



ELSEVIER

## Bibliography Section

### Liquid Column Chromatography

#### 1. REVIEWS AND BOOKS

- 1091 Freitag, R. and Vogt, S.: Recovery of biopolymers - the use and advantage of displacement chromatography. *Bioforum Int.*, 1 (1997) 114-118; *C.A.*, 129 (1998) 213629f - a review with 12 refs.
- 1092 Hochstrasser, D.F.: Proteome in perspective. *Clin. Chem. Lab. Med.*, 36 (1998) 825-836.
- 1093 Lopatin, A.A.: (Dialog between a physical chemist and chromatographer on thermodynamics and some other subjects). *Ross. Khim. Zh.*, 42 (1998) 91-101; *C.A.*, 129 (1998) 294150t - a review with 20 refs.
- 1094 Polanuer, B.M.: (The application of analytical chromatography in biotechnology: problems and prospects). *Biotehnologiya*, (1966) 47-57; *C.A.*, 129 (1998) 287385v - a review with 14 refs.
- 1095 Shirota, O. and Ohtsu, Y.: (Semi-microcolumn high-performance liquid chromatography). *Bunseki Kagaku*, 47 (1998) 465-472; *C.A.*, 129 (1998) 213641d - a review with 29 refs.
- 1096 Strube, J., Schmidt-Traub, H. and Schulte, M.: (Design, operation, and economics of chromatographic separations). *Chem.-Ing.-Tech.*, 70 (1998) 1271-1279; *C.A.*, 129 (1998) 277839g - a review with 36 refs.
- 1097 Vailaya, A. and Horváth, C.: Retention in reversed-phase chromatography: partition or adsorption? *J. Chromatogr. A*, 829 (1998) 1-27 - a review with 107 refs.
- 1098 Xu, G. and Zhang, Y.: Advances of chromatography and related techniques in China: a status report. *Am. Lab. (Shelton)*, 30 (1998) 406; *C.A.*, 130 (1999) 32439 - a review with 57 refs.

See also 1111, 1140, 1147, 1159, 1168, 1178, 1187, 1193, 1209, 1213, 1231, 1232, 1235, 1237, 1241, 1243, 1244, 1251, 1257, 1279, 1285, 1391, 1511, 1577, 1582, 1600, 1701, 1859, 1945, 1982, 1983, 1998, 2000, 2004, 2010, 2014, 2117, 2133, 2172, 2179, 2205, 2212, 2218, 2219.

#### 2. FUNDAMENTALS, THEORY AND GENERAL

##### 2a. General

- 1099 Aguillar, M.-I., Clayton, D.J., Holt, P., Kronina, V., Boysen, R.I., Purcell, A.W. and Hearn, M.T.W.: RP-HPLC binding domains of proteins. *Anal. Chem.*, 70 (1998) 5010-5018.

- 1100 Arnold, F.: (Equipment-qualification in chromatography). *GIT Labor-Fachz.*, 42 (1998) 1148-1150; *C.A.*, 130 (1999) 20029.
- 1101 Barwick, V.J. and Ellison, S.L.R.: Estimating measurement uncertainty using a cause and effect and reconciliation approach. Part 2. Measurement uncertainty estimates compared with collaborative trial expectation. *Anal. Commun.*, 35 (1998) 377-383; *C.A.*, 130 (1999) 46703.
- 1102 Chapuzet, E., Mercier, N., Bervoas-Martin, S., Boulanger, B., Chevalier, P., Chiap, P., Grandjean, D., Hubert, P., Lagorce, P., Lallier, M., Laparra, M.C., Laurentie, M. and Nivet, J.C.: (Chromatographic determination methods in biological media. An example of the application of the validation strategy Report of an SFSTP commission). *S.T.P. Pharma Prat.*, 8 (1998) 81-107; *C.A.*, 129 (1998) 186258a.
- 1103 Dahl, D.B., Riley, J.T. and Green, T.K.: Chromatographic separation techniques for undergraduates. *J. Chem. Educ.*, 75 (1998) 1209; *C.A.*, 129 (1998) 330221c.
- 1104 Fatkudinova, S.R. and Solopchenko, G.N.: Digital models of real chromatograms for the estimation of errors in the results of chemical analysis. *J. Anal. Chem.*, 53 (1998) 1004-1010; *C.A.*, 130 (1999) 46854.
- 1105 Guillemin, C.L.: Decreasing the cost of routine chromatographic analyses while fulfilling Good Laboratory Practice requirements is possible. *Process Control Qual.*, 11 (1998) 135-145; *C.A.*, 129 (1998) 339275f.
- 1106 Hansen, E. and Mollerup, J.: Application of the two-film theory to the determination of mass transfer coefficients for bovine serum albumin on anion-exchange columns. *J. Chromatogr. A*, 827 (1998) 259-267.
- 1107 Katsumine, M., Iwaki, K., Matsuda, R. and Hayashi, Y.: Routine check of baseline noise in ion chromatography. *J. Chromatogr. A*, 833 (1999) 97-104.
- 1108 Kele, M. and Guiochon, G.: Repeatability and reproducibility of retention data and band profiles on reversed-phase liquid chromatographic columns. II. Results obtained with Symmetry C<sub>18</sub> columns. *J. Chromatogr. A*, 830 (1999) 55-79.
- 1109 Kele, M. and Guiochon, G.: Repeatability and reproducibility of retention data and band profiles on reversed-phase liquid chromatography columns. I. Experimental protocol. *J. Chromatogr. A*, 830 (1999) 41-54.
- 1110 Lan, K. and Jorgenson, J.W.: Automated measurement of peak widths for the determination of peak capacity in complex chromatograms. *Anal. Chem.*, 71 (1999) 709-714.
- 1111 Liang, H. and Lin, B.-C.: Frameworks of separation theories from two separate worlds: dynamics and thermodynamics. *J. Chromatogr. A*, 828 (1998) 3-17 - a review with 52 refs.

- 1112 Ma, M. and Cantwell, F.F.: Solvent microextraction with simultaneous back-extraction for sample cleanup and preconcentration: preconcentration in a single microdrop. *Anal. Chem.*, 71 (1999) 388-393.
- 1113 MacNair, J.E., Patel, K.D. and Jorgenson, J.W.: Ultrahigh pressure reversed-phase capillary liquid chromatography: isocratic and gradient elution using columns packed with 1.0  $\mu$ m particles. *Anal. Chem.*, 71 (1999) 700-708.
- 1114 McGuffin, V.L., Krouskop, P.E. and Wu, P.: Stochastic simulation of the partition mechanism under diffusion-limited conditions in chromatography and electrochromatography. *J. Chromatogr. A*, 828 (1998) 37-50.
- 1115 Miyabe, K. and Guiuchon, G.: Analysis of surface diffusion phenomena in reversed-phase liquid chromatography. *Anal. Chem.*, 71 (1999) 889-896.
- 1116 Miyabe, K. and Guiuchon, G.: Peak tailing and column radial heterogeneity in linear chromatography. *J. Chromatogr. A*, 830 (1999) 263-274.
- 1117 Nelson, M.D. and Dolan, J.W.: Gradient background peaks - a case study. *LC-GC Int.*, 11 (1998) 764-769.
- 1118 Nelson, M.D. and Dolan, J.W.: UV detector noise. *LC-GC Int.*, 12 (1999) 64-70.
- 1119 Rivera, S.L. and Klein, E.J.: Automatic classification of chromatographic peaks. In: Am. Control Conf., Proc., 1997, American Automatic Control Council, Evanston, 1997, pp. 3262-3266; C.A., 129 (1998) 213660j.
- 1120 Robbins, W.K.: Quantitative measurement of mass and aromaticity distributions for heavy distillates 1. Capabilities of the HPLC-2 system. *J. Chromatogr. Sci.*, 36 (1998) 457-466.
- 1121 Rudakov, O.B.: Relative permittivity as a measure of the polarity of binary mobile phases used in high-performance liquid chromatography. *J. Anal. Chem.*, 53 (1998) 835-839; C.A., 129 (1998) 297683e.
- 1122 Seibert, D.S. and Poole, C.F.: A general model for the optimization of sample processing conditions by solid-phase extraction applied to the isolation of estrogens from urine. *J. High Resolut. Chromatogr.*, 21 (1998) 481-490.
- 1123 Smith, M.S. and Guiuchon, G.: Theoretical analysis of the behavior of an heterogeneously packed chromatographic column. *J. Chromatogr. A*, 827 (1998) 241-257.
- 1124 Smith, R.M., Burgess, R.J., Chienthavorn, O. and Stuttard, J.R.: Superheated water: a new look at chromatographic eluents for reversed-phase liquid chromatography. *LC-GC Int.*, 12 (1999) 30-36.
- 1125 Snyder, L.R. and Dolan, J.W.: Systematic approaches to HPLC method development for reversed-phase separation. *Chem. Anal. (Warsaw)*, 43 (1998) 495-512; C.A., 129 (1998) 285350f.
- 1126 Walkenhorst, R.: (Triple detection in gel permeation chromatography). *GIT Labor-Fachz.*, 42 (1998) 1132-1137; C.A., 130 (1999) 20028.
- 1127 Wolcott, R.G. and Dolan, J.W.: Column temperature effects in gradient elution. *LC-GC Int.*, 12 (1999) 14-18.
- 1128 Yu, T., Liang, C.S. and Luo, S.-K.: Correlation of countercurrent extraction with countercurrent chromatography in aqueous matrices. An improved model. *Anal. Chem.*, 71 (1999) 507-513.
- 1129 Yuan, Q.S., Rosenfeld, A., Root, T.W., Klingenberg, D.J. and Lightfoot, E.N.: Flow distribution in chromatographic columns. *J. Chromatogr. A*, 831 (1999) 149-165.
- 1130 Yun, T., Smith, M.S. and Guiuchon, G.: Theoretical analysis of the behavior of a centrally injected band in a homogeneous chromatographic column. *J. Chromatogr. A*, 828 (1998) 19-35.
- 1131 Zenkevich, I.G.: Nontraditional criteria for the identification of organic compounds by chromatography and chromatography-mass spectrometry. *J. Anal. Chem.*, 53 (1998) 725-731; C.A., 129 (1998) 269729f.
- 1132 Zhang, Z. and McElvain, J.S.: Optimizing spectroscopic signal-to-noise ratio in analysis of data collected by a chromatographic/spectroscopic system. *Anal. Chem.*, 71 (1999) 39-45.
- For additional information see C.A.:  
 129 (1998) 197331v, 213834w, 281079b;  
 130 (1999) 46838.
- See also 1094, 1145, 1147, 1162, 1166, 1185, 1215, 1216, 1219, 1227, 1339, 2007, 2009.
- 2b. Thermodynamics and theoretical relationships*
- 1133 Czerhati, T., Kosa, A. and Balogh, S.: Comparison of partial least-square method and canonical correlation analysis in a quantitative structure-retention relationship study. *J. Biochem. Biophys. Methods*, 36 (1998) 131-141; C.A., 129 (1998) 119734q.
- 1134 Dondi, F., Contado, C., Blo, G. and Garcia Martin, S.: SPLITT cell separation of polydisperse suspended particles of environmental interest. *Chromatographia*, 48 (1998) 643-654.
- 1135 Iyer, H., Tapper, S., Lester, P., Wolk, B. and van Reis, R.: Use of the steric mass action model in ion-exchange chromatographic process development. *J. Chromatogr. A*, 832 (1999) 1-9.
- 1136 Jandera, P., Komers, D., Andel, L. and Prokes, L.: Fitting competitive adsorption isotherms to the distribution data in normal phase systems with binary mobile phases. *J. Chromatogr. A*, 831 (1999) 131-148.
- 1137 Kiridena, W. and Poole, C.F.: Structure-driven retention model for optimization of ternary solvent systems in reversed-phase liquid chromatography. *Chromatographia*, 48 (1998) 607-614.
- 1138 LePree, J.M. and Cancino, M.E.: Application of the phenomenological model to retention in reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 829 (1998) 41-63.
- 1139 Madden, J.E. and Haddad, P.R.: Critical comparison of retention models for optimisation of the separation of anions in ion chromatography. I. Non-suppressed anion chromatography using phthalate eluents and three different stationary phases. *J. Chromatogr. A*, 829 (1998) 65-80.
- 1140 Miyabe, K.: (Analysis on mass-transfer phenomena in reversed-phase liquid chromatography). *Bunseki Kagaku*, 47 (1998) 769-782; C.A., 130 (1999) 20023 - a review with 38 refs.
- 1141 Miyabe, K. and Guiuchon, G.: Estimation of the column radial heterogeneity from an analysis of the characteristics of tailing peaks in linear chromatography. *J. Chromatogr. A*, 830 (1999) 29-39.
- 1142 Mollerup, J. and Hansen, E.: Overall mass-transfer coefficients in non-linear chromatography. *J. Chromatogr. A*, 827 (1998) 235-239.

1143 Péter, A., Török, G. and Fülop, F.: Effect of temperature on retention of cyclic  $\beta$ -amino acid enantiomers on a chiral crown ether stationary phase. *J. Chromatogr. Sci.*, 36 (1998) 311-317.

1144 Peters, M. and Davis, J.M.: Statistical-overlap theory for column switching. *Am. Lab. (Shelton)*, 30 (1998) 32-38; C.A., 130 (1999) 10125.

See also 1093, 1115, 1131, 1132, 1148, 1158, 1192, 1208, 1211, 1267, 1282, 1465, 1587, 1592, 1847.

*2c. Relationship between structure and chromatographic behaviour*

1145 Janjić, T.J., Vučković, S. and Šešep, M.B.: The  $\log k_D$  vs.  $\pi_m^*$  linearity rule as a method of studying RPP mobile phase scales. *J. Serb. Chem. Soc.*, 63 (1998) 519-527; C.A., 129 (1998) 169872d.

1146 Kaliszak, R., Matkowskański, M., Haber, D., Nasal, A., Czechak, T., Forgacs, E., Gadzala-Kopciuch, R.M. and Buszewski, B.: Application of quantitative structure-retention relationships (QSRR) to elucidate molecular mechanism of retention on the new stationary phases for high-performance liquid chromatography. *Chem. Anal. (Warsaw)*, 43 (1998) 547-559; C.A., 129 (1998) 285383u.

1147 Oka, N.: (Outline of chromatography). In: Harada, K. and Oka, H. (Editors), *LC/MS*. Kodansha, Tokyo, 1996, pp. 7-22; C.A., 130 (1999) 46841 - a review with 7 refs.

1148 Rosés, M., Bolliet, D. and Poole, C.F.: Comparison of solute descriptors for predicting retention of ionic compounds (phenols) in reversed-phase liquid chromatography using the solvation parameter model. *J. Chromatogr. A*, 829 (1998) 29-40.

See also 11099, 11106, 1221, 1362, 1365, 1389, 1393, 2202, 2205.

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

1149 Bartkowiak, A. and Hunkeler, D.: Copolymer composition and molecular weight characterization by liquid chromatography under limiting conditions. *Polym. Mater. Sci. Eng.*, 78 (1998) 59-60; C.A., 129 (1998) 276605r.

1150 Berthod, A., Carda-Broch, S. and Garcia-Alvarez-Cogue, M.C.: Hydrophobicity of ionizable compounds. A theoretical study and measurements of diuretic octanol-water partition coefficients by countercurrent chromatography. *Anal. Chem.*, 71 (1999) 879-888.

1151 Hirayangi, S.: (Round robin test of average molecular weight of polymers by size exclusion chromatography). *Bunseki*, (1998) 795-797; C.A., 130 (1999) 25534.

1152 Torrens, F., Sánchez-Marín, J. and Nebot-Gil, I.: Universal model for the calculation of all organic solvent-water partition coefficients. *J. Chromatogr. A*, 827 (1998) 345-358.

See also 1220, 1221, 1303, 1374, 1988.

### 3. GENERAL TECHNIQUES

#### 3a. Apparatus and accessories

1153 Kharitonov, O.V., Chuveleva, E.A., Gelis, V.M. and Firsova, L.A.: Recovery of  $^{151}\text{Sm}$  by displacement complexing chromatography. II. Recovery of  $^{151}\text{Sm}$  from nuclear fuel processing solutions. *Radiochemistry (Moscow)*, 40 (1998) 137-140; C.A., 129 (1998) 167061q.

1154 Yokouchi, Y., Ohno, Y., Nakagomi, K., Tanimura, T. and Kabasawa, Y.: (A device for liquid-solid fractional extraction). *Chromatography*, 19, No. 2 (1998) 96-97; C.A., 129 (1998) 333219X.

For additional information see C.A.:

129 (1998) 163243c, 169855a, 197303n, 211014c, 246971x, 247170q, 254092u, 254150m, 254152p, 262358a, 310178r, 332857p, 350388r; 130 (1999) 46834, 46910.

See also 1120.

#### 3b. Detectors and detection reagents

1155 Alexander, J.N.: Evaporative light scattering detection for microcolumn liquid chromatography. *J. Microcolumn Sep.*, 10 (1998) 491-502; C.A., 129 (1998) 285369u.

1156 Bouman, M.A.E., Allender, C.J., Brain, K.R. and Heard, C.M.: A high-throughput screening technique employing molecularly imprinted polymers as biomimetic selectors. *Methodol. Surv. Bianal. Drugs*, 25 (1998) 37-43; C.A., 129 (1998) 310310c.

1157 Caliamanis, A., McCormick, M.J. and Carpenter, P.D.: Conductometric detection of anions of weak acids in chemically suppressed ion chromatography: critical point concentrations. *Anal. Chem.*, 71 (1999) 741-746.

1158 Chen, E.C.M., Carr, S., Wentworth, W.E. and Chen, E.S.D.: Modified kinetic model of the electron-capture detector. Molecular electron affinities and electron collection modes. *J. Chromatogr. A*, 827 (1998) 91-104.

1159 Chen, X.: (Study and application of tris(2,2'-bipyridine)-ruthenium electrochemiluminescence in flow injection analysis and high performance liquid chromatography). *Sepu*, 16 (1998) 301-305; C.A., 129 (1998) 197326x - a review with 36 refs.

