H. and Siraganian, R.P.: The antiganglioside monoclonal antibody AA4 induces protein tyrosine phosphorylations, but not degranulation, in rat basophilic leukemia cells. *J. Biol. Chem.,* 269 (1994) 19466-19473.

385 Vercesi, A.E., Castilho, R.F., Meinicke, A.R., Valle, V.G.R., Hermes-Lima, M. and Bechara, E.J.H.: Oxidative damage of mitochondria induced by 5-aminolevulinic acid: role of $Ca^{2+}$ and membrane protein thiols. *Biochim. Biophys. Acta,* 1188 (1994) 86-92.

See also 397, 398, 399, 457, 471, 532, 599, 622, 685, 686, 1007.

*19c. Proteins synthesized by genetic manipulation, monoclonal antibodies*

386 Abe, M., Abe, K., Iwabuchi, K., Domoto, C. and Arai, S.: Corn cystatin I expressed in *Escherichia coli*: investigation of its inhibitory profile and occurrence in corn kernels. *J. Biochem. (Tokyo),* 116 (1994) 488-492.

387 Alam, R., Hachiya, N., Sakaguchi, M., Kawabata, S.-i., Iwanaga, S., Kitajima, M., Mihara, K. and Omura, T.: cDNA Cloning and characterization of mitochondrial import stimulation factor (MSF) purified from rat liver cytosol. *J. Biochem. (Tokyo),* 116 (1994) 416-425.

388 Cho, F.S., Phillips, K.S., Bogucki, B. and Weaver, T.E.: Characterization of a rat cDNA clone encoding calcium/calmodulin-dependent protein kinase I. *Biochim. Biophys. Acta,* 1224 (1994) 156-160.

389 Day, I.S. and Reddy, A.S.N.: Cloning of a family of cyclins from *Arabidopsis thaliana. Biochim. Biophys. Acta,* 1218 (1994) 115-118.

390 Geijtenbeek, T.B.H., de Groot, E., van Baal, J., Brunink, F., Westerman, J., Snoek, G.T. and Wirtz, K.W.A.: Characterization of mouse phosphatidylinositol transfer protein expressed in *Escherichia coli. Biochim. Biophys. Acta,* 1213 (1994) 309-318.

391 Koyama, Y. and Nishi, S.: Expression of rat α-fetoprotein cDNA and its mutants in cultured mouse fibroblasts and identification of glycosylation sites related to electrophoretic variants. *Biochim. Biophys. Acta,* 1208 (1994) 332-337.

392 Lopatin, S.A., Ilyna, A.V., Shulga, A.A., Grinchenko, O.S., Varlamov, V.P., Skryabin, K.G. and Kirpichnikov, M.P.: (A universal method of isolation of recombinant somatotropin and its mutants using metal chelate affinity chromatography). *Biokhimiya (Moscow),* 59 (1994) 226-230.

393 Miyazaki, I., Gaedigk, R., Hui, M.F., Cheung, R.K., Morkowski, J., Rajotte, R.V. nd Dosch, H.-M.: Cloning of human and rat p69 cDNA, a candidate autoimmune target in type 1 diabetes. *Biochim. Biophys. Acta,* 1227 (1994) 101-104.

394 Morino, S., Yasui, M., Doi, M., Inoue, M., Ishida, T., Ueda, H. and Uesugi, S.: Direct expression of a synthetic gene in *Escherichia coli*: purification and physicochemial properties of human initiation factor 4E. *J. Biochem. (Tokyo),* 116 (1994) 687-693.

395 Okumura, N., Okada, M. and Nakagawa, H.: Depolarization-induced tyrosine phosphorylation in PC12h cells. *J. Biochem. (Tokyo),* 116 (1994) 346-350.

396 Okumura, N., Okada, M., Nagai, K. and Nakagawa, H.: Vasoactive intestinal peptide induces tyrosine phosphorylation in PC12h cells. *J. Biochem. (Tokyo),* 116 (1994) 341-345.

397 Ono, A. and Kawakita, M.: Transport of envelope proteins of Sendai virus, HN and $F_0$, is blocked at different steps by thapsigargin and other perturbants to intracellular $Ca^{2+}$. *J. Biochem. (Tokyo),* 116 (1994) 649-656.

398 Oridate, N., Nishi, S., Inuyama, Y. and Sakai, M.: Jun and Fos related gene products bind to and modulate the GPE I, a strong enhancer element of the rat glutathione transferase P gene. *Biochim. Biophys. Acta,* 1219 (1994) 499-504.

399 Raman, V., Rand, K. and Hill, R.J.: Transfer of a functional arabinose operator-repressor system to *Drosophila melanogaster* Schneider line-2 cells. *Biochim. Biophys. Acta,* 1219 (1994) 441-448.

400 Saito, F., Hori, K., Kanda, M., Kurotsu, T. and Saito, Y.: Entire nucleotide sequence for *Bacillus brevis* Nagano Grs2 gene encoding gramicidin S synthetase 2: a multifunctional peptide synthetase. *J. Biochem. (Tokyo),* 116 (1994) 357-367.

401 Saitoh, E. and Isemura, S.: Production of human salivary type cysteine proteinase inhibitors (cystatins) by an *Escherichia coli* system and partial characterization of recombinant cystatin S and its mutant ($^{117}$arginine→tryptophan). *J. Biochem. (Tokyo),* 116 (1994) 399-405.

402 Sharif, K.A., Fujita, N., Jin, R., Igarashi, K., Ishihama, A. and Krakow, J.S.: Epitope mapping and functional characterization of monoclonal antibodies specific for the α subunit of *Escherichia coli* RNA polymerase. *J. Biol. Chem.,* 269 (1994) 23655-23660.

403 Shimada, K., Ohnishi, Y., Horinouchi, S. and Beppu, T.: Extracellular transport of peudoazurin of *Alcaligenes faecalis* in *Escherichia coli* using the COOH-terminal domain of *Serratia marcescens* serine protease. *J. Biochem. (Tokyo),* 116 (1994) 327-334.

404 Zhu, W., Leavitt, M.C., Jung, G. and Ito, J.: Mutagenesis of a highly conserved lysine 340 of the PRD1 DNA polymerase. *Biochim. Biophys. Acta,* 1219 (1994) 260-266.

See also 221, 371, 432, 567, 609, 629, 689, 739, 757, 786, 807, 927.

*19d. Microbial and plant proteins*

405 Alderton, W.K., Lowe, C.R. and Thatcher, D.R.: Purification of recombinant ricin A chain with immobilised triazine dyes. *J. Chromatogr. A,* 677 (1994) 289-299.

406 Allona, I., Collada, C., Casado, R. and Aragoncillo, C.: Electrophoretic analysis of seed storage proteins from gymnosperms. *Electrophoresis (Weinheim),* 15 (1994) 1062-1067.

407 Barlett, T.J., Aibangbee, A., Bruce, I.J., Donovan, P.J. and Yon, R.J.: Endogenous polypeptide-chain length and partial sequence of aspartate transcarbamoylase from wheat, characterised by immunochemical and cDNA methods. *Biochim. Biophys. Acta,* 1207 (1994) 187-193.

408 Chang, T.-m., Hossain, A. and Chang, C.H.L.: Effect of rate of intracellular transport and diacytosis on cytotoxicity of hybrid toxins. Study with hybrids using hepatic asialoglycoprotein receptor-mediated endocytosis. *Biochim. Biophys. Acta,* 1224 (1994) 77-88.

409 Chen, J.J., McNealy, D.J., Dalal, S. and Androphy, E.J.: Isolation, sequence analysis and characterization of a cDNA encoding human chaperonin 10. *Biochim. Biophys. Acta,* 1219 (1994) 189-190.

410 Cheng, L., Spangfort, M.D. and Allen, J.F.: Substrate specificity and kinetics of thylakoid phosphoprotein phosphatase reactions. *Biochim. Biophys. Acta,* 1188 (1994) 151-157.

411 De Wolf, M.J.S. and Dierick, W.S.H.: Regeneration of active receptor recognition domains on the B subunit of cholera toxin by formation of hybrids from chemically inactivated derivatives. *Biochim. Biophys. Acta,* 1223 (1994) 285-295.

412 Gandhi, V.M., Cherian, K.M. and Mulky, M.J.: Detoxification of castor seed meal by interaction with sal seed meal. *J. Am. Oil Chem. Soc.,* 71 (1994) 827-831.

413 Garrels, J.I., Futcher, B., Kobayashi, R., Latter, G.I., Schwender, B., Volpe, T., Warner, J.R. and McLaughlin, C.S.: Protein identifications for a *Saccharomyces cerevisiae* protein database. *Electrophoresis (Weinheim),* 15 (1994) 1466-1486.

414 Häder, D.-P. and Lebert, M.: Analysis of photoreceptor proteins of microorganisms by gradient gel electrophoresis and other biochemical separation methods. *Electrophoresis (Weinheim),* 15 (1994) 1051-1061.

415 Hierse, R.E., de Villiers, O.T. and Bosman, M.: Identification of tall fescue grass cultivars by sodium dodecyl sulfate and acid polyacrylamide gel electrophoresis. *S. Afr. J. Plant Soil,* 11 (1994) 26-29; *C.A.,* 121 (1994) 31113k.

416 Humphery-Smith, I., Guyonnet, F. and Chastel, C.: Polypeptide cartography of *Spiroplasma taiwanense. Electrophoresis (Weinheim),* 15 (1994) 1212-1217.

417 Isas, J.M. and Burgess, B.K.: Purification and characterization of a NADP+/NADPH-specific flavoprotein that is overexpressed in Fdl- strains of *Azobacter vinelandii. J. Biol. Chem.,* 269 (1994) 19404-19409.

418 Kojima, S., Terabe, M., Taguchi, S., Momose, H. and Miura, K.-i.: Primary structure and inhibitory properties of a proteinase inhibitor produced by *Streptomyces cacaoi. Biochim. Biophys. Acta,* 1207 (1994) 120-125.

419 Liang, O.D., Flock, J.-I. and Wadström, T.: Evidence that the heparin-binding consensus sequence of vitronectin is recognized by *Staphylococcus aureus. J. Biochem. (Tokyo),* 116 (1994) 457-463.

420 McCormac, D.J., Bruce, D. and Greenberg, B.M.: State transitions, light-harvesting antenna phosphorylation and light-harvesting antenna migration *in vivo* in the higher plant *Spirodela oligorrhiza. Biochim. Biophys. Acta,* 1187 (1994) 301-312.

421 Mishra, N.P. and Ghanotakis, D.F.: Exposure of a Photosystem II complex to chemically generated singlet oxygen results in D1 fragments similar to the ones observed during aerobic photoinhibition. *Biochim. Biophys. Acta,* 1187 (1994) 296-300.

422 Morel, M.H.: Acid-polyacrylamide gel electrophoresis of wheat glutenins: a new tool for the separation of high and low molecular weight subunits. *Cereal Chem.,* 71 (1994) 238-242; *C.A.,* 121 (1994) 177980n.

423 Nakamura, T. and Yamamori, M.: Electrophoretic purification of Wx gene protein product and method for breeding sticky wheat. *Jpn. Kokai Tokkyo Koho* JP 06,125,669 [94,125,669] (Cl. AO1H1/00), 10 May 1994, Appl. 92/277,562, 15 Oct. 1992; 11 pp.; *C.A.,* 121 (1994) 77774e.

424 O'Neill, G.M., Donovan, G.R. and Baldo, B.A.: Cloning and characterization of a major allergen of the house dust mite, *Dermatophagoides pteronyssinus,* homologous with glutathione S-transferase. *Biochim. Biophys. Acta,* 1219 (1994) 521-528.

425 Oda, S.: Two-dimensional electrophoretic analysis of friabilin. *Cereal Chem.,* 71 (1994) 394-395; *C.A.,* 121 (1994) 200131x.

426 Olshevsky, E.G., Lisakovsky, S.V., Volodina, T.V., Kozel'tsev, V.L. and Shain, S.S.: (Ergot strains identification using electrophoretic analysis of sclerocial body proteins). *Biokhimiya (Moscow),* 59 (1994) 589-597.

427 Peruski, L.F., Jr. and Neidhardt, F.C.: Identification of a conditionally essential heat shock protein in *Escherichia coli. Biochim. Biophys. Acta,* 1207 (1994) 165-172.

428 Peschek, G.A., Obinger, C., Sherman, D.M. and Sherman, L.A.: Immunocytochemical localization of the cytochrome-c oxidase in a cyanobacterium, *Synechococcus* PCC7942 (*Anacystis nidulans*). *Biochim. Biophys. Acta,* 1187 (1994) 369-372.

429 Posch, A., van den Berg, B.M., Duranton, C. and Görg, A.: Polymorphism of pepper (*Capsicum annuum* L.) seed proteins studied by two-dimensional electrophoresis with immobilized pH gradients: methodical and genetic aspects. *Electrophoresis (Weinheim),* 15 (1994) 297-304.

430 Sárvári, É. and Nyitrai, P.: Separation of chlorophyll-protein complexes by Deriphat polyacrylamide gradient gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1068-1071.

431 Søndergaard, I., Jensen, K. and Krath, B.N.: Classification of wheat varieties by isoelectric focusing patterns of gliadins and neural network. *Electrophoresis (Weinheim),* 15 (1994) 584-588.

432 Steinemann, D., Lill, H., Junge, W. and Engelbrecht, S.: Overproduction, renaturation and reconstitution of δ and ε subunits from chloroplast and cyanobacterial $F_1$. *Biochim. Biophys. Acta,* 1187 (1994) 354-359.

433 Stone, C.E. and Cooper, J.E.: Automated $^{35}S$-labeled protein electrophoresis for identification of strains of *Rhizobium leguminosarum* bv. *trifolii. J. Rapid Methods Autom. Microbiol.,* 2 (1994) 311-322; *C.A.,* 121 (1994) 129215v.

434 Tsugita, A., Kawakami, T., Uchiyama, Y., Kamo, M., Miyatake, N. and Nozu, Y.: Separation and characterization of rice proteins. *Electrophoresis (Weinheim),* 15 (1994) 708-720.

435 Vanfleteren, J.R. and de Vreese, A.: Analysis of the proteins of aging *Caenorhabditis elegans* by high resolution two-dimensional gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 289-296.

436 Werner, W.E., Wiktorowicz, J.E. and Kasarda, D.D.: Wheat varietal identification by capillary electrophoresis. *Am. Lab. (Shelton),* 26 (1994) 32N, 32OO; *C.A.,* 121 (1994) 156030n.

437 Wong, T.M., Carey, C.M. and Lin, S.H.C.: Rapid characterization of soy protein and hydrolysates by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 413-417.

438 Xin-ming, L., Vohradský, J. and Weiser, J.: The use of protein synthesis elongation factor EF-Tu as internal calibration standard in two-dimensional electrophoretic studies of differentiation in *Streptomyces. Electrophoresis (Weinheim),* 15 (1994) 1198-1204.

See also 368, 369, 381, 386, 566, 839, 858, 994.

*19e. Proteins of blood, serum and blood cells*

439 Bauer, P.I., Farkas, G., Mihalik, R., Kopper, L., Kun, E. and Faragó, A.: Phosphorylation of poly(ADP-ribose)polymerase protein in human peripheral lymphocytes stimulated with phytohemagglutinin. *Biochim. Biophys. Acta,* 1219 (1994) 234-239.

440 Bennett, L.E., Charman, W.N., Williams, D.B. and Charman, S.A.: Analysis of bovine immunoglobulin G by capillary gel electrophoresis. *J. Pharm. Biomed. Anal.,* 12 (1994) 1103-1108.

441 Caslavska, J., Gebauer, P. and Thormann, W.: Fractionation of human serum proteins by capillary and recycling isotachophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1167-1175.

442 Chen, F.-T.: Characterization of charge-modified and fluorescein-labeled antibody by capillary electrophoresis using laser-induced fluorescence. Application to immunoassay of low level immunoglobulin A. *J. Chromatogr. A,* 680 (1994) 419-423.

443 Chiang, T.M.: Activation of phospholipase D in human platelets by collagen and thrombin and its relationship to platelet aggregation. *Biochim. Biophys. Acta,* 1224 (1994) 147-155.

444 Ermolenko, M.N. and Sviridov, O.V.: (Interaction of thyroid hormones with immunoglobulins isolated from human blood serum. II. Structural elements and location of the thyroxine-binding region in the immunoglobulin M molecule). *Biokhimiya (Moscow),* 59 (1994) 88-95.

445 Frøkiaer, H., Møller, P., Sørensen, H. and Sørensen, S.: High-performance capillary electrophoresis for characterization of hapten-protein conjugates used for production of antibodies against soyasaponin I. *J. Chromatogr. A,* 680 (1994) 437-445.

446 Galisteo-Gonzalez, F., Puig, J., Martin-Rodriguez, A., Serra-Domenech, J. and Hidalgo-Alvarez, R.: Influence of electrostatic forces on IgG adsorption onto polystyrene beads. *Colloids Surf., B,* 2 (1994) 435-441; *C.A.,* 121 (1994) 103561e.

447 Harada, H., Kubota, T., Tsukada, Y. and Karasawa, Y.: Characterization of tumor-associated antigen (2H6 antigen) defined by monoclonal antibody 2H6. *Clin. Chim. Acta,* 228 (1994) 195-203.

448 Hashimoto, Y., Sasaki, H., Togo, M., Tsukamoto, K., Horie, Y., Fukata, H., Watanabe, T. and Kurokawa, K.: Roles of myosin light-chain kinase in platelet shape change and aggregation. *Biochim. Biophys. Acta,* 1223 (1994) 163-169.

449 Iino, M., Takeya, H., Nishioka, J., Nakagaki, T., Tamura, K. and Suzuki, K.: The role of human factor X activation peptide in activation of factor X by factor IXa. *J. Biochem. (Tokyo),* 116 (1994) 335-340.

450 James, D.C., Freedman, R.B., Hoare, M. and Jenkins, N.: High resolution separation of recombinant human interferon-γ glycoforms by micellar electrokinetic capillary chromatography. *Anal. Biochem.,* 222 (1994) 315-322.

451 Kamiguti, A.S., Desmond, H.P., Theakston, R.D.G., Hay, C.R.M. and Zuzel, M.: Ineffectiveness of the inhibition of the main haemorrhagic metalloproteinase from *Bothrops jararaca* venom by its only plasma inhibitor, α2-macroglobulin. *Biochim. Biophys. Acta,* 1200 (1994) 307-314.

452 Lampreave, F., González-Ramón, N., Martínez-Ayensa, S., Hernández, M.-A., Lorenzo, H.-K., Gil, A.G. and Piñeiro, A.: Characterization of the acute phase serum protein response in pigs. *Electrophoresis (Weinheim),* 15 (1994) 672-676.

453 Levinson, S.S. and Keren, D.F.: Free light chains of immunoglobulins: clinical laboratory analysis. *Clin. Chem. (Washington),* 40 (1994) 1869-1878 - a review with 76 refs.

454 Marshall, T., Williams, J. and Williams, K.M.: Electrophoresis of human serum proteins following acute myocardial infarction. *Biochem. Soc. Trans.,* 22 (1994) 312S; *C.A.,* 121 (1994) 176573v.

455 Martin, L.M., Rotondi, K.S. and Merrifield, R.B.: Antibody binding constants by capillary electrophoresis. In: Hodges, R.S. and Smith, J.A. (Editors), *Pept.: Chem., Struct. Biol., Proc. Am. Pept. Symp., 13th 1993,* ESCOM, Leiden, 1994, pp. 249-251; *C.A.,* 121 (1994) 202710j.

456 Miura, M., Uji, Y., Hata, K. and Okabe, H.: (Separation and identification of human serum protein with capillary electrophoresis system). *Rinsho Kagaku (Nippon Rinsho Kagakkai),* 23 (1994) 32-37; *C.A.,* 121 (1994) 174341u.

457 Mohammad, R.M., Vistisen, K. and Al-Katib, A.: Protein study of T and B acute lymphoblastic leukemia cell lines. *Electrophoresis (Weinheim),* 15 (1994) 1218-1224.

458 Nielsen, J.L., Poulsen, O.M. and Abildrup, A.: Studies of serum protein complexes with nickel using crossed immunoelectrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 666-671.

459 Niessen, H.W.M. and Verhoeven, A.J.: Role of protein phosphorylation in the degranulation of electropermeabilized human neutrophils. *Biochim. Biophys. Acta,* 1223 (1994) 267-273.

460 Okumura, Y., Ishitobi, M., Sobel, M., Akiyoshi, K. and Sunamoto, J.: Transfer of membrane proteins from human platelets to liposomal fraction by interaction with liposomes containing an artificial boundary lipid. *Biochim. Biophys. Acta,* 1194 (1994) 335-340.

461 Olivier, J.-C., Taverna, M., Vauthier, C., Couvreur, P. and Baylocq-Ferrier, D.: Capillary electrophoresis monitoring of the competitive adsorption of albumin onto the orosomucoid-coated polyisobutylcyanoacrylate nanoparticles. *Electrophoresis (Weinheim),* 15 (1994) 234-239.

462 Pu, X.P., Iwamoto, A., Nishimura, H. and Nagasawa, S.: Purification and characterization of a novel substrate for plasma kallikrein (PK-120) in human plasma. *Biochim. Biophys. Acta,* 1208 (1994) 338-343.

463 Raut, S., Corran, P.H. and Gaffney, P.J.: Ultra-rapid preparation of milligram quantities of the purified polypeptide chains of human fibrinogen. *J. Chromatogr. B,* 660 (1994) 390-394.

464 Reif, O.-W. and Freitag, R.: Control of the cultivation process of antithrombin III and its characterization by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 383-394.

465 Strege, M.A. and Lagu, A.L.: Capillary electrophoretic analysis of the urea unfolding of bovine serum albumin. *Am. Lab. (Shelton),* 26 (1994) 48C-48D; *C.A.,* 121 (1994) 174397s.