1160 Dapkevičius, A., van Beek, T.A., Niederländer, H.A.G. and de Groot, A.: On-line detection of antioxidative activity in high-performance liquid chromatography eluates by chemiluminescence. *Anal. Chem.*, 71 (1999) 736-740.

1161 Enami, T. and Nagae, N.: UV absorption detection with a packed flow cell in microcolumn liquid chromatography. *Analisis*, 26 (1998) M31-M33; C.A., 129 (1998) 193771r.

1162 French, A.G., Martínez Galera, M., García, M.D. Gil, Martínez Vidal, J.L., de la Peña, A., Muñoz, and Salinas, F.: Cross-sections of spectrochromatograms for the resolution of overlapping peaks in diode-array high-performance liquid chromatography. *Talanta*, 46 (1998) 1329-1340; C.A., 129 (1998) 169901n.

1163 Ikegawa, S. and Goto, J.: (Development of detection oriented derivatization in liquid chromatography/mass spectrometry). *Chromatography*, 19 (1998) 146-147; C.A., 130 (1999) 22440.

- 1164 Situmorang, M., Lee, M.T.B., Witzeman, K. and Heineman, W.R.: Liquid chromatography with electrochemical detection (LC-EC): an experiment using 4-aminophenol. *J. Chem. Educ.*, 75 (1998) 1035-1038; C.A., 129 (1998) 188840h.
- 1165 Terashima, C., Tanaka, H. and Furuno, M.: Using an electrochemical detector with a carbon interdigitated-array microelectrode for capillary-column liquid chromatography. *J. Chromatogr. A*, 828 (1998) 113-120.
- 1166 Yang, L., Xu, G., Zhang, Y. and Lu, P.: (Application of fast Fourier transform method for noise smoothing and determination of weak chromatographic signal). *Sepu*, 16 (1998) 386-389; C.A., 130 (1999) 32451.
- 1167 Yoneda, K. and Tajima, H.: (Sensor for liquid chromatographic system.) *Jpn. Kokai Tokkyo Koho JP 10 253,529 [98 23,529]* (Cl. G01N21/27), 25 Sep. 1998, Appl. 97/69,153, 5 Mar. 1997; 5 pp.; C.A., 129 (1998) 285407e.
- 1168 Zou, J. and Wang, X.: (Bis(2,4,6-trichlorophenyl) oxalate chemiluminescence reaction and its applications in analytical chemistry). *Nanjing Huagong Daxue Xuebao*, 19 (1997) 107-116; C.A., 129 (1998) 197321s - a review with 69 refs.
- For additional information see C.A.:  
129 (1998) 297730t, 310126x, 310127y.
- See also 1126, 1234, 1373, 1402, 1464, 1485, 1506, 1811, 1847, 1894, 1898, 1949, 1952, 2016, 2033, 2051, 2176, 2223, 2227, 2237, 2241, 2263, 2272, 2273, 2275.
- 3c. *Sorbents and columns, packing procedures*
- 1169 Akcay, H. and Kilinc, S.: Preparation of a chromatographic solid support on the basic of perlite, and separation of uranium on a tributyl-phosphate-loaded perlite column. *Sep. Sci. Technol.*, 33 (1998) 2025-2037; C.A., 129 (1998) 347631j.
- 1170 Berek, D.: Interactive properties of polystyrene/divinylbenzene based commercial SEC columns. *Polym. Mater. Sci. Eng.*, 78 (1998) 63; C.A., 129 (1998) 276606s.
- 1171 Bereznitski, Y. and Jaroniec, M.: Characterization of silica-based octyl phases of different bonding density. Part I. Thermal stability studies. *J. Chromatogr. A*, 828 (1998) 51-58.
- 1172 Bereznitski, Y., Jaroniec, M. and Gangoda, M.E.: Characterization of silica-based octyl phases of different bonding density. Part II. Studies of surface properties and chromatographic selectivity. *J. Chromatogr. A*, 828 (1998) 59-73.
- 1173 Bidlingmaier, B., Unger, K.K. and von Doehren, N.: Comparative study on the column performance of microparticulate 5-μm C<sub>18</sub>-bonded and monolithic C<sub>18</sub>-bonded reversed-phase columns in high-performance liquid chromatography. *J. Chromatogr. A*, 832 (1999) 11-16.
- 1174 Brooks, D.E., Muller, W. and Hritcu, D.: Tethered polymer macromolecule-excluding surface, its synthesis and use. *PCT Int. Appl. WO 98 46,351* (Cl. B01J20/32), 22 Oct. 1998, CA Appl. 2,202,424, 11 Apr. 1997; 49 pp.; C.A., 129 (1998) 331504j.
- 1175 Buszewski, B., Gadzala-Kopciuch, R., Kaliszak, R., Markuszewski, M., Matyska, M.T. and Pesek, J.J.: Polyfunctional chemically bonded stationary phase for reversed phase high-performance liquid chromatography. *Chromatographia*, 48 (1998) 615-622.
- 1176 Claessens, H.A., van Straten, M.A., Cramers, C.A., Jezierska, M. and Buszewski, B.: Comparative study of test methods for reversed-phase columns for high-performance liquid chromatography. *J. Chromatogr. A*, 826 (1998) 135-156.
- 1177 Crescenzi, V., Masci, G., Fonsi, M. and Casati, G.: Molecularly imprinted polymers binding clenbuterol. *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)*, 39 (1998) 699-700; C.A., 129 (1998) 193790w.
- 1178 Dingenen, J.: Columns and packing methods. *Analusis*, 26 (1998) M18-M32; C.A., 130 (1999) 37944 - a review without refs.
- 1179 Fairbank, R.W.P. and Wirth, M.J.: Role of surface-adsorbed water in the horizontal polymerization of trichlorosilanes. *J. Chromatogr. A*, 830 (1999) 285-291.
- 1180 Feng, Y.-Q., Gong, Y.-H. and Da, S.-L.: (Preparation and evaluation ofaza crown ether bonded silica for high-performance liquid chromatography). *GaoDeng Xuexiao Huaxue Xuebao*, 19 (1998) 720-722; C.A., 129 (1998) 169885k.
- 1181 Ferroukh, O., Guermouche, S., Guermouche, M.H., Berdagué, P., Bayle, J.P. and Lafontaine, E.: New chemically bonded liquid crystal for high-performance liquid chromatography: synthesis, characterization and chromatographic behaviour. *Chromatographia*, 48 (1998) 823-829.
- 1182 Gebauer, S., Fribe, S., Gübitz, G. and Krauss, G.-J.: High performance liquid chromatography on calixarene-bonded silica gels. II. Separations of regio- and stereoisomers on p-tert.-butyl-calix(n)arene phases. *J. Chromatogr. Sci.*, 36 (1998) 383-387.
- 1183 Gustavsson, P.-E. and Larsson, P.-O.: Continuous superporous agarose beds for chromatography and electrophoresis. *J. Chromatogr. A*, 832 (1999) 29-39.
- 1184 Gustavsson, P.-E., Axelsson, A. and Larsson, P.-O.: Superporous agarose beads as a hydrophobic interaction chromatography support. *J. Chromatogr. A*, 830 (1999) 275-284.
- 1185 Ho, M. and Pemberton, J.E.: Alkyl chain conformation of octadecylsilane stationary phases by Raman spectroscopy. 1. Temperature dependence. *Anal. Chem.*, 70 (1998) 4915-4920.
- 1186 Hosoya, K., Yoshizako, K., Sasaki, H., Kimata, K. and Tanaka, N.: Molecular recognition towards coplanar polychlorinated biphenyls based on the porogen imprinting effects of xylenes. *J. Chromatogr. A*, 828 (1998) 91-94.
- 1187 Jackson, P.T. and Carr, P.W.: Improving reversed-phase liquid chromatography. *CHEMTECH*, 28 (1998) 29-37; C.A., 129 (1998) 325502r - a review with 31 refs.
- 1188 Jiang, W. and Irgum, K.: Covalently bonded polymeric zwitterionic stationary phase for simultaneous separation of inorganic cations and anions. *Anal. Chem.*, 71 (1999) 333-344.
- 1189 Kobayashi, S., Tanaka, I., Shirota, O., Kanda, T. and Ohtsu, Y.: Synthesis and characterization of a polymer-coated C<sub>18</sub> stationary phase with high carbon content for liquid chromatography. *J. Chromatogr. A*, 828 (1998) 75-81.
- 1190 Li, X., Li, C.-X. and He, B.-L.: (Preparation and application of magnetic affinity adsorbent based on magnetic cellulose bead). *GaoDeng Xuexiao Huaxue Xuebao*, 19 (1998) 994-999; C.A., 129 (1998) 213664p.
- 1191 Li, Y.-M., Liao, J.-L., Zhang, R., Henriksson, H. and Hjertén, S.: Continuous beds for microchromatography: chromatofocusing and anion exchange chromatography. *Anal. Biochem.*, 267 (1999) 121-124.

- 1192 Lopez-Grio, S., Baeza-Baeza, J.J. and Garcia-Alvarez-Coque, M.C.: Influence of the addition of modifiers on solute-micellar interaction in hybrid micellar liquid chromatography. *Chromatographia*, 48 (1998) 655-663.
- 1193 Luo, Y., Guo, Z., Li, T. and Shen, H.: (Development of application of liquid-crystalline molecules in analytical chemistry). *Fenxi Huaxue*, 26 (1998) 891-897; C.A., 129 (1998) 197323u - a review with 68 refs.
- 1194 Mifune, M., Iwado, A., Mori, Y., Onoda, M., Kanai, T., Saito, Y. and Hagiwara, J.: (Development of new stationary phase for HPLC using  $\pi$ -electron interaction - silica gel modified with metal-porphyrins). *Chromatography*, 19, No. 2 (1998) 124-127; C.A., 129 (1998) 339293k.
- 1195 Mifune, M., Shimomura, Y., Saito, Y., Mori, Y., Onoda, M., Iwado, A., Motohashi, N. and Hagiwara, J.: High-performance liquid chromatography stationary phases based on  $\pi$ - $\pi$  electron interaction. Aminopropyl silica gels modified with metal phthalocyanines. *Bull. Chem. Soc. Jpn.*, 71 (1998) 1825-1829; C.A., 129 (1998) 225100q.
- 1196 Minakuchi, H., Matsuzuka, M., Nakamichi, K., Sugita, N. and Tanaka, N.: Performance of an octadecylsilylated continuous porous silica column in polypeptide separations. *J. Chromatogr. A*, 828 (1998) 83-90.
- 1197 Perek, J.J., Matuska, M.T. and Takhar, S.: Synthesis and characterization of long chain alkyl stationary phases on a silica hydride surface. *Chromatographia*, 48 (1998) 631-636.
- 1198 Pietraszkiewicz, M., Pietraszkiewicz, O. and Kozdraj, M.: Calix[4]resorcinarenes as dynamic coatings for modified stationary RP-18 phase for HPLC. *Pol. J. Chem.*, 72 (1998) 1963-1970; C.A., 129 (1998) 254129m.
- 1199 Pohl, C., Jagodzinski, J. and Saini, C.: Hydrolytically stable resins for use in anion-exchange chromatography. *PCT Int. Appl. WO 98 39,367* (Cl. C08F8/30), 11 Sep. 1998; US Appl. 805,858, 3 Mar. 1997; 31 p.; C.A., 129 (1998) 239244b.
- 1200 Sanchez, R., Riemont, J. and Tavares, M.R.B.: Structural characterization of the polymeric lattice of furfuraldehyde resins. *Polym. Test.*, 17 (1998) 395-401; C.A., 129 (1998) 344009b.
- 1201 Shibukawa, M., Aoyagi, K., Sakamoto, R. and Oguma, K.: Liquid chromatography and differential scanning calorimetry studies on the states of water in hydrophilic polymer gel packings in relation to retention selectivity. *J. Chromatogr. A*, 832 (1999) 17-27.
- 1202 Shukla, A.A., Bae, S.S., Moore, J.A. and Cramer, S.M.: Structural characteristics of low-molecular-mass displacers for cation-exchange chromatography. II. Role of the stationary phase. *J. Chromatogr. A*, 827 (1998) 295-310.
- 1203 Tallarek, U., Bayer, E., van Dusschoten, D., Scheenen, T., van As, H., Guiuchon, G. and Neue, U.D.: Dynamic NMR microscopy of chromatographic columns. *AIChE J.*, 44 (1998) 1962-1975; C.A., 129 (1998) 190895y.
- 1204 Yang, R., Jiang, S. and Chen, L.: (Phenylvinylmethylpolysiloxane-coated high performance liquid chromatographic stationary phases). *Sepu*, 16 (1998) 331-333; C.A., 129 (1998) 197352c.
- 1205 Zobel, H.: Technical note: the use of phenols in a chromatographic evaluation of reversed-phase HPLC columns. *LC-GC Int.*, 12 (1999) 37-40.
- For additional information see C.A.: 129 (1998) 197297p, 211058v, 211060q, 211092b, 242209z.
- 247243r, 285409g, 291648a, 310139d, 310179s, 325547j, 350387q, 350392n; 130 (1999) 40196, 40583.
- See also 1108, 1109, 1123, 1134, 1141, 1212, 1225, 1240, 1249, 1252, 1253, 1255, 1256, 1258, 1263, 1264, 1265, 1266, 1268, 1276, 1278, 1285, 1293, 1305, 1324, 1398, 1479, 1486, 1503, 1516, 1590, 1591, 1838, 1843, 1958, 1980, 1991, 2039, 2107, 2226, 2234.
- 3d. Quantitative analysis
- See 1175.
- 3e. Preparative scale chromatography
- 1206 Chang, C. and Lenhoff, A.M.: Comparison of protein adsorption isotherms and uptake rates in preparative cation-exchange materials. *J. Chromatogr. A*, 827 (1998) 281-293.
- 1207 Eggert, M., Baltes, T., Garret-Flaudy, F. and Freitag, R.: Affinity precipitation - an alternative to fluidized bed adsorption? *J. Chromatogr. A*, 827 (1998) 269-280.
- 1208 Heuer, C., Küsters, E., Plattner, T. and Seidel-Morgenstern, A.: Design of the simulated moving bed process based on adsorption isotherm measurement using a perturbation method. *J. Chromatogr. A*, 827 (1998) 175-191.
- 1209 Juza, M., Mazzotti, M. and Morbidelli, M.: Simulated moving-bed technology. Analytical separations on a large scale. *G/T Spez. Chromatogr.*, 18 (1998) 70-76; C.A., 129 (1998) 296697u - a review with 8 refs.
- 1210 Katti, A.M. and Jagland, P.: Development and optimization of industrial scale chromatography for use in manufacturing. *Analisis*, 26 (1998) M38-M45; C.A., 130 (1999) 15270.
- 1211 Migliorini, C., Mazzotti, M. and Morbidelli, M.: Continuous chromatographic separation through simulated moving beds under linear and nonlinear conditions. *J. Chromatogr. A*, 827 (1998) 161-173.
- 1212 Orihuela, C., Fronek, R., Miller, L., Honda, D. and Murphy, J.: Unique dynamic axial compression packing system. *J. Chromatogr. A*, 827 (1998) 193-196.
- 1213 Pynnonen, B.: Simulated moving bed processing: escape from the high-cost box. *J. Chromatogr. A*, 827 (1998) 143-160 - a review with 62 refs.
- For additional information see C.A.: 130 (1999) 46822.
- See also 1106, 1123, 1142, 1202, 1220, 1223, 1225, 1228, 1273, 1532, 1534, 1539, 1553, 1560, 1582, 1583, 1589, 1620, 1627, 1633, 1661, 1712, 1770, 1813, 1824, 1921, 2002, 2008, 2011, 2192, 2218.
- 3f. Programmed temperature, pressure, vapors, gradients
- 1214 Guenzi, A. and Doppler, D.: Column-switching with heat-cutting: a useful tool to achieve selectivity in biofluids for difficult-to-analyze compounds. *Methodol. Surv. Bioanal. Drugs, 25(Drug Development Assay Approaches)* (1998) 155-18; C.A., 129 (1998) 325663u.

- 1215 López Grío, S., Baeza Baeza, J.J., García Alvarez-Coque, M.C.: Modelling of the elution behaviour in hybrid micellar eluents with different organic modifiers. *Anal. Chim. Acta.*, 381 (1999) 275-285.

For additional information see C.A.:  
129 (1998) 197337b.

See also 1201, 1814.

#### 4. SPECIAL TECHNIQUES

##### 4a. Automation

- 1216 Brown, S.G., Olivares, M.J. and Adams, B.E.: The automated HPLC mobile phase preparation and electronic notebooking system. *Proc. - NOBCChE*, 24 (1997) 143-152; C.A., 129 (1998) 225091n.

- 1217 Gansen, M.: (Chromatography information management system (CIMS). More as chromatographic data systems (CDS) and beyond laboratory information management systems). *Labor-Praxis*, 22 (1998) 39-43; C.A., 129 (1998) 254108d.

- 1218 Hochberger, A.: (Automated method development in bio-chromatography). *LaborPraxis*, 22 (1998) 56-58; C.A., 129 (1998) 241985n.

See also 1229, 1496, 1584, 1946, 2278.

##### 4b. Computerization and modelling

- 1219 Cai, C. and de Harrington, P.: Different discrete wavelet transforms applied to denoising analytical data. *J. Chem. Inf. Comput. Sci.*, 38 (1998) 1161-1170; C.A., 129 (1998) 325505u.

- 1220 Dunnebier, G., Weirich, I. and Klatt, K.-U.: Computationally efficient dynamic modelling and simulation of simulated moving bed chromatographic processes with linear isotherms. *Chem. Eng. Sci.*, 53 (1998) 2537-2546; C.A., 129 (1998) 204571d.

- 1221 Hrobonova, K., Hatrik, S., Lehota, J. and Cizmarik, J.: Study of local anaesthetics, part 146: Correlation between local anaesthesia, coded structural information, and chromatographic properties for homologous series of alkoxy-substituted esters of phenylcarbamic acid using a neural network. *Pharmazie*, 54 (1999) 44-47.

- 1222 Johansson, P., Wikenstedt, B. and McDowall, R.D.: Retrospective validation of a chromatography data system. *LC-GC Int.*, 12 (1999) 88-102.

- 1223 Lin, W.-B., Wang, F.-S. and Lee, W.-C.: Model simulation and optimization in preparative liquid chromatography using a combination of perturbation and modified collation methods. *Ind. Eng. Chem. Res.*, 37 (1998) 4399-4407. C.A., 129 (1998) 262132x.

- 1224 McDowall, R.D.: Time on your hands? *LC-GC Int.*, 11 (1998) 770-775.

- 1225 Meyers, J.J. and Liapis, A.I.: Network modeling of the intraparticle convection and diffusion of molecules in porous particles packed in a chromatographic column. *J. Chromatogr. A*, 827 (1998) 197-213.

- 1226 Ouchi, G.I.: The universal serial bus. *LC-GC Int.*, 11 (1998) 786-789.

- 1227 Shao, X., Cai, W. and Sun, P.: Determination of the component number  $n$  overlapping multicomponent chromatogram using wavelet transform. *Chemom. Intell. Lab. Syst.*, 43 (1998) 147-155; C.A., 129 (1998) 350246t.

- 1228 Strube, J. and Schmidt-Traub, H.: Dynamic simulation of simulated-moving-bed chromatographic processes. *Comput. Chem. Eng.*, 22 (1998) 1309-1317; C.A., 129 (1998) 218586z.

- 1229 Vest Nielsen, N.-P., Smedsgaard, J. and Frisvad, J.C.: Full second-order chromatographic/spectrometric data matrices for automated sample identification and component analysis by non-data-reducing image analysis. *Anal. Chem.*, 71 (1999) 727-735.

For additional information see C.A.:  
129 (1998) 269725b.

See also 1104, 1110, 1114, 1115, 1128, 1131, 1132, 1135, 1143, 1157, 1215, 1217, 1273, 1363, 1573, 1814, 2262.

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

- 1230 Bartle, K.D., Batchelder, D.N., Cooper, S., Myers, P., Robson, M.M. and Ruddick, A.: Prospects for Raman spectroscopic detection in microseparation. *LC-GC Int.*, 12 (1999) 105-107.

- 1231 Cappiello, A. and Farniglini, G.: Capillary-scale particle-beam liquid chromatography/mass spectrometry interface: can electron ionization sustain the competition. *J. Am. Soc. Mass Spectrom.*, 9 (1998) 993-1001; C.A., 129 (1998) 297681c - a review with 16 refs.

- 1232 Donais, M.K.: How to interface a liquid chromatograph to an inductively coupled plasma-mass spectrometer for elemental speciation studies. *Spectroscopy (Eugene)*, 13 (1998) 30-35; C.A., 129 (1998) 339272c - a review with 11 refs.

- 1233 Ducret, A., Bartone, N., Haynes, P.A., Blanchard, A. and Aebersold, R.: A simplified gradient solvent delivery system for capillary liquid chromatography - electrospray ionization mass spectrometry. *Anal. Biochem.*, 265 (1998) 129-138.

- 1234 Dzyabchenko, A.A., Proskurnin, M.A., Abroskin, A.G. and Chashchikhin, D.V.: Conjunction of thermal lens spectrometry and high-performance liquid chromatography. Approach to data treatment. *J. Chromatogr. A*, 827 (1998) 13-20.

- 1235 Gilbert, J.D., McLoughlin, D.A. and Olah, T.V.: The use LC-MS-MS for multiple component pharmacokinetic studies in support of drug discovery. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 235-245; C.A., 129 (1998) 310233e - a review with 8 refs.

- 1236 Guetens, G., de Boeck, G., van Cauwenbergh, K., de Gruijn, E.A. and Tjaden, U.R.: Hyphenated analytical techniques in cancer research. *LC-GC Int.*, 12 (1999) 115-120.

- 1237 Harada, K.: (Introduction and guideline for liquid chromatography and mass spectrometry). In: Harada K. and Oka H. (Editors), *LC/MS*, Kodansha, Tokyo, 1966, pp. 1-6, C.A., 130 (1999) 46840 - a review without refs.

- 1238 Larsen, E.H.: Method optimization and quality assurance in speciation analysis using high performance liquid chromatography with detection by inductively coupled plasma mass spectrometry. *Spectrochim. Acta, Part B*, 53B (1998) 253-265; C.A., 129 (1998) 157746c.

- 1239 Lecchi, P. and Abramson, F.P.: Analysis of biopolymers by size-exclusion chromatography-mass spectrometry. *J. Chromatogr. A*, 828 (1998) 509-513.
- 1240 Moore, R.E., Licklider, L., Schumann, D. and Lee, T.D.: A microscale electrospray interface incorporating a monolithic, poly(styrene-divinylbenzene) support for on-line liquid chromatography/tandem mass spectrometry analysis of peptides and proteins. *Anal. Chem.*, 70 (1998) 4879-4884.
- 1241 Oka, N. and Harada, K.: (High speed countercurrent chromatography and mass spectrometry). In: Harada, K. and Oka, H. (Editors), *LC/MS*, Kodansha, Tokyo, 1996, pp. 209-224; C.A., 130 (1999) 46843 - a review with 9 refs.
- 1242 Sakairi, M.: Combination of chromatography and quantitative analysis method. In: Harada, K. and Oka, H. (Editors), *LC/MS*, Kodansha, Tokyo, 1996, pp. 57-86; C.A., 130 (1999) 46696 - a review without refs.
- 1243 Suzuki, K.T.: Hyphenated techniques as tools for speciating biological metals: metallothionein and metal-binding proteins. *Analisis*, 26 (1998) M57-M61; C.A., 130 (1999) 22330 - a review with 12 refs.
- 1244 Torto, N., Laurell, T., Gorton, L. and Marko-Varga, G.: Recent trends in the application of microdialysis in bioprocesses. *Anal. Chim. Acta*, 379 (1999) 281-305 - a review with 100 refs.
- 1245 Wang, H. and Callahan, P.M.: Adsorption studies of azo dyes as resonance Raman spectroscopic probes at solid-liquid interfaces. *J. Chromatogr. A*, 828 (1998) 121-134.
- 1246 Wilson, I.D., Lindon, J.C. and Nicholson, J.K.: Liquid chromatography directly and jointly combined with nuclear magnetic resonance spectroscopy and mass spectrometry. *LC-GC*, 16 (1998) 842-852; C.A., 129 (1998) 269732b.
- 1247 Zybin, A., Schaldach, G., Berndt, H. and Niemax, K.: Metal speciation in the ppt range by HPLC and iodine laser atomic absorption spectrometry in a flame. *Anal. Chem.*, 70 (1998) 5093-5096.
- See also 1101, 1131, 1163, 1229, 1288, 1296, 1309, 1315, 1318, 1325, 1331, 1334, 1340, 1364, 1400, 1403, 1427, 1428, 1429, 1444, 1450, 1451, 1455, 1463, 1466, 1470, 1487, 1508, 1529, 1538, 1541, 1546, 1561, 1564, 1578, 1587, 1593, 1630, 1635, 1645, 1650, 1651, 1657, 1678, 1691, 1707, 1809, 1812, 1829, 1832, 1844, 1848, 1851, 1853, 1856, 1858, 1862, 1864, 1890, 1904, 1909, 1914, 1916, 1943, 1945, 1947, 1953, 1956, 1969, 1973, 1976, 1995, 1999, 2001, 2006, 2024, 2028, 2029, 2036, 2037, 2045, 2048, 2050, 2061, 2067, 2083, 2084, 2088, 2094, 2099, 2100, 2125, 2131, 2135, 2141, 2144, 2150, 2153, 2154, 2157, 2158, 2160, 2163, 2166, 2167, 2172, 2173, 2174, 2180, 2194, 2199, 2200, 2221, 2227, 2231, 2236, 2244, 2248, 2259, 2261, 2276.
- 1249 Di, Z., Chen, G., Lei, J., Li, R. and Li, H.: (Synthesis of metal chelate affinity chromatographic medium and studies of chromatographic characteristics). *Separation Purif. Technol.*, 16 (1998) 297-300; C.A., 129 (1998) 241970d.
- 1250 Holtapple, C.K. and Stanker, L.H.: Affinity selection of compounds in a fluoroquinolone chemical library by on-line immunoaffinity deletion coupled to column HPLC. *Anal. Chem.*, 70 (1998) 4817-4821.
- 1251 Katoh, S.: (Bioaffinity and separation). *Kagaku Kogaku*, 62 (1998) 593-595; C.A., 130 (1999) 35148 - a review with 7 refs.
- 1252 Liu, X.-C. and Mosbach, K.: A novel separation material for boronate affinity chromatography and immobilized metal affinity chromatography. *Am. Biotechnol. Lab.*, 16 (1998) 22; C.A., 130 (1999) 1876.
- 1253 Mueller, E. and Morr, M.: Sorbents containing nucleotides for affinity chromatography. *Ger. Offen. DE 19,715,331 (Cl. C08F291/08)*, 15 Oct. 1998, Appl. 19,715,331, 12 Apr. 1997; 8 p.; C.A., 129 (1998) 317254w.
- 1254 Tejeda-Mansir, A., Juvera, J.M., Magaña, I. and Guzman, R.: Design of affinity membrane chromatographic columns. *Bio-process Eng.*, 19 (1998) 115-119; C.A., 129 (1998) 312935j.
- 1255 Tejeda, A., Ortega, J., Magaña, I. and Guzmán, R.: Optimal design of affinity membrane chromatographic columns. *J. Chromatogr. A*, 830 (1999) 293-300.
- 1256 Tonkova, E., Ticha, M. and Kucerova, Z.: Different types of immobilized 3,5-diiodo-L-tyrosine for affinity chromatography of pepsin. *Int. J. Bio-Chromatogr.*, 4 (1998) 35-41; C.A., 129 (1998) 312940g.
- 1257 Turkova, J.: Oriented immobilization of biologically active proteins as a tool for revealing protein interactions and function. *J. Chromatogr. B*, 722 (1999) 11-31 - a review with 78 refs.
- 1258 Zhou, D., Zou, H., Bi, J., Yang, L., Jia, L., Zhang, Q. and Zhang, Y.: Membrane support as the stationary phase in high-performance immunoaffinity chromatography. *Anal. Chem.*, 71 (1999) 115-118.

For additional information see C.A.:  
129 (1998) 186411v.

- See also 1190, 1207, 1319, 1379, 1438, 1523, 1580, 1588, 1590, 1605, 1623, 1625, 1632, 1658, 1662, 1683, 1685, 1701, 1715, 1773, 1781, 1793, 1944, 1948, 2218, 2219, 2228.

#### 4f. Trace analysis and preseparation techniques

- 1259 Lord, H.L. and Pawliszyn, J.: Recent advances in solid-phase microextraction. *LC-GC Int.*, 11 (1998) 776-785.
- 1260 Majors, R.E.: Distillation as a sample preparation and separation technique. *LC-GC Int.*, 12 (1999) 19-23, 36.
- 1261 Merschman, S.A., Lubbad, S.H. and Tilotta, D.C.: Poly(dimethylsiloxane) films as sorbents for solid-phase microextraction coupled with infrared spectroscopy. *J. Chromatogr. A*, 829 (1998) 377-384.
- 1262 Simplicio, A.L. and Boas, L.V.: Validation of a solid-phase microextraction method for the determination of organophosphorus pesticides in fruits and fruit juice. *J. Chromatogr. A*, 833 (1999) 35-42.

#### 4d. Affinity chromatography (advances)

- 1248 Cicciotto, S., Kiefel, M.J., Abo, S., Stewart, W., Quelch, K. and von Itzstein, M.: Synthesis and evaluation of N-acetylneurameric acid-based affinity matrixes for the purification of sialic acid-recognition proteins. *Glycoconjugate J.*, 15 (1998) 663-669; C.A., 129 (1998) 27617a.

See also 1112, 1214, 1294, 1314, 1435, 1948, 1950, 1954, 1957, 2166, 2240, 2268.

#### 4g. Enantiomers, separation

- 1263 Arnold, P.H., Striegler, S. and Sundaresan, V.: Chiral ligand exchange adsorbents for amines and underivatized amino acids: "bait-and-switch" molecular imprinting. *ACS Symp. Ser.*, 703 (1998) 109-118; C.A., 129 (1998) 297699q.
- 1264 Ekborg-Ott, K., Liu, Y. and Armstrong, D.W.: Highly enantioselective HPLC separations using the covalently bonded macrocyclic antibiotic, ristocetin A, chiral stationary phase. *Chirality*, 10 (1998) 434-483; C.A., 129 (1998) 197343a.
- 1265 Francotte, E.: Achiral derivatization as a means of improving the chromatographic resolution of racemic alcohols on benzoyl-cellulose CSPs. *Chirality*, 10 (1998) 492-498; C.A., 129 (1998) 216205a.
- 1266 Hagiwara, J., Matsunaga, H. and Tsukamoto, T.: Separation of enantiomers on a chiral stationary phase based on ovoglycoprotein. III. Effect of aggregation of ovoglycoprotein on chiral resolution. *J. Chromatogr. A*, 830 (1999) 81-89.
- 1267 Jonsson, S., Isaksson, R. and Petersson, C.: Unexpected difference in enantioselective retention on cellulose (CBH I) silica stationary phase caused by exchange of potassium for sodium ion in the mobile phase. *Chirality*, 10 (1998) 513-518; C.A., 129 (1998) 265526q.
- 1268 Lee, W.: Effect of the amide connecting tether type of Pirkle-concept chiral stationary phases derived from (S)-N-(3,5-dinitrobenzoyl)-leucine on enantiomeric separations. *Anal. Lett.*, 32 (1999) 423-432.
- 1269 Lodevico, R.G., Bobbitt, D.R. and Edkins, T.J.: Development of a bimodal polarimetric response model for improved quantitation of enantiomeric mixtures under conditions of poor chromatographic resolution. *Talanta*, 46 (1998) 907-914; C.A., 129 (1998) 169898s.
- 1270 Lorenz, K., Yamamoto, E. and Okamoto, Y.: Enantiomeric enrichment of stereolabile chiral spiro compounds by dynamic HPLC on chiral stationary phase. *Angew. Chem., Int. Ed.*, 37 (1998) 1922-1925; C.A., 129 (1998) 269714x.
- 1271 McIninch, J.K., Geiser, F., Prickett, K.B. and May, S.W.: Determination of the absolute configuration of  $\alpha$ -hydroxyglycine derivatives by enzymatic conversion and chiral high-performance liquid chromatography. *J. Chromatogr. A*, 828 (1998) 191-198.
- 1272 Oi, N., Nakajima, T., Takami, S. and Kato, R.: (Influence of mobile phase nature in enantiomer separation by HPLC with chiral polymethacrylamide stationary phase). *Chromatography*, 19, No. 2 (1998) 64-65; C.A., 129 (1998) 339290g.
- 1273 Pais, L.S., Loureiro, J.M. and Rodrigues, A.E.: Separation of enantiomers of a chiral epoxide by simulated moving bed chromatography. *J. Chromatogr. A*, 827 (1998) 215-233.
- 1274 Pirkle, W.H. and Spence, P.L.: Chiral recognition of phthalides and lactams. *Chirality*, 10 (1998) 430-433; C.A., 129 (1998) 216326r.
- 1275 Sandberg, A., Markides, K.E. and Heldin, E.: Lasalocid adsorbed on porous graphitic carbon as a chiral selector, in capillary liquid chromatography. *J. Chromatogr. A*, 828 (1998) 149-156.
- 1276 Umeda, S., Saitoh, K., Satoh, T., Yokota, K. and Kakuchi, T.: Chromatographic optical resolution of enantiomer by (1 $\rightarrow$ 6)-3,4-di-O-alkyl-2,5-anhydro-D-glucitol derivatives bound on silica gel. *Polym. Prepr.*, 39 (1998) 715-716; C.A., 129 (1998) 297692g.
- 1277 Yang, G.-S., Dai, Q., Gao, R.-Y., Wang, Q.-S. and Shen, H.-X.: Study of chiral recognition mechanism of O,O-diethyl ( $p$ -methylbenzenesulfonamido)-aryl(alkyl)-methylphosphonates by HPLC with a series of CSs. *Chin. J. Chem.*, 16 (1998) 243-249; C.A., 129 (1998) 197338c.
- 1278 Zhou, Z.Q., Ding, E.R., Hou, J.G., Chen, L.R. and Yin, Y.Q.: The separation of the new chiral metal cluster ( $\mu$ -Se)RuCoW (CO)<sub>8</sub>-C<sub>5</sub>H<sub>4</sub>C(O)CH<sub>3</sub> on an amylopectin tris(phenylcarbamate)chiral column by HPLC. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3021-3030.
- See also 1293, 1295, 1398, 1405, 1419, 1431, 1473, 1474, 1486, 1488, 1493, 1510, 1513, 1515, 1516, 1517, 1523, 1553, 1838, 1843, 1854, 1865, 1900, 1949, 1965, 2002, 2010, 2011, 2014, 2032, 2034, 2042, 2060, 2061, 2062, 2063, 2070, 2087, 2096, 2097, 2155.
- 4h. Other special techniques
- 1279 Bauer, J.: Advances in cell separation: recent developments in counterflow centrifugal elutriation and continuous flow cell separation. *J. Chromatogr. B*, 722 (1999) 55-69 - a review with 218 refs.
- 1280 Berthod, A., Talabardon, K., Caravieilhes, S. and de Bellefon, C.: Original use of the liquid nature of the stationary phase in counter-current chromatography. II. A liquid-liquid reactor for catalytic reactions. *J. Chromatogr. A*, 828 (1998) 523-530.
- 1281 Genest, P.W., Field, T.G., Vasudevan, P.T. and Palekar, A.A.: Continuous purification of porcine lipase by rotating annular size-exclusion chromatography. *Appl. Biochem. Biotechnol.*, 73 (1998) 215-230; C.A., 130 (1999) 1618.
- 1282 Guermouche, M.H., Habel, D. and Guermouche, S.: Theoretical aspects of micellar liquid chromatography using C<sub>12</sub>DAPS surfactant. *Fluid Phase Equilib.*, 147 (1998) 301-307; C.A., 129 (1998) 166539q.
- 1283 Ikeya, T., Kataoka, K., Okano, T. and Sakurai, Y.: Selective adhesion of rat lymphocyte subpopulation on the polymer surface with phenylboronic acid moieties: evaluation by field-flow fractionation/adhesion chromatography FFF/AC method. *React. Funct. Polym.*, 37 (1998) 251-261; C.A., 129 (1998) 158840r.
- 1284 Maryutina, T.A. and Ignatova, S.N.: Countercurrent chromatography for the preconcentration and separation of inorganic compounds: influence of physicochemical properties of two-phase liquid systems on the retention of the stationary phase. *J. Anal. Chem.*, 53 (1998) 740-745; C.A., 129 (1998) 224992v.
- 1285 Safarik, I. and Safarikova, M.: Use of magnetic techniques for the isolation of cells. *J. Chromatogr. B*, 722 (1999) 33-53 - a review with 126 refs.
- 1286 Shen, P. and Hong, X.: (Separation and determination of effective components of *Polygonum multiflorum* Thunb. by high-speed counter-current chromatography). *Zhongguo Yaoxue Zazhi (Beijing)*, 32(Suppl.) (1997) 33-35; C.A., 130 (1999) 17298.