466 Suen, K.K.Y. and Lewis, W.H.P.: Focused antigen capture immunoassay. *Electrophoresis (Weinheim),* 15 (1994) 1120-1124.

467 Venembre, P., Seta, N., Boutten, A., Dehoux, M., Aubier, M. and Durand, G.: Comparison of enhanced chemiluminescence and colorimetric techniques for the immuno-detection of $\alpha_1$-antitrypsin. *Clin. Chim. Acta,* 227 (1994) 175-184.

See also 85, 223, 279, 329, 334, 391, 586, 988.

*19f. Structural and muscle proteins*

468 Balagopal, P., Nair, K.S. and Stirewalt, W.S.: Isolation of myosin heavy chain from small skeletal muscle samples by preparative continuous elution gel electrophoresis: application to measurement of synthesis rate in human and animal tissue. *Anal. Biochem.,* 221 (1994) 72-77.

469 Blotnick, E. and Muhlrad, A.: Effect of nucleotides and actin on the intramolecular cross-linking of myosin subfragment-1. *Biochemistry,* 33 (1994) 6867-6876.

470 Celis, J.E. and Olsen, E.: A qualitative and quantitative protein database approach identifies individual and groups of functionally related proteins that are differentially regulated in simian virus 40 (SV40) transformed human keratinocytes: an overview of the functional changes associated with the transformed phenotype. *Electrophoresis (Weinheim),* 15 (1994) 309-344.

471 Celis, J.E., Rasmussen, H.H., Olsen, E., Madsen, P., Leffers, H., Honoré, B., Dejgaard, K., Gromov, P., Vorum, H., Vassilev, A., Baskin, Y., Liu, X. et al.: The human keratinocyte two-dimensional protein database (update 1994): towards an integrated approach to the study of cell proliferation, differentiation and skin diseases. *Electrophoresis (Weinheim),* 15 (1994) 1349-1458.

472 Chacko, S., Jacob, S.S. and Horiuchi, K.Y.: Myosin I from mammalian smooth muscle is regulated by caldesmon-calmodulin. *J. Biol. Chem.,* 269 (1994) 15803-15807.

473 Corbett, J.M., Wheeler, C.H., Baker, C.S., Yacoub, M.H. and Dunn, M.J.: The human myocardial two-dimensional gel protein database: update 1994. *Electrophoresis (Weinheim),* 15 (1994) 1459-1465.

474 Gabai, V.L., Kabakov, A.E., Makarova, Yu.M., Mosina, V.A. and Mosin, A.F.: (DNA fragmentation in Ehrlich ascites carcinoma under exposures causing cytoskeletal protein aggregation). *Biokhimiya (Moscow),* 59 (1994) 551-558.

475 Herbert, B.R. and Woods, J.L.: Immobilised pH gradient isoelectric focusing of wool proteins. *Electrophoresis (Weinheim),* 15 (1994) 972-976.

476 Honoré, B., Rasmussen, H.H., Celis, A., Leffers, H., Madsen, P. and Celis, J.E.: The molecular chaperones HSP28, GRP78, endoplasmin, and calnexin exhibit strikingly different levels in quiescent keratinocytes as compared to their proliferating normal and transformed counterparts: cDNA cloning and expression of calnexin *Electrophoresis (Weinheim),* 15 (1994) 482-490.

477 Ishikoh, A.U., Hayashi, A., Tokimitsu, I., Tajima, S. and Nishikawa, T.: Coordinate modulation of melanogenesis and type I trimer collagen secretion by type I collagen substratum during reversible conversion between melanotic and amelanotic cells in mouse B16 melanoma. *J. Biochem. (Tokyo),* 116 (1994) 610-614.

478 Jungblut, P., Otto, A., Zeindl-Eberhart, E., Pleissner, K.-P., Knecht, M., Regitz-Zagrosek, V., Fleck, E. and Wittmann-Liebold, B.: Protein composition of the human heart: the construction of a myocardial two-dimensional electrophoresis database. *Electrophoresis (Weinheim),* 15 (1994) 685-707.

479 Knecht, M., Regitz-Zagrosek, V., Pleissner, K.-P., Emig, S., Jungbult, P., Hildebrandt, A. and Fleck, E.: Dilated cardiomyopathy: computer-assisted analysis of endomyocardial biopsy protein patterns by two-dimensional gel electrophoresis. *Eur. J. Clin. Chem. Clin. Biochem.,* 32 (1994) 615-624.

480 Madgavan, R. and Jarrett, H.W.: Calmodulin-activated phosphorylation of dystrophin. *Biochemistry.* 33 (1994) 5797-5804.

481 Odani, H., Mizutani, A., Hidaka, H., Fujisawa, K., Shinzato, T. and Maeda, K.: Detection of modified $\beta_2$-microglobulin ($\beta_2$m) from amyloid deposits in tenosynovial tissue of carpal tunnel syndrome (CTS). *Clin. Chim. Acta,* 227 (1994) 209-210.

482 Pan, K., Damodaran, S. and Greaser, M.L.: Isolation and characterization of titin T1 from bovine cardiac muscle. *Biochemistry,* 33 (1994) 8255-8261.

483 Sobieszek, A.: Gradient polyacrylamide gel electrophoresis in presence of sodium dodecyl sulfate: a practical approach to muscle contractile and regulatory proteins. *Electrophoresis (Weinheim),* 15 (1994) 1014-1020.

484 Suzuki, J., Kimura, S. and Maruyama, K.: Electron microscopic filament lengths of connectin and its fragments. *J. Biochem. (Tokyo),* 116 (1994) 406-410.

485 Tokimitsu, I., Kato, H., Wachi, H. and Tajima, S.: Elastin synthesis is inhibited by angiotensin II but not by platelet-derived growth factor in arterial smooth muscle cells. *Biochim. Biophys. Acta,* 1207 (1994) 68-73.

486 Tsujimura, K., Tanaka, J., Ando, S., Matsuoka, Y., Kusubata, M., Sugiura, H., Yamauchi, T. and Inagaki, M.: Identification of phosphorylation sites on glial fibrillary acidic protein for cdc2 kinase and $Ca^{2+}$-calmodulin-dependent protein kinase II. *J. Biochem. (Tokyo),* 116 (1994) 426-434.

487 Weser, U. and Kaup, Y.: Intact mummified bone alkaline phosphatase. *Biochim. Biophys. Acta,* 1208 (1994) 186-188.


See also 76, 663, 994.

*19g. Protamines, histones and other nuclear proteins*


488 Briolay, A., Rousset, B. and Roux, B.: Nuclear proteins interacting with DNA and tubulin. Study of the interaction of the High Mobility Group protein 1 with tubulin. *Biochim. Biophys. Acta,* 1219 (1994) 39-46.

489 Eissenberg, J.C., Ge, Y. and Hartnett, T.: Increased phosphorylation of HP1, a heterochromatin-associated protein of *Drosophila*, is correlated with heterochromatin. *J. Biol. Chem.,* 269 (1994) 21315-21321.

490 Fletcher, T.M., Serwer, P. and Hansen, J.C.: Quantitative analysis of macromolecular conformational changes using agarose gel electrophoresis: application to chromatin folding. *Biochemistry,* 33 (1994) 10859-10863.

491 Jackson, S., Brooks, W. and Jackson, V.: Dynamics of the interactions of histones H2A,H2B and H3,H4 with torsionally stressed DNA. *Biochemistry,* 33 (1994) 5392-5403.

492 Kallajoki, M. and Osborn, M.: Gel electrophoretic analysis of nuclear matrix fractions isolated from different human cell lines. *Electrophoresis (Weinheim),* 15 (1994) 520-528.

493 Kirinoki, M., Takai, D., Kaku, R., Yao, Y. and Hirabayashi, T.: Two-dimensional gel electrophoresis of skeletal muscle nuclear proteins. *Seibutsu Butsuri Kagaku,* 38 (1994) 103-107; *C.A.,* 121 (1994) 53352q.

494 Rabilloud, T.: Two-dimensional electrophoresis of basic proteins with equilibrium isoelectric focusing in carrier ampholyte-pH gradients. *Electrophoresis (Weinheim),* 15 (1994) 278-282.

495 Soto, M., Requena, J.M., Morales, G. and Alonso, C.: The *Leishmania infantum* histone H3 possesses an extremely divergent N-terminal domain. *Biochim. Biophys. Acta,* 1219 (1994) 533-535.

496 Wollberg, P., Söderqvist, H. and Nelson, B.D.: Mitogen activation of human peripheral T lymphocytes induces the formation ov new cyclic AMP response element-binding protein nuclear complexes. *J. Biol. Chem.,* 269 (1994) 19719-19724.

*19h. Chromoproteins and metalloproteins*

497 Caslavska, J. and Thormann, W.: Isolation of human serum transferrin by free-fluid recycling electrophoresis in simple buffers. *Electrophoresis (Weinheim),* 15 (1994) 1176-1185.

498 Cresteil, T., Marie, S., Sonnier, M., Kersual, J. and Gonzalez, F.J.: Evidence for the transient expression of P-450 during the neonatal period in rat. *Biochim. Biophys. Acta,* 1208 (1994) 111-117.

499 Gulyaeva, L.F., Grishanova, A.Yu. and Lyakhovich, V.V.: (Induction of cytochromes P-4501A and P-4502B in different organs of rats treated with hexachlorobenzene and Aroclor 1254). *Biokhimiya (Moscow),* 59 (1994) 531-536.

500 Huang, T.-L., Shieh, P.C.-H. and Cooke, N.: The separation of hemoglobin variants by capillary zone electrophoresis. *J. High Resolut. Chromatogr.,* 17 (1994) 676-678.

501 Molteni, S., Frischknecht, H. and Thormann, W.: Application of dynamic capillary isoelectric focusing to the analysis of human hemoglobin variants. *Electrophoresis (Weinheim),* 15 (1994) 22-30.

502 Nakamura, K., Horiuchi, T., Yasukochi, T., Sekimizu, K., Hara, T. and Sagara, Y.: Significant contribution of arginine-112 and its positive charge of *Pseudomonas putida* cytochrome P-450$_{cam}$ in the electron transport from putidaredoxin. *Biochim. Biophys. Acta,* 1207 (1994) 40-48.

503 Niederau, C.M. and Reinauer, H.: Comparison of seven methods for the determination of glycated hemoglobins. *Klin. Labor.,* 39 (1993) 1009-1014; *C.A.,* 121 (1994) 200268x.

504 Okazaki, T., Nagai, T. and Kanno, T.: (Analysis of hemoglobin complex of haptoglobin variant by polyacrylamide gel cross electrophoresis). *Seibutsu Butsuri Kagaku,* 38 (1994) 109-114; *C.A.,* 121 (1994) 53353r.

505 Sequeira, D.J., Cawley, G.F., Eyer, C.S. and Backes, W.L.: Temporal changes in P-450 2E1 expression with continued ethylbenzene exposure. *Biochim. Biophys. Acta,* 1207 (1994) 179-186.

506 Shaeffer, J.R.: Monoubiquitinated α globin is an intermediate in the ATP-dependent proteolysis of α globin. *J. Biol. Chem.,* 269 (1994) 22205-22210.

507 Ying, L., He, J. and Furmanski, P.: Iron-induced conformational change in human lactoferrin: demonstration by sodium dodecyl sulfate-polyacrylamide gel electrophoresis and analysis of effects of iron binding to the N and C lobes of the molecule. *Electrophoresis (Weinheim),* 15 (1994) 244-250.

See also 458.

*19i. Proteins of glands, gland products, various zymogens (incl. milk proteins)*

508 Aggarwal, S.R. and Palmer, T.N.: Recovery from acute glucagon challenge in isolated rat hepatocytes: is protein dephosphorylation synchronous or asynchronous? *Bichim. Biophys. Acta,* 1224 (1994) 311-322.

509 Alape-Giron, A., Lomonte, B., Gustafsson, B., da Silva, N.J. and Thelestam, M.: Electrophoretic and immunochemical studies of *Micrurus* snake venoms. *Toxicon,* 32 (1994) 713-723; *C.A.,* 121 (1994) 101598y.

510 Ghosal, D., Shappell, N.W. and Keenan, T.W.: Endoplasmic reticulum lumenal proteins of rat mammary gland. Potential involvement in lipid droplet assembly during lactation. *Biochim. Biophys. Acta,* 1200 (1994) 175-181.

511 He, T.-Y., Russo, J. and Russo, I.H.: Polypeptide pattern of human breast epithelial cells following human chorionic gonadotropin (hCG) treatment. *Electrophoresis (Weinheim),* 15 (1994) 746-750.

512 Ivanov, V.L., Skokov, A.P., Moroz, M.N. and Lisin, P.A.: (Electrophoretic analysis of milk proteins and its use in the dairy industry). In: *Nov. Issled. Protsessov Pr-va Moloch.-Belkov. Produktov: Sib. N.-I. i Proekt.-Tekhnol. In-t Pererab. S.-Kh. Produktsii, Novosibirsk, 1991,* pp. 72-80; From *Ref. Zh., Khim.,* 1992, Abstr. No. 11R1204; *C.A.,* 121 (1994) 106770h.

513 Marshall, T. and Williams, K.M.: Analysis of snake venoms by sodium dodecyl sulfate-polyacrylamide gel electrophoresis and two-dimensional electrophoresis. *Appl. Theor. Electrophor.,* 4 (1994) 25-31; *C.A.,* 121 (1994) 198190v.

514 Mogi, M., Harada, M., Kage, T., Chino, T. and Yoshitake, K.: Two-dimensional electrophoresis of human salivary proteins from patients with sialoadenopathy. *Arch. Oral Biol.,* 38 (1993) 1135-1139; *C.A.,* 121 (1994) 200117x.

515 Puchkova, L.V., Aleinikova, T.D., Tsymbalenko, N.V., Zakharova, E.T., Konopistseva, L.A., Chebotar, N.A. and Gaitskhoki, V.S.: (Biosynthesis and secretion of ceruloplasmin in mammary cells of lactating rats). *Biokhimiya (Moscow),* 59 (1994) 296-303.

516 Richardson, R.T. and O'Rand, M.G.: Cloning and sequencing of cDNAs for rabbit preproacrosin and a novel preproacrosin-related cDNA. *Biochim. Biophys. Acta,* 1219 (1994) 215-218.

517 Takagi, T., Nakamura, A., Deguchi, R. and Kyozuka, K.-i.: Isolation, characterization, and primary structure of three major proteins obtained from *Mytilus edulis* sperm. *J. Biochem. (Tokyo),* 116 (1994) 598-605.

518 Williams, K.M. and Marshall, T.: Electrophoretic analysis of stimulated cat parotid saliva. *Biochem. Soc. Trans.,* 22 (1994) 311S; *C.A.,* 121 (1994) 174428c.

See also 220, 374, 538, 539, 584, 675, 757.

*19j. Proteins of brain, cerebrospinal fluid and eye*

519 Bianchi, R., Verzini, M., Garbuglia, M., Giambanco, I. and Donato, R.: Mechanism of S100 protein-dependent inhibition of glial fibrillary acidic protein (GFAP) polymerization. *Biochim. Biophys. Acta,* 1223 (1994) 354-360.

520 Brunet, J.-F.M., Berger, F., Amalfitano, G. and Benabid, A.L.: Chemolabeling of frozen cerebral-tissue proteins and immunopurified products with biotin and digoxigenin: physicochemical characteristics of biotinylated and digoxigeninated products. *Anal. Biochem.,* 222 (1994) 76-80.

521 Kaartinen, J.M., LaNoue, K.F. and Ohisalo, J.J.: Quantitation of inhibitory G-proteins in fat cells of obese and normal-weight human subjects. *Biochim. Biophys. Acta,* 1201 (1994) 69-75.

522 Mattila, K.M. and Frey, H.: Alzheimer brain proteins investigated by two-dimensional gel electrophoresis with immoblized pH gradients in the first dimension. *Electrophoresis (Weinheim),* 15 (1994) 721-725.

523 Pipkin, J.L., Hinson, W.G., Lyn-Cook, L.E., la Borde, J., Anson, J.F., Feuers, R.J., Duffy, P.H., Hart, R.W. and Casciano, D.A.: The homology of a novel polypeptide with stress protein characteristics in embryonic mice brain and in the hypothalamus of caloric restricted rats as determined by ultramicro Western Blotting. *Electrophoresis (Weinheim),* 15 (1994) 677-684.

524 Schmerr, M.J., Goodwin, K.R. and Cutlip, R.C.: Capillary electrophoresis of the scrapie prion protein from sheep brain. *J. Chromatogr. A,* 680 (1994) 447-453.

525 Singer, W.D., Miller, R.T. and Sternweis, P.C.: Purification and characterization of the α subunit of $G_{13}$. *J. Biol. Chem.,* 269 (1994) 19796-19802.

526 Surridge, C.D. and Burns, R.G.: The difference in the binding of phosphatidylinositol distinguishes MAP2 from MAP2C and tau. *Biochemistry,* 33 (1994) 8051-8057.

527 Weimbs, T. and Stoffel, W.: Topology of CNS myelin proteolipid protein: evidence for the nonenzymatic glycosylation of extracytoplasmic domains in normal and diabetic animals. *Biochemistry,* 33 (1994) 10408-10415.

See also 371, 551, 573.

*19k. Proteins of neoplastic tissue and transformed cells*

528 Abe, H., Okuno, N., Takeda, O., Suminami, Y., Kato, H. and Nakamura, K.: Analysis on heterogeneity of squamous cell carcinoma antigen by two-dimensional electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 988-991.

529 Adema, G.J., de Boer, A.J., Vogel, A.M., Loenen, W.A.M. and Figdor, C.G.: Molecular characterization of the melanocyte lineage-specific antigen gp100. *J. Biol. Chem.,* 269 (1994) 20126-20133.

530 Feinstein, R., Bolton, W.K., Quinones, J.N., Mosialos, G., Sif, S., Huff, J.L., Capobianco, A.J. and Gilmore, T.D.: Characterization of a chicken cDNA encoding the retinoblastoma gene product. *Biochim. Biophys. Acta,* 1218 (1994) 82-86.

531 Fox, S.R., Fawcett, J., Jackson, D.G., Collins, I., Gatter, K.C., Harris, A.L., Gearing, A. and Simmons, D.L.: Normal human tissues, in addition to some tumors, express multiple different CD44 isoforms. *Cancer Res.,* 54 (1994) 4539-4546.

532 Guy, G.R., Philip, R. and Tan, Y.H.: Analysis of cellular phosphoproteins by two-dimensional gel electrophoresis: applications for cell signaling in normal and cancer cells. *Electrophoresis (Weinheim),* 15 (1994) 417-440.

533 Ji, H., Whitehead, R.H., Reid, G.E., Moritz, R.L., Ward, L.D. and Simpson, R.J.: Two-dimensional electrophoretic analysis of proteins expressed by normal and cancerous human crypts: application of mass spectrometry to peptide-mass fingerprinting. *Electrophoresis (Weinheim),* 15 (1994) 391-405.

534 Leavitt, J.: Discovery and characterization of two novel human cancer-related proteins using two-dimensional gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 345-357.

535 Merrick, B.A., Patterson, R.M., Witcher, L.L., He, C. and Selkirk, J.K.: Separation and sequencing of familiar and novel murine proteins using preparative two-dimensional gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 735-745.

536 Okuzawa, K., Franzén, B., Lindholm, J., Linder, S., Hirano, T., Bergman, T., Ebihara, Y., Kato, H. and Auer, G.: Characterization of gene expression in clinical lung cancer materials by two-dimensional polyacrylamide gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 382-390.

537 Seftor, R.E.B.: Electrophoretic analysis of proteins associated with tumor cell invasion. *Electrophoresis (Weinheim),* 15 (1994) 454-462.

538 Wirth, P.J.: Two-dimensional polyacrylamide gel electrophoresis in experimental hepatocarcinogenesis studies. *Electrophoresis (Weinheim),* 15 (1994) 358-371.

539 Zeindl-Eberhart, E., Jungblut, P. and Rabes, H.M.: Expression of tumor-associated protein variants in chemically induced rat hepatomas and transformed rat liver cell lines determined by two-dimensional electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 372-381.

See also 391, 470.

*19l. Specific binding and receptor proteins*

540 Bianchi, R., Garbuglia, M., Verzini, M., Giambanco, I. and Donato, R.: Calpactin I binds to the glial fibrillary acidic protein (GFAP) and cosediments with glial filaments in a $Ca^{2+}$-dependent manner: implications for concerted regulatory effects of calpactin I and S100 protein on glial filaments. *Biochim. Biophys. Acta,* 1223 (1994) 361-367.

541 Campbell, F.M., Gordon, M.J. and Dutta-Roy, A.K.: Plasma membrane fatty acid-binding protein ($FABP_{pm}$) of the sheep placenta. *Biochim. Biophys. Acta,* 1214 (1994) 187-192.

542 Canfield, A.E., Sutton, A.B., Hiscock, D.R.R., Gallagher, J.T. and Schor, A.M.: Alpha- and beta-xylosides modulate the synthesis of fibronectin and thrombospondin-1 by endothelial cells. *Biochim. Biophys. Acta,* 1200 (1994) 249-258.

543 Chen, R. and Derynck, R.: Homomeric interactions between type II transforming growth factor-β receptors. *J. Biol. Chem.,* 269 (1994) 22868-22874.

544 Chen, S.R.W. and MacLennan, D.H.: Identification of calmodulin-, $Ca^{2+}$-, and ruthenium red-binding domains in the $Ca^{2+}$ release channel (ryanodine receptor) of rabbit skeletal muscle sarcoplasmic reticulum. *J. Biol. Chem.,* 269 (1994) 22698-22704.

545 DiRusso, C., Rogers, R.P. and Jarrett, H.W.: Novel DNA-Sepharose purification of the FadR transcription factor. *J. Chromatogr. A,* 677 (1994) 45-52.

546 Dudani, A.K., Pluskota, A. and Ganz, P.R.: Interaction of tissue plasminogen activator with a human endothelial cell 45-kilodalton plasminogen receptor. *Biochem. Cell Biol.,* 72 (1994) 126-131.

547 Fackelmayer, F.O. and Richter, A.: Purification of two isoforms of hnRNP-U and characterization of their nucleic acid binding activity. *Biochemistry,* 33 (1994) 10416-10422.

548 Fohr, U.G., Gibson, G.E., Tofel-Grehl, B., Schäfer, B.W. and Heizmann, C.W.: Expression of intracellular calcium-binding proteins in cultured skin fibroblasts from Alzheimer and normal aged donors. *Biochim. Biophys. Acta,* 1223 (1994) 391-397.

549 Germano, P., Gomez, J., Kazanietz, M.G., Blumberg, P.M. and Rivera, J.: Phosphorylation of the γ chain of the high affinity receptor for immunoglobulin E by receptor-associated protein kinase C-δ. *J. Biol. Chem.,* 269 (1994) 23102-23107.

550 Gianturco, S.H., Ramprasad, M.P., Lin, A.H.-Y., Song, R. and Bradley, W.A.: Cellular binding site and membrane binding proteins for triglyceride-rich lipoproteins in human monocyte-macrophages and THP-1 monocytic cells. *J. Lipid Res.,* 35 (1994) 1674-1687.

551 Gorodovikova, E.N. and Philippov, P.P.: (Study of a function of the calcium-binding protein p26 (recoverin) in bovine retina rod cells). *Biokhimiya (Moscow),* 59 (1994) 582-588.

552 Grazioli, L., Casero, D., Restivo, A., Cozzi, E. and Marcucci, F.: Tumor necrosis factor-driven formation of disulfide-linked receptor aggregates. *J. Biol. Chem.,* 269 (1994) 22304-22309.

553 Gromov, P.S. and Celis, J.E.: Several small GTP-binding proteins are strongly down-regulated in simian virus 40 (SV40) transformed human keratinocytes and may be required for the maintenance of the normal phenotype. *Electrophoresis (Weinheim),* 15 (1994) 474-481.

554 Hale, J.E. and Beidler, D.E.: Purification of humanized murine and murine monoclonal antibodies using immobilized metal-affinity chromatography. *Anal. Biochem.,* 222 (1994) 29-33.

555 Harder, T. and Gerke, V.: The annexin $II_2p11_2$ complex is the major protein component of the Triton X-100-insoluble low-density fraction prepared from MDCK cells in the presence of $Ca^{2+}$. *Biochim. Biophys. Acta,* 1223 (1994) 375-382.

556 Hollung, K., Gabrielsen, O.S. and Jakobsen, K.S.: Enrichment of DNA-binding proteins from crude tissue for electrophoretic mobility shift assay using magnetic phospho cellulose particles. *Nucleic Acids Res.,* 22 (1994) 3261-3262; *C.A.,* 121 (1994) 197025h.

557 Huber, L.A. and Peter, M.E.: Mapping small GTP-binding proteins on high-resolution two-dimensional gels by a combination of GTP binding and labeling with *in situ* periodate-oxidized GTP. *Electrophoresis (Weinheim),* 15 (1994) 283-288.

558 Huber, L.A., Ullrich, O., Takai, Y., Luetcke, A., Dupree, P., Olkkonen, V., Virta, H., de Hoop, M.J., Alexandrov, K. et al.: Mapping of Ras-related GTP-binding proteins by GTP overlay following two-dimensional gel electrophoresis. *Proc. Natl. Acad. Sci. U.S.A.,* 91 (1994) 7874-7878; *C.A.,* 121 (1994) 152603d.

559 Jui, H., Suzuki, Y., Accili, D. and Taylor, S.I.: Expression of a cDNA encoding the human insulin receptor-related receptor. *J. Biol. Chem.,* 269 (1994) 22446-22452.

560 Jung, S.-K. and Fujimoto, D.: A novel β-galactoside-binding lectin in adult rat kidney. *J. Biochem. (Tokyo),* 116 (1994) 547-553.

561 Kaetzel, M.A., Pula, G., Campos, B., Uhrin, P., Horseman, N. and Dedman, J.R.: Annexin VI isoforms are differentially expressed in mammalian tissues. *Biochim. Biophys. Acta,* 1223 (1994) 368-374.

562 Kiess, W., Kessler, U., Funk, B. and Hoeflich, A.: Perturbation of C6 glial cells by acetate leads to modulation of [$^{125}$I]IGF-II binding to the IGF-II/M6P receptor: implications for ligand internalization studies. *Biochim. Biophys. Acta,* 1223 (1994) 179-184.

563 Konig, B. and Grätzel, M.: Site of dopamine $D_1$ receptor binding to $G_S$ protein mapped with synthetic peptides. *Biochim. Biophys. Acta,* 1223 (1994) 261-266.

564 Li, C.-C.H., Korner, M., Ferris, D.K., Chen, E., Dai, R.-M. and Longo, D.L.: NF-κB/Rel family members are physically associated phosphoproteins. *Biochem. J.,* 303 (1994) 499-506.

565 Li, N., Sood, G.K., Seetharam, S. and Seetharam, B.: Polymorphism of human transcobalamin II: substitution of proline and/or glutamine residues by arginine. *Biochim. Biophys. Acta,* 1219 (1994) 515-520.

566 Li, Z.-S., Noubhani, A.M., Bourbouloux, A. and Delrot, S.: Affinity purification of sucrose binding proteins from the plant plasma membrane. *Biochim. Biophys. Acta,* 1219 (1994) 389-397.

567 Maatman, R.G.H.J., van Moerkerk, H.T.B., Nooren, I.M.A., van Zoelen, E.J.J. and Veerkamp, J.H.: Expression of human liver fatty acid-binding protein in *Escherichia coli* and comparative analysis of its binding characteristics with muscle fatty acid-binding protein. *Biochim. Biophys. Acta,* 1214 (1994) 1-10.

568 Maekawa, S., Mishima, M., Toriyama, M. and Sakai, H.: Purification of a low molecular weight microtubule binding protein from sea urchin eggs. *Biochim. Biophys. Acta,* 1207 (1994) 194-200.

569 Marklund, U., Larsson, N., Brattsand, G., Osterman, O., Chatila, T.A. and Gullberg, M.: Serine 16 of oncoprotein 18 is a major cytosolic target for the $Ca^{2+}$/calmodulin-dependent kinase-Gr. *Eur. J. Biochem.,* 225 (1994) 53-60.

570 Mel'gunov, V.I., Nabokina, S.M., Al-Nuri, M.A., Akimova, E.I. and Adzhimolaev, T.A.: (The use of polyclonal rabbit antibodies recognizing human annexins for recognition of its own proteins). *Biokhimiya (Moscow),* 59 (1994) 525-530.

571 Menegazzi, P., Larini, F., Treves, S., Guerrini, R., Quadroni, M. and Zorzato, F.: Identification and characterization of three calmodulin binding sites of the skeletal muscle ryanodine receptor. *Biochemistry,* 33 (1994) 9078-9084.

572 Miyamoto, Y., Habata, Y., Ohtaki, T., Masuda, Y., Ogi, K., Onda, H. and Funino, M.: Cloning and expression of a complementary DNA encoding the bovine receptor for pituitary adenylate cyclase-activating polypeptide (PACAP). *Biochim. Biophys. Acta,* 1218 (1994) 297-307.

573 Moench, S.J., Terry, C.-E. and Dewey, T.G.: Fluorescence labeling of the palmitoylation sites of rhodopsin. *Biochemistry,* 33 (1994) 5783-5790.

574 Murphy, L.D. and Zimmerman, S.B.: Macromolecular crowding effects on the interaction of DNA with *Escherichia coli* DNA-binding proteins: a model for bacterial nucleoid stabilization. *Biochim. Biophys. Acta,* 1219 (1994) 277-284.

575 Naka, M., Qing, Z.X., Sasaki, T., Kise, H., Tawara, I., Hamaguchi, S. and Tanaka, T.: Purification and characterization of a novel calcium-binding protein, S100C, from porcine heart. *Biochim. Biophys. Acta,* 1223 (1994) 348-353.

576 Nakato, H., Shofuda, K.-i., Izumi, S. and Tomino, S.: Structure and developmental expression of a larval cuticle protein gene of the silkworm, *Bombyx mori. Biochim. Biophys. Acta,* 1218 (1994) 64-74.

577 Nesterov, A., Lysan, S., Vdovina, I., Nicholsky, N. and Fujita, D.J.: Phosphorylation of the epidermal growth factor receptor during internalization in A-431 cells. *Arch. Biochem. Biophys.,* 313 (1994) 351-359.

578 Okazaki, K., Iino, S., Inoue, S., Kobayashi, S. and Hidaka, H.: Differential distribution of neurocalcin isoforms in rat spinal cord, dorsal root ganglia and muscle spindle. *Biochim. Biophys. Acta,* 1223 (1994) 311-317.

579 Pochet, R., van Rampelbergh, J., Bastianelli, E. and van Eldik, L.J.: Calmodulin, calbindin-D28K and calretinin in rat and chicken pineal glands: immunocytochemical and immunoblotting analysis. *Biochim. Biophys. Acta,* 1223 (1994) 318-324.

580 Prasada Rao, U.J.S., Ramasarma, P.R., Rao, D.R. and Prasad, K.V.S.: Detection of lectin activity on Western blots using erythrocytes. *Electrophoresis (Weinheim),* 15 (1994) 907-910.

581 Regalado, F., Martínez, M.P., López de Haro, M.S. and Nieto, A.: Isolation and characterization of two isoforms of a retinoic acid-binding protein from rabbit epididymal secretions. *Biochim. Biophys. Acta,* 1200 (1994) 235-240.

582 Rojo, M. and Wallimann, T.: The mitochondrial ATP/ADP carrier: interaction with detergents and purification by a novel procedure. *Biochim. Biophys. Acta,* 1187 (1994) 360-367.

583 Smidt, M.P., Wijnholds, J., Snippe, L., van Keulen, G. and AB, G.: Binding of a bZip protein to the estrogen-inducible apoVLDL II promoter. *Biochim. Biophys. Acta,* 1219 (1994) 115-120.

584 Strauss, K.I., Isaacs, K.R., Ha, Q.N. and Jacobowitz, D.M.: Calretinin is expressed in the Leydig cells of rat testis. *Biochim. Biophys. Acta,* 1219 (1994) 435-440.

585 Theobald, J., Smith, P.D., Jacob, S.M. and Moss, S.E.: Expression of annexin VI in A431 carcinoma cells suppresses proliferation: a possible role for annexin VI in cell growth regulation. *Biochim. Biophys. Acta,* 1223 (1994) 383-390.

586 Vesterberg, O.: Specific, sensitive and accurate quantification of albumin, retinol binding protein and transferrin human urine and serum by zone immunoelectrophoresis assay (ZIA). *Electrophoresis (Weinheim),* 15 (1994) 589-593.

587 Wang, W., Himes, R.H. and Dentler, W.L.: The binding of a ciliary microtubule plus-end binding protein complex to microtubules is regulated by ciliary protein kinase and phosphatase activities. *J. Biol. Chem.,* 269 (1994) 221460-21466.

588 Weber, W., Wenisch, E., Günther, N., Marnitz, U., Betzel, C. and Righetti, P.G.: Protein microheterogeneity and crystal habits: the case of epidermal growth factor receptor isoforms as isolated in a multicompartment electrolyzer with isoelectric membranes. *J. Chromatogr. A,* 679 (1994) 181-189.

589 Xie, J. and Fleischer, B.: Isolation and characterization of a novel inositol hexakisphosphate binding protein from mammalian cell cytosol. *Biochemistry,* 33 (1994) 7908-7916.

590 Yamashita, H., ten Dijke, P., Franzen, P., Miyazono, K. and Heldin, C.-H.: Formation of hetero-oligomeric complexes of type I and type II receptors for transforming growth factor-β. *J. Biol. Chem.,* 269 (1994) 20172-20178.

591 Zhang, K., Zhou, D., Gu, Q. and Xu, X.: (Analysis of opioid receptor and anti-idiotypic anti-ohmefentanyl antibody by capillary zone electrophoresis). *Sepu,* 12 (1994) 95-97; *C.A.,* 121 (1994) 27035u.

See also 231, 262, 357, 366, 390, 458, 780, 927.

*19m. Urinary proteins*

592 Packwood, W.H., Satoh, P.S., Bell, R.R., Kolaja, G.J. and VanderMeer, D.A.: Improved sodium dodecyl sulfate-polyacrylamide gel electrophoresis of urinary proteins for assessing renal function: method development and preliminary assessment. *Toxicol. Methods,* 4 (1994) 92-101; *C.A.,* 121 (1994) 174391k.

593 Suzuki, H., Sakurai, Y., Oohashi, Y. and Goto, M.: Electrophoretic method for detecting albumin degradation products in urine for diagnosis of diabetic kidney disease. *Jpn. Kokai Tokkyo Koho* JP 06,160,384 [94,160,384] (Cl. G01N33/53), 07 Jun. 1994, Appl. 92/331,203, 18 Nov. 1992; 16 pp.; *C.A.,* 121 (1994) 152782m.

See also 586.

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

594 Audenaert, A.-M., Knockaert, I., Collen, D. and Declerck, P.J.: Conversion of plasminogen activator inhibitor-1 from inhibitor to substrate by point mutations in the reactive-site loop. *J. Biol. Chem.,* 269 (1994) 19559-19564.

595 Awadé, A.C., Moreau, S., Mollé, D., Brulé, G. and Maubois, J.-L.: Two-step chromatographic procedure for the purification of hen egg white ovomucin, lysozyme, ovotransferrin and ovalbumin and characterization of purified proteins. *J. Chromatogr. A,* 677 (1994) 279-288.

596 Bigg, H.F., Clark, I.M. and Cawston, T.E.: Fragments of human fibroblast collagenase: interaction with metalloproteinase inhibitors and substrates. *Biochim. Biophys. Acta,* 1208 (1994) 157-165.

597 Garcia-Casado, G., Sanchez-Monge, R., Lopez-Otin, C. and Salcedo, G.: Rye inhibitors of animal α-amylases show different specifities, aggregative properties and IgE-binding capacities than their homologues from wheat and barley. *Eur. J. Biochem.,* 224 (1994) 525-531.

598 Goto, K., Suzuki, Y., Yoshida, K., Yamamoto, K. and Sinohara, H.: Plasma α-1-antiproteinase from the Mongolian gerbil, *Meriones unguiculatus*: isolation, partial characterization, sequencing of cDNA, and implications for molecular evolution. *J. Biochem. (Tokyo),* 116 (1994) 582-588.

599 Häkkinen, L., Heino, J., Koivisto, L. and Larjava, H.: Altered interaction of human granulation-tissue fibroblasts with fibronectin is regulated by α5β1 integrin. *Biochim. Biophys. Acta,* 1224 (1994) 33-42.

600 Hodges, D.J., Lee, D.C., Salter, C.J., Reid, D.G., Harper, G.P. and Cawston, T.E.: Purification and secondary structural analysis of tissue inhibitor of metalloproteinases-1. *Biochim. Biophys. Acta,* 1208 (1994) 94-100.

601 Melrose, J., Rodgers, K. and Ghosh, P.: The preparation and use of biotinylated trypsin in western blotting for the detection of trypsin inhibitory proteins. *Anal. Biochem.,* 222 (1994) 34-43.

602 Rubin, H., Plotnick, M., Wang, Z., Liu, X., Zhong, Q., Schechter, N.M. and Cooperman, B.S.: Conversion of $\alpha_1$-antichymotrypsin into a human neutrophil elastase inhibitor: demonstration of variants with different association rate constants, stoichiometries of inhibition, and complex stabilities. *Biochemistry,* 33 (1994) 7627-7633.

603 Yano, K.-i., Sakurai, M.T., Watabe, S., Izumi, S. and Tomino, S.: Structure and expression of mRNA for vitellogenin in *Bombyx mori. Biochim. Biophys. Acta,* 1218 (1994) 1-10.

See also 401, 418, 576.

## 20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

### *20a. Oxidoreductases*

604 Alvarez, C.I., Genti-Raimondi, S., Patrito, L.C. and Flury, A.: Topography of human placental 3β-hydroxysteroid dehydrogenase/$\Delta^{5-4}$ isomerase in microsomal membrane. A study using limited proteolysis and immunoblotting. *Biochim. Biophys. Acta,* 1207 (1994) 102-108.

605 Azevedo, J.E., Duarte, M., Belo, J.A., Werner, S. and Videira, A.: Complementary DNA sequences of the 24 kDa and 21 kDa subunits of complex I from *Neurospora*. *Biochim. Biophys. Acta,* 1188 (1994) 159-161.

606 Bross, P., Jensen, T.G., Andresen, B.S., Kjeldsen, M., Nandy, A., Koelvraa, S., Ghisla, S., Rashed, I., Bolund, L. and Gregersen, N.: Characterization of wild-type human medium-chain acyl-CoA dehydrogenase (MCAD) and mutant enzymes present in MCAD-deficient patients by two-dimensional gel electrophoresis: evidence for post-translational modification of the enzyme. *Biochem. Med. Metab. Biol.,* 52 (1994) 36-44; *C.A.,* 121 (1994) 176832d.

607 Cadenas, Q. and Engel, P.C.: Activity staining of halophilic enzymes: substitution of salt with a zwitterion in non-denaturing electrophoresis. *Biochem. Mol. Biol. Int.,* 33 (1994) 785-792; *C.A.,* 121 (1994) 199053q.

608 Cochran, B., Capaldi, R.A. and Ackrell, B.A.C.: The cDNA sequence of beef heart $C_{II-3}$, a membrane-intrinsic subunit of succinate-ubiquinone oxidoreductase. *Biochim. Biophys. Acta,* 1188 (1994) 162-166.

609 Ensor, C.M. and Tai, H.-H.: Bacterial expression and site-directed mutagenesis of two critical residues (tyrosine-151 and lysine-155) of human placental $NAD^+$-dependent 15-hydroxyprostaglandin dehydrogenase. *Biochim. Biophys. Acta,* 1208 (1994) 151-156.

610 Hakkola, E.H., Hiltunen, J.K. and Autio-Harmainen, H.I.: Mitochondrial 2,4-dienoyl-CoA reductases in the rat: differential responses to clofibrate treatment. *J. Lipid Res.,* 35 (1994) 1820-1828.

611 Itoh, N., Morinaga, N. and Kouzai, T.: Purification and characterization of a novel metal-containing nonheme bromoperoxidase from *Pseudomonas putida*. *Biochim. Biophys. Acta,* 1207 (1994) 208-216.

612 Jiang, Y. and Dalton, H.: Chemical modification of the hydroxylase of soluble methane monooxygenase gives one form of the protein with significantly increased thermostability and another that functions well in organic solvents. *Biochim. Biophys. Acta,* 1201 (1994) 76-84.

613 Mizuguchi, H., Imamura, I., Takemura, M. and Fukui, H.: Purification and characterization of diamine oxidase (histaminase) from rat small intestine. *J. Biochem. (Tokyo),* 116 (1994) 631-635.

614 Nasrin, S., Ichinose, H., Hidaka, H. and Nagatsu, T.: Recombinant human tyrosine hydroxylase types 1-4 show regulatory kinetic properties for the natural (6R)-tetrahydrobiopterin cofactor. *J. Biochem. (Tokyo),* 116 (1994) 393-398.

615 Prieto, M.A. and Garcia, J.L.: Molecular characterization of 4-hydroxyphenylacetate 3-hydroxylase of *Escherichia coli*. A two-protein component enzyme. *J. Biol. Chem.,* 269 (1994) 22823-22829.

616 Roveri, A., Maiorino, M., Nisii, C. and Ursini, F.: Purification and characterization of phosholipid hydroperoxide glutathione peroxidase from rat testis mitochondrial membranes. *Biochim. Biophys. Acta,* 1208 (1994) 211-221.

617 Sato, K., Nakanishi, M., Deyashiki, Y., Hara, A., Matsuura, K. and Ohya, I.: Purification and characterization of dimeric dihydrodiol dehydrogenase from dog liver. *J. Biochem. (Tokyo),* 116 (1994) 711-717.

618 Udagama-Randeniya, P. and Savidge, R.: Electrophoretic analysis of coniferyl alcohol oxidase and related laccases. *Electrophoresis (Weinheim),* 15 (1994) 1072-1077.

619 Uemura, J., Toba, T., Fujisawa, T. and Itoh, T.: Identification of species among the *Lactobacillus acidophilus* group by electrophoresis of lactate dehydrogenases. *Anim. Sci. Technol.,* 65 (1994) 112-119; *C.A.,* 121 (1994) 129194n.

620 Wenisch, E., Vorauer, K., Jungbauer, A., Katinger, H. and Righetti, P.G.: Purification of human recombinant superoxide dismutase by isoelectric focusing in a multicompartment electrolyzer with zwitterionic membranes. *Electrophoresis (Weinheim),* 15 (1994) 647-653.

See also 100, 714.

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

621 Chen, Y.-M., Shall, S. and O'Farrell, M.: Poly(ADP-ribose) polymerase in plant nuclei. *Eur. J. Biochem.,* 224 (1994) 135-142.

622 Cuenda, A., Henao, F., Nogues, M. and Gutiérrez-Merino, C.: Quantification and removal of glycogen phosphorylase and other enzymes associated with sarcoplasmic reticulum membrane preparations. *Biochim. Biophys. Acta,* 1194 (1994) 35-43.

623 Kalmar, G.B., Kay, R.J., LaChance, A.C. and Cornell, R.B.: Primary structure and expression of a human CTP:phosphocholine cytidylyltransferase. *Biochim. Biophys. Acta,* 1219 (1994) 328-334.

624 Mera, N., Ohmori, S., Itahashi, K., Kiuchi, M., Igarashi, T., Rikihisa, T. and Kitada, M.: Immunochemical evidence for the occurrence of mu class glutathione S-transferase in human fetal livers. *J. Biochem. (Tokyo),* 116 (1994) 315-320.