- 1287 Yang, T.H., Lee, C.J. and Chu, I.M.: A new approach to counteracting chromatographic electrophoresis. *Sep. Sci. Technol.*, 33 (1998) 1819-1831; *C.A.*, 129 (1998) 272535v.

See also 1128, 1150, 1154, 1254, 1255, 1312, 1356, 1834, 1921, 1928, 1987, 2218.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

### 5a. Aliphatic hydrocarbons

- 1288 Andreoli, R., Manini, P., Mutti, A., Bergamaschi, E. and Niessen, W.M.A.: Determination of *n*-hexane metabolites by liquid chromatography/mass spectrometry. I. 2,5-Hexanedione and other phase I metabolites in untreated and hydrolyzed urine samples by atmospheric pressure chemical ionization. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1410-1416; *C.A.*, 130 (1999) 35301.

### 5b. Cyclic hydrocarbons, fullerenes

- 1289 Chen, D.-Z., Liang, Y.-Z., Shen, H.-L., Cui, H. and Yu, R.-Q.: (Qualitative and quantitative analysis of two-way chromatographic/spectroscopic data with overlapping peaks. (II). Annihilation of rank and resolution by projection method for determination of polycyclic aromatic hydrocarbons in air-borne particulates). *Gaojing Xuexiao Huaxue Xuebao*, 19 (1998) 1227-1231; *C.A.*, 129 (1998) 20220u.

- 1290 Nerin, C. and Domeno, C.: Determination of polycyclic aromatic hydrocarbons and some related compounds in industrial waste oil by GPC-HPLC-UV. *Analyst (Cambridge)*, 124 (1999) 67-70.

- 1291 Nerin, C., Domeno, C., Fernandez, P. and Cacho, J.: Some considerations about the separation of polycyclic aromatic hydrocarbons on a 2-(1-pyrenyl) ethyldimethylsilica-HPLC column. *Quim. Anal. (Barcelona)*, 17 (1998) 75-81; *C.A.*, 129 (1998) 211066w.

- 1292 Pérez, S., Ferrer, I., Hennion, M-C. and Barceló, D.: Isolation of priority polycyclic aromatic hydrocarbons from natural sediments and sludge reference materials by an antifluorene immunosorbent followed by liquid chromatography and iodine array detection. *Anal. Chem.*, 70 (1998) 4996-5001.

- 1293 Roussel, C., Suteu, C., Shaimi, L. and Soufiaoui, M.: Structure and substituent effect on chiral separation of some 4a-methyl-2,3,4,4<sup>a</sup>-tetrahydro-1H-fluorene derivatives and 4a-methyl-1,2,3,4,4<sup>a</sup>,9<sup>a</sup>-hexahydro-fluoren-9-one derivatives on CTA-I and Chiracel OJ chiral stationary phases. *Chirality*, 10 (1998) 522-527; *C.A.*, 129 (1998) 269715y.

- 1294 Tomaniova, M., Hajsova, J., Pavelka, J., Jr., Kocourek, V., Holadova, K. and Klimova, I.: Microwave-assisted solvent extraction - a new method for isolation of polynuclear aromatic hydrocarbons from plants. *J. Chromatogr. A*, 827 (1998) 21-29.

See also 1120, 1141, 1173, 1180, 1197, 1304.

### 5c. Halogen derivatives

- 1295 Ramos, L., Hernandez, L.M. and Gonzalez, M.J.: Simultaneous separation of coplanar and chiral polychlorinated biphenyls by off-line pyrenyl-silica liquid chromatography and gas chromatography. Enantiomeric ratios of chiral congeners. *Anal. Chem.*, 71 (1999) 70-77.
- 1296 Samsonov, D.P., Evdokimov, K.Yu., Zhiryukhina, N.P. and Kiryukhin, V.P.: Determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans by chromatography-tandem mass spectrometry using an ion-trap spectrometer. *J. Anal. Chem.*, 53 (1998) 663-667; *C.A.*, 129 (1998) 226700x.

For additional information see *C.A.*:  
129 (1998) 244883p.

See also 1186.

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

- 1297 Rahimi, P., Gentzis, T. and Cotte, E.: Observation of optical behavior of heavy oil fractions obtained by ion exchange chromatography. *Prepr.-Am. Chem. Soc., Div. Pet. Chem.*, 43 (1998) 619-622; *C.A.*, 129 (1998) 262637r.
- 1298 Vasilescu, E.M., Medvedovici, A. and Dimitrescu, V.: Chromatographic characterization of some Romanian diesel fuels. *Rev. Roum. Chim.*, 43 (1998) 473-480; *C.A.*, 129 (1998) 262528p.

## 6. ALCOHOLS

- 1299 Menon, S.K., Natarajan, B. and Joseph, J.C.: Assay of analytes in complex matrices. I. HPLC assay of glycerin in intravenous fat emulsions. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2977-2986.

See also 1275, 1337.

## 7. PHENOLS

- 1300 Bader, G., Lück, L., Schenk, R., Hirschelmann, R. and Hiller, K.: Leiocarpoid - Leitsubstanz zur Qualitätssicherung von *Solidaginis virgaureae* herba. *Pharmazie*, 53 (1998) 805-806.
- 1301 De Smet, R., David, F., Sandra, P., van Kaer, J., Lesaffer, G., Dhondt, A., Lameire, N. and Vandolder, R.: A sensitive HPLC method for the quantification of free and total *p*-cresol in patients with chronic renal failure. *Clin. Chim. Acta*, 278 (1998) 1-21.
- 1302 Escarpa, A. and González, M.C.: Fast separation of (poly)phenolic compounds from apples and pears by high-performance liquid chromatography with diode-array detection. *J. Chromatogr. A*, 830 (1999) 301-309.
- 1303 Hueso-Urena, F., Jimenez-Pulido, S.B., Moreno-Carretero, M.N. and Rodriguez-Avi, J.: Quantitative structure-liquid chromatographic retention time relationships on natural phenols found in olive oil. *J. Am. Oil. Chem. Soc.*, 75 (1998) 793-799; *C.A.*, 129 (1998) 229897c.

- 1304 Juan, M.E., Lamuela-Raventos, R.M., de la Torre-Boronat, M.C. and Planas, J.M.: Determination of *trans*-resveratrol in plasma by HPLC. *Anal. Chem.*, 71 (1999) 747-750.
- 1305 Kvistad, A.M., Lundanes, E. and Greibrokk, T.: Determination of alkylphenols in water samples by solid-phase extraction on to poly(styrene-divinylbenzene) and quantification by liquid chromatography with UV detection. *Chromatographia*, 48 (1998) 707-713.
- 1306 Moon, Y.-J. and Kang, S.-W.: (Retention behavior and separation of phenol derivatives through cyclodextrin complexes in reversed-phase liquid chromatography). *Anal. Sci. Technol.*, 11 (1998) 179-188; C.A., 129 (1998) 197340x.
- 1307 Nakashima, K., Kinoshita, S., Wada, M., Kuroda, N. and Baeyens, W.R.G.: HPLC with fluorescence detection of urinary phenol, cresols and xylenols using 4-(4,5-diphenyl-1H-imidazol-2-yl)benzoyl chloride as fluorescence labeling reagent. *Analyst (Cambridge)*, 123 (1998) 2281-2284.
- 1308 Romani, A., Pinelli, P., Mulinacci, N., Vincieri, F.F. and Tattini, M.: Identification and quantitation of polyphenols in leaves of *Myrthus communis* L. *Chromatographia*, 49 (1999) 17-20.
- 1309 Ryan, D., Robards, K. and Lavee, S.: Determination of phenolic compounds in olives by reversed-phase chromatography and mass spectrometry. *J. Chromatogr. A*, 832 (1999) 87-96.
- 1310 Wada, M., Kinoshita, S., Itayama, Y., Kuroda, N. and Nakashima, K.: Sensitive high-performance liquid chromatographic determination with fluorescence detection of phenol and chlorophenols with 4-(4,5-diphenyl-1H-imidazol-2-yl)benzoyl chloride as a labeling reagent. *J. Chromatogr. B*, 721 (1999) 179-186.
- 1311 Williams, T.D., Jay, M., Lehmler, H.-J., Clark, M.E., Stalker, D.J. and Bummer, P.M.: Solubility enhancement of phenol and phenol derivatives in perfluoroctyl bromide. *J. Pharm. Sci.*, 87 (1998) 1585-1589.

For additional information see C.A.:  
129 (1998) 301791h, 350378n.

See also 1148, 1182, 1205.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

### 8a. Flavonoids

- 1312 Berthod, A., Talabardon, K., de la Poype, F. and Erdelmeier, C.A.J.: Purification of a flavonoid sample by countercurrent chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3003-3019.
- 1313 Biles, P.V. and Ziobro, G.C.: Identification of the source of reagent variability in the xanthylol/urea method. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1155-1161.
- 1314 Da Costa, C., Margolis, S.A., Benner, B.A., Jr. and Horton, D.: Comparison of methods for extraction of flavanones and xanthones from the root bark of the osage orange tree using liquid chromatography. *J. Chromatogr. A*, 831 (1999) 167-178.

- 1315 Häkkinen, S. and Auriola, S.: High-performance liquid chromatography with electrospray ionization mass spectrometry and diode array ultraviolet detection in the identification of flavonol aglycones and glycosides in berries. *J. Chromatogr. A*, 829 (1998) 91-100.
- 1316 Lin, J.-K., Lin, C.-L., Liang, Y.-C., Lin-Shiau, S.-Y. and Juan, I.-M.: Survey of catechins, gallic acid, and methylxanthines in green, oolong, pu-erh, and black teas. *J. Agric. Food Chem.*, 46 (1998) 3635-3642.
- 1317 Luczkiewicz, M., Cisowski, W. and Majewska, E.: High-performance liquid chromatographic determination of polymethoxylated flavonols in soil-grown plant and *in vitro* cultures of *Rudbeckia hirta* L. *Acta Pol. Pharm.*, 55 (1998) 143-147; C.A., 129 (1998) 281080v.
- 1318 Stevens, J.F., Taylor, A.W. and Deinzer, M.L.: Quantitative analysis of xanthohumol and related prenylflavonoids in hops and beer by liquid chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 832 (1999) 97-107.
- 1319 Tsuchiya, H.: High-performance liquid chromatographic analysis of polyhydroxyflavones using solid-phase borate-complex extraction. *J. Chromatogr. B*, 720 (1998) 225-230.

For additional information see C.A.:

129 (1998) 272454t, 293954w, 347351t, 347352u.

See also 2193.

### 8b. Aflatoxins and other mycotoxins

- 1320 Castegnaro, M., Garren, L., Galendo, D., Gelderblom, W.C.A., Chelule, P., Dutton, M.F. and Wild, C.P.: Analytical method for the determination of sphinganine and sphingosine in serum as a potential biomarker for fumonisin exposure. *J. Chromatogr. B*, 720 (1998) 15-24.
- 1321 Elizalde-González, M., Mattusch, J. and Wennrich, R.: Stability and determination of aflatoxins by high-performance liquid chromatography with amperometric detection. *J. Chromatogr. A*, 828 (1998) 439-444.
- 1322 Kotal, F., Holadova, K., Hajslava, J., Poustka, J. and Radova, Z.: Determination of trichothecenes in cereals. *J. Chromatogr. A*, 830 (1999) 219-225.
- 1323 Larsen, T.O., Frisvad, J.C., Ravn, T. and Skaanning, T.: Mycotoxin production by *Penicillium expansum* on black currant and cherry juice. *Food Addit. Contam.*, 15 (1998) 676-680; C.A., 129 (1998) 289354h.
- 1324 Yu, W., Dorner, J.W. and Chu, F.S.: Immunoaffinity column as cleanup tool for a direct competitive enzyme-linked immunosorbent assay of cyclopiazonic acid in corn, peanuts, and mixed feed. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1169-1175.
- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- 1325 Kondo, K., Kurihara, M., Miyata, N., Suzuki, T. and Toyoda, M.: Mechanistic studies of catechins as antioxidants - against radical oxidation. *Arch. Biochem. Biophys.*, 362 (1999) 79-86.
- 1326 Morales, F.J. and Jimenez-Perez, S.: Study of hydroxymethylfurfural formation from acid degradation of the Amadori product in milk-resembling systems. *J. Agric. Food Chem.*, 46 (1998) 3885-3890.

- 1327 Rischer, M., Adamczyk, M., Ratz, H., Hose, S., Marchesan, M., Paper, D.H., Franz, G., Wolf-Heuss, E. and Engel, J.: Quantitative determination of the iridoid glycosides aucuvin and catalpol in *Plantago lanceolata* L. extracts by HPTLC and HPLC. *J. Planar Chromatogr.*, 11 (1998) 374-378.
- 1328 Sheu, S.-J. and Hsin, W.-C.: HPLC separation of the major constituents of *Gardeniae fructus*. *J. High Resolut. Chromatogr.*, 21 (1998) 523-526.
- 1329 Terahara, N., Toki, K., Saito, N., Honda, T., Matsui, T. and Osa-jima, Y.: Eight new anthocyanins, ternatis C1-C5 and D3 and preternatis 13 and C4 from young *Clitoria ternatea* flowers. *J. Natural Prod.*, 61 (1998) 1361-1367.
- 1330 Yamazaki, H., Tanaka, M. and Shimada, T.: Highly sensitive high-performance liquid chromatographic assay for coumarin 7-hydroxylation and 7-ethoxycoumarin O-deethylation by human liver cytochrome P450 enzymes. *J. Chromatogr. B*, 721 (1999) 13-19.

See also 1136, 1296, 1314, 1966.

## 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 1331 Kirchmaier, M., Pöder, R. and Huber, C.G.: Identification of iludins in *Omphalotus nidiformis* and *Omphalotus olivascens* var. *indigo* by column liquid chromatography-atmospheric pressure chemical ionization tandem mass spectrometry. *J. Chromatogr. A*, 832 (1999) 247-252.
- 1332 Koivusalmi, E., Haatainen, E. and Root, A.: Quantitative RP-HPLC determination of some aldehydes and hydroxyaldehydes as their 2,4-dinitrophenylhydrazone derivatives. *Anal. Chem.*, 71 (1999) 86-91.
- 1333 Komazaki, Y., Narita, Y. and Tanaka, S.: Development of automated measurement system using a diffusion scrubber and high-performance liquid chromatography for monitoring of formaldehyde and acetaldehyde in automotive exhaust gas. *Analyst (Cambridge)*, 123 (1998) 2343-2349.
- 1334 Lewis, R.J., Jones, A. and Véronoux, J.-P.: HPLC/tandem electrospray mass spectrometry for the determination of sub-ppb levels of Pacific and Caribbean ciguatoxins in crude extracts of fish. *Anal. Chem.*, 71 (1999) 247-250.
- 1335 Qtiz, C.S. and de Bartorrello, M.M.: Development and validation of a reversed phase HPLC method for quantitative analysis of bis-isoxazolylnaphthoquinone. *Talanta*, 46 (1998) 1537-1545; C.A., 129 (1998) 169904r.
- 1336 Park, H.-M., Eu, Y.-W., Cha, K.-S., Kim, Y.-M. and Lee, K.-B.: Determination of free acetaldehyde in total blood for investigating the effect of aspartate on metabolism of alcohol in mice. *J. Chromatogr. B*, 719 (1998) 217-221.
- 1337 Thalken, R.S., Cook, L.W. and Petersen, D.R.: Formation and export of the glutathione conjugate of 4-hydroxy-2,3-E-nonenal (4-HNE) in hepatoma cells. *Arch. Biochem. Biophys.*, 361 (1999) 113-119.

For additional information see C.A.:  
129 (1998) 293986h.

See also 1136, 1296, 1314, 1966, 2075, 2128, 2130.