625 Petrovic, S., Krajnovic-Ozretic, M. and Ozretic, B.: Isolation and properties of mitochondrial aspartate aminotransferase from red muscle of grey mullet, *Mugil auratus* Risso. *Biochim. Biophys. Acta,* 1207 (1994) 201-207.

626 Snyder, F.F., Jenuth, J.P., Dilay, J.E., Fung, E., Lightfoot, T. and Mably, E.R.: Secondary loss of deoxyguanosine kinase activity in purine nucleoside phosphorylase deficient mice. *Biochim. Biophys. Acta,* 1227 (1994) 33-40.

627 Stasia, M.-J., Surla, A., Renversez, J.-C., Pene, F., Morel-Femelez, A. and Morel, F.: Aspartate aminotrasferase macroenzyme complex in serum identified and characterized. *Clin. Chem. (Washington),* 40 (1994) 1340-1343.

628 Weisshart, K., Kuo, A.A., Hwang, C.B.B., Kumura, K. and Coen, D.M.: Structural and functional organization of herpes simplex virus DNA polymerase investigated by limited proteolysis. *J. Biol. Chem.,* 269 (1994) 22788-22796.

See also 677.

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

629 Aukema, H.M., Davidson, L.A., Chang, W.-C., Lupton, J.R., Derr, J.N. and Chapkin, R.S.: Dietary modulation of rat colonic cAMP-dependent protein kinase activity. *Biochim. Biophys. Acta,* 1224 (1994) 51-60.

630 Birrell, H.C., Brightwell, M.D. and Camillery, P.: A capillary electrophoresis assay for the fibrinolytic agent, eminase. *Chromatographia,* 39 (1994) 325-328.

631 Fehér, Z. and Mishra, N.C.: Aphidicolin-resistant Chinese hamster ovary cells possess altered DNA polymerases of the α-family. *Biochim. Biophys. Acta,* 1218 (1994) 35-47.

632 Horn, M.A. and Walker, J.C.: Biochemical properties of the autophosphorylation of RLK5, a receptor-like protein kinase from *Arabidopsis thaliana. Biochim. Biophys. Acta,* 1208 (1994) 65-74.

633 Inomata, M., Takayama, Y., Kiyama, H., Nada, S., Okada, M. and Nakagawa, H.: Regulation of Src family kinases in the developing rat brain: correlation with their regulator kinase, Csk. *J. Biochem. (Tokyo),* 116 (1994) 386-392.

634 Kanemitsu, F. and Okigaki, T.: A combination assay of MB and MM isoforms of serum creatine kinase in acute myocardial infarction. *Clin. Chim. Acta,* 229 (1994) 161-169.

635 Lee, K.N., Csako, G., Bernhardt, P. and Elin, R.J.: Relevance of macro creatine kinase type 1 and type 2 isoenzymes to laboratory and clinical data. *Clin. Chem. (Washington),* 40 (1994) 1278-1283.

636 Mansour, S.J., Resing, K.A., Candi, J.M., Hermann, A.S., Gloor, J.W., Herskind, K.R., Wartmann, M., Davis, R.J. and Ahn, N.G.: Mitogen-activated protein (MAP) kinase phosphorylation of MAP kinase kinase: determination of phosphorylation sites by mass spectrometry and site-directed mutagenesis. *J. Biochem. (Tokyo),* 116 (1994) 304-314.

637 Nagai, M., Nemoto, T. and Ota, M.: Mobility of digoxigenin-dUTP polymerase chain reaction products and detection of single-stranded products in agarose electrophoresis. *Anal. Biochem.,* 221 (1994) 208-210.

638 Pollo, D.A., Baldassare, J.J., Honda, T., Henderson, P.A., Talkad, V.D. and Gardner, J.D.: Effects of cholecystokinin (CCK) and other secretagogues on isoforms of protein kinase C (PKC) in pancreatic acini. *Biochim. Biophys. Acta,* 1224 (1994) 127-138.

639 Rangaswamy, V. and Altekar, W.: Characterization of 1-phosphofructokinase from halophilic archaebacterium *Haloarcula vallismortis. Biochim. Biophys. Acta,* 1201 (1994) 106-112.

640 Steinböck, F., Choojun, S., Held, I., Roehr, M. and Kubicek, C.P.: Characterization and regulatory properties of a single hexokinase from the citric acid accumulating fungus *Aspergillus niger. Biochim. Biophys. Acta,* 1200 (1994) 215-223.

641 Venegas, J. and Solari, A.: Colorimetric detection of DNA polymerase activity after sodium dodecyl sulfate polyacrylamide gel electrophoresis. *Anal. Biochem.,* 221 (1994) 57-60.

642 Wang, L-M. and Kucera, G.L.: Deoxycytidine kinase is phosphorylated *in vitro* by protein kinase Cα. *Biochim. Biophys. Acta,* 1224 (1994) 161-167.

643 Watanabe, F., Teraoka, H., Iijima, S., Mimori, T. and Tsukada, K.: Molecular properties, substrate specificity and regulation of DNA-dependent protein kinase from Raji Burkitt's lymphoma cells. *Biochim. Biophys. Acta,* 1223 (1994) 255-260.

644 Zhu, W. and Ito, J.: Purification and characterization of PRD1 DNA polymerase. *Biochim. Biophys. Acta,* 1219 (1994) 267-276.

See also 388, 404, 688, 750.

*20d. Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*

645 Arrese, E.L. and Wells, M.A.: Purification and properteis of a phosphorylatable triacylglycerol lipase from the fat body of an insect, *Manduca sexta. J. Lipid Res.,* 35 (1994) 1652-1660.

646 Artashov, D.K., Gevantmakher, S.V., Vagina, O.N., Rozmukhamedova, B. and Davranov, K.D.: (Purification and properties of *Penicillium* sp. lipase in aqueous solutions and in reversed micelles in benzene). *Biokhimiya (Moscow),* 59 (1994) 425-433.

647 Been-Zeev, O., Stahnke, G., Liu, G., Davis, R.C. and Doolittle, M.H.: Lipoprotein lipase and hepatic lipase: the role of asparagine-linked glycosylationin the expression of a functional enzyme. *J. Lipid Res.,* 35 (1994) 1511-1523.

648 Bornscheuer, U., Reif, O.-W., Lausch, R., Freitag, R., Scheper, T., Kolisis, F.N. and Menge, U.: Lipase of *Pseudomonas cepacia* for biotechnological purposes: purification, crystallization and characterization. *Biochim. Biophys. Acta,* 1201 (1994) 55-60.

649 Bruchelt, G., Büdenbender, M., Schmidt, K.-H., Birk, A., Treuner, J. and Niethammer, D.: Determination of 2-5A synthetase and 2-5A phosphodiesterase in neuroblastoma cells by analytical capillary isotachophoresis: effects of cytokines and comparison with radioenzymatic methods. *Electrophoresis (Weinheim),* 15 (1994) 40-45.

650 Canalias, F., Visvikis, A., Thioudellet, C. and Siest, G.: Stable expression of enzymatically active human pancreatic lipase in V79 cells: purification and characterization of the recombinant enzyme. *Clin. Chem. (Washington),* 40 (1994) 1251-1257.

651 Crenon, I., Granon, S., Chapus, C. and Kerfelec, B.: Molecular cloning and expression of two horse pancreatic cDNA encoding colipase A and B. *Biochim. Biophys. Acta,* 1213 (1994) 357-360.

652 Curtil, C., Channac, L., Ebel, C. and Masson, P.: Cold-induced conformational changes of ribonuclease A as investigated by subzero transverse temperature gradient gel electrophoresis. *Biochim. Biophys. Acta,* 1208 (1994) 1-7.

653 Dawson, J.F., Boland, M.P. and Holmes, C.F.B.: A capillary electrophoresis-based assay for protein kinases and protein phosphoesterases using peptide substrates. *Anal. Biochem.,* 220 (1994) 340-345.

654 Halford, S.E., Taylor, J.D., Vermote, C.L.M. and Vipond, I.B.: Assays for restriction endonucleases using plasmid substrates. *Methods Mol. Biol. (Totowa),* 30(DNA-Protein Interactions) (1994) 385-396; *C.A.,* 121 (1994) 76787z.

655 Iwasaki, Y., Niwa, S., Nakano, H., Nagasawa, T. and Yamane, T.: Purification and properties of phosphatidylinositol-specific phospholipase C from *Streptomyces antibioticus. Biochim. Biophys. Acta,* 1214 (1994) 221-228.

656 Kamibayashi, C., Estes, R., Lickteig, R.L., Yang, S., Craft, X. and Mumby, M.C.: Comparison of heterotrimeric protein phosphatase 2A containing different B subunits. *J. Biol. Chem.,* 269 (1994) 20139-20148.

657 Kawamura, M., Gotoda, T., Mori, N., Shimano, H., Kozaki, K., Harada, K., Shimada, M., Inaba, T., Watanabe, Y., Yazaki, Y. and Yamada, N.: Establishment of enzyme-linked immunosorbent assays for lipoprotein lipase with newly developed antibodies. *J. Lipid Res.,* 35 (1994) 1688-1697.

658 Korsten, J., van Lieshou, J. and Salemink, P.: Quantification of rat alkaline phosphatase isoenzymes in plasma. *Life Sci. Adv.: Biochem.,* 11 (1992) 1-4; *C.A.,* 121 (1994) 102575a.

659 Koyama, I., Sato, M., Sakai, H., Nagata, A., Miura, M., Sakagishi, Y. and Komoda, T.: Carbohydrate-mediated recognition of a circulating placental alkaline phosphatase-immunoglobulin M complex. *Clin. Chim. Acta,* 230 (1994) 9-19.

660 Mercer, D., Tang, M., Marino, I.R., Demetris, A., Fung, J., Starzl, T. and Warty, V.: Changes in biliary (high-molecular-mass) and liver isoforms of alkaline phosphatase after baboon-to-human liver transplantation. *Clin. Chem. (Washington),* 40 (1994) 1335-1339.

661 Nuero, O.M., Garcia-Lepe, R., Lahoz, C., Santamaria, F. and Reyes, F.: Detection of lipase activity on ultrathin-layer isoelectric focusing gels. *Anal. Biochem.,* 222 (1994) 503-504.

662 Ohmori, H., Kuba, M. and Kumon, A.: 3-Phosphohistidine/6-phospholysine phosphatase from rat brain as acid phosphatase. *J. Biochem. (Tokyo),* 116 (1994) 380-385.

663 Ong, J.M., Simsolo, R.B., Saghizadeh, M., Pauer, A. and Kern, P.A.: Expression of lipoprotein lipase in rat muscle: regulation by feeding and hypothyroidism. *J. Lipid Res.,* 35 (1994) 1542-1551.

664 Previato, L., Guardamagna, O., Dugi, K.A., Ronan, R., Talley, G.D., Santamarina-Fojo, S. and Brewer, H.B., Jr.: A novel missense mutation in the C-terminal domain of lipoprotein lipase ($Glu^{410}\rightarrow Val$) leads to enzyme inactivation and familial chylomicronemia. *J. Lipid Res.,* 35 (1994) 1552-1560.

665 Randolph-Habecker, J., Lott, J.A. and Tesi, R.J.: Alkaline phosphatase isoforms in serum after liver allograft surgery. *Clin. Chem. (Washington),* 40 (1994) 1272-1277.

666 Saheki, S., Ochi, M. and Takeuchi, N.: (Electrophoretic analysis of alkaline phosphatase isoenzymes. A study on serum alkaline phosphatase in transient hyperphosphatasemia). *Seibutsu Butsuri Kagaku,* 38 (1994) 143-147; *C.A.,* 121 (1994) 128359h.

667 Schmidt-Dannert, C., Sztajer, H., Stöcklein, W., Menge, U. and Schmid, R.D.: Screening, purification and properties of a thermophilic lipase from *Bacillus thermocatenulatus. Biochim. Biophys. Acta,* 1214 (1994) 43-53.

668 Slavin, B.G., Ong, J.M. and Kern, P.A.: Hormonal regulation of hormone-sensitive lipase activity and mRNA levels in isolated rat adipocytes. *J. Lipid Res.,* 35 (1994) 1535-1541.

669 Takagi, A., Ikeda, Y., Mori, A., Tsutsumi, Z., Oida, K., Nakai, T. and Yamamoto, A.: A newly identified heterozygous lipoprotein lipase gene mutation ($Cys^{239}\rightarrow$stop/$TGC^{972}\rightarrow TGA$;$LPL_{obama}$) in a patient with primary type IV hyperlipoproteinemia. *J. Lipid Res.,* 35 (1994) 2008-2018.

670 Takizawa, N., Mizuno, Y., Ito, Y. and Kikuchi, K.: Tissue distribution of isoforms of type-1 protein phosphatase PP1 in mouse tissues and its diabetic alterations. *J. Biochem. (Tokyo),* 116 (1994) 411-415.

671 Yasuda, T., Nadano, D., Takeshita, H. and Kishi, K.: Use of antibodies against synthetic peptides for analysis of molecular multiplicity: human deoxyribonuclease I polymorphism. *Electrophoresis (Weinheim),* 15 (1994) 260-264.

See also 309, 319, 487, 911.

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

672 Chen, K.-S., Lee, K.-K. and Chen, H.-C.: A rapid method for detection of N-acetylglucosaminidase-type chitinase activity in crossed immunoelectrophoresis and sodium dodecyl sulfate-polyacrylamide gel electrophoresis gels using 4-methylumbelliferyl-N-acetyl-D-glucosaminidde as substrate. *Electrophoresis (Weinheim),* 15 (1994) 662-665.

673 Fieldes, M.A. and Gerhardt, K.E.: An examination of the β-glucosidase (linamarase) banding pattern in flax seedlings using Ferguson plots and sodium dodecyl sulphate-polyacrylamide gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 654-661.

674 Furegon, L., Curioni, A. and Peruffo, A.D.B.: Direct detection of pullulanose activity in electrophoretic polyacrylamide gels. *Anal. Biochem.,* 221 (1994) 200-201.

675 Krishnan, A., Nair, P.N. and Jones, D.: Isolation, cloning, and characterization of new chitinase stored in active form in chitin-lined venom reservoir. *J. Biol. Chem.,* 269 (1994) 20971-20976.

676 Mukasa, H., Tsumori, H. and Takeda, H.: Renaturation and activity staining of glycosidases and glycosyltransferases in gels after sodium dodecyl sulfate-electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 911-915.

677 Mukasa, H., Tsumori, H. and Uezono, Y.: Glucose, fructose, mannose and/or glucose-1-phosphate-releasing activity stains for glycosidases and glycosyltransferases in gels after isoelectric focusing. *Electrophoresis (Weinheim),* 15 (1994) 255-259.

678 Ozaki, K., Sumitomo, N., Hayashi, Y., Kawai, S. and Ito, S.: Site-directed mutagenesis of the putative active site of endoglucanase K from *Bacillus* sp. KSM-330. *Biochim. Biophys. Acta,* 1207 (1994) 159-164.

679 Sakai, N., Inui, K., Midorikawa, M., Okuno, Y., Ueda, S., Iwamatsu, A. and Okada, S.: Purification and characterization of galactocerebrosidase from human lymphocytes. *J. Biochem. (Tokyo),* 116 (1994) 615-620.

680 Shirokane, Y., Arai, A. and Uchida, R.: A new enzyme, maltobionate α-D-glucohydrolase, from alkalophilic *Bacillus* sp. N-1053. *Biochim. Biophys. Acta,* 1207 (1994) 143-151.

681 Trudel, J. and Asselin, A.: Protein purification for microsequencing by sequential native and denaturing polyacrylamide gel electrophoresis: application to one chitinase. *Anal. Biochem.,* 221 (1994) 214-216.

682 Vargic, T. and Mrsa, V.: Detection of exo-β-1,3-glucanase activity in polyacrylamide gels after electrophoresis under denaturing or nondenaturing conditions. *Electrophoresis (Weinheim),* 15 (1994) 903-906.

683 Venerando, B., Fiorilli, A., Di Francesco, L., Chiarini, A., Monti, E., Zizioli, D. and Tettamanti, G.: Cytosolic sialidase from pig brain: a 'protein complex' containing catalytic and protective units. *Biochim. Biophys. Acta,* 1208 (1994) 229-237.

See also 56, 215, 1008.

*20f. Other hydrolases*

684 Akama, K., Terao, K., Tanaka, Y., Noguchi, A., Yonezawa, N., Nakano, M. and Tobita, T.: Purification and characterization of a novel acrosin-like enzyme from boar cauda epididymal sperm. *J. Biochem. (Tokyo),* 116 (1994) 464-470.

685 Anderson, S.A. and Mukkada, A.J.: Biochemical and immunochemical characterization of a P-type ATPase from *Leishmania donovani* promastigote plasma membrane. *Biochim. Biophys. Acta,* 1195 (1994) 71-80.

686 Anderson, S.A., Jiang, S. and Mukkada, A.J.: The β-aspartyl phosphate intermediate in a *Leishmania donovani* promastigote plasma membrane P-type ATPase. *Biochim. Biophys. Acta,* 1195 (1994) 81-88.

687 Chu, Y., Wilson, S.E. and Schlender, K.K.: A latent form of protein phosphatase 1α associated with bovine heart myofibrils. *Biochim. Biophys. Acta,* 1208 (1994) 45-54.

688 Ebbert, V. and Godde, D.: Regulation of thylakoid protein phosphorylation in intact chloroplasts by the activity of kinases and phosphatases. *Biochim. Biophys. Acta,* 1187 (1994) 335-346.

689 Egmond, M.R., Antheunisse, W.P., van Bemmel, C.J., Ravestein, P., de Vlieg, J., Peters, H. and Branner, S.: Engineering surface charges in a subtilisin: the effects on electrophoretic and ion-exchange behavior. *Protein Eng.,* 7 (1994) 793-800; *C.A.,* 121 (1994) 171623b.

690 Finotti, P. and Manente, S.: Heparin-induced structural and functional alterations of bovine trypsin. *Biochim. Biophys. Acta,* 1207 (1994) 80-87.

691 Gauthier, E.R., Dumas, C., Chapdelaine, P., Tremblay, R.R. and Dubé, J.Y.: Characterization of canine pancreas kallikrein cDNA. *Biochim. Biophys. Acta,* 1218 (1994) 102-104.

692 Gorkina, N.B., Pashkova, N.I., Starostina, N.G. and Tsiomenko, A.B.: (Some properties of extracellulalr proteinase IV of the *Pseudomonas* sp. (LM7) lytic complex causing the lysis of methanotrophs). *Biokhimiya (Moscow),* 59 (1994) 288-295.

693 Huber, L.A., Beug, H., Simons, K. and Reichmann, E.: Two-dimensional gel mapping of small GTPases reveals transformation-specific changes during oncogenesis. *Electrophoresis (Weinheim),* 15 (1994) 469-473.

694 Karasawa, K., Yato, M., Setaka, M. and Nojima, S.: Purification and characterization of platelet-activating factor acetylhydrolase from peritoneal fluid obtained from guinea pigs after endotoxin shock. *J. Biochem. (Tokyo),* 116 (1994) 374-379.

695 Le Guennec, J.-Y., Peineau, N., Esnard, F., Lacampagne, A., Gannier, F., Argibay, J., Gauthier, F. and Garnier, D.: A simple method for calibrating collagenase/pronase E ratio to optimize heart cell isolation. *Biol. Cell,* 79 (1993) 161-165; *C.A.,* 121 (1994) 53349u.

696 Medina, L., Pérez-Ramos, J., Ramírez, R., Selman, M. and Pardo, A.: Leukotriene C4 upregulates collagenase expression and synthesis in human lung fibroblasts. *Biochim. Biophys. Acta,* 1224 (1994) 168-174.

697 Meikle, M.C., Bord, S., Hembry, R.M. and Reynolds, J.J.: Rabbit calvarial osteoblasts in culture constitutively synthesize progelatinase-A, and TIMP-1 and TIMP-2. *Biochim. Biophys. Acta,* 1224 (1994) 99-102.

698 Ogawa, W., Izawa, S., Sakai-Tomita, Y., Moritani, C., Tsuda, M., Kinomura, K., Kitazawa, S. and Tsuchiya, T.: $F_0F_1$-ATPase of *Vibrio parahaemolyticus*: purification using new detergents and characterization. *Biochim. Biophys. Acta,* 1188 (1994) 69-74.

699 Sun, Y. and Ball, W.J., Jr.: Identification of antigenic sites on the $Na^+/K^+$-ATPase β-subunit: their sequences and the effects of thiol reduction upon their structure. *Biochim. Biophys. Acta,* 1207 (1994) 236-248.

700 Taddei, N., Stefani, M., Vecchi, M., Modesti, A., Raugei, G., Bucciantini, M., Magherini, F. and Ramponi, G.: Arginine-23 is involved in the catalytic site of muscle acylphosphatase. *Biochim. Biophys. Acta,* 1208 (1994) 75-80.

701 Tatsumi, H., Ikegaya, K., Murakami, S., Kawabe, H., Nakano, E. and Motai, H.: Elucidation of the thermal stability of the neutral proteinase II from *Aspergillus oryzae*. *Biochim. Biophys. Acta,* 1208 (1994) 179-185.

See also 432, 462, 596, 630, 740, 1008.

*20g. Lyases*

702 Andreotti, G., Tutino, M.L., Sannia, G., Marino, G. and Cubellis, M.V.: Indole-3-glycerol-phosphate synthase from *Sulfolobus solfataricus* as a model for studying thermostable TIM-barrel enzymes. *Biochim. Biophys. Acta,* 1208 (1994) 310-315.

703 Dubery, I.A. and Smit, F.: Phenylalanine ammonia-lyase from cotton (*Gossypium hirsutum*) hypocotyls: properties of the enzyme induced by a *Verticillium dahliae* phytotoxin. *Biochim. Biophys. Acta,* 1207 (1994) 24-30.

704 Malhotra, K., Kim, S. and Sancar, A.: Characterization of a medium wavelength type DNA photolyase: purification and properties of photolyase from *Bacillus firmus*. *Biochemistry,* 33 (1994) 8712-8718.

705 Okuda, M., Kohno, H., Furukawa, T., Tokunaga, R. and Taketani, S.: Overexpression in *Escherichia coli*, and one-step purification of the human recombinant ferrochelatase. *Biochim. Biophys. Acta,* 1200 (1994) 123-128.

*20h. Isomerases*

706 Kullertz, G., Meyer, S. and Fischer, G.: Differentiation by preparative continuous free flow-isoelectric focusing of cyclosporin A inhibitable peptidyl-prolyl *cis/trans* isomerase of human erythrocytes. *Electrophoresis (Weinheim),* 15 (1994) 960-967.

707 Park, S.M. and Koo, H.-S.: Purification of *Caenorhabditis elegans* DNA topoisomerase I. *Biochim. Biophys. Acta,* 1219 (1994) 47-54.

708 Preising-Müller, R., Gühnemann-Schäfer, K. and Kindl, H.: Domains of the tetrafunctional protein acting in glyoxysomal fatty acid β-oxidation. Demonstration of epimerase and isomerase activities on a peptide lacking hydratase activity. *J. Biol. Chem.,* 269 (1994) 20475-20481.

709 Yu, X.-c., Wang, C.-C. and Tsou, C.-L.: Association and dissociation of protein disulfide isomerase. *Biochim. Biophys. Acta,* 1207 (1994) 109-113.

See also 604, 787.

*20i. Ligases*

See 649, 783.

*20j. Complex mixtures and incompletely identified enzymes*

710 Avakyan, S.A., Boyaiyan, A.S., Pogosyan, A.G. and Karagezyan, K.G.: (Prostaglandin $D_2$-synthase from bovine brain: purification and physico-chemical properties). *Biokhimiya (Moscow),* 59 (1994) 251-258.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

711 Jett., S.D. and Bear, D.G.: Snapshot blotting: transfer of nucleic acids and nucleoprotein complexes from electrophoresis gels to grids for electron microscopy. *Proc. Natl. Acad. Sci. U.S.A.,* 91 (1994) 6870-6874; *C.A.,* 121 (1994) 103571h.

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

712 Balagurumoorthy, P. and Brahmachari, S.K.: Structure and stability of human telomeric sequence. *J. Biol. Chem.,* 269 (1994) 21858-21869.

713 Cordier, Y., Roch, O., Cordier, P. and Bischoff, R.: Capillary gel electrophoresis of oligonucleotides: prediction of migration times using base-specific migration coefficients. *J. Chromatogr. A,* 680 (1994) 479-489.

714 Dolnik, V. and Skursky, L.: Monitoring enzymic peroxidation of NAD+ by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 455-461.

715 Effenhauser, C.S., Paulus, A., Manz, A. and Widmer, H.M.: High-speed separation of antisense oligonucleotides on a micromachined capillary electrophoresis device. *Anal. Chem.,* 66 (1994) 2949-2953.

716 Izumi, T., Yamaguchi, M., Isobe, T., Okuyama, T. and Shinoda, T.: (Capillary electrophoresis of oligonucleotides using enzyme-hydrolyzed glucomannan). *Kuromatogurafi,* 14 (1993) 79R-88R; *C.A.,* 121 (1994) 152565t.

717 Izumi, T., Yamaguchi, M., Isobe, T., Okuyama, T. and Shinoda, T.: (Capillary electrophoresis of oligonucleotides using low-molecular-weight glucomannan). *Kuromatogurafi,* 14 (1993) 122-123; *C.A.,* 121 (1994) 53351p.

718 Lee, K.-J., Lee, J.J. and Moon, D.C.: Application of micellar electrokinetic capillary chromatography for monitoring of hippuric and methylhippuric acid in human urine. *Electrophoresis (Weinheim),* 15 (1994) 98-102.

719 Liu, S., North, J.A., Murray, B.K., Huang, M. and Lee, M.L.: Analysis of intracellular ribonucleotide pools in a drug-treated human cancer cell line using capillary zone electrophoresis. *J. Microcolumn Sep.,* 6 (1994) 49-54; *C.A.,* 121 (1994) 152577y.

720 Loregian, A., Scremin, C., Schiavon, M., Marcello, A. and Palu, G.: Quantitative analysis of ribonucleotide triphosphates in cell extracts by high-performance liquid chromatography and micellar electrokinetic capillary chromatography: a comparative study. *Anal. Chem.,* 66 (1994) 2981-2984.

721 Morris, N.J., Bushfield, M., Lavan, B.E. and Houslay, M.D.: Multi-site phosphorylation of the inhibitory guanine nucleotide regulatory protein $G_i$-2 occurs in intact rat hepatocytes. *Biochem. J.,* 301 (1994) 693-702.

722 O'Neill, K., Shao, X., Zhao, Z., Malik, A. and Lee, M.L.: Capillary electrophoresis of nucleotides on Ucon-coated fused silica columns. *Anal. Biochem.,* 222 (1994) 185-189.

723 Panzeter, P.L., Zweifel, B. and Althaus, F.R.: Fast protein liquid chromatographic purification of poly(ADP-ribose) polymerase and separation of ADP-ribose polymers. *J. Chromatogr. A,* 678 (1994) 35-40.

724 Pascolo, E., Hudrisier, D., Sproat, B., Thuong, N. and Toulmé, J.-J.: Relative contribution of photo-addition, helper oligonucleotide and RNase H to the antisense effect of psoralen-oligonucleotide conjugates, on *in vitro* translation of *Leishmania* mRNAs. *Biochim. Biophys. Acta,* 1219 (1994) 98-106.

725 Randolph, C.A. and Champoux, J.J.: The use of DNA and RNA oligonucleotides in hybrid structures with longer polynucleotide chains to probe the structural requirements for Moloney murine leukemia virus plus strand priming. *J. Biol. Chem.,* 269 (1994) 19207-19215.

726 Richards, R.M.E. and Xing, D.K.L.: Determination of thymidine, uracil and *p*-aminobenzoic acid in bacteriological cultures by capillary zone electrophoresis. *J. Pharm. Biomed. Anal.,* 12 (1994) 1063-1068.

727 Shao, X., O'Neill, K., Zhao, Z., Anderson, S., Malik, A. and Lee, M.: Analysis of nucleotide pools in human lymphoma cells by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 463-468.

728 Srivatsa, G.S., Batt, M., Schuette, J., Carlson, R.H., Fitchett, J., Lee, C. and Cole, D.L.: Quantitative capillary gel electrophoresis assay of phosphorothioate oligonucleotides in pharmaceutical formulations. *J. Chromatogr. A,* 680 (1994) 469-477.

729 Tebbs, R.S. and Romano, L.J.: Mutagenesis at a site-specifically modified NarI sequence by acetylated and deacetylated aminofluorene adducts. *Biochemistry,* 33 (1994) 8998-9006.

730 Tseng, H.C., Dadoo, R. and Zare, R.N.: Selective determination of adenine-containing compounds by capillary electrophoresis with laser-induced fluorescence detection. *Anal. Biochem.,* 222 (1994) 55-58.

731 Wolf, S.S., Hopley, J.G. and Schweizer, M.: The application of $^{33}$P-labeling in the electrophoretic mobility shift assay. *BioTechniques,* 16 (1994) 590-592; *C.A.,* 121 (1994) 74694t.

See also 9, 151.

*21b. Nucleic acids, RNA*

732 Abe, T., Konishi, T., Katoh, T., Hirano, H., Matsukuma, K., Kashimura, M. and Higashi, K.: Induction of heat shock 70 mRNA by cadmium is mediated by glutathione suppressive and non-suppressive triggers. *Biochim. Biophys. Acta,* 1201 (1994) 29-36.

733 Armbrecht, H.J., Boltz, M.A. and Wongsurawat, N.: Expression of plasma membrane calcium pump mRNA in rat intestine: effect of age and 1,25-dihydroxyvitamin D. *Biochim. Biophys. Acta,* 1195 (1994) 110-114.

734 Backus, J.W., Schock, D. and Smith, H.C.: Only cytidines 5′ of the apolipoprotein B mRNA mooring sequence are edited. *Biochim. Biophys. Acta,* 1219 (1994) 1-14.

735 Bae, Y.M. and Hastings, J.W.: Cloning, sequencing and expression of dinoflagellate luciferase DNA from a marine alga, *Gonyaulax polyedra. Biochim. Biophys. Acta,* 1219 (1994) 449-456.

736 Barker, H.L., Perry, A.C.F., Jones, R. and Hall, L.: Sequence and expression of a monkey testicular transcript encoding tMDC I, a novel member of the metalloproteinase-like, disintegrin-like, cysteine-rich (MDC) protein family. *Biochim. Biophys. Acta,* 1218 (1994) 429-431.

737 Barnard, G.F., Staniunas, R.J., Puder, M., Steele, G.D., Jr. and Chen, L.B.: Human ribosomal protein L37 has motifs predicting serine/threonine phosphorylation and a zinc-finger domain. *Biochim. Biophys. Acta,* 1218 (1994) 425-428.

738 Braun, H.-P., Emmermann, M., Mentzel, H. and Schmitz, U.K.: Primary structure and expression of a gene encoding the cytosolic ribosomal protein S4 from potato. *Biochim. Biophys. Acta,* 1218 (1994) 435-438.

739 Chen, K.-S. and DeLuca, H.F.: Isolation and characterization of a novel cDNA from HL-60 cells treated with 1,25-dihydroxyvitamin D-3. *Biochim. Biophys. Acta,* 1219 (1994) 26-32.

740 Cottin, P., Brustis, J.J., Poussard, S., Elamrani, N., Broncard, S. and Ducastaing, A.: $Ca^{2+}$-Dependent proteinases (calpains) and muscle cell differentiation. *Biochim. Biophys. Acta,* 1223 (1994) 170-178.

741 Flamigni, F., Campana, G., Carboni, L., Rossoni, C. and Spampinato, S.: Post-transcriptional inhibition of ornithine decarboxylase induction by zinc in a difluoromethylornithine resistant cell line. *Biochim. Biophys. Acta,* 1201 (1994) 101-105.

742 Flynn, A., Shatsky, I.N., Proud, C.G. and Kaminski, A.: The RNA-binding properties of protein synthesis initiation factor eIF-2. *Biochim. Biophys. Acta,* 1219 (1994) 293-301.

743 Fucci, L., Aniello, F., Branno, M., Biffali, E. and Geraci, G.: Isolation of a new H3.3 histone variant cDNA of *P. lividus* sea urchin: sequence and embryonic expression. *Biochim. Biophys. Acta,* 1219 (1994) 539-542.

744 Gasdaska, P.Y., Oblong, J.E., Cotgreave, I.A. and Powis, G.: The predicted amino acid sequence of human thioredoxin is identical to that of the autocrine growth factor human adult T-cell derived factor (ADF): thioredoxin mRNA is elevated in some human tumors. *Biochim. Biophys. Acta,* 1218 (1994) 292-296.

745 Geng, Y.-i., Almqvist, M. and Hansson, G.K.: cDNA Cloning and expression of inducible nitric oxide synthase from rat vascular smooth muscle cells. *Biochim. Biophys. Acta,* 1218 (1994) 421-424.

746 Grigorian, M., Tulchinsky, E., Burrone, O., Tarabykina, S., Georgiev, G. and Lukanidin, E.: Modulation of mts1 expression in mouse and human normal and tumor cells. *Electrophoresis (Weinheim),* 15 (1994) 463-468.

747 Hagiwara, H., Sakaguchi, H., Lodhi, K.M., Suda, K. and Hirose, S.: Subtype switching of natriuretic peptide receptors in rat chondrocytes during *in vitro* culture. *J. Biochem. (Tokyo),* 116 (1994) 606-609.

748 Hames, B.D. and Higgins, S.J.: Fractionation of nucleic acids by gel electrophoresis. In: Hames, B.D. and Higgins, S.J. (Editors), *Gene Transcr.,* IRL, Oxford, 1993, pp. 347-351; *C.A.,* 121 (1994) 174141d - a review with 10 refs.

749 Inagaki, N., Mizuta, M. and Seino, S.: Cloning of a mouse Rabphilin-3A expressed in hormone-secreting cells. *J. Biochem. (Tokyo),* 116 (1994) 239-242.

750 Kerr, M., Fischer, J.E., Purushotham, K.R., Gao, D., Nakagawa, Y., Maeda, N., Ghanta, V., Hiramato, R., Chegini, N. and Humphreys-Beher, M.G.: Characterization of the synthesis and expression of the GTA-kinase from transformed and normal rodent cells. *Biochim. Biophys. Acta,* 1218 (1994) 375-387.

751 Krupsky, M., Fine, A., Berk, J.L. and Goldstein, R.H.: Retinoic acid-induced inhibition of type I collagen gene expression by human lung fibroblasts. *Biochim. Biophys. Acta,* 1219 (1994) 335-341.

752 Kusakabe, T., Koga, K. and Sugimoto, Y.: Isolation and characterization of cDNA and genomic promoter region for a heat shock protein 30 from *Aspergillus nidulans. Biochim. Biophys. Acta,* 1219 (1994) 555-558.

753 Lisowska, K., Krawczyk, Z., Widlak, W., Wolniczek, P. and Wisniewski, J.: Cloning, nucleotide sequence and expression of rat heat inducible hsp70 gene. *Biochim. Biophys. Acta,* 1219 (1994) 64-72.

754 Maier, R., Bilbe, G., Rediske, J. and Lotz, M.: Inducible nitric oxide synthase from human articular chondrocytes: cDNA cloning and analysis of mRNA expression. *Biochim. Biophys. Acta,* 1208 (1994) 145-150.

755 Manfras, B.J., Rudert, W.A., Trucco, M. and Boehm, B.O.: Cloning and characterization of a glutamate transporter cDNA from human brain and pancreas. *Biochim. Biophys. Acta,* 1195 (1994) 185-188.

756 Matsuhisa, A., Kishi, Y. and Shiba, K.: A simple staining method for DNA and RNA blotted on a membrane using a polyethyleneimine-enzyme conjugate. *J. Biochem. (Tokyo),* 116 (1994) 478-481.

757 Milde, K.F., Alejandro, R., Mintz, D.H. and Pastori, R.L.: Molecular cloning of the canine CD44 antigen cDNA. *Biochim. Biophys. Acta,* 1218 (1994) 112-114.

758 Mitra, A. and Que, Q.: Ectopic expression of a viral adenine methyltransferase gene in tobacco. *Biochim. Biophys. Acta,* 1219 (1994) 244-249.

759 Montermini, L., Wang, H., Verderio, E., Taroni, F., DiDonato, S. and Finocchiaro, G.: Identification of 5' regulatory regions of the human carnitine palmitoyltransferase II gene. *Biochim. Biophys. Acta,* 1219 (1994) 237-240.

760 Morgan, E.T., Thomas, K.B., Swanson, R., Vales, T., Hwang, J. and Wright, K.: Selective suppression of cytochrome P-450 gene expression by interleukins 1 and 6 in rat liver. *Biochim. Biophys. Acta,* 1219 (1994) 475-483.

761 Ness, G.C., Pandleton, L.C. and Zhao, Z.: Thyroid hormone rapidly increases cholesterol 7$\alpha$-hydroxylase mRNA levels in hypophysectomized rats. *Biochim. Biophys. Acta,* 1214 (1994) 229-233.

762 Nishimatsu, S.-i., Koyasu, N., Sugaya, T., Ohnishi, J., Yamagishi, T., Murakami, K. and Miyazaki, H.: Isolation and characterization of two alternatively spliced complementary DNAs encoding a *Xenopus laevis* angiotensin II receptor. *Biochim. Biophys. Acta,* 1218 (1994) 401-407.

763 Ohashi, K., Toshima, J., Tajinda, K. Nakamura, T. and Mizuno, K.: Molecular cloning of a chicken lung cDNA encoding a novel protein kinase with N-terminal two LIM/double zinc finger motifs. *J. Biochem. (Tokyo),* 116 (1994) 636-642.

764 Omi, T., Kajii, E., Iwamoto, S., Tsuchida, S. and Ikemoto, S.: Differential splicing of the glycophorin A mRNA. *Electrophoresis (Weinheim),* 15 (1994) 1091-1094.

765 Orsat, B., Spielmann, A., Marc-Martin, S., Lemberger, T. and Stutz, E.: Analysis of the 22 kbp long psbD-psbC gene cluster of *Euglena gracilis* chloroplast DNA: evidence for overlapping transcription units undergoing differential processing. *Biochim. Biophys. Acta,* 1218 (1994) 75-81.

766 Pajor, A.M.: Sequence of a putative transporter from rabbit kidney related to the Na+/glucose cotransporter gene family. *Biochim. Biophys. Acta,* 1194 (1994) 349-351.

767 Pan, C., Chamberlin, M.E., Wu, S., Chan, W. and Chou, J.Y.: Pregnancy-specific glycoprotein gene expression and the induction by 5-bromo-2'-deoxyuridine. *Biochemistry,* 33 (1994) 7260-7266.

768 Perry, A.C.F., Barker, H.L., Jones, R. and Hall, L.: Genetic evidence for an additional member of the metalloproteinase-like, disintegrin-like, cysteine-rich (MDC) family of mammalian proteins and its abundant expression in the testis. *Biochim. Biophys. Acta,* 1207 (1994) 134-137.

769 Pruzina, S., Antoniou, M., Hurst, J., Grosveld, F. and Philipsen, S.: Transcriptional activation by hypersensitive site three of the human β-globin locus control region in murine erythroleukemia cells. *Biochim. Biophys. Acta,* 1219 (1994) 351-360.

770 Randall, W.R., Rimer, M. and Gough, N.R.: Cloning and analysis of chicken acetylcholinesterase transcripts from muscle and brain. *Biochim. Biophys. Acta,* 1218 (1994) 453-456.

771 Reuben, M., Rising, L., Prinz, C., Hersey, S. and Sachs, G.: Cloning and expression of the rabbit gastric CCK-A receptor. *Biochim. Biophys. Acta,* 1219 (1994) 321-327.

772 Ringuette, M.J. and Spencer, J.H.: Mapping the initiation sites of *in vitro* transcripts of bacteriophage S13. *Biochim. Biophys. Acta,* 1218 (1994) 331-338.

773 Schmalix, W.A. and Bandlow, W.: SWH1 from yeast encodes a candidate nuclear factor containing ankyrin repeats and showing homology to mammalian oxysterol-binding protein. *Biochim. Biophys. Acta,* 1219 (1994) 205-210.

774 Smith, D.L., Law, R.E., Shaw, K.J., Do, Y.S., Hsueh, W.A. and Morris, B.J.: Proximal 2.6 kb of 5'-flanking DNA is insufficient for human renin promoter activity in renin-synthesizing choriodecidual cells. *Biochim. Biophys. Acta,* 1219 (1994) 465-474.

775 Su, Z.-H., Ikeda, M., Sato, Y., Saito, H., Imai, K., Isobe, M. and Yamashita, O.: Molecular characterization of ovary trehalase of the silkworm, *Bombyx mori* and its transcriptional activation by diapause hormone. *Biochim. Biophys. Acta,* 1218 (1994) 366-374.

776 Takahashi, A., Sasaki, H., Kim, S.J., Tobisu, K., Kakisoe, T., Tsukamoto, T., Kumamoto, Y., Sugimura, T. and Terada, M.: Markedly increased amounts of messenger RNAs for vascular endothelial growth factor and placenta growth factor in renal cell carcinoma associated with angiogenesis. *Cancer Res.,* 54 (1994) 4233-4237.

777 Tooi, O., Fujii, G., Tashiro, K. and Shiokawa, K.: Molecular cloning of cDNA for XTCAD-1, a novel *Xenopus* cadherin, and its expression in adult tissues and embryos of *Xenopus laevis. Biochim. Biophys. Acta,* 1219 (1994) 121-128.

778 Triggs-Raine, B.L., Benoit, G., Salo, T.J., Trasler, J.M. and Gravel, R.A.: Characterization of the murine β-hexosaminidase (HEXB) gene. *Biochim. Biophys. Acta,* 1227 (1994) 79-86.

779 Uchida, T.: Regulation of choline kinase R: analyses of alternatively spliced choline kinases and the promoter region. *J. Biochem. (Tokyo),* 116 (1994) 508-518.

780 Uehara, T., Hoshino, S.-i., Ui, M., Tokumitsu, Y. and Nomura, Y.: Possible involvement of phosphatidylinositol-specific phospholipase C related to pertussis toxin-sensitive GTP-binding proteins during adipocyte differentiation of 3T3-L1 fibloblasts: negative regulation of protein kinase C. *Biochim. Biophys. Acta,* 1224 (1994) 302-310.

781 Ueyama, H., Naitoh, H. and Ohkubo, I.: Structure and expression of rat and mouse mRNAs for Za-$\alpha_2$-glycoprotein. *J. Biochem. (Tokyo),* 116 (1994) 677-681.

782 Watson, M.A. and Fleming, T.P.: Isolation of differentially expressed sequence tags from human breast cancer. *Cancer Res.,* 54 (1994) 4598-4602.

783 Wexler, I.D., Du, Y., Lisgaris, M.V., Mandal, S.K., Freytag, S.O., Yang, B.-S., Liu, T.-C., Kwon, M., Patel, M.S. and Kerr, D.S.: Primary amino acid sequence and structure of human pyruvate carboxylase. *Biochim. Biophys. Acta,* 1227 (1994) 46-52.

See also 92, 273, 374, 377, 379, 388, 393, 515, 516, 561, 572, 576, 603, 663, 668, 784, 786, 798, 801, 804, 807, 823, 826, 857, 913, 922.

*21c. Nucleic acids, DNA*

784 Ahn, K.-S. and Henney, H.R., Jr.: An *Acanthamoeba* ubiquitin-fusion protein; cDNA and deduced protein sequence. *Biochim. Biophys. Acta,* 1218 (1994) 109-111.