## 10. CARBOHYDRATES

### 10a. Mono and oligosaccharides. Structural studies

- 1338 Anderberg, S.J., Newton, G.L. and Fahey, R.C.: Mycothiol biosynthesis and metabolism. Cellular levels of potential intermediates in the biosynthesis and degradation of mycothiol in *Mycobacterium smegmatis*. *J. Biol. Chem.*, 273 (1998) 30391-20297.
- 1339 Birrell, H., Charlwood, J., Lynch, I., North, S. and Camilleri, P.: A dual-detection strategy in the chromatographic analysis of 2-aminoacridone derivatized oligosaccharides. *Anal. Chem.*, 71 (1999) 102-108.
- 1340 Brull, L., Huisman, M., Schols, H., Voragen, A., Critchley, G., Thomas-Oates, J. and Haverkamp, J.: Rapid molecular mass and structural determination of plant cell wall-derived oligosaccharides using off-line high-performance anion-exchange chromatography/mass spectrometry. *J. Mass Spectrom.*, 33 (1998) 713-720; C.A., 129 (1998) 272627b.
- 1341 Caron, I., Elfakir, C. and Dreux, M.: Partially methylated  $\beta$ -cyclodextrin analysis: A systematic approach to appropriate RP column selection. *J. High Resolut. Chromatogr.*, 21 (1998) 554-560.
- 1342 Davis, M.W.: A rapid modified method for compositional carbohydrate analysis of lignocellulosics by high-pH anion-exchange chromatography with pulsed amperometric detection (HPAEC/PAD). *J. Wood Chem. Technol.*, 18 (1998) 235-252; C.A., 129 (1998) 162977h.
- 1343 Deras, I.L., Kawasaki, N. and Lee, Y.C.: Quantitative recovery of Man<sub>n</sub>GlcNAc<sub>2</sub>A<sup>n</sup> derivatives from concanavalin A. *Carbohydr. Res.*, 306 (1998) 469-471; C.A., 129 (1998) 316459e.
- 1344 Dongowski, G., Neubert, R.H.H., Plätzer, M., Schwarz, M.A., Schönenberger, B. and Anger, H.: Interaction between food components and drugs. Part 6: Influence of starch degradation products on propranolol transport. *Pharmazie*, 53 (1998) 871-875.
- 1345 Endo, T., Nagase, H., Ueda, H., Shigihara, A., Kobayashi, S. and Nagai, T.: Isolation, purification and characterization of cyclomaltooctadecaose  $\alpha$ -cyclodextrin), cyclomaltononadecaose ( $\xi$ -cyclodextrin), cyclomaltohexaose ( $\omega$ -cyclodextrin) and cyclomaltoheneicosaoose ( $\pi$ -cyclodextrin). *Chem. Pharm. Bull.*, 46 (1998) 1340-1343.
- 1346 Guile, G.R., Harvey, D.J., O'Donnell, N., Powell, A.K., Hunter, A.P., Zamze, S., Fernandes, D.L., Dwek, R.A. and Wing, D.R.: Identification of highly fucosylated N-linked oligosaccharides from the human parotid gland. *Zur. J. Biochem.*, 238 (1998) 623-656.
- 1347 Hama, Y., Nakagawa, H., Mochizuki, K., Sumi, T. and Hatake, H.: Quantitative anhydrous mercaptolysis of algal galactans followed by HPLC of component sugars. *J. Biochem. (Tokyo)*, 125 (1999) 160-165.
- 1348 Hanover, J.A., Lai, Z., Lee, G., Lubas, W.A. and Sato, S.M.: Elevated O-linked N-acetylglicosamine metabolism in pancreatic  $\beta$ -cells. *Arch. Biochem. Biophys.*, 362 (1999) 38-45.
- 1349 Iwai, K., Meguro, T. and Hase, S.: Detection of mannosidase and related free oligomannosides in the cytosol fraction of hen oviduct. *J. Biochem. (Tokyo)*, 125 (1999) 70-74.

- 1350 Kim, S.-T., Huh, W.-K., Lee, B.-H. and Kang, S.-O.: D-Arabinose dehydrogenase and its gene from *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta*, 1429 (1998) 29-39.
- 1351 López Hernández, J., González-Castro, M.J., Naya Alba, I. and de la Cruz Garcia, C.: High-performance liquid chromatographic determination of mono- and oligosaccharides in vegetables with evaporative light-scattering detection and refractive index detection. *J. Chromatogr. Sci.*, 36 (1998) 293-298.
- 1352 Makatsori, E., Karamanos, N.K., Anastassiou, E.D., Hjerpe, A. and Tsegenidis, T.: A method to quantitate total sialic acid, glucosamine, and galactosamine in blood serum and glycoconjugates by HPLC. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3031-3045.
- 1353 Makino, Y., Omichi, K. and Hase, S.: Analysis of oligosaccharide structures from the reducing and terminal by combining partial acid hydrolysis and a two-dimensional sugar map. *Anal. Biochem.*, 264 (1998) 172-179.
- 1354 Muller, D., Vic, G., Critchley, P., Crout, D.H.G., Lea, N., Roberts, L. and Lork, J.M.: Chemical synthesis of globotriose and galabiose: relative stabilities of their complexes with *Escherichia coli* Shiga-like toxin-1 as determined by denaturation-titration with guanidinium chloride. *J. Chem. Soc., Perkin Trans. 1*, (1998) 2287-2294; *C.A.*, 129 (1998) 276145r.
- 1355 Nadanaka, S., Kitagawa, H. and Sugahara, K.: Demonstration of the immature glycosaminoglycan tetrasaccharide sequence Glc $\beta$ 1-3Gal $\beta$ 1-3Gal $\beta$ 1-4Xyl on recombinant soluble human  $\alpha$ -thrombomodulin. An oligosaccharide structure on a "part-time" proteoglycan. *J. Biol. Chem.*, 273 (1998) 33728-33734.
- 1356 Pirlet, A.-S., Pitiot, O., Guentas, L., Heyraud, A., Courtois, B., Courtois, J. and Vijayakshmi, M.A.: Separation of low-molecular-mass acetylated glucuronans on L-histidine immobilized onto poly(ethylene-vinyl alcohol) hollow-fiber membranes. *J. Chromatogr. A*, 826 (1998) 157-166.
- 1357 Sasaki, T., Yamada, H., Matsumura, K., Shimizu, T., Kobata, A. and Endo, T.: Detection of O-mannosyl glycans in rabbit skeletal muscle  $\alpha$ -dystroglycan. *Biochim. Biophys. Acta*, 1425 (1998) 599-606.
- 1358 Spyridaki, M.-H.E. and Siskos, P.A.: Development of a new direct reversed-phase ion-pair high-performance liquid chromatographic method for the separation and determination of sialic acids. *J. Chromatogr. A*, 831 (1999) 179-189.
- 1359 Suzuki, S., Hayase, S., Nakano, M., Oda, Y. and Kakehi, K.: Analysis of glucuronolactone and glucuronic acid in drug formulations by high-performance liquid chromatography. *J. Chromatogr. Sci.*, 36 (1998) 357-360.
- 1360 Thiébot, B., Langris, M., Bonnamy, P.-J. and Bocquet, J.: Activation of protein kinase C pathway by phorbol ester results in a proteoglycan synthesis increase in peritubular cells from immature rat testis. *Biochim. Biophys. Acta*, 1426 (1999) 151-167.
- 1361 Yamada, S., Yamane, Y., Sakamoto, K., Tsuda, H. and Sugahara, K.: Characterization of sulfated tetrasaccharides and hexasaccharides containing a rare disaccharide sequence, -3GalNAc(4,6-disulfate) 1-4IdoA $\alpha$ 1-, isolated from porcine intestinal dermatan sulfate. *Eur. J. Biochem.*, 258 (1998) 775-783.
- 1362 Yoshimi, Y., Yamazaki, S. and Ikekita, M.: Developmental changes in Asn-linked neutral oligosaccharides in murine cerebrum. *Biochim. Biophys. Acta*, 1426 (1999) 69-79.
- 1363 Zhong, L., Shu, W., Liao, Y., Huang, P. and Xu, Q.: Determination of thermodynamic and kinetic parameters of large scale chromatographic separation of sugar and reducing sugar. *Chin. J. React. Polym.*, 5 (1996) 84-91; *C.A.*, 129 (1998) 344651e.
- 1364 Zook, C.M.: Microdialysis sampling coupled to high performance anion exchange chromatography-pulsed amperometric detection for analysis of carbohydrates. Avail. *UMI*, Order No. DA9831200, 1998, 137 p.; *C.A.*, 129 (1998) 325515x.
- 1365 Zook, C.M. and Lacourse, W.R.: Monitoring *in vitro* enzymic digestion of lactose in milk using microdialysis with pulsed amperometric detection. *Curr. Sep.*, 17 (1998) 41-45; *C.A.*, 129 (1998) 188478w.
- For additional information see *C.A.*:  
 129 (1998) 163087e, 169880e, 189606y, 232251t, 315186b;  
 130 (1999) 35351.
- See also 1315, 1368, 1372, 1373, 1375, 1376, 1383, 1388, 1391, 1396, 1443, 1774, 1815, 2198.
- 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides**
- 1366 Bolton, M.C., Dudhia, J. and Bayliss, M.T.: Age-related changes in the synthesis of link protein and aggrecan in human articular cartilage: implications for aggregate stability. *Biochem. J.*, 337 (1999) 77-82.
- 1367 Evers, D.L., Hung, R.L., Thomas, V.H. and Rice, K.G.: Preparative purification of a high-mannose type N-glycan from soybean agglutinin by hydrazinolysis and tyrosinamide derivatization. *Anal. Biochem.*, 265 (1998) 313-316.
- 1368 Huckerby, T.N., Lauder, R.M. and Nieduszynski, I.A.: Structure determination for octasaccharides derived from the carbohydrate-protein linkage region of chondroitin sulphate chains in the proteoglycan aggrecan from bovine articular cartilage. *Eur. J. Biochem.*, 258 (1998) 669-676.
- 1369 Koshiishi, I., Horikoshi, E. and Imanari, T.: Quantification of hyaluronan and chondroitin/dermatan sulfates in the tissue sections on glass slides. *Anal. Biochem.*, 267 (1999) 222-226.
- 1370 Koshiishi, I., Takenouchi, M., Hasegawa, T. and Imanari, T.: Enzymatic method for the simultaneous determination of hyaluronan and chondroitin sulfates using high-performance liquid chromatography. *Anal. Biochem.*, 265 (1998) 49-54.
- 1371 Moriyama, T., Tozawa, T., Hirata, S. and Ikeda, H.: Detection of hydroxyethyl starch induced macroamylasemia. Comparison of electrophoresis and gel-permeation high-performance liquid chromatography. *Seibutsu Butsuri Kagaku*, 42 (1998) 131-136; *C.A.*, 129 (1998) 227666c.
- 1372 Nakazawa, K., Takahashi, I. and Yamamoto, Y.: Glycosyltransferase and sulfotransferase activities in chick corneal stromal cells before and after *in vitro* culture. *Arch. Biochem. Biophys.*, 359 (1998) 269-282.
- 1373 Sato, C., Inoue, S., Matsuda, T. and Kitajima, K.: Fluorescent-assisted detection of oligosialyl units in glycoconjugates. *Anal. Biochem.*, 266 (1999) 102-109.
- 1374 Suortti, T., Gorenstein, M.V. and Roger, P.: Determination of the molecular mass of amylose. *J. Chromatogr. A*, 828 (1998) 515-521.

- 1375 Tomiya, N. and Takahashi, N.: Contribution of component monosaccharides to the coordinates of neutral and sialyl pyridylaminated N-glycans on a two-dimensional sugar map. *Anal. Biochem.*, 264 (1998) 204-210.
- 1376 Toyoda, H., Yamamoto, H., Ogino, N., Toida, T. and Imanari, T.: Rapid and sensitive analysis of disaccharide composition in heparin and heparan sulfate by reversed-phase ion-pair chromatography on a 2 µm porous silica gel column. *J. Chromatogr. A*, 830 (1999) 197-201.
- 1377 Tumova, S., Hatch, B.A., Law, D.J. and Bame, K.J.: Basic fibroblast growth factor does not prevent heparan sulphate proteoglycan catabolism in intact cells, but it alters the distribution of the glycosaminoglycan degradation products. *Biochem. J.*, 337 (1999) 471-481.
- 1378 Zamze, S., Harvey, D.J., Chen, Y.-J., Guile, G.R., Dwek, R.A. and Wing, D.R.: Sialylated N-glycans in adult rat brain tissue. A widespread distribution of disialylated antennae in complex and hybrid structures. *Eur. J. Biochem.*, 258 (1998) 243-270.

See also 1382, 1569.

10c. *Glycoproteins and their constituents*

- 1379 Appukuttan, P.S., Annamma, K.I., Geetha, M. and Jaison, P.L.: Separation of bovine heart galactose lectin from endogenous glycoproteins co-purified with the lectin during affinity chromatography. *J. Biosci. (Bangalore)*, 23 (1998) 137-141; C.A., 129 (1998) 213659r.
- 1380 Castillo, G. and Snow, A.D.: Chromatographic production of pure perlecan and other heparan sulphat proteoglycans and their uses in assays and in animal models. *PCT Int. Appl. WO 98 39,653 (Cl. G01N33/53)*, 11 Sep. 1998, US Appl. 38,613, 6 Mar. 1997; 68 p.; C.A., 129 (1998) 227801t.
- 1381 Erickson, H.K. and Kyte, J.: Lysine-691 of the anion exchanger from human erythrocytes is located on its cytoplasmic surface. *Biochem. J.*, 336 (1998) 443-449.
- 1382 Escribano, J., Ríos, I. and Fernández, J.A.: Isolation and cytotoxic properties of a novel glycoconjugate from corms of saffron plant (*Crocus sativus* L.). *Biochim. Biophys. Acta*, 1426 (1999) 217-222.
- 1383 Fujimoto, Ii, Menon, K.K., Otake, Y., Tanaka, F., Wada, H., Takahashi, H., Tsuji, S., Natsuka, S., Nakakita, S.-i., Hase, S. and Ikenaka, K.: Systematic analysis of N-linked sugar chains from whole tissue employing partial automation. *Anal. Biochem.*, 267 (1999) 336-343.
- 1384 Inoue, S., Lin, S., Chang, T., Wu, S., Yao, C., Chu, T., Troy, F.A., II and Inoue, Y.: Identification of free deaminated sialic acid (2-keto-3-deoxy-D-glycero-D-galacto-nononic acid) in human red blood cells and its elevated expression in fetal cord red blood cells and ovarian cancer cells. *J. Biol. Chem.*, 273 (1998) 27199-27204.
- 1385 Lindstedt, K.A., Kokkonen, J.O. and Kovanan, P.T.: Regulation of the activity of secreted human lung mast cell tryptase by mast cell proteoglycans. *Biochim. Biophys. Acta*, 1425 (1998) 617-627.
- 1386 Liu, H., Lee, Y.-W. and Dean, M.F.: Re-expression of differentiated proteoglycan phenotype by dedifferentiated human chondrocytes during culture in alginate beads. *Biochim. Biophys. Acta*, 1425 (1998) 505-515.
- 1387 Lopes, C.H.G.L., Mazzini, M.N., Tortorella, H., Konrath, R.A. and Brandelli, A.: Isolation, partial characterization and biological activity of mannosyl glycopeptides from seminal plasma. *Glycoconjugate J.*, 15 (1998) 477-481; C.A., 129 (1998) 213677v.
- 1388 Martenson, S., Levery, S.B., Fang, T.T. and Bendiak, B.: Neutral core oligosaccharides of bovine submaxillary mucin. Use of lead tetraacetate in the cold for establishing branch positions. *Eur. J. Biochem.*, 258 (1998) 603-622.
- 1389 Nakano, T. and Ozimek, L.: Gel chromatography of glycomacropептиde (GMP) from sweet whey on Sephadryl S-200 at different pH's and on Sephadex G-75 in 6M guanidine hydrochloride. *Milchwissenschaft*, 53 (1998) 629-633; C.A., 129 (1998) 342826s.
- 1390 Pavao, M.S.G., Aiello, K.R.M., Werneck, C.C., Silva, L.C.F., Valente, A.-P., Mulloy, B., Colwell, N.S., Tollesen, D.M. and Mourao, P.A.S.: Highly sulfated dermatan sulfates from ascidians. Structure versus anticoagulant activity of these glycosaminoglycans. *J. Biol. Chem.*, 273 (1998) 27848-27857.
- 1391 Smith, K.D., Hounsell, E.F., McGuire, J.M., Elliott, M.A. and Elliott, H.G.: Structural elucidation of the N-linked oligosaccharides of glycoproteins using high pH anion-exchange chromatography. *Adv. Macromol. Carbohydr. Res.*, 1 (1997) 65-91; C.A., 130 (1999) 38573 - a review with 79 refs.
- 1392 Van Damme, E.J.M., Barre, A., Mazard, A.-M., Verhaert, P., Horman, A., Debray, H., Rouge, P. and Peumans, W.J.: Characterization and molecular cloning of the lectin from *Helianthus tuberosus*. *Eur. J. Biochem.*, 259 (1999) 135-142.
- 1393 Van Klinken, J.-W.B., Einerhand, A.W.C., Büller, H. and Dekker, J.: Strategic biochemical analysis of mucins. *Anal. Biochem.*, 265 (1998) 103-116.
- 1394 Verhoeven, A.J.M., Neve, B.P. and Jansen, H.: Secretion and apparent activation of human hepatic lipase requires proper oligosaccharide processing in the endoplasmic reticulum. *Biochem. J.*, 337 (1999) 133-140.
- 1395 Woo, B.H., Lee, J.T. and Lee, K.C.: Purification of Sepharose-unbinding ricin from castor beans (*Ricinus communis*) by hydroxyapatite chromatography. *Protein Expression Purif.*, 13 (1998) 150-154; C.A., 129 (1998) 226702z.
- 1396 Yonezawa, N., Fukui, N., Kudo, K. and Nakano, M.: Localization of neutral N-linked carbohydrate chains in pig zona pellucida glycoprotein ZPC. *Eur. J. Biochem.*, 260 (1999) 57-63.

For additional information see C.A.:  
129 (1998) 186260v.

See also 1257, 1266, 1634, 1646, 1669, 1944.

11. ORGANIC ACIDS AND LIPIDS

11a. *Organic acids and simple esters*

- 1397 Baset, H.A., Ford-Hutchinson, A.W. and O'Neill, G.P.: Molecular cloning and functional expression of a *Caenorhabditis elegans* aminopeptidase structurally related to mammalian leukotriene A<sub>4</sub> hydrolases. *J. Biol. Chem.*, 273 (1998) 27978-27987.