785 Akiyama, S., Endo, H., Inohara, N., Ohta, S. and Kagawa, Y.: Gene structure and cell type-specific expression of the human ATP synthase α subunit. *Biochim. Biophys. Acta,* 1219 (1994) 129-140.

786 Anson, D.S. and Occhiodoro, T.: Transcriptional activity of the CD45 gene promoter in retroviral vector constructs. *Biochim. Biophys. Acta,* 1219 (1994) 81-88.

787 Assairi, L.M.: DNA unknotting activity (DNA topoisomerase II) isolated from a thermophilic archaebacterium *Sulfolobus* is inhibited by novobiocin. Partial purification, identification of the two subunits and characteristics of the enzyme. *Biochim. Biophys. Acta,* 1219 (1994) 107-114.

788 Baba, Y., Tsuhako, M., Hayashi, K. and Akashi, M.: (Development of new technology for gene diagnosis of cancer using capillary electroporesis). *Kuromatogurafi,* 14 (1993) 126-127; *C.A.,* 121 (1994) 30253u.

789 Bolufer, P., Molina, R., Ruiz, A., Hernandez, M., Vazquez, C. and Lluch, A.: Estradiol receptors in combination with neu or myc oncogene amplifications might define new subtypes of breast cancer. *Clin. Chim. Acta,* 229 (1994) 107-122.

790 Butler, J.M., McCord, B.R., Jung, J.M., Wilson, M.R., Budowle, B. and Allen, R.O.: Quantitation of polymerase chain reaction products by capillary electrophoresis using laser fluorescence. *J. Chromatogr. B,* 658 (1994) 271-280.

791 Chan, K.C.: Novel separation and detection methods of DNA fragments in electrophoresis. *Report,* Order No. DE93007539, 1993, 120 pp.; *C.A.,* 121 (1994) 149879t.

792 Chevallier, B., Hubert, J.-C. and Kammerer, B.: Determination of chromosome size and number of rrn loci in *Lactobacillus plantarum* by pulsed-field gel electrophoresis. *FEMS Microbiol. Lett.,* 120 (1994) 51-56; *C.A.,* 121 (1994) 101014e.

793 Day, I.N.M. and Humphries, S.E.: Electrophoresis for genotyping: microtiter array diagonal gel electrophoresis on horizontal polyacrylamide gels; hydrolink, or agarose. *Anal. Biochem.,* 222 (1994) 389-395.

794 Défontaines, A.-D. and Viovy, J.-L.: Gel electrophoresis of end-labeled DNA. II. Dynamics and detrapping in pulsed fields. *Electrophoresis (Weinheim),* 15 (1994) 111-119.

795 Denton, P.H., Cullen, J.B., Loeb, D., Lucas, A., Nunes, K., Hulett, C. and Vance, J.M.: Partitioned pulsed-field gel electrophoresis-PCR (PPF-PCR): a new method for pulsed-field mapping for STS and microsatellites. *Nucleic Acids Res.,* 22 (1994) 1776-1777; *C.A.,* 121 (1994) 50891d.

796 Desruisseaux, C. and Slater, G.W.: Simple model of trapping electrophoresis with complicated transient dynamics. *Phys. Rev. E: Stat. Phys. Plasmas, Fluids, Relat. Interdiscip. Top.,* 49 (1994) 5885-5888; *C.A.,* 121 (1994) 77652p.

797 Diarra-Mehrpour, M., Bourguignon, J., Sarafan, N., Bost, F., Sesboüé, R., Muschio-Bonnet, F. and Martin, J.-P.: Tandem orientation of the inter-α-trypsin inhibitor heavy chain H1 and H3 genes. *Biochim. Biophys. Acta,* 1219 (1994) 551-554.

798 French, N.S. and Norton, J.D.: Analysis of retrotransposon families in genomic DNA by two-dimensional restriction mapping: detection of VL30 insertions in mouse thymic lymphoma. *Biochim. Biophys. Acta,* 1219 (1994) 484-492.

799 Fujita, T., Kamahori, M. and Umemura, S.: Capillary electrophoresis device for gene polymorphism analysis. *Jpn. Kokai Tokkyo Koho* JP 06,138,090 [94,138,090] (Cl. GO1N27/447), 20 May 1994, Appl. 92/291,161, 29 Oct. 1992; 6 pp.; *C.A.,* 121 (1994) 197656q.

800 Funke, R.P., Kolchinsky, A. and Gresshoff, P.M.: High EDTA concentrations cause entrapment of small DNA molecules in the compression zone of pulsed field gels, resulting in smaller than expected insert sizes in YACs prepared from size selected DNA. *Nucleic Acids Res.,* 22 (1994) 2708-2709; *C.A.,* 121 (1994) 149971s.

801 Gianquinto, L., Pailhoux, E.A., Bezard, J., Servel, N., Kirszenbaum, M. and Cotinot, C.: Cloning and characterization of a full-length cDNA coding for ovine aldolase B from fetal mesonephros. *Biochim. Biophys. Acta,* 1219 (1994) 223-227.

802 Gravius, B., Cullum, J. and Hranueli, D.: High G+C-content DNA markers for pulsed-field gel electrophoresis. *BioTechniques,* 16 (1994) 52; *C.A.,* 121 (1994) 30338a.

803 Gross, A.W., Aprille, J.R. and Ernst, S.G.: Identification of human mitochondrial DNA fragments corresponding to the genes for ATPase, cytochrome C oxidase, and nine tRNAs in a denaturing gradient gel electrophoresis system. *Anal. Biochem.,* 222 (1994) 507-510.

804 Hallahan, D.L., Lau, S.-M., Harder, P.A., Smiley, D.W.M., Dawson, G.W., Pickett, J.A., Christoffersen, R.E. and O'Keefe, D.P.: Cytochrome P-450-catalysed monoterpenoid oxidation in catmint (*Nepeta racemosa*) and avocado (*Persea americana*); evidence for related enzymes with different activities. *Biochim. Biophys. Acta,* 1201 (1994) 94-100.

805 Henderson, C.J., Bammler, T. and Wolf, C.R.: Deduced amino acid sequence of a murine cytochrome P-450 Cyp4a protein: developmental and hormonal regulation in liver and kidney. *Biochim. Biophys. Acta,* 1200 (1994) 182-190.

806 Hirai, O. and Tice, R.R.: (Sensitive method for the detection of DNA damage in individual cells. Single cell gel assay). *Hen'igensei Shiken,* 3 (1994) 1-11; *C.A.,* 121 (1994) 127080y - a review with 38 refs.

807 Hokari, A., Zeniya, M. and Esumi, H.: Cloning and functional expression of human inducible nitric oxide synthase (NOS) cDNA from a glioblastoma cell line A-172. *J. Biochem. (Tokyo),* 116 (1994) 575-581.

808 Holstege, F.C.P., van der Vliet, P.C. and Timmers, H.T.M.: Instability of human TATA-binding protein CAG triplet repeats during amplification by PCR. *Biochim. Biophys. Acta,* 1219 (1994) 157-159.

809 Kim, R. and Beck, W.T.: Differences between drug-sensitive and -resistant human leukemic CEM cells in c-jun expression, AP-1 DNA-binding activity, and formation of Jun/Fos family dimers, and their association with internucleosomal DNA ladders after treatment with internucleosomal DNA ladders after treatment with VM-26. *Cancer Res.,* 54 (1994) 4958-4966.

810 Kim, Y. and Morris, M.D.: Pulsed field capillary electrophoresis of multikilobase length nucleic acids in dilute methyl cellulose solutions. *Anal. Chem.,* 66 (1994) 3081-3085.

811 Kitamoto, K., Kimura, K., Gomi, K. and Kumagai, C.: Electrophoretic karyotype and gene assignment to chromosomes of *Aspergillus oryzae. Biosci., Biotechnol., Biochem.,* 58 (1994) 1467-1470; *C.A.,* 121 (1994) 197418p.

812 Krause, G., David, S., Büchler, W., Wehling, M. and Gerzer, R.: Distinction of weakly homologous cDNA amplificates by single-strand conformation polymorphism analysis: application to guanylyl cyclase isozymes. *Electrophoresis (Weinheim),* 15 (1994) 557-561.

813 Kraxenberger, A., Friedl, A.A. and Kellerer, A.M.: Computer simulation of pulsed field gel runs allows the quantitation of radiation-induced double-strand breaks in yeast. *Electrophoresis (Weinheim),* 15 (1994) 128-136.

814 Krude, T. and Knippers, R.: Minichromosome replication *in vitro*: inhibition of re-replication by replicatively assembled nucleosomes. *J. Biol. Chem.,* 269 (1994) 21021-21029.

815 Lan, Q., Niu, L.L. and Fallon, A.M.: Mosquito ribosomal protein rpL31 resembles rat rpL34: cDNA and deduced amino acid sequence. *Biochim. Biophys. Acta,* 1218 (1994) 460-462.

816 Lanan, M., Grossmann, D.W. and Morris, M.D.: Electric birefringence imaging of DNA in agarose electrophoresis gels: noise limits and prolonged electric field effects. *Electrophoresis (Weinheim),* 15 (1994) 137-142.

817 Leren, T.P., Solberg, K., Roedningen, O.K., Ose, L., Tonstad, S. and Berg, K.: Evaluation of running conditions for SSCP analysis: application of SSCP for detection of point mutations in the LDL receptor gene. *PCR Methods Appl.,* 3 (1993) 159-162; *C.A.,* 121 (1994) 196960x.

818 Loebrich, M., Ikpeme, S. and Kiefer, J.: DNA double-strand break measurement in mammalian cells by pulsed-field gel electrophoresis; an approach using restriction enzymes and gene probing. *Int. J. Radiat. Biol.,* 65 (1994) 623-630; *C.A.,* 121 (1994) 77284v.

819 Lopez-Miranda, J., Kam, N., Osada, J., Rodriguez, C., Fernandez, P., Contois, J., Schaefer, E.J. and Ordovas, J.M.: Effect of fat feeding on human intestinal apolipoprotein B mRNA levels and editing. *Biochim. Biophys. Acta,* 1214 (1994) 143-147.

820 Lu, H., Arriaga, E., Chen, D.Y., Figeys, D. and Dovichi, N.J.: Activation energy of single-stranded DNA moving through cross-linked polyacrylamide gels at 300 V/cm. Effect of temperature on sequencing rate in high-electric-field capillary gel electrophoresis. *J. Chromatogr. A,* 680 (1994) 503-510.

821 Maekawa, M., Kayoko, S. and Kanno, T.: Search for improved electrophoretic conditions for PCR-single-strand conformation polymorphism analysis: is an SDS buffer conditon useful? *PCR Methods Appl.,* 3 (1993) 130-132; *C.A.,* 121 (1994) 149858k.

822 Manohar, A. and Anwar, R.A.: Evidence for the presence of a functional TATA box (ATAAAA) sequence in the gene for bovine elastin. *Biochim. Biophys. Acta,* 1219 (1994) 233-236.

823 Markovics, A., Ram, D., Grossman, Z., Ziv, E. and Lantner, F.: Cloning and characterization of the SmIMP25 integral membrane protein of the parasitic helminth *Schistosoma mansoni. Biochim. Biophys. Acta,* 1218 (1994) 273-282.

824 Mayer, P., Slater, G.W. and Drouin, G.: Simulation of reduced band broadening during single-stranded DNA pulsed field electrophoresis in polyacrylamide gels. *Electrophoresis (Weinheim),* 15 (1994) 120-127.

825 Morrison, C. and Gannon, F.: The impact of the PCR plateau phase on quantitative PCR. *Biochim. Biophys. Acta,* 1219 (1994) 493-498.

826 Nunomura, W., Takakuwa, Y. and Higashi, T.: Changes in serum concentration and mRNA level of rat C-reactive protein. *Biochim. Biophys. Acta,* 1227 (1994) 74-78.

827 Oana, H., Masubuchi, Y., Matsumoto, M., Doi, M., Matsuzawa, Y. and Yoshikawa, K.: Periodic motion of large DNA molecules during steady field gel electrophoresis. *Macromolecules,* 27 (1994) 6061-6067; *C.A.,* 121 (1994) 200142b.

828 Orson, F.M.: Photodocumentation of UV shadowing with DNA gels. *BioTechniques,* 16 (1994) 592-596; *C.A.,* 121 (1994) 74695u.

829 Powell, N.G., Threlfall, E.J., Chart, H. and Rowe, B.: Subdivision of *Salmonella enteritidis* PT 4 by pulsed-field gel electrophoresis: potential for epidemiological surveillance. *FEMS Microbiol. Lett.,* 119 (1994) 193-198; *C.A.,* 121 (1994) 30270x.

830 Premaratne, S., Swenson, S.D., Mandel, M. and Mower, H.F.: Detection of small quantities of double stranded DNA by enhanced fluorescence of substituted aldehyde modified polydeoxynucleotide-ethidium bromide complexes. *Biochim. Biophys. Acta,* 1219 (1994) 422-424.

831 Sakallah, S.A., Norton, D.R., Zhang, W. and Marzluff, W.F.: Isolation and characterization of the tandemly repeated U6 genes from the sea urchin *Stronglylocentrotus purpuratus. Biochim. Biophys. Acta,* 1218 (1994) 439-442.

832 Saqib, K.M., Hay, S.M. and Rees, W.D.: The expression of *Escherichia coli* diaminopimelate decarboxylase in mouse 3T3 cells. *Biochim. Biophys. Acta,* 1219 (1994) 398-404.

833 Seib, T., Welter, C., Engel, M., Theisinger, B. and Dooley, S.: Presence of regulatory sequences within intron 4 of human and murine c-myb genes. *Biochim. Biophys. Acta,* 1219 (1994) 285-292.

834 Seifert, H., Schulze, A., Baginski, R. and Pulverer, G.: Comparison of four different methods for epidemiologic typing of *Acinetobacter baumannii. J. Clin. Microbiol.,* 32 (1994) 1816-1819; *C.A.,* 121 (1994) 174585b.

835 Shahabuddin, M., Rawlings, D.J. and Kaslow, D.C.: A novel glucose-6-phosphate dehydrogenase in *Plasmodium falciparum*: cDNA and primary protein structure. *Biochim. Biophys. Acta,* 1219 (1994) 191-194.

836 Smith, M.A. and Bar-Yam, Y.: Pulsed field gel electrophoresis simulations in the diffusive regime. In: Lim, H.A. (Editor), *Int. Conf. Bioinformatics, Supercomput. Complex Genome Anal., Proc. Conf., 2nd 1992,* World Sci. Publ., Singapore, 1993, pp. 185-193; *C.A.,* 121 (1994) 174386n.

837 Solovyan, V.T., Andreyev, I.O. and Kunakh, V.A.: (The fractionation of eukarytic DNA by pulsed field gel electrophoresis. Evidence for nuclear DNA organization as constituent component of topoisomerase II/DNA complex). *Biopolim. Kletka,* 9 (1993) 44-51; *C.A.,* 121 (1994) 174407v.

838 Sudor, J. and Novotny, M.V.: Separation of large DNA fragments by capillary electrophoresis under pulsed-field conditions. *Anal. Chem.,* 66 (1994) 2446-2450.

839 Syomin, E.V., Kandror, K.V., Semakin, A.B., Tsuprun, V.L. and Stepanov, A.S.: (Investigation of some biochemical properties of GYPSY (mdg4) virus-like particles (VLP) preparations). *Biokhimiya (Moscow),* 59 (1994) 503-512.

840 Togusari, T. and Irisawa, K.: Gel electrophoresis apparatus for DNA analysis. *Jpn. Kokai Tokkyo Koho* JP 06,105,636 [94,105,636] (Cl. GO1N27/447), 22 Apr. 1994, Appl. 92/283,952, 29 Sep. 1992; 5 pp.; *C.A.,* 121 (1994) 51478m.

841 Toth, G., Schlammadinger, J. and Szabó, G.: DNA uptake stimulating protein from *Neurosora crassa* enhances DNA and oligonucleotide uptake also in mammalian cells. *Biochim. Biophys. Acta,* 1219 (1994) 314-320.

842 Träger, T., Schmidt, P. and Epplen, J.T.: Screening of a mouse/human Y-chromosomal cosmid library for gene candidates and markers by using (short) oligonucleotide probes. *Electrophoresis (Weinheim),* 15 (1994) 871-879.

843 Van der Schans, M.J., Allen, J.K., Wanders, B.J. and Guttman, A.: Effect of sample matrix and injection plug on dsDNA migration in capillary gel electrophoresis. *J. Chromatogr. A,* 680 (1994) 511-516.

844 Volkmuth, W.D., Duke, T., Wu, M.C., Austin, R.H. and Szabo, A.: DNA electrodiffusion in a 2D array of posts. *Phys. Rev. Lett.,* 72 (1994) 2117-2120; *C.A.,* 121 (1994) 53348t.

845 Wada, A.: Movement of fluorescence pattern after photobleaching: an accelerated procedure for DNA electrophoretic mobility analysis. *Chemtracts: Biochem. Mol. Biol.,* 4 (1993) 289-293; *C.A.,* 121 (1994) 149875p.

846 Wada, M., Kohno, K., Kano, Y., Mitsui, H., Kuwano, M., Schlessinger, D. and Imamoto, F.: Increased retention of small chromosomes in a novel yeast mutant. *J. Biochem. (Tokyo),* 116 (1994) 694-696.

847 Wagner, L. and Lai, E.: Separation of large DNA molecules with high voltage pulsed field gel electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1078-1083.

848 Weaver, K.R., Caetano-Anolles, G., Gresshoff, P.M. and Callahan, L.M.: Isolation and cloning of DNA amplification products from silver-stained polyacrylamide gels. *BioTechniques,* 16 (1994) 226-227; *C.A.,* 121 (1994) 196945w.

849 Weill, G.: DNA pulsed-field gel electrophoresis. *Trends Polym. Sci. (Cambridge),* 2 (1994) 132-136; *C.A.,* 121 (1994) 152337v - a review with 35 refs.

850 Yakrus, M.A. and Straus, W.L.: DNA polymorphisms detected in *Mycobacterium haemophilum* by pulsed-field gel electrophoresis. *J. Clin. Microbiol.,* 32 (1994) 1083-1084; *C.A.,* 121 (1994) 30251s.

851 Zhu, H., Clark, S.M., Benson, S.C., Rye, H.S., Glazer, A.N. and Mathies, R.A.: High-sensitivity capillary electrophoresis of double-stranded DNA fragments using monomeric and dimeric intercalating dyes. *Anal. Chem.,* 66 (1994) 1941-1948.

See also 44, 72, 92, 389, 574, 644, 732, 743, 748, 750, 756, 758, 762, 779, 853, 863, 898, 905, 919.

*21d. Structural studies on RNA and RNA mapping*

852 Ajuh, P.M. and Maden, E.B.: Chemical secondary structure probing of two highly methylated regions in *Xenopus laevis* 28S ribosomal RNA. *Biochim. Biophys. Acta,* 1219 (1994) 89-97.

853 Akiyama, K., Seki, S., Oshida, T. and Yoshida, M.C.: Structure, promoter analysis and chromosomal assignment of the human *APEX* gene. *Biochim. Biophys. Acta,* 1219 (1994) 15-25.

854 DeStefano, J.J., Wu, W., Seehra, J., McCoy, J., Laston, D., Albone, E., Fay, P.J. and Bambara, R.A.: Characterization of an RNase H deficient mutant of human immunodeficiency virus-1 reverse transcriptase having an aspartate to asparagine change at position 498. *Biochim. Biophys. Acta,* 1219 (1994) 380-388.

855 Guo, D.-F. and Inagami, T.: The genomic organization of the rat angiotensin II receptor $AT_{1B}$. *Biochim. Biophys. Acta,* 1218 (1994) 91-94.

856 Han, H., Schepartz, A., Pellegrini, M. and Dervan, P.B.: Mapping RNA regions in eukaryotic ribosomes that are accessible to methidiumpropyl-EDTA•Fe(II) and EDTA•Fe(II). *Biochemistry,* 33 (1994) 9831-9844.

857 Hosaka, H., Sakabe, I., Sakamoto, K., Niimi, T., Yokoyama, S. and Takaku, H.: Characterization of the secondary structrure of an oligonucleotide corresponding to the autocleavage site of a precursor RNA from bacteriophage T4. *Biochim. Biophys. Acta,* 1218 (1994) 351-356.

858 Swoboda, I., Schneiner, O., Kraft, D., Breitenbach, M., Heberle-Bors, E. and Vicente, O.: A birch gene family encoding pollen allergens and pathogenesis-related proteins. *Biochim. Biophys. Acta,* 1219 (1994) 457-464.

859 Van Oers, C.C.M., Bakker, L. and Baas, P.D.: The exon 4 poly(A) site of the human calcitonin/CGRP-I pre-mRNA is a weak site *in vitro. Biochim. Biophys. Acta,* 1218 (1994) 55-63.

See also 759, 772, 779.

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

860 Arakawa, H., Uetanaka, K., Maeda, M., Tsuji, A., Matsubara, Y. and Narisawa, K.: Analysis of polymerase chain reaction-product by capillary electrophoresis with laser-induced fluorescence detection and its application to the diagnosis of medium-chain acyl-coenzyme A dehydrogenase deficiency. *J. Chromatogr. A,* 680 (1994) 517-523.

861 Arquint, M. and Spencer, J.H.: Mapping of RNA polymerase binding sites in the H/A gene region of bacteriophage S13 by footprinting and exonuclease III analysis. *Biochim. Biophys. Acta,* 1218 (1994) 339-345.

862 Arz, H.E., Gisselmann, G., Schiffmann, S. and Schwenn, J.D.: A cDNA for adenylyl sulphate (APS)-kinase from *Arabidopsis thaliana. Biochim. Biophys. Acta,* 1218 (1994) 447-452.

863 Barron, A.E., Blanch, H.W. and Soane, D.S.: A transient entanglement coupling mechanism for DNA separation by capillary electrophoresis in ultradilute polymer solutions. *Electrophoresis (Weinheim),* 15 (1994) 597-615.

864 Barros, F., Muñoz-Barús, I., Lareu, M.V., Rodriguez-Calvo, M.S. and Carracedo, A.: Double- and single-strand conformation polymorphism analysis of point mutations and short tandem repeats. *Electrophoresis (Weinheim),* 15 (1994) 566-571.

865 Breimer, L.H., Winder, A.F., Jay B. and Jay, M.: Initiation codon mutation of the tyrosinase gene as a cause of human albinism. *Clin. Chim. Acta,* 227 (1994) 17-22.

866 Brenner, C.H., Rittner, C. and Schneider, P.M.: Calculation of paternity probabilities from multilocus DNA profiles. *Electrophoresis (Weinheim),* 15 (1994) 170-174.

867 Cairns, M.J. and Murray, V.: Comparison of the sequence specificity of *cis*-diaminedichloroplatinum (II) damage in guanine- and 7-deazaguanine-containing DNA. *Biochim. Biophys. Acta,* 1218 (1994) 315-321.

868 Carlson, C.R., Caugant, D.A. and Kolstoe, A.-B.: Genotypic diversity among *Bacillus cereus* and *Bacillus thuringiensis* strains. *Appl. Environ. Microbiol.,* 60 (1994) 1719-1725; *C.A.,* 121 (1994) 30888e.

869 Chen, M., Maerz, W., Usadel, K.H., Scheuermann, E.H. and Boehm, B.O.: Typing of the HLA-DRB3 gene by temperature gradient gel electrophoresis. Prediction of the resolution of four allelic fragments by computational simulation of DNA melting. *J. Immunol. Methods,* 168 (1994) 257-265; *C.A.,* 121 (1994) 126199g.

870 Cheng, J., Kasuga, T., Mitchelson, K.R., Lightly, E.R.T., Watson, N.D., Martin, W.J. and Atkinson, D.: Polymerase chain reaction heteroduplex polymorphism analysis by entangled solution capillary electrophoresis. *J. Chromatogr. A,* 677 (1994) 169-177.

871 Chiari, M., Nesi, M. and Righetti, P.G.: Capillary zone electrophoresis of DNA fragments in a novel polymer network: poly(N-acryloylaminoethoxyethanol). *Electrophoresis (Weinheim),* 15 (1994) 616-622.

872 Donahue, J.P., Sugg, N. and Hawiger, J.: The integrin $\alpha_v$ gene: identification and characterization of the promoter region. *Biochim. Biophys. Acta,* 1219 (1994) 228-232.

873 Fucharoen, S., Fucharoen, G., Ratanasiri, T., Jetsrisuparb, A. and Fukumaki, Y.: A simple-non-radioactive assay for hemoglobin E gene in prenatal diagnosis. *Clin. Chim. Acta,* 229 (1994) 197-203.

874 Gaëta, B.A., Borthwick, I. and Stanley, K.K.: The 5'-flanking region of the α2MR/LRP gene contains an enhancer-like cluster of Sp1 binding sites. *Biochim. Biophys. Acta,* 1219 (1994) 307-313.

875 Gelfi, C., Orsi, A., Righetti, P.G., Brancolini, V., Cremonesi, L. and Ferrari, M.: Capillary zone electrophoresis of polymerase chain reaction-amplified DNA fragments in polymer networks the case of GATT microsatellites in cystic fibrosis. *Electrophoresis (Weinheim),* 15 (1994) 640-643.

876 Gelfi, C., Righetti, P.G., Brancolini, V., Cremonesi, L. and Ferrari, M.: Capillary electrophoresis in polymer networks for analysis of PCR products: detection of ΔF508 mutation in cystic fibrosis. *Clin. Chem. (Washington),* 40 (1994) 1603-1605.

877 Gelfi, C., Righetti, P.G., Magnani, C., Cremonesi, L. an Ferrari, M.: Simultaneous detection of ΔF508, G542X, N1303K and 1717-1G→A mutations in cystic fibrosis by capillary electrophoresis in polymer networks. *Clin. Chim. Acta,* 229 (1994) 181-189.

878 Glasbey, C.A. and Wright, F.: An algorithm for unwarping multitrack electrophoretic gels. *Electrophoresis (Weinheim),* 15 (1994) 143-148.

879 Haas, H., Budowle, B. and Weiler, G.: Horizontal polyacrylamide gel electrophoresis for the separation of DNA fragments. *Electrophoresis (Weinheim),* 15 (1994) 153-158.

880 Hershfield, B., Chader, G. and Aguirre, G.: A polymerase chain reaction-based method for the identification of DNA samples from common vertebrate species. *Electrophoresis (Wenheim),* 15 (1994) 880-884.

881 Holgersson, S., Karlsson, J.-Å., Kihlgren, A., Rosén, B., Savolainen, P. and Gyllensten, U.: Fluorescent-based typing of the two short tandem repeat loci HUMTH01 and HUMACTBP2: reproducibility of size measurements and genetic variation in the Swedish population. *Electrophoresis (Weinheim),* 15 (1994) 890-895.

882 Ikushima, T.: (Radiobiological study on DNA strand breaks and repair using single cell gel electrophoresis). *Kyoto Daigaku Genshiro Jikkensho Gakujutsu Koenkai Hobunshu,* 28 (1994) 91-97; *C.A.*, 121 (1994) 128788x.

883 Ke, S.H. and Wartell, R.M.: Influence of nearest neighbor sequence on the stability of base pair mismatches in long DNA: determination by temperature-gradient gel electrophoresis. *Nucleic Acids Res.,* 21 (1993) 5137-5143; *C.A.*, 121 (1994) 30246u.

884 Kinoshita, M., Seno, T, Fukui, T., Shin, S., Tsubota, A. and Kumada, H.: A detection method for point mutation in the precore region of human hepatitis B virus (HBV)-DNA using mutation-site-specific assay. *Clin. Chim. Acta,* 228 (1994) 83-90.

885 Kluck, R.M., McDougall, C.A., Harmon, B.V. and Halliday, J.W.: Calcium chelators induce apoptosis - evidence that raised intracellular ionised calcium is not essential for apoptosis. *Biochim. Biophys. Acta,* 1223 (1994) 247-254.

886 Krawczak, M.: Multilocus DNA fingerprinting: the independence problem in quantitative paternity testing. *Electrophoresis (Weinheim),* 15 (1994) 165-169.

887 Kuypers, A.W.H.M., Meijerink, J.P.P., Smetsers, T.F.C.M., Linssen, P.C.M. and Mensink, E.J.B.M.: Quantitative analysis of DNA aberrations amplified by competitive polymerase chain reaction using capillary electrophoresis. *J. Chromatogr. B,* 660 (1994) 271-277.

888 Lacroix, J.M.: DNA fragment size determination on agarose gel by using the application GEL. *Comput. Appl. Biosci.,* 10 (1994) 185-187; *C.A.*, 121 (1994) 152715s.

889 Loomans, D. and Blumen, A.: Evaluation of the tension on DNA segments in the lakes-straits model. *Macromol. Symp.,* 81(Statistical Mechanics of Condensed Polymer Systems: Theory and Simulations) (1994) 101-113; *C.A.*, 121 (1994) 152700h.

890 Lu, H., Arriaga, E., Chen, D.Y. and Dovichi, N.J.: High-speed and high-accuracy DNA sequencing by capillary gel electrophoresis in a simple, low cost instrument. Two-color peak-height encoded sequencing at 40°C. *J. Chromatogr. A,* 680 (1994) 497-501.

891 Luckenbach, C., Luckenbach, A. and Ritter, H.: Restriction fragment length polymorphism: molecular weight analysis and calculation with a scanner-based computer system. *Electrophoresis (Weinheim),* 15 (1994) 149-152.

892 Maekawa, M., Dey, D.C., Kotani, K., Kanno, T. and Sudo, K.: (Effect of electrophoretic conditions on single strand conformation polymorphism (SSCP) pattern). *Seibutsu Butsuri Kagaku,* 38 (1994) 95-101; *C.A.*, 121 (1994) 28020x.

893 McClelland, M., Arensdorf, H., Cheng, R. and Welsh, J.: Arbitrarily primed PCR fingerprints resolved on SSCP gels. *Nucleic Acids Res.,* 22 (1994) 1777-1771; *C.A.*, 121 (1994) 50888h.

894 McGregor, D.A. and Yeung, E.S.: Detection of DNA fragments separated by capillary electrophoresis based on their native fluorescence inside a sheath flow. *J. Chromatogr. A,* 680 (1994) 491-496.

895 McManus, J.F., Begley, C.G. and Ratnaike, S.: Complex pattern of alternative splicing in the normal uroporphyrinogen decarboxylase gene: implications for diagnosis of familial porphyria cutanea tarda. *Clin. Chem. (Washington),* 40 (1994) 1884-1889.

896 Melmer, G.: Hybridization of the variable number of tandem repeat core oligonucleotide GNNGTGGG to 350 cosmids from chromosome 7. *Electrophoresis (Weinheim),* 15 (1994) 175-176.

897 Miyashita, H., Yonekura, H., Unno, M., Suzuki, Y., Watanabe, T., Moriizumi, S., Takasawa, S. and Okamoto, H.: Characterization of the 5'-regulatory region of rat Reg I gene. *Biochim. Biophys. Acta,* 1219 (1994) 241-243.

898 Mouradian, S., Brumley, R.L., Jr. and Smith, L.M.: Separating field strength, temperature, and pulsing effects in pulsed field electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 1084-1090.

899 Moyret, C., Theillet, C., Puig, P.L., Moles, J.-P., Thomas, G. and Hamelin, R.: Relative efficiency of denaturing gradient gel electrophoresis and single strand conformation polymorphism in the detection of mutations in exons 5 to 8 of the p53 gene. *Oncogene,* 9 (1994) 1739-1743; *C.A.*, 121 (1994) 74715a.

900 Nesi, M., Righetti, P.G., Patrosso, M.C., Ferlini, A. and Chiari, M.: Capillary electrophoresis of polymerase chain reaction-amplified products in polymer networks: the case of Kennedy's disease. *Electrophoresis (Weinheim),* 15 (1994) 644-646.

901 Nishikawa, T. and Kambara, H.: Separation of long DNA fragments by capillary gel electrophoresis with laser-induced fluorescence detection. *Electrophoresis (Weinheim),* 15 (1994) 215-220.

902 Norwood, C.B.: DNA adduct investigations with capillary electrophoresis and mass spectrometry. Avail. *Univ. Microfilms Int.,* Order No. DA9332458, 1993, 169 pp.; *C.A.*, 121 (1994) 129284s.

903 Oetting, W.S., Fryer, J.P., Oofuji, Y., Middendorf, L.R., Brumbaugh, J.A., Summers, C.G. and King, R.A.: Analysis of tyrosinase gene mutations using direct automated infrared fluorescence DNA sequencing of amplified exons. *Electrophoresis (Weinheim),* 15 (1994) 159-164.

904 Penner, G.A. and Bezte, L.J.: Increased detection of polymorphism among randomly amplified wheat DNA fragments using a modified temperature sweep gel electrophoresis (TSGE) technique. *Nucleic Acids Res.,* 22 (1994) 1780-1781; *C.A.*, 121 (1994) 28039k.

905 Pulyaeva, H., Zakharov, S.F., Garner, M.M. and Chrambach, A.: Detection of a single base mismatch in double-stranded DNA by electrophoresis on uncrosslinked polyacrylamide gel. *Electrophoresis (Weinheim),* 15 (1994) 1095-1100.

906 Raghava, G.P.S.: Improved estimation of DNA fragment length from gel electrophoresis data using a graphical method. *BioTechniques,* 17 (1994) 100-104; *C.A.*, 121 (1994) 174570t.

907 Sayada, C., Picard, B., Elion, J. and Krishnamoorthy, R.: Genomic fingerprinting of *Yersinia enterocolitica* species by degenerate oligonucleotide-primed polymerase chain reaction. *Electrophoresis (Weinheim),* 15 (1994) 562-565.

908 Scanu, A.M., Pfaffinger, D., Lee, J.C. and Hinman, J.: A single point mutation (Trp72→Arg) in human apo(a) kringle 4-37 associated with a lysine binding defect in Lp(a). *Biochim. Biophys. Acta,* 1227 (1994) 41-45.

909 Schreiber, W.E., Fong, F. and Jamani, A.: Molecular diagnosis of acute intermittent porphyria by analysis of DNA extracted from hair roots. *Clin. Chem. (Washington),* 40 (1994) 1744-1748.

910 Schreiber, W.E., Rozon, C., Fong, F. and Jamani, A.: Detection of polymorphisms and mutations in the porphobilinogen deaminase gene by nonisotopic SSCP. *Clin. Chem. (Washington),* 40 (1994) 1982-1983.

911 Shapovalova, N.I., Zheleznaya, L.A., Matvienko, N.N. and Matvienko, N.I.: (New site-specific endonuclease BspKT5I). *Biokhimiya (Moscow),* 59 (1994) 485-493.

912 Shimokata, K. and Ichiyama, S.: (Genetic analysis and molecular epidemiology of MRSA). *Saishin Igaku,* 49 (1994) 1472-1475; *C.A.,* 121 (1994) 174701m.

913 Stennard, F.A., Holloway, A.F., Hamilton, J. and West, A.K.: Characterisation of six additional human metallothionein genes. *Biochim. Biophys. Acta,* 1218 (1994) 357-365.

914 Stonehouse, T.J. and Fox, K.R.: DNase I footprinting of triple helix formation at polypurine tracts by acridine-linked oligopyrimidines: stringency, structural changes and interaction with minor groove binding ligands. *Biochim. Biophys. Acta,* 1218 (1994) 322-330.

915 Sudo, K., Maekawa, M., Kanno, T., Li, S.S.-L., Akizuki, S. and Magara, T.: Premature termination mutations in two patients with deficiency of lactate dehydrogenase H(B) subunit. *Clin. Chem. (Washington),* 40 (1994) 1567-1570.

916 Theodorakis, C.W., D'Surney, S.J. and Shugart, L.R.: Detection of genotoxic insult as DNA strand breaks in fish blood cells by agarose gel electrophoresis. *Environ. Toxicol. Chem.,* 13 (1994) 1023-1031; *C.A.,* 121 (1994) 51639q.

917 Tsuchiya, Y., Kano, Y. and Koshino, S.: Identification of lactic acid bacteria using temperature gradient gel electrophoresis for DNA fragments amplified by polymerase chain reaction. *J. Am. Soc. Brew. Chem.,* 52 (1994) 95-99; *C.A.,* 121 (1994) 197013c.

918 Uhrberg, M., Hinney, A., Enczmann, J. and Wernet, P.: Analysis of the HLA-DR gene locus by temperature gradient gel electrophoresis and its application for the rapid selection of unrelated bone marrow donors. *Electrophoresis (Weinheim),* 15 (1994) 1044-1050.

919 Uhrig, J.F., Jakobs, C.U., Majewski, C. and Trebst, A.: Molecular characterization of two spontaneous antimycin A resistant mutants of *Rhodospirillum rubrum. Biochim. Biophys. Acta,* 1187 (1994) 347-353.

920 Venema, R.C., Nishida, K., Alexander, R.W., Harrison, D.G. and Murphy, T.J.: Organization of the bovine gene encoding the endothelial nitric oxide synthase. *Biochim. Biophys. Acta,* 1218 (1994) 413-420.

921 Wang, J.C. and van Dyke, M.W.: Sp1, USF, and GAL4 activate transcription independently of TFIID-downstream promoter interactions. *Biochim. Biophys. Acta,* 1218 (1994) 308-314.

922 Watanabe, J., Hayashi, S.-i. and Kawajiri, K.: Different regulation and expression of the human CYP2E1 gene due to the RsaI polymorphism in the 5'-flanking region. *J. Biochem. (Tokyo),* 116 (1994) 321-326.

923 Wheeler, D.L. and Chrambach, A.: A computer simulation accounting for dissimilar electrophoretic behavior between two similarly curved DNA fragments due to a difference in arc-length. *Electrophoresis (Weinheim),* 15 (1994) 885-889.

924 Williams, P.E., Marino, M.A., del Rio, S.A., Turni, L.A. and Devaney, J.M.: Analysis of DNA restriction fragments and polymerase chain reaction products by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 525-540.

925 Yonezawa, A. and Sugiura, Y.: DNA binding mode of class-IIS restriction endonuclease FokI revealed by DNA footprinting analysis. *Biochim. Biophys. Acta,* 1219 (1994) 369-379.

See also 58, 252, 354, 424, 565, 583, 650, 712, 765, 785, 790, 797, 815, 820, 833, 858.

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

926 Krämer, B., Meichle, A., Hensel, G., Charnay, P. and Krönke, M.: Characterization of an Krox-24/Egr-1-responsive element in the human tumor necrosis factor promoter. *Biochim. Biophys. Acta,* 1219 (1994) 413-421.

927 Marklew, S., Smith, D.P., Mason, C.S. and Old, R.W.: Isolation of a novel RXR from *Xenopus* that most closely resembles mammalian RXR β and is expressed throughout early development. *Biochim. Biophys. Acta,* 1218 (1994) 267-272.

928 Papavassiliou, A.G.: 1,10-Phenanthroline-copper ion nuclease footprinting of DNA-protein complexes *in situ* following mobility-shift electrophoresis assays. *Methods Mol. Biol. (Totowa),* 30(DNA-Protein Interactions) (1994) 43-78; *C.A.,* 121 (1994) 103505q.

929 Taylor, J.D., Ackroyd, A.J. and Halford, S.E.: The gel shift assay for the analysis of DNA-protein interactions. *Methods Mol. Biol. (Totowa),* 30(DNA-protein Interactions) (1994) 263-279; *C.A.,* 121 (1994) 77499u.

See also 574, 742, 833, 902.

## 22. ALKALOIDS

930 Dette, C., Ebel, S. and Terabe, S.: Neutral and anionic cyclodextrins in capillary zone electrophoresis: enantiomeric separation of ephedrine and related compounds. *Electrophoresis (Weinheim),* 15 (1994) 799-803.

931 Hsieh, F.Y.L., Cai, J. and Henion, J.: Determination of trace impurities of peptides and alkaloids by capillary electrophoresis-ion spray mass spectrometry. *J. Chromatogr. A,* 679 (1994) 206-211.

932 Lemire, S.W. and Busch, K.L.: Chromatographic separations of the constituents derived from *Sanguinaria canadensis*: thin-layer chromatography and capillary zone electrophoresis. *J. Planar Chromatogr.,* 7 (1994) 221-228.

933 Trenerry, V.C., Robertson, J. and Wells, R.J.: The determination of cocaine and related substances by micellar electrokinetic capillary chromatography. *Electrophoresis (Weinheim),* 15 (1994) 103-108.

See also 955.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

*23a. Porphyrins and other pyrroles*

934 Aiken, J.H., III: New methods for the analysis of tetrapyrroles in biological systems and novel surfactant systems in electrokinetic chromatography. Avail. *Univ. Microfilms Int.*, Order No. DA9326061, 1993, 163 pp.; *C.A.*, 121 (1994) 30133e.

*23d. Pyridine derivatives*

935 Chiari, M., Nesi, M., Ottolina, G. and Righetti, P.G.: Separation of charged and neutral isotopic molecules by micellar electrokinetic chromatography in coated capillaries. *J. Chromatogr. A*, 680 (1994) 571-577.

936 Rowe, R.C., Wren, S.A.C. and McKillop, A.G.: Molecular size/shape effects in the separation of the monosubstituted alkyl pyridines using capillary electrophoresis. *Electrophoresis (Weinheim)*, 15 (1994) 635-639.

See also 203.

*23e. Other N-heterocyclic compounds*

937 Bjergegaard, C., Simonsen, H. and Sørensen, H.: Determination of heterocyclic compounds by micellar electrokinetic capillary chromatography. *J. Chromatogr. A*, 680 (1994) 561-569.

938 Locke, S.J. and Thibault, P.: Improvement in detection limits for the determination of paralytic shellfish poisoning toxins in shellfish tissues using capillary electrophoresis/electrospray mass spectrometry and discontinuous buffer systems. *Anal. Chem.*, 66 (1994) 3436-3446.

939 Mopper, B. and Sciacchitano, C.J.: Capillary zone electrophoretic determination of histamine in fish. *J. Assoc. Off. Anal. Chem.*, 77 (1994) 881-890.

See also 948.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

940 Goebel, L.K., McNair, H.M., Rasmussen, H.T. and McPherson, B.P.: Separation of ethoxylated alcohol sulphates by capillary electrophoresis using indirect UV detection. *J. Microcolumn Sep.*, 5 (1993) 47-50; *C.A.*, 121 (1994) 38069j.

See also 300, 642.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

941 Blatny, P., Kvasnicka, F. and Kenndler, E.: Time course of formation of inositol phosphates during enzymatic hydrolysis of phytic acid (myo-inositol hexaphosphoric acid) by phytase determined by capillary isotachophoresis. *J. Chromatogr. A*, 679 (1994) 345-348.

942 Buscher, B.A.P., Irth, H., Andersson, E., Tjaden, U.R. and van der Greef, J.: Determination of inositol phosphates in fermentation broth using capillary zone electrophoresis with indirect UV detection. *J. Chromatogr. A*, 678 (1994) 145-150.

943 Robins, W.H. and Wright, B.W.: Capillary electrophoretic separation of organophosphonic acids using borate esterification and direct UV detection. *J. Chromatogr. A*, 680 (1994) 667-673.

See also 282, 294, 308, 309, 316, 395, 396, 443, 486, 532, 577, 632, 636, 721.

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

944 Cha, K.W., Park, S.I., Lee, Y.K. and Yim, J.J.: Capillary electrophoretic separation of pteridine compounds. *Pteridines*, 4 (1993) 210-213; *C.A.*, 121 (1994) 30248w.

945 Dinelli, G. and Bonetti, A.: Micellar electrokinetic capillary chromatography analysis of water-soluble vitamins and multi-vitamin integrators. *Electrophoresis (Weinheim)*, 15 (1994) 1147-1150.