- 1398 Bomer, B., Grosser, R., Kohler, B., Michel, S. and Zwerring, U.: Chromatographic enantiomer separation of lactones with N-(acryloyl)-L-phenylalanine D-neomethylamide modified polymers. *PCT Int. Appl.* WO 98 45,230 (Cl. C07B57/00), 15 Oct. 1998, DE Appl. 19,714,343, 8 Apr. 1997; 27 p.; C.A., 129 (1998) 290016f.
- 1399 Borgeat, P., Picard, S., Battistini, B. and Sirois, P.: Measurements of arachidonic acid metabolites derived from the lipoxygenase pathways by high-pressure liquid chromatography. *Methods Mol. Biol. (Totowa)*, 105(Phospholipid Signaling Protocols) (1998) 209-216; C.A., 129 (1998) 157032s.
- 1400 Bylund, J., Ericsson, J. and Oliv, E.H.: Analysis of cytochrome P450 metabolites of arachidonic and linoleic acids by liquid chromatography - mass spectrometry with ion trap MS. *Anal. Biochem.*, 265 (1998) 55-68.
- 1401 Cai, Z. and Katsumura, Y.: Simple procedure to eliminate concentrated sodium bicarbonate and carbonate with reusable strong cation-exchange cartridges for ion chromatographic analysis of formate and oxalate. *J. Chromatogr. A*, 829 (1998) 407-410.
- 1402 Casella, I.G., Zambonin, C.G. and Prete, F.: Liquid chromatography with electrocatalytic detection of oxalic acid by a palladium-based glassy carbon electrode. *J. Chromatogr. A*, 833 (1999) 75-82.
- 1403 Cheng, F.-C., Yang, D.-Y., Wu, T.-F. and Chen, S.-H.: Rapid on-line microdialysis hyphenated technique for the dynamic monitoring of extracellular pyruvate, lactic acid and ascorbic acid during cerebral ischemia. *J. Chromatogr. B*, 723 (1999) 31-38.
- 1404 Chung, Y. and Park, S.: Reversed phase high performance liquid chromatographic separation of esterquats with indirect spectrophotometric detection. *Microchim. J.*, 50 (1998) 42-50; C.A., 129 (1998) 285380r.
- 1405 Fransson, B. and Ragnarsson, U.: Separation of enantiomers of  $\alpha$ -hydroxy acids by reversed-phase liquid chromatography after derivatization with 1-(9-fluorenyl)ethyl chloroformate. *J. Chromatogr. A*, 827 (1998) 31-36.
- 1406 Fulton, D., Falck, J.R., McGiff, J.C., Carroll, M.A. and Quilley, J.: A method for the determination of 5,6-EET using the lactone as an intermediate in the formation of the diol. *J. Lipid Res.*, 39 (1998) 1713-1721; C.A., 129 (1998) 257142w.
- 1407 Goss, J.D.: Improved liquid chromatography of salicylic acid and some related compounds on a phenyl column. *J. Chromatogr. A*, 828 (1998) 267-271.
- 1408 Guillen, D.A., Barroso, C.G., Zorro, L., Carrascal, V. and Perez-Bustamante, J.A.: Organic acids analysis in Brandy de Jerez by ion-exclusion chromatography, post-column buffering and conductometric detection. *Analisis*, 26 (1998) 186-189; C.A., 129 (1998) 229808z.
- 1409 Hill, D.J., Griffiths, D.H. and Rowley, A.F.: Trout thrombocytes contain 12- but not 5-lipoxygenase activity. *Biochim. Biophys. Acta*, 1437 (1999) 63-70.
- 1410 Ivanov, I., Schwarz, K., Holzhütter, H.G., Myagkova, G. and Kühn, H.:  $\omega$ -Oxidation impairs oxidizability of polyenoic fatty acids by 15-lipoxygenases: consequences for substrate orientation at the active site. *Biochem. J.*, 336 (1998) 345-352.
- 1411 James, M.O., Yan, Z., Cornett, R., Jayanti, V.M.K.M., Henderson, G.N., Davydova, N., Katovich, M.J., Pollock, B. and Stacpoole, P.W.: Pharmacokinetics and metabolism of [<sup>14</sup>C] dichloroacetate in male Sprague-Dawley rats. Identification of glycine conjugates, including hippurate, as urinary metabolites of dichloroacetate. *Drug Metab. Disp.*, 26 (1998) 1134-1143.
- 1412 Jarosova, A., Gajduskova, V., Raszyk, J. and Sevela, K.: Determination of phthalic acid esters (PAEs) in biological materials by HPLC. *Czech J. Food Sci.*, 16 (1998) 122-130; C.A., 129 (1998) 340608y.
- 1413 Knight, J., Taylor, G.W., Wright, P., Clare, A.S. and Rowley, A.F.: Eicosanoid biosynthesis in an advanced deuterostome invertebrate, the sea squirt (*Ciona intestinalis*). *Biochim. Biophys. Acta*, 1436 (1999) 467-478.
- 1414 Lee, S.H., Kim, S.O. and Chung, B.C.: Gas chromatographic-mass spectrometric determination of urinary oxoacids using O-(2,3,4,5,6-pentafluorobenzyl)oxime-trimethylsilyl ester derivatization and cation-exchange chromatography. *J. Chromatogr. B*, 719 (1998) 1-7.
- 1415 Lu, Q. and Faulkner, D.J.: Three dolabellanes and a macrolide from the sponge *Dysidea* sp. from Palau. *J. Natural Prod.*, 61 (1998) 1096-1100.
- 1416 Mancini, J.A., Waterman, H. and Riendeau, D.: Cellular oxygenation of 12-hydroxyeicosatetraenoic acid and 15-hydroxyeicosatetraenoic acid by 5-lipoxygenase is stimulated by 5-lipoxygenase-activating protein. *J. Biol. Chem.*, 273 (1998) 32842-32847.
- 1417 Mehta, A., Oeser, A.M. and Carlson, M.G.: Rapid quantitation of free fatty acids in human plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 719 (1998) 9-23.
- 1418 Ohya, T., Kudo, N., Suzuki, E. and Kawashima, Y.: Determination of perfluorinated carboxylic acids in biological samples by high-performance liquid chromatography. *J. Chromatogr. B*, 720 (1998) 1-7.
- 1419 Okabe, H., Itabashi, Y., Ota, T. and Kuksis, A.: Highly sensitive method for the separation of enantiomeric and regiosomeric diacylglycerols as 2-anthrylurethanes by chiral-phase high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 829 (1998) 81-89.
- 1420 Pfister, S.L., Spitzbarth, N., Nithipatikom, K., Edgemon, W.S., Falck, J.R. and Campbell, W.B.: Identification of the 11,14,15- and 11,12,15-trihydroxyeicosatrienoic acids ad endothelin-derived relaxing factors of rabbit aorta. *J. Biol. Chem.*, 273 (1998) 30879-30887.
- 1421 Schmidt-Sommerfeld, E., Bobrowski, P.J., Penn, D., Rhead, W.J., Wanders, R.J.A. and Bennett, M.J.: Analysis of carnitine esters by radio-high performance liquid chromatography in cultured skin fibroblasts from patients with mitochondrial fatty acid oxidation disorders. *Pediatr. Res.*, 44 (1998) 210-214; C.A., 129 (1998) 272455u.
- 1422 Smith, D.L., Brady, C.A., Lachowicz, A. and Heinlein, J.: Comparison of acrylate monomer species by gas and liquid chromatography using multiple detectors. In: *RadTech'98 North Am. UV/EB Conf. Prof.*, RadTech International North America, Westbrook, 1998, pp. 375-387; C.A., 129 (1998) 16186f.
- 1423 Staniforth, M., O'Hanlon, M. and Khong, T.M.: Comparative study of lactic acid and polylactides using static headspace, gas chromatography and high-performance liquid chromatography. *J. Chromatogr. A*, 833 (1999) 195-208.

- 1424 Wang, M.M., Reynaud, D. and Pace-Asciak, C.R.: *In vivo* stimulation of 12(S)-lipoxygenase in the rat skin by bradykinin and platelet activating factor: formation of 12(S)-HETE and hepopilins, and actions on vascular permeability. *Biochim. Biophys. Acta*, 1436 (1999) 354-362.
- 1425 Yokota, K., Saito, K., Murakami, S., Muromatsu, A., Akihiko, Y. and Yamazaki, S.: (Detection of hydroxy acids with chemiluminescence method using ruthenium complex). *Chromatography*, 19, No. 2 (1998) 128-129; C.A., 129 (1998) 339307t.
- For additional information see C.A.:  
129 (1998) 211075y, 244287x.
- See also 2227, 2228, 2229, 222E, 223E, 227D, 227E, 227D, 2189, 2196.
- 11b. *Prostaglandins*
- 1426 Chen, Y., Zackert, W.E., Roberts, J., II. and Morrow, J.D.: Evidence for the formation of a novel cyclopentenone isoprostane, 15-A<sub>2</sub>-isoprostone (8-iso-prostaglandin A<sub>2</sub>) *in vivo*. *Biochim. Biophys. Acta*, 1436 (1999) 550-556.
- 1427 Chiang, N., Takano, T., Clish, C.B., Petasis, N.A., Tai, H.-H. and Serhan, C.N.: Aspirin-triggered 15-epi-lipoxin A<sub>4</sub> (ATL) generation by human leukocytes and murine peritonitis exudates: development of a specific 15-epi-LX<sub>4</sub> ELISA. *J. Pharmacol. Exp. Ther.*, 287 (1998) 779-790.
- 1428 Ferreira, P., Meyer, I., Mollner, S., Frank, R. and Pfeuffer, T.: Selective formation of G<sub>αo</sub>-MHC I complexes after desensitization of human platelets with iloprost. *Eur. J. Biochem.*, 259 (1999) 167-174.
- 1429 Lawson, J.A., Li, H., Rokach, J., Adiyaman, M., Hwang, S., Khanapure, S.P. and Fitzgerald, G.A.: Identification of two major F<sub>2</sub> isoprostanes, 8,12-iso- and 5-epi-8,12-iso-isoprostane F<sub>2α</sub>-VI, in human urine. *J. Biol. Chem.*, 273 (1998) 29295-29301.
- 1430 Ma, H., Sprecher, H.W. and Kolattukudy, P.E.: Estrogen-induced production of a peroxisome proliferator-activated receptor (PPAR) ligand in a PPAR $\gamma$ -expressing tissue. *J. Biol. Chem.*, 273 (1998) 30131-30138.
- 1431 Vafeas, C., Miegel, P.A., Urbano, F., Falck, J.R., Chauhan, K., Berman, M. and Schwartzman, M.L.: Hypoxia stimulates the synthesis of cytochrome P450-derived inflammatory eicosanoids in rabbit corneal epithelium. *J. Pharmacol. Exp. Ther.*, 287 (1998) 903-910.
- 1432 Wheelan, P., Hankin, J.A., Bilir, B., Guenette, D. and Murphy, R.C.: Metabolic transformations of leukotriene B<sub>4</sub> in primary cultures of human hepatocytes. *J. Pharmacol. Exp. Ther.*, 288 (1999) 326-334.
- See also 1399, 1446, 1842.
- 11c. *Lipids and their constituents*
- 1433 Babia, T., Veldman, R.J., Hoekstra, D. and Kok, J.W.: Modulation of carcinoembryonic antigen release by glucosylceramide. Implications for HT29 cell differentiation. *Eur. J. Biochem.*, 258 (1998) 233-242.
- 1434 Eckard, P.R., Taylor, L.T. and Slack, G.C.: Method development for the separation of phospholipids by subcritical fluid chromatography. *J. Chromatogr. A*, 826 (1998) 241-247.
- 1435 Furusawa, N., Ozaki, A., Nakamura, M., Morita, Y. and Okazaki, K.: Simple and rapid extraction method of total egg lipids for determining organochlorine pesticides in the egg. *J. Chromatogr. A*, 830 (1999) 473-476.
- 1436 Gomez, N., Jr. and Robinson, N.C.: Quantitative determination of cardiolipin in mitochondrial electron transferring complexes by silicic acid high-performance liquid chromatography. *Anal. Biochem.*, 267 (1999) 212-216.
- 1437 Grage, S., Heinz, S. and Bayerl, T.M.: Diffusion of lipids in supported bilayers as an NMR probe for topological studies in nanoporous solids. *Eur. Biophys. J.*, 27 (1998) 425-428; C.A., 129 (1998) 213697b.
- 1438 Hirayama, C., Sakata, M., Nakamura, M., Ihara, H., Kunitake, M. and Tsuchihara, M.: Preparation of poly(ethylene terephthalate) and application to selective removal of lipopolysaccharides. *J. Chromatogr. B*, 721 (1999) 187-195.
- 1439 Jennemann, R., Bauer, L., Bertalanefy, H., Geyer, R., Gschwind, R.M., Selmer, T. and Wiegandt, H.: Novel glycoinositolphosphosphingolipids, basidiolipids, from Agaricus. *Eur. J. Biochem.*, 259 (1999) 331-338.
- 1440 Kratky, D., Lass, A., Abuja, P.M., Esterbauer, H. and Kühn, H.: A sensitive chemiluminescence method to measure the lipoxygenase catalyzed oxygenation of complex substrates. *Biochim. Biophys. Acta*, 1437 (1999) 13-22.
- 1441 Kwon, O.-S., Newport, G.D. and Slikker, W., Jr.: Quantitative analysis of free sphingoid bases in the brain and spinal cord tissues by high-performance liquid chromatography with a fluorescence detection. *J. Chromatogr. B*, 720 (1998) 9-14.
- 1442 Menon, S.K., Natarajan, B. and Joseph, J.C.: Assay of analytes in complex matrices. II. Determination of fat content in IV fat emulsions by high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2987-3001.
- 1443 Müller-Loennies, S., Holst, O., Lindner, B. and Bräde, H.: Isolation and structural analysis of phosphorylated oligosaccharides obtained from *Escherichia coli* J-5 lipopolysaccharide. *Eur. J. Biochem.*, 260 (1999) 235-249.
- 1444 Oliw, E.H., Su, C., Skogstrom, T. and Benthin, G.: Analysis of novel hydroperoxides and other metabolites of oleic, linoleic, and linolenic acids by liquid chromatography-mass spectrometry with ion trap MSn. *Lipids*, 33 (1998) 843-852. C.A., 130 (1999) 12108.
- 1445 Pawłowicz, R. and Drozdowski, B.: (Qualitative and quantitative analysis of frying fats by high performance size exclusion chromatography (HPSEC)). *Tłuszcze Jadalone*, 32 (1997) 71-80; C.A., 129 (1998) 202167c.
- 1446 Sakamoto, H., Kitahara, J. and Nakagawa, Y.: Effect of intracellular glutathione on the production of prostaglandin D<sub>2</sub> in RBL-2H3 cells oxidized by tert-butyl hydroperoxide. *J. Biochem. (Tokyo)*, 125 (1999) 90-95.
- For additional information see C.A.:  
129 (1998) 257277u.
- See also 1320, 1413, 1527, 2182, 2217.
- 11d. *Lipoproteins and their constituents*
- 1447 Chang, S. and Boronsztajn, J.: Binding of fatty acid ethyl esters to albumin for transport to cells in culture. *Biochim. Biophys. Acta*, 1436 (1999) 491-498.

- 1448 Clay, M.A., Cehic, D.A., Pyle, D.H., Rye, D.H. and Barter, P.J.: Formation of apolipoprotein-specific high-density lipoprotein particles from lipid-free apolipoproteins A-I and A-II. *Biochem. J.*, 337 (1999) 445-451.

See also 1560.

## 12. ORGANIC PEROXIDES

For additional information see C.A.:  
129 (1998) 297720q.

See also 1444.

## 13. STEROIDS

### 13a. General techniques

For additional information see C.A.:  
129 (1998) 193566c.

See also 1175.

### 13b. Pregnane and androstane derivatives

- 1449 Appleblad, P., Jonsson, T., Bäckström, T. and Irgum, K.: Determination of C-21 ketosteroids in serum using trifluoromethanesulfonic acid catalyzed precolumn dansylation and 1,1'-oxalyldiimidazole postcolumn peroxyoxalate chemiluminescence detection. *Anal. Chem.*, 70 (1998) 5002-5009.
- 1450 Coldham, N.G., Biancotto, G., Montessisa, C., Howells, L.C. and Sauer, M.J.: Utility of isolated hepatocytes and radio-HPLC-MS for the analysis of the metabolic fate of 10-nortestosterone laurate in cattle. *Analyst (Cambridge)*, 123 (1998) 2589-2594.
- 1451 Gentile, D.M., Verhoeven, C.H.J., Shimada, T. and Back, D.J.: The role of CYP2C in the *in vitro* bioactivation of the contraceptive steroid desogestrel. *J. Pharmacol. Exp. Ther.*, 287 (1998) 975-982.
- 1452 Katayama, M., Nakane, R., Matsuda, Y., Kaneko, S., Hara, K. and Sato, H.: Determination of progesterone and 17-hydroxyprogesterone by high performance liquid chromatography after pre-column derivatization with 4,4-difluoro-5,7-dimethyl-4-bora-3a,4a-diaza-s-indacene-3-propionohydrazine. *Analyst (Cambridge)*, 123 (1998) 2339-2342.
- 1453 Le Bizec, B., Monteau, F., Gaudin, I. and André, F.: Evidence for the presence of endogenous 19-norandrosterone in human urine. *J. Chromatogr. B*, 723 (1999) 157-172.
- 1454 Marwah, A., Marwah, P. and Lardy, H.: Development and validation of a high-performance liquid chromatography assay for the quantitative determination of 7-oxo-dehydroepiandrosterone-3 $\beta$ -sulfate in human plasma. *J. Chromatogr. B*, 721 (1999) 197-205.

See also 2028, 2154.