See also 565, 726.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

*29a. General techniques*

946 Furuta, R. and Doi, T.: Chiral separation of diniconazole, uniconazole and structurally related compounds by cyclodextrin-modified micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 15 (1994) 1322-1325.

*29e. Herbicides*

947 Farran, A. and Hernanz, O.: Separation of mixtures of phenylurea and phenoxyalkyl acid herbicides by capillary zone electrophoresis. *Quim. Anal. (Barcelona)*, 12 (1993) 205-208; *C.A.*, 121 (1994) 163536k.

*29f. Fungicides*

See 161.

*29g. Other types of pesticides and various agrochemicals*

948 Wechsler, K., Rombourg, M., Exinger, A. and Breuzin, C.: (Triazole electrophoresis possibilities and limits of the method). *Ann. Falsif. Expert. Chim. Toxicol.*, 87 (1994) 23-34; *C.A.*, 121 (1994) 51629m.

30. SYNTHETIC AND NATURAL DYES

*30a. Synthetic dyes*

949 Caslavska, J., Molteni, S., Chmelik, J., Slais, K., Matulik, F. and Thormann, W.: Behaviour of substituted aminomethylphenol dyes in capillary isoelectric focusing with electroosmotic zone displacement. *J. Chromatogr. A,* 680 (1994) 549-559.

950 Suzuki, S., Shirao, M., Aizawa, M., Nakazawa, H., Sasa, K. and Sasagawa, H.: Determination of synthetic food dyes by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 541-547.

*30b. Chloroplast and other natural pigments*

951 Rigol, A., Lopez-Sanchez, J.F. and Rauret, G.: Application of capillary zone electrophoresis to the estimation of the humic acid content in soils. *Quim. Anal. (Barcelona),* 13 (1994) 11-14; *C.A.*, 121 (1994) 107316b.

See also 573.

32. DRUG ANALYSIS

*32a. Drug analysis, general techniques*

952 Bechet, I., Paques, P., Fillet, M., Hubert, P. and Crommen, J.: Chiral separation of basic drugs by capillary zone electrophoresis with cyclodextrin additives. *Electrophoresis (Weinheim),* 15 (1994) 818-823.

953 Gonzalez, E. and Laserna, J.J.: Capillary zone electrophoresis for the rapid screening of banned drugs in sport. *Electrophoresis (Weinheim),* 15 (1994) 240-243.

954 Guttman, A. and Cooke, N.: Practical aspects of chiral separations of pharmaceuticals by capillary electrophoresis. I. Separation optimization. *J. Chromatogr. A,* 680 (1994) 157-162.

955 Korman, M., Vindevogel, J. and Sandra, P.: Application of micellar electrokinetic chromatography to the quality control of pharmaceutical formulations: the analysis of xanthine derivatives. *Electrophoresis (Weinheim),* 15 (1994) 1304-1309.

956 Lunte, S.M. and O'Shea, T.J.: Pharmaceutical and biomedical applications of capillary electrophoresis/electrochemistry. *Electrophoresis (Weinheim),* 15 (1994) 79-86.

957 Ng, C.L., Ong, C.P., Lee, H.K. and Li, S.F.Y.: Determination of pharmaceuticals and related impurities by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 579-586.

958 Nishi, H., Nakamura, K., Nakai, H. and Sato, T.: Chiral separation of drugs by capillary electrophoresis using β-cyclodextrin polymer. *J. Chromatogr. A,* 678 (1994) 333-342.

959 Nishi, H., Nakamura, K., Nakai, H., Sato, T. and Terabe, S.: Enantiomeric separation of drugs by affinity electrokinetic chromatography using dextran sulfate. *Electrophoresis (Weinheim),* 15 (1994) 1335-1340.

960 Rickard, E.C. and Bopp, R.J.: Optimization of a capillary electrophoresis method to determine the chiral purity of a drug. *J. Chromatogr. A,* 680 (1994) 609-621.

961 Schmutz, A. and Thormann, W.: Assessment of impact of physico-chemical drug properties on monitoring drug levels by micellar electrokinetic capillary chromatography with direct serum injection. *Electrophoresis (Weinheim),* 15 (1994) 1295-1303..

962 Schmutz, A. and Thormann, W.: Factors affecting the determination of drugs and endogenous low molecular mass compounds in human serum by micellar electrokinetic capillary chromatography with direct sample injection. *Electrophoresis (Weinheim),* 15 (1994) 51-61.

963 Soini, H., Riekkola, M.-L. and Novotny, M.V.: Mixed polymer networks in the direct analysis of pharmaceuticals in urine by capillary electrophoresis. *J. Chromatogr. A,* 680 (1994) 623-634.

964 Tomlinson, A.J., Benson, L.M., Johnson, K.L. and Naylor, S.: Investigation of drug metabolism using capillary electrophoresis with photodiode array detection and on-line mass spectrometry equipped with an array detector. *Electrophoresis (Weiheim),* 15 (1994) 62-71.

965 Wang, L. and Feng, S.: (Application of polyacrylamide gel electrophoresis (PAGE) in determing natural drugs). *Zhongcaoyao,* 25 (1994) 328-336; *C.A.*, 121 (1994) 164075w - a review with 16 refs.

See also 4, 5, 153, 167.

*32b. Antirheumatics and antiinflammatory drugs*

966 Rawjee, Y.Y., Williams, R.L. and Vigh, G.: Capillary electrophoretic chiral separations using cyclodextrin additives. III. Peak resolution surfaces for ibuprofen and homatropine as a function of the pH and the concentration of b-cyclodextrin. *J. Chromatogr. A,* 680 (1994) 599-607.

See also 163.

*32c. Autonomic and cardiovascular drugs*

967 Jumppanen, J.H., Sirén, H. and Riekkola, M.-L.: Effect of alkali metals and metal-ammonia complexes on electroosmosis, effective field strength, and resolution in the separation of diuretics by CZE. *J. High Resolut. Chromatogr.,* 17 (1994) 537-542.

968 Lamoree, M.H., Reinhoud, N.J., Tjaden, U.R., Niessen, W.M.A. and van der Greef, J.: On-capillary isotachophoresis for loadability enhancement in capillary zone electrophoresis/mass spectrometry of β-agonists. *Biol. Mass Spectrom.,* 23 (1994) 339-345; *C.A.*, 121 (1994) 49517e.

969 Sirén, H., Jumppanen, J.H., Manninen, K. and Riekkola, M.-L.: Introduction of migration indices for identification: chiral separation of some β-blockers by using cyclodextrins in micellar electrokinetic capillary chromatography. *Electrophoresis (Weinheim),* 15 (1994) 779-784.

See also 125, 162, 954.

*32d. Central nervous system drugs*

970 Altria, K.D., Clayton, N.G., Hart, M., Harden, R.C., Hevizi, J., Akwana, J.V. and Portsmouth, M.J.: An inter-company cross-validation exercise on capillary electrophoresis testing of dose uniformity of paracetamol content in formulation. *Chromatographia,* 39 (1994) 180-184.

971 Bechet, I., Fillet, M., Hubert, P. and Crommen, J.: Determination of benzodiazepines by micellar electrokinetic chromatography. *Electrophoresis (Weinheim),* 15 (1994) 1316-1321.

972 Benson, L.M., Tomlinson, A.J. and Naylor, S.: Time course analysis of a microsomal incubation of a therapeutic drug using preconcentration capillary electrophoresis (PC-CE). *J. High Resolut. Chromatogr.,* 17 (1994) 671-673.

973 Desiderio, C., Fanali, S., Küpfer, A. and Thormann, W.: Analysis of mephenytoin, 4-hydroxymephenytoin and 4-hydroxyphenytoin enantiomers in human urine by cyclodextrin micellar electrokinetic capillary chromatography: simple determination of a hydroxylation polymorphism in man. *Electrophoresis (Weinheim),* 15 (1994) 87-93.

974 Heuermann, M. and Blaschke, G.: Simultaneous enantioselective determination and quantification of dimethindene and its metabolite N-demethyl-dimethindene in human urine using cyclodextrins as chiral additives in capillary electrophoresis. *J. Pharm. Biomed. Anal.,* 12 (1994) 753-760.

975 Molteni, S., Caslavska, J., Alleman, D. and Thormann, W.: Determination of methadone and its primary metabolite in human urine by capillary electrophoretic techniques. *J. Chromatogr. B,* 658 (1994) 355-367.

976 Rogan, M.M., Altria, K.D. and Goodall, D.M.: Enantiomeric separation of salbutamol and related impurities using capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 808-817.

977 Schafroth, M., Thormann, W. and Allemann, D.: Micellar electrokinetic capillary chromatography of benzodiazepines in human urine. *Electrophoresis (Weinheim),* 15 (1994) 72-78.

978 Shihabi, Z.K. and Oles, K.S.: Felbamate measured in serum by two methods: HPLC and capillary electrophoresis. *Clin. Chem. (Washington),* 40 (1994) 1904-1908.

979 Vlasicova, E. and Polonsky, J.: Analytical capillary isotachophoresis of some psychopharmaceutical agents. *Pharmazie,* 49 (1994) 734-736.

980 Weng, J.: (Separation of barbiturates mixture by MEKC). *Fujian Shifan Daxue Xuebao, Ziran Kexueban,* 9 (1993) 61-67; *C.A.,* 121 (1994) 194768s.

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

981 Altria, K.D. and Filbey, S.D.: The application of experimental design to the robustness testing of a method for the determination of drug-related impurities by capillary electrophoresis. *Chromatographia,* 39 (1994) 306-310.

See also 161.

*32g. Other drug categories*

982 Chan, K.C., Majadly, F., McCloud, T.G., Muschik, G.M., Issaq, H.J. and SNader, K.M.: Micellar electrokinetic chromatography of the anti-human immunodeficiency virus (HIV) agent michellamine B with absorption and laser-induced fluorescence detection. *Electrophoresis (Weinheim),* 15 (1994) 1310-1315.

983 Chi, H., Hsieh, A.K., Ng, C.L., Lee, H.K. and Li, S.F.Y.: Determination of components in propolis by capillary electrophoresis and photodiode array detection. *J. Chromatogr. A,* 680 (1994) 593-597.

984 D'Hulst, A. and Verbeke, N.: Separation of the enantiomers of coumarinic anticoagulant drugs by capillary electrophoresis using maltodextrins as chiral modifiers. *Chirality,* 6 (1994) 225-229; *C.A.,* 121 (1994) 148214k.

985 Thanh, H.H.: Migration behaviour of triiodinated X-ray contrast media containing diol groups as borate complexes in capillary electrophoresis. *J. Chromatogr. A,* 678 (1994) 343-350.

986 Wätzig, H. and Dette, C.: Analysis of acetylcysteine by capillary electrophoresis (CE). Part 3: Quantification. *Pharmazie,* 49 (1994) 656-659.

See also 163.

*32h. Toxicological and forensic applications*

987 Chen, F.-T.A. and Evangelista, R.A.: Feasibility studies for simultaneous immunochemical multianalyte drug assay by capillary electrophoresis with laser-induced fluorescence. *Clin. Chem. (Washington),* 40 (1994) 1819-1822.

988 Evangelista, R.A. and Chen, F.-T.A.: Analysis of structural specificity in antibody-antigen reactions by capillary electrophoresis with laser-induced fluorescence detection. *J. Chromatogr. A,* 680 (1994) 587-591.

989 Thormann, W., Molteni, S., Caslavska, J. and Schmutz, A.: Clinical and forensic applications of capillary electrophoresis. *Electrophoresis (Weinheim),* 15 (1994) 3-12 - a review with 134 refs.

See also 194, 866, 933, 953, 975.

*32i. Plant extracts*

See 188, 932.

## 33. CLINICO-CHEMICAL APPLICATIONS

*33a. General papers and reviews*

990 Hochstrasser, D.F. and Tissot, J.D.: Clinical application of high-resolution two-dimensional polyacrylamide gel electrophoresis. *Adv. Electrophor.,* 6 (1993) 267-375; *C.A.,* 121 (1994) 174390j.

See also 989.

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

991 Bergquist, J., Gilman, S.D., Ewing, A.G. and Ekman, R.: Analysis of human cerebrospinal fluid by capillary electrophoresis with laser-induced fluorescence detection. *Anal. Chem.,* 66 (1994) 3512-3518.

992 Sakurabayashi, I., Kubo, N., Kaimon, M., Ohta, H. and Kawai, T.: (Automated electrophoresis equipment and software for detection of pathologic conditions). *Seibutsu Butsuri Kagaku,* 38 (1994) 173-177; *C.A.,* 121 (1994) 174404s.

See also 214, 242, 244, 248, 254, 259, 264, 265, 266, 269, 275, 293, 303, 304, 329, 453, 454, 467, 479, 481, 501, 503, 550, 627, 634, 635, 649, 659, 660, 664, 665, 669, 718, 789, 817, 865, 873, 876, 877, 884, 895, 909, 910, 915, 962, 1018.

## 34. FOOD ANALYSIS

*34a. General papers and reviews*

993 Cancalon, P.F.: Capillary electrophoresis as a tool for food quality monitoring. *Am. Lab. (Shelton),* 26 (1994) 48F, 48H, 48S; *C.A.,* 121 (1994) 156025q.

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

994 Janssen, F.W., de Baaij, J.A. and Haegele, G.H.: Heat-treated meat products. Detection of modified gluten by SDS-electrophoresis, western-blotting, and immunochemical staining. *Fleischwirtschaft,* 74 (1994) 168-178; *C.A.,* 121 (1994) 203614t.

995 Kvasnicka, F., Parkin, G. and Harvey, C.: Capillary electrophoresis as a new tool in sugar factory analysis. *Int. Sugar J.,* 95 (1993) 451-458; *C.A.,* 121 (1994) 182262j.

See also 201, 228, 290, 436, 939, 950, 999.

## 35. ENVIRONMENTAL ANALYSIS

*35a. General papers and reviews*

996 Brumley, W.C., Brownrigg, C.M. and Grange, A.H.: Capillary liquid chromatography-mass spectrometry and micellar electrokinetic chromatography as complementary techniques in environmental analysis. *J. Chromatogr. A,* 680 (1994) 635-644.

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

997 Oehrle, S.A., Blanchard, R.D., Stumpf, C.L. and Wulfeck, D.L.: Environmental monitoring of wastewater using capillary ion electrophoresis. *J. Chromatogr. A,* 680 (1994) 645-652.

See also 998, 1010.

## 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

*36a. Surfactants*

998 Gibbons, J.M. and Hoke, S.H.: Capillary zone electrophoresis with indirect UV detection: determination of sodium dodecyl sulfate in simulated stream water. *J. High Resolut. Chromatogr.,* 17 (1994) 665-667.

*36b. Antioxidants and preservatives*

999 Kaniansky, D., Masár, M., Madajová, V. and Marák, J.: Determination of sorbic acid in food products by capillary zone electrophoresis in a hydrodynamically closed separation compartment. *J. Chromatogr. A,* 677 (1994) 179-185.

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

1000 Elaev, N.R. and Baigil'dina, A.A.: (A neural membrane Na,K-ATPase inhibitor: isolation and general characteristics). *Biokhimiya (Moscow),* 59 (1994) 389-394.

1001 Ishida, H.: (Forming of large-size ceramic building materials using electrophoresis). *Nyu Seramikkusu,* 7 (1994) 44-47; *C.A.,* 121 (1994) 40753w - a review with 9 refs.

See also 138.

## 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

1002 Blake, R.C., II, Shute, E.A. and Howard, G.T.: Solubilization of minerals by bacteria: electrophoretic mobility of *Thiobacillus ferrooxidans* in the presence of iron, pyrite, and sulfur. *Appl. Environ. Microbiol.,* 60 (1994) 3349-3357; *C.A.,* 121 (1994) 175063s.

1003 Fang, Y.: (Studies on the interaction between $La^{3+}$ and human erythrocyte by cell electrophoresis). *Shengwu Wuli Xuebao,* 10 (1994) 233-237; *C.A.,* 121 (1994) 200147g.

1004 Hawk-Reinhard, D.R.: Evaluation of electrophoretic purification of islets of langerhans. Avail. *Univ. Microfilms Int.,* Order No. DA9419037, 1993, 203 pp.; *C.A.,* 121 (1994) 200252n.

1005 Hsu, J.P., Hsu, W.C. and Chang, Y.I.: Effects of fixed-charge distribution and pH on the electrophoretic mobility of biological cells. *Colloid Polym. Sci.,* 272 (1994) 251-260; *C.A.,* 121 (1994) 102485w.

1006 Pawar, Y.: Electrophoresis of heterogeneously charged colloidal particles. Avail. *Univ. Microfilms Int.,* Order No. DA9402584, 1993, 250 p.; *C.A.,* 121 (1994) 43658e.

1007 Ramsby, M.L., Makowski, G.S. and Khairallah, E.A.: Differential detergent fractionation of isolated hepatocytes: biochemical, immunochemical and two-dimensional gel electrophoresis chracterization of cytoskeletal and noncytoskeletal compartments. *Electrophoresis (Weinheim),* 15 (1994) 265-277.

1008 Spaans, M.C., Tobler, M., Ammann, R.W. and Freiburghaus, A.U.: Separation and analysis of pig pancreatic zymogen granules with free flow electrophoresis and lectins. *Electrophoresis (Weinheim),* 15 (1994) 572-576.

See also 8.

## 38. INORGANIC COMPOUNDS

### *38a. Cations*

1009 Barger, W.R., Mowery, R.L. and Wyatt, J.R.: Separation and indirect detection by capillary zone electrophoresis of ppb (w/w) levels of aluminum ions in solutions of multiple cations. *J. Chromatogr. A,* 680 (1994) 659-665.

1010 Gupta, P. and Tan, S.H.: Capillary electrophoresis analysis of metal ions in high-purity water. *Ultrapure Water,* 11 (1994) 54-60; *C.A.*, 121 (1994) 186608z.

1011 Hirokawa, T. and Kiso, Y.: Application of PIXE to separation science trace element analysis by a combined method isotachophoresis-PIXE. *Int. J. PIXE,* 3 (1993) 1-29; *C.A.*, 121 (1994) 169064b - a review with 44 refs.

1012 Hu, J.-Y., Hirokawa, T., Nishiyama, F., Kimura, G., Kiso, Y., Ito, K. and Shoto, E.: Analysis for trace rare earth elements in misch metal by means of ITP-PIXE method. *Int. J. PIXE,* 3 (1993) 89-102; *C.A.*, 121 (1994) 169174n.

1013 Morin, P., Francois, C. and Dreux, M.: (Capillary electrophoresis of inorganic cations and anions with different carrier electrolytes and indirect UV detection). *Analusis,* 22 (1994) 178-187; *C.A.*, 121 (1994) 72567e.

1014 Motomizu, S., Mori, N., Kuwabara, M. and Oshima, M.: Separation and sensitive determination of metal ions by capillary zone electrophoresis with 2-(5-nitro-2-pyridylazo)-5-(N-propyl-N-sulphopropylamino)phenol. *Anal. Sci.*, 10 (1994) 101-103; *C.A.*, 121 (1994) 98593k.

1015 Shi, H., Zhang, R., Chandrasekher, G. and Ma, Y.: Simultaneous detection and quantitation of sodium, potassium, calcium and magnesium in ocular lenses by high-performance capillary electrophoresis with indirect photometric detection. *J. Chromatogr. A,* 680 (1994) 653-658.

1016 Wu, J., Liu, X., Li, Z., Ma, W., Deng, M. and Guang, S.: (High-performance capillary zone electrophoresis for the determination of rare earth elements). *Fenxi Huaxue,* 22 (1994) 341-345; *C.A.*, 121 (1994) 169169q.

1017 Yang, J.-Y., Yang, M.-H. and Lin, T.-H.: Effect of wet decomposition methods on the determination of zinc and selenium in rice leaves and grains using electrophoresis. *Anal. Sci.,* 10 (1994) 439-443; *C.A.*, 121 (1994) 77647r.

1018 Zhang, R., Shi, H. and Ma, Y.: Quantitative determination of ionized calcium and total calcium in human serum by capillary zone electrophoresis with indirect photometric detection. *J. Microcolumn Sep.,* 6 (1994) 217-221; *C.A.*, 121 (1994) 174398t.

See also 89, 138.

### *38b. Anions*

1019 Buchberger, W., Cousins, S.M. and Haddad, P.R.: Optimisation of indirect UV detection in capillary zone electrophoresis of low-molecular-mass anions. *TrAC,* 13 (1994) 313-319.

1020 Göttlein, A.: Advantages of multi-wavelength detection for the analysis of mineral anions with capillary electrophoresis. *Fresenius J. Anal. Chem.,* 349 (1994) 776-778.

1021 Meulemans, A. and Delsenne, F.: Measurement of nitrite and nitrate levels in biological samples by capillary electrophoresis. *J. Chromatogr. B,* 660 (1994) 401-404.

1022 Rhemrev-Boom, M.M.: Determination of anions with capillary electrophoresis and indirect ultraviolet detection. *J. Chromatogr. A,* 680 (1994) 675-684.

See also 89, 143, 150, 943, 1013.

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| MONTH | 1994 | J | F | M | A | M | |
|---|---|---|---|---|---|---|---|
| Journal of Chromatography A | Vols. 683–688 | 689/1<br>689/2<br>690/1<br>690/2 | 691/1 + 2<br>692/1 + 2<br>693/1<br>693/2 | 694/1<br>694/2<br>695/1<br>695/2 | 696/1<br>696/2<br>697/1 + 2<br>698/1 + 2 | 699/1<br>699/2<br>700/1 + 2<br>702/1 + 2 | The publication schedule for further issues will be published later. |
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Edited by **Z. El Rassi**

**Journal of Chromatography Library, Volume 58**

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The book will be of interest to a wide audience, including analytical chemists and biochemists, carbohydrate, glycoprotein and glycolipid chemists, molecular biologists, biotechnologists, etc. It will also be a useful reference work for both the experienced analyst and the newcomer as well as for users of HPLC and HPCE, graduates and postdoctoral students.

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