### 13c. Estrogens

- 1455 Draisci, R., Palleschi, L., Ferretti, E., Marchiafava, C., Lucentini, L. and Cammarata, P.: Quantification of 17 $\beta$ -estradiol residues in bovine serum by liquid chromatography-tandem mass spectrometry with atmospheric pressure chemical ionisation. *Analyst (Cambridge)*, 123 (1998) 2605-2609.
- 1456 Kuhnz, W. and Gieschen, H.: Predicting the oral bioavailability of 19-nortestosterone progestins *in vivo* from their metabolic stability in human liver microsomal preparations *in vitro*. *Drug Metab. Disp.*, 26 (1998) 1120-1127.
- 1457 Tagawa, N., Tsuruta, H., Fujinami, A. and Kobayashi, Y.: Simultaneous determination of estriol and estriol 3-sulfate in serum by column-switching semi-micro high-performance liquid chromatography with ultraviolet and electrochemical detection. *J. Chromatogr. B*, 723 (1999) 39-45.
- 1458 Verhoeven, C.H.J., Krebbers, S.F.M., Wagenaars, G.N. and Vos, R.M.E.: *In vitro* and *in vivo* metabolism of desogestrel in several species. *Drug Metab. Disp.*, 26 (1998) 927-936.
- 1459 Verhoeven, C.H.J., Krebbers, S.F.M., Wagenaars, G.N., Booy, C.J., Groothuis, G.M.M., Olinga, P. and Vos, R.M.E.: *In vitro* and *in vivo* metabolism of the progestagen ORG 30659 in several species. *Drug Metab. Disp.*, 26 (1998) 1102-1112.

See also 1122, 1182.

### 13d. Sterols

- 1460 Barrero, A.F., Oltra, J.E., Poyatos, J.A., Jimenez, D. and Oliver, E.: Phycomysterols and other sterols from the fungus *Phycomyces blakesleeanus*. *J. Natural Prod.*, 61 (1998) 1491-1496.
- 1461 Clamagirand, V. and Boivin, P.: (Ergosterol determination in assessment of the microbiological quality of barley). *Proc. Congr.-Eur. Brew. Conv.*, 26th (1997) 109-116; C.A., 129 (1998) 274864a.
- 1462 De Marino, S., Iorizzi, M., Palagiano, E., Zollo, F. and Roussakis, C.: Starfish saponins. 55. Isolation, structure elucidation and biological activity of the steroid oligoglycosides from an antarctic starfish of the family Asteriidae. *J. Natural Prod.*, 61 (1998) 1319-1327.
- 1463 Manini, P., Andreoli, R., Careri, M., Elviri, L. and Musci, M.: Atmospheric pressure chemical ionization liquid chromatography/mass spectrometry in cholesterol oxide determination and characterization. *Rapid Commun. Mass Spectrom.*, 12 (1998) 883-889; C.A., 129 (1998) 160765p.
- 1464 Saisho, Y., Shimada, C. and Umeda, T.: Determination of 7 $\alpha$ -hydroxycholesterol in dog plasma by high-performance liquid chromatography with fluorescence detection. *Anal. Biochem.*, 265 (1998) 361-367.

### 13e. Bile acids and alcohols

- 1465 Dax, C.I. and Müllner, S.: Convenient and optimized method for sample pre-treatment for the analysis of bile acids in biological matrices. *Chromatographia*, 48 (1998) 681-689.
- 1466 Ikegawa, S., Ishikawa, H., Oiwa, H., Nagata, M., Goto, J., Kozaki, T., Gotowda, M. and Asakawa, N.: Characterization of cholyl-adenylate in rat liver microsomes by liquid chromatography-electrospray ionization-mass spectrometry. *Anal. Biochem.*, 266 (1999) 125-132.

- 1467 Scalia, S., Williams, J.R., Shim, J.-H., Law, B. and Morgan, E.D.: Supercritical fluid extraction on bile acids from bovine bile raw material. *Chromatographia*, 48 (1998) 785-789.

13g. Other steroids

For additional information see C.A.:  
129 (1998) 265536t, 321280u.

14. STEROID GLYCOSIDES AND SAPONINS

See 2193.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 1468 Dachtler, M., Kohler, K. and Albert, K.: Reversed-phase high-performance liquid chromatographic identification of lutein and zeaxanthin stereoisomers in bovine retina using a C<sub>30</sub> bonded phase. *J. Chromatogr. B*, 720 (1998) 211-216.
- 1469 Fragoso-Serrano, M., González-Chimeo, E. and Pereda-Miranda, R.: Novel labdane diterpenes from the insecticidal plant *Hyptis spicigera*. *J. Natural Prod.*, 62 (1999) 45-50.
- 1470 Glasius, M., Duane, M. and Larsen, B.R.: Determination of polar terpene oxidation products in aerosols by liquid chromatography-ion trap mass spectrometry. *J. Chromatogr. A*, 833 (1999) 121-135.
- 1471 Hurley, M.B. and Rowarth, J.S.: Comparison of a fast liquid chromatography column with a standard column for the rapid isocratic quantitation of ABA. *J. Chromatogr. Sci.*, 36 (1998) 345-348.
- 1472 Jung, Y.A. and Row, K.H.: Extraction and purification of perillyl alcohol from Korean orange peel by reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 828 (1998) 445-449.
- 1473 Kojima, K., Isaka, K., Purev, O., Jargalsaikhan, G., Suran, D., Mizukami, H. and Ogihara, Y.: Sesquiterpenoid derivatives from *Ferula feruloides*. *Chem. Pharm. Bull.*, 46 (1998) 1781-1784.
- 1474 Kramell, R., Miersch, O., Schneider, G. and Wasternack, C.: Liquid chromatography of jasmonic acid amine conjugate. *Chromatographia*, 49 (1999) 42-46.
- 1475 Min, B.-S., Nakamura, N., Miyashiro, H., Bae, K.-W. and Hattori, M.: Triterpenes from the spores of *Ganoderma lucidum* and their inhibitory activity against HIV-1 protease. *Chem. Pharm. Bull.*, 46 (1998) 1607-1612.
- 1476 Zjawionz, J.K., Bartyzel, P. and Hamman, M.T.: Chemistry of puerphenone: 1,6-conjugate addition to its quinone-methide system. *J. Natural Prod.*, 61 (1998) 1502-1508.

See also 2193.

15c. Bitter substances

- 1477 Forster, A., Beck, B., Koberlein, A. and Schmidt, R.: (Gradient HPLC with diode array detector for improved separation of hop bitter substances). *Proc. Congr.-Eur. Brew. Conv.*, 26th (1997) 223-230; *C.A.*, 129 (1998) 274868e.
- 1478 Galal, A.M., Ahmad, M.S., El-Feraly, F.S. and McPhail, A.T.: New products from the reactions of artemisin with ammonia and amines. *J. Natural Prod.*, 62 (1999) 54-58.

16. NITRO AND NITROSO COMPOUNDS

- 1479 Chang, C.-S., Wen, C.-H. and Den, T.-G.: Stationary phases. Part 45. Chromatographic separation of high energetic materials with C<sub>60</sub>-fullerene stationary phase. *Propellants, Explos., Pyrotech.*, 23 (1998) 111-113; *C.A.*, 129 (1998) 191172x.
- 1480 Markuszewski, M., Krass, J.D., Hippe, T., Jastorff, B. and Kaliszak, R.: Separation of nitroaromatics and their transformation products in soil around ammunition plants: new high performance liquid chromatographic change transfer stationary phases. *Chemosphere*, 37 (1998) 559-575; *C.A.*, 129 (1998) 198979z.
- 1481 Rastogi, R. and Gupta, V.K.: Determination of meta-, para- and ortho-nitroanilines using spectrophotometric and thermal gradient chromatographic methods. *J. Indian Chem. Soc.*, 75 (1998) 267-268; *C.A.*, 129 (1998) 254143m.
- 1482 Stoyanovsky, D.A., Melnikov, Z. and Cederbaum, A.I.: ESR and HPLC-EC analysis of the interaction of hydroxyl radical with DMSO: rapid reduction and quantification of POBN and PBN nitroxides. *Anal. Chem.*, 71 (1999) 715-721.
- 1483 Walsh, M.E. and Ranney, T.: Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid-phase extraction and gas chromatography-electron capture detection: Comparison with high-performance liquid chromatography. *J. Chromatogr. Sci.*, 36 (1998) 406-416.

For additional information see C.A.:  
129 (1998) 350375j.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 1484 Arlorio, M., Coisson, J.D. and Martelli, A.: Ion-pair HPLC determination of biogenic amines and precursor aminoacids. Application of a method based on simultaneous use of heptane-sulphonate and octylamine to some foods. *Chromatographia*, 48 (1998) 763-769.
- 1485 Bolden, M.E. and Danielson, N.D.: Liquid chromatography of aromatic amines with photochemical derivatization and tris(bipyridine)ruthenium(III) chemiluminescence detection. *J. Chromatogr. A*, 828 (1998) 421-430.

- 1486 Hadley, M.R., Oldham, H.G., Daman, L.A. and Hutt, A.J.: High performance liquid chromatographic analysis of the *in vitro* N-dealkylated and N-oxide metabolites of N-ethyl-N-methylaniline: methodology for the determination of enzyme activity and stereoselectivity of N-oxidation. *Chromatographia*, 48 (1998) 664-670.
- 1487 Lacorte, S., Perrot, M.-C., Fraisse, D. and Barceló, D.: Determination of chlorobenzidines in industrial effluent by solid-phase extraction and liquid chromatography with electrochemical and mass spectrometric detection. *J. Chromatogr. A*, 833 (1999) 181-194.
- 1488 Machida, Y., Nishi, H. and Nakamura, K.: Enantiomer separation of hydrophobic amino compounds by high-performance liquid chromatography using crown ether dynamically coated chiral stationary phase. *J. Chromatogr. A*, 830 (1999) 311-320.
- 1489 Obrezkov, O.N., Nikiforov, A.Yu., Smolenkov, A.D. and Spigun, O.A.: Determination of aliphatic amines by suppressed ion chromatography with conductometric detection. *Vest. Mosk. Univ., Ser. 2: Khim.*, 39 (1998) 46-48; *C.A.*, 129 (1998) 320746p.
- 1490 Paseiro-Losada, P., Simal-Gándara, J., Sanmartín-Fenollera, P., Pérez-Lamela, C. and López-Fabal, F.: *m*-Xylylenediamine determination in the official EU aqueous food stimulants. *J. Chromatogr. Sci.*, 36 (1998) 554-560.
- 1491 Verdu, E., Planelles, F., Campello, D., Grane, N. and Santiago, J.M.: (Determination of aromatic amines by HPLC(II)). *Tec. Lab.*, 19 (1997) 752-761; *C.A.*, 129 (1998) 297712p.
- 1492 Wu, Y.-C. and Huang, S.-D.: Solid phase microextraction coupled with high-performance liquid chromatography for the determination of aromatic amines. *Anal. Chem.*, 71 (1999) 310-318.
- 1493 Yamazaki, S., Saito, K. and Tanimura, T.: Enantiomeric separation of underivatized aliphatic β-amino alcohols by ligand-exchange chromatography using N-n-dodecyl-(1R,2R)-nor-ephedrine as a coating reagent for reversed-phase column. *J. High Resolut. Chromatogr.*, 21 (1998) 561-564.
- See also 1182, 1202, 1263, 1275, 1527, 1619.
- 17b. *Catecholamines and their metabolites*
- 1494 Cao, G.-M. and Hoshino, T.: Stability of catecholamines, indolamines and related metabolites in the process of sample preparation with ultrasonication and an analysis by high-performance liquid chromatography. *Anal. Sci.*, 14 (1998) 835-838; *C.A.*, 129 (1998) 240010d.
- 1495 Kobsayashi, S., Kanda, T. and Yutaka, O.: (Determination of urinary catecholamines by semi-microcolumn liquid chromatography with triple column-switching system). *Chromatography*, 19 (1998) 130-131; *C.A.*, 130 (1999) 22345.
- See also 1112, 1165, 1842.
- 17c. *Urea and guanidine derivatives*
- 1496 Nohara, Y., Hanai, T., Suzuki, J., Matsumoto, G., Iinuma, F., Kubo, H. and Kinoshita, T.: Automatic system for the assay of quanidino compounds to assess uremic status and effect of hemodialysis. *Chem. Pharm. Bull.*, 46 (1998) 1844-1845.
- 17d. *Other amine derivatives and amides (excl. peptides)*
- 1497 Girardon, V., Tessier, M. and Marechal, E.: Characterization of functional aliphatic oligoamides using N-trifluoroacetylation. II. Size exclusion chromatography. *Eur. Polym. J.*, 34 (1998) 1325-1330; *C.A.*, 129 (1998) 290582n.
- 1498 Matysiak, J., Niewiadomy, A., Zabinska, A. and Rozly, J.K.: Structure and retention of 2,4-dihydroxythiobenzanilides in a reversed-phase system. *J. Chromatogr. A*, 830 (1999) 491-496.
- 1499 Shibukawa, M., Eto, R., Kira, A., Miura, F., Oguma, K., Tatsumoto, H., Ogura, H. and Uchiumi, A.: Separation and determination of quaternary ammonium compounds by high-performance liquid chromatography with a hydrophilic polymer column and conductometric detection. *J. Chromatogr. A*, 830 (1999) 321-328.
- See also 1411, 1476, 1482, 2245.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 1500 Accinni, R., Campolo, J., Bartesaghi, S., de Leo, G., Lucarelli, C., Cursano, C.F. and Parodi, O.: High-performance liquid chromatographic determination of total plasma homocysteine with or without internal standards. *J. Chromatogr. A*, 828 (1998) 397-400.
- 1501 Alegria, A., Barbera, R., Farre, R., Lagarda, M.J. and Lopez, J.C.: (Determination of amino acids in infant formulas by reversed-phase high-resolution liquid chromatography). *Alimentaria (Madrid)*, 295 (1998) 103-110; *C.A.*, 130 (1999) 37509.
- 1502 Bianchi, L., Della Corte, L. and Tipton, K.F.: Simultaneous determination of basal and evoked output levels of aspartate, glutamate, taurine and 4-aminobutyric acid during microdialysis and from superfused brain slices. *J. Chromatogr. B*, 723 (1999) 47-59.
- 1503 Biesaga, M., Orska, J. and Trojanowicz, M.: HPLC of amino acids using tetraphenylporphyrin-silica stationary phases. *Chem. Anal. (Warsaw)*, 43 (1998) 647-656; *C.A.*, 129 (1998) 285384v.
- 1504 Briddon, A.: Total plasma homocysteine as part of the routine aminogram by ion-exchange chromatography. *Amino Acids*, 15 (1998) 235-239; *C.A.*, 130 (1999) 1890.
- 1505 Campanella, L., Crescentini, G. and Avino, P.: Simultaneous determination of cysteine, cystine and 18 other amino acids in various matrices by high-performance liquid chromatography. *J. Chromatogr. A*, 833 (1999) 137-145.
- 1506 Capdevilla, A. and Wagner, C.: Measurement of plasma S-adenosylmethionine and S-adenosylhomocysteine as their fluorescent isoindoles. *Anal. Biochem.*, 264 (1998) 180-184.
- 1507 D'Eramo, J.L., Finkelstein, A.E., Boccazz, F.O. and Fridman, O.: Total homocysteine levels in plasma: high-performance liquid chromatographic determination with electrochemical detection and glassy carbon electrode. *J. Chromatogr. B*, 720 (1998) 205-210.

- 1508 De Brbandere, V.I., Houl, P., Stockl, D., Thienpont, L.M., de Leenheer, A.P.: Isotope dilution-liquid chromatography/electrospray ionization-tandem mass spectrometry for the determination of serum thyroxine as a potential reference method. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1099-1103; C.A., 129 (1998) 255118u.
- 1509 Fermo, I., Arcelloni, C., Mazzola, G., D'Angelo, A. and Paroni, R.: High-performance liquid chromatographic method for measuring total plasma homocysteine levels. *J. Chromatogr. B*, 719 (1998) 31-36.
- 1510 Fitznar, H.P., Lobbes, J.M. and Kattner, G.: Determination of enantiomeric amino acids with high-performance liquid chromatography and pre-column derivatisation with o-phthalaldehyde and N-isobutyrylcysteine in seawater and fossil samples (mollusks). *J. Chromatogr. A*, 832 (1999) 123-132.
- 1511 Fountoulakis, M. and Lahm, H.-W.: Hydrolysis and amino acid composition analysis of proteins. *J. Chromatogr. A*, 826 (1998) 109-134 - a review with 246 refs.
- 1512 Fukunaga, K., Nakazono, N. and Yoshida, M.: Determination of reduced-forms glutathione and total glutathione in blood and plasma by high performance liquid chromatography with on-column fluorescence derivatization. *Chromatographia*, 48 (1998) 690-694.
- 1513 Galaverna, G., Corradini, R., Dossena, A., Chiavaro, E., Marchelli, R., Dallavalle, F. and Folesani, G.: Chiral discrimination of Dns- and unmodified D,L-amino acids by copper(II) complexes of terdentate ligands in high-performance liquid chromatography. *J. Chromatogr. A*, 829 (1998) 101-113.
- 1514 Gebauer, S., Fribe, S., Scherer, G., Gübitz, G. and Krauss, G.-J.: High performance liquid chromatography on calixarene-bonded silica gels. III. Separations of *cis/trans* isomers of proline-containing peptides. *J. Chromatogr. Sci.*, 36 (1998) 388-394.
- 1515 Lee, W.: Chromatographic separation of the enantiomers of amino acid esters as benzophenone imine derivatives. *Bull. Korean Chem. Soc.*, 19 (1998) 715-717; C.A., 129 (1998) 203217f.
- 1516 Lee, W.: Separation of the enantiomers of amino acid esters as benzophenone imine derivatives on polysaccharide-derived chiral stationary phase. *Chromatographia*, 49 (1999) 61-64.
- 1517 Lehotay, J., Hrobonova, K., Krupcik, J. and Cizmarik, J.: Chiral separation of enantiomers of amino acid derivatives by HPLC on vancomycin and teicoplanin chiral stationary phases. *Pharmazie*, 53 (1998) 863-865.
- 1518 Liu, H., Sañuda-Peña, M.C., Harvey-White, J.D., Kalra, S. and Cohen, S.A.: Determination of submicromolar concentrations of neurotransmitter amino acids by fluorescence detection using a modification of the 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate method for amino acid analysis. *J. Chromatogr. A*, 828 (1998) 383-395.
- 1519 Martin, S.C., Tsakas-Ampatzis, I., Bartlett, W.A. and Jones, A.F.: Measurement of plasma total homocysteine by HPLC with coulometric detection. *Clin. Chem. (Washington)*, 45 (1999) 150-152.
- 1520 Mendez, E., Ferreira, I.M.P.L.V.O., Gomes, A.M. and Ferreira, M.A.: Development validation and application of a method for monitoring of essential and semiessential free amino acids in infant formula and follow-up milks using HPLC/diode array detection. *Anal. Sci.*, 14 (1998) 827-830; C.A., 129 (1998) 229816a.
- 1521 Minniti, G., Piana, A., Armani, U. and Cerone, R.: Determination of plasma and serum homocysteine by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 828 (1998) 401-405.
- 1522 Parmentier, C., Leroy, P., Wellman, M. and Nicolas, A.: Determination of cellular thiols and glutathione-related enzyme activities: versatility of high-performance liquid chromatography-spectrofluorimetric detection. *J. Chromatogr. B*, 719 (1998) 37-46.
- 1523 Péter, A., Török, G., Armstrong, D.W., Tóth, G. and Tourvá, D.: Effect of temperature on retention of enantiomers of  $\beta$ -methyl amino acids on a teicoplanin chiral stationary phase. *J. Chromatogr. A*, 828 (1998) 177-190.
- 1524 Petritis, K.N., Chaibault, P., Elfakir, C. and Dreux, M.: Ion-pair reversed-phase liquid chromatography for determination of polar underivatized amino acids using perfluorinated carboxylic acids as ion pairing agent. *J. Chromatogr. A*, 833 (1999) 147-155.
- 1525 Pfeiffer, C.M., Twite, D., Shih, J., Holets-McCormack, S.R. and Gunter, E.W.: Method comparison for total plasma homocysteine between the Abbott IMx analyzer and an HPLC assay with internal standardization. *Clin. Chem. (Washington)*, 45 (1999) 152-153.
- 1526 Samma, S., Joko, M., Tanaka, N., Akiyama, T., Kagebayashi, Y., Yoshida, K., Aarima, M. and Okajima, E.: Comparison of serum levels of pyridinoline and pyridinoline cross-linked carboxy-terminal telopeptide of type I collagen as markers of bone resorption in patients receiving maintenance hemodialysis. *Clin. Exp. Nephrol.*, 2 (1998) 64-71; C.A., 129 (1998) 241966g.
- 1527 Stark, M., Wang, Y., Danielson, O., Jörnvall, H. and Johansson, J.: Determination of proteins, phosphatidylethanolamine, and phosphatidylserine in organic solvent extracts of tissue material by analysis of phenylthiocarbamyl derivatives. *Anal. Biochem.*, 265 (1998) 97-102.
- 1528 Tsuruta, Y. and Inoue, H.: 4-(5,6-Dimethoxy-2-phthalimidinyl)-2-methoxyphenylsulfonyl chloride as a fluorescent labeling reagent for determination of amino acids in high-performance liquid chromatography and its application for determination of urinary free hydroxyproline. *Anal. Biochem.*, 265 (1998) 15-21.
- 1529 Uden, P.C., Bird, S.M., Kotrebai, M., Nolibus, P., Tyson, J.F., Block, E. and Deneyer, E.: Analytical selenoaminoacid studies by chromatography with interfaced atomic mass spectrometry and atomic emission spectral detection. *Fresenius J. Anal. Chem.*, 362 (1998) 447-456.
- 1530 Vasanits, A. and Molnár-Perl, I.: Temperature, eluent flow-rate and column effects on the retention and quantitation properties of phenylthiocarbamyl derivatives of amino acids in reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 832 (1999) 109-122.

For additional information see C.A.:

129 (1998) 158857b, 325537f, 335855x.

See also 1143, 1180, 1263, 1271, 1275, 1411, 1484, 1485, 1488, 1573, 1584, 1858, 2177, 2198, 2261.

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

- 1531 Agner, E.: Purification of peptides and oligonucleotides by sample displacement chromatography process and apparatus. *PCT Int. Appl. WO 98 46,623* (Cl. C07K1/6), 22 Oct. 1998, GB Appl. 97/7,969, 16 Apr. 1997; 38 p.; C.A., 129 (1998) 316562h.
- 1532 Angelova, M.K., Dimov, N.P., Nachev, N.D. and Tsvetkov, A.B.: Preparative hydrophobic interaction chromatography as effective stage in the purification of glucagon and insulin. *Bulg. Chem. Commun.* 1996-1997, 29 (1997) 90-100; C.A., 129 (1998) 270720c.
- 1533 Chen, H. and Feng, Y.-M.: Hydrophilic Thr can replace the hydrophobic and absolutely conservative A3Val in insulin. *Biochim. Biophys. Acta*, 1429 (1998) 69-73.
- 1534 Chen, J.-W., Liu, B.-L. and Tzeng, Y.-M.: Purification and quantification of destruxins A and B from *Metarrhizium anisopliae*. *J. Chromatogr. A*, 830 (1999) 115-125.
- 1535 Craig, A.G., Zafaralla, G., Cruz, L.J., Santos, A.D., Hillyard, D.R., Dykert, J., Rivier, J.E., Gray, W.R., Imperial, J., DelaCruz, R.G., Spornig, A. et al.: An O-glycosylated neuroexcitatory Conus peptide. *Biochemistry*, 37 (1998) 16019-16025.
- 1536 Detmers, F.J.M., Kunji, E.R.S., Lanfermeijer, F.C., Poolman, B. and Konings, W.N.: Kinetics and specificity of peptide uptake by the oligopeptide transport system of *Lactococcus lactis*. *Biochemistry*, 37 (1998) 16671-16679.
- 1537 Eichler, D.C., Root, A.W., Duckett, G., Moore, K.L. and Diamond, F.B.: A spun-column assay for determination of leptin binding in serum. *Anal. Biochem.*, 267 (1999) 100-103.
- 1538 Erdjument-Bromage, H., Lui, M., Lacomis, L., Grewal, A., Annan, R.S., McNulty, D.E., Carr, S.A. and Tempst, P.: Examination of micro-tip reversed-phase liquid chromatographic extraction of peptide pools for mass spectrometric analysis. *J. Chromatogr. A*, 826 (1998) 167-181.
- 1539 Fahrner, R.L., Lester, P.M., Blank, G.S. and Reifsnyder, D.H.: Non-flammable preparative reversed-phase liquid chromatography of recombinant human insulin-like growth factor-I. *J. Chromatogr. A*, 830 (1999) 127-134.
- 1540 Fahrner, R.L., Lester, P.M., Blank, G.S. and Reifsnyder, D.H.: Real-time control of purified product collection during chromatography of recombinant human insulin-like growth factor-I using an on-line assay. *J. Chromatogr. A*, 827 (1998) 37-43.
- 1541 Floyd, P.D., Li, L., Moroz, T.P. and Sweedler, J.V.: Characterization of peptides from Aplysia using microbore liquid chromatography with matrix-assisted laser desorption/ionization time-of-flight mass spectrometry guided purification. *J. Chromatogr. A*, 830 (1999) 105-113.
- 1542 Fouchaq, B., Benaroudj, N., Ebel, C. and Ladjim, M.M.: Oligomerization of the 17-kDa peptide-binding domain in the molecular chaperone HSC70. *Eur. J. Biochem.*, 259 (1999) 379-384.
- 1543 Goumon, Y., Lugardon, K., Kieffer, B., Lefévre, J.-F., van Dorsselaer, A., Aunis, D. and Metz-Boutigue, M.-H.: Characterization of antibacterial COOH-terminal proenkephalin-A-derived peptides (PEAP) in infectious fluids. Importance of enkelytin, the antibacterial PEAP<sub>209-237</sub> secreted by stimulated chromaffin cells. *J. Biol. Chem.*, 273 (1998) 29847-29856.
- 1544 Hamada, J.S., Spanier, A.M., Bland, J.M. and Diack, M.: Preparative separation of value-added peptides from rice bran proteins by high-performance liquid chromatography. *J. Chromatogr. A*, 827 (1998) 319-327.
- 1545 Haro, L.S., Cubriel, A., Bustamante, J., Flores, R. and Martinez, A.O.: Divalent metal cation chelators enhance chromatographic separation of structurally similar macromolecules: separation of human growth hormone isoforms. *J. Chromatogr. B*, 720 (1998) 39-47.
- 1546 Huang, H., Jemal, A., David, C., Barker, S.A., Swenson, D.H. and Means, J.C.: Analysis of DNA adduct, S-[2-(N<sup>7</sup>-guanyl)ethyl]glutathione, by liquid chromatography/mass spectrometry and liquid chromatography/tandem mass spectrometry. *Anal. Biochem.*, 265 (1998) 139-150.
- 1547 Kaiser, R. and Metzka, L.: Enhancement of cyanogen bromide cleavage yields for methionyl-serine and methionyl-threonine peptide bonds. *Anal. Biochem.*, 266 (1999) 1-8.
- 1548 Kovalevskaya, G., Birken, S., Kakuma, T., Schlatterer, J. and O'Connor, J.F.: Evaluation of nicked chorionic gonadotropin content in clinical specimens by a specific immunometric assay. *Clin. Chem. (Washington)*, 45 (1999) 68-77.
- 1549 Lee, T.-G. and Maruyama, S.: Isolation of HIV-1 protease-inhibiting peptides from thermolysin hydrolysate of oyster proteins. *Biochem. Biophys. Res. Commun.*, 253 (1998) 604-608.
- 1550 Lehmann, S.M.C. and de Beer, W.H.J.: High-performance liquid chromatographic analysis with diode-array detection of bradykinin, neuropeptide K, and substance P in human plasma. *J. Chromatogr. Sci.*, 36 (1998) 306-310.
- 1551 Lippi, A., Criscuoli, M., Guelfi, M., Santicioli, P. and Maggi, C.A.: Pharmacokinetics of the bicyclic peptide tachykinin NK<sub>2</sub> receptor antagonist men 11420 (napadutant) in rats. *Drug Metab. Disp.*, 26 (1998) 1077-1081.
- 1552 Lu, H.S., Fausset, P.R., Narhi, L.O., Horan, T., Shinagawa, K., Shimamoto, G. and Boone, T.C.: Chemical modification and site-directed mutagenesis of methionine residues in recombinant human granulocyte colony-stimulating factor: effects on stability and biological activity. *Arch. Biochem. Biophys.*, 362 (1999) 1-11.
- 1553 Marastoni, M., Guerrini, R., Balboni, G., Salvadori, S., Fantin, G., Fogagnolo, M., Lazarus, L.H. and Tomatis, R.: Opioid deltorphin C analogues containing cis- or trans-2- or 3- or 4-aminocyclodexanecarboxylic acid residues. *Arzneim.-Forsch.*, 49 (1999) 6-12.
- 1554 Navale, V., Kaushal, P., Hunt, S., Burducea, I., Gentz, R., Khan, F. and Vertes, A.: Peptide mapping and disulfide bond analysis of myeloid progenitor inhibitory chemokine and keratinocyte growth factor by matrix-assisted laser desorption ionization mass spectrometry. *Anal. Biochem.*, 267 (1999) 125-134.
- 1555 Paruszewski, R., Jaworski, P., Winiecka, I., Tautt, J. and Dudkiewicz, J.: New renin inhibitors with hydrophilic C-terminus. *Pharmazie*, 54 (1999) 102-106.
- 1556 Ramanan, S. and Velayudhan, A.: Displacement chromatography of chemotactic peptides. *J. Chromatogr. A*, 830 (1999) 91-104.
- 1557 Recio, I. and Visser, S.: Two ion-exchange chromatographic methods for the isolation of antibacterial peptides from lactoferrin. *In situ* enzymatic hydrolysis on an ion-exchange membrane. *J. Chromatogr. A*, 831 (1999) 191-201.

- 1558 Riessler, K. and Cramer, H.: Preparation and chromatographic purification of  $^{125}\text{I}$  - (TYR $^0$ )-somatostatin-14 for the use in radioimmunoassay and receptorbinding experiments. *Prep. Biochem. Biotechnol.*, 28 (1998) 219-233; C.A., 129 (1998) 255121q.
- 1559 Rodriguez-Crespo, I., Straub, W., Gavilanes, F. and Ortiz de Montellano, P.R.: Binding of cyanine light chain (PIN) to neuronal nitric oxide synthase in the absence of inhibition. *Arch. Biochem. Biophys.*, 359 (1998) 297-304.
- 1560 Roush, D.J., Antia, F.D. and Göklen, K.E.: Preparative high-performance liquid chromatography of echinocandins. *J. Chromatogr. A*, 827 (1998) 373-389.
- 1561 Sanz-Nebot, V., Garcés, A. and Barbosa, J.: Investigation of crudes of synthesis of carbetoxin by liquid chromatography coupled to electrospray ionization mass spectrometry. *J. Chromatogr. A*, 833 (1999) 267-275.
- 1562 Seidler, T., Pemberton, C., Yandle, T., Espiner, E., Nicholls, G. and Richards, M.: The amino terminal regions of proBNP and proANP oligomerase through leucine zipper-like coiled-coil motifs. *Biochem. Biophys. Res. Commun.*, 255 (1999) 495-501.
- 1563 Wu, S.-J. and Wang, C.: Binding of heptapeptides or unfolded proteins to the chimeric C-terminal domains of 70-kDa heat shock cognate proteins. *Eur. J. Biochem.*, 259 (1999) 449-455.

For additional information see C.A.:  
129 (1998) 321144c, 326166w.

See also 1196, 1197, 1240, 1382, 1564, 1567, 1589, 1614, 1679, 1743, 1882, 2131, 2141.

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

- 1564 Appfel, A., Yin, H., Hancock, W.S., McManigill, D., Frenz, J. and Wu, S.-L.: Effect of electric field on liquid chromatographic separation of peptide digests. Combining capillary separation techniques. *J. Chromatogr. A*, 832 (1999) 149-163.
- 1565 Boggs, J.M., Rangaraj, G. and Koshy, K.M.: Analysis of the membrane-interacting domains of myelin basic protein by hydrophobic photolabeling. *Biochim. Biophys. Acta*, 1417 (1999) 254-266.
- 1566 Haniu, M., Arakawa, T., Bures, E.J., Young, Y., Hui, J.O., Rohde, M.F., Welcher, A.A. and Horan, T.: Human leptin receptor. Determination of disulfide structure and N-glycosylation sites of the extracellular domain. *J. Biol. Chem.*, 273 (1998) 28691-28699.
- 1567 Lippincott, J. and Apostol, I.: Carbamylated cysteine: a potential artifact in peptide mapping of hemoglobins in the presence of urea. *Anal. Biochem.*, 267 (1999) 57-64.
- 1568 Minning, D.M. and Goldberg, D.E.: Determinants of Ascaris hemoglobin octamer formation. *J. Biol. Chem.*, 273 (1998) 32644-32649.
- 1569 Olczak, M. and Watorek, W.: Oligosaccharide and polypeptide homology of lupin (*Lupinus luteus* L.) acid phosphatase subunits. *Arch. Biochem. Biophys.*, 360 (1998) 85-92.
- 1570 Olman, M.A., Williams, W.F., Strickland, J.H., Jr., Hagood, J.S., Simmons, W.L. and Rivera, K.E.: Facile purification of fibrinogen fragments using a computer-based model with general applicability to the generation of salt gradients. *Protein Expression Purif.*, 14 (1998) 71-78; C.A., 130 (1999) 35184.

- 1571 Pellegrini, A., Thomas, U., Bramaz, N., Hunziker, P. and von Fellenberg, R.: Isolation and identification of three bactericidal domains in the bovine  $\alpha$ -lactalbumin molecule. *Biochim. Biophys. Acta*, 1426 (1999) 439-448.
- 1572 Rai, S.S. and Wolff, J.: Localization of critical histidyl residues required for vinblastine-induced tubulin polymerization and for microtubule assembly. *J. Biol. Chem.*, 273 (1998) 31131-31137.
- 1573 Shindo, N., Fujimura, T., Nojima-Kazuno, S., Mineki, R., Furusawa, S., Sasaki, K.-i. and Murayama, K.: Identification of multidrug resistant protein 1 of mouse leukemia P388 cells on a PVDF membrane using 6-aminoquinolyl-carbonyl (AQC)-amino acid analysis and world wide web (WWW)-accessible tools. *Anal. Biochem.*, 264 (1998) 251-258.
- 1574 Tamburini, M., Romano, M., Carratore, V., Kunzmann, A., Coletta, M. and di Prisco, G.: The hemoglobins of the antarctic fishes *Arctedidraco orianae* and *Pogonophryne scotti*. *J. Biol. Chem.*, 273 (1998) 32452-32459.

See also 1119, 1382, 1511, 1624, 1650, 1652, 1804.

#### 19. PROTEINS

##### 19a. General techniques

- 1575 Alomirah, H.F., Alli, I. and Gibbs, B.F.: Identification of proteolytic products as indicators of quality in ground and whole meat. *J. Food Qual.*, 21 (1998) 299-316; C.A., 129 (1998) 274861x.
- 1576 Bible, K.C., Boerner, S.A. and Kaufmann, S.H.: A one-step method for protein estimation in biological samples: nitration of tyrosine in nitric acid. *Anal. Biochem.*, 267 (1999) 217-221.
- 1577 DeStefano, J.J., Hearn, M.T.W., Jungbauer, A., Hodges, R.S., Regnier, F.E. and Unger, K.K. (Editors): *Proceedings of the 17th International Symposium on the Separation and Analysis of Proteins, Peptides and Polynucleotides, held in Washington, DC, 26-29 October 1997*. In: *J. Chromatogr. A*, Vol. 816, Elsevier, Amsterdam, 1998, 111 pp.
- 1578 Ehring, H.: Hydrogen exchange/electrospray ionization mass spectrometry studies of structural features of proteins and protein/protein interactions. *Anal. Biochem.*, 267 (1999) 252-259.
- 1579 Farnan, D.: High speed chromatography of proteins in short columns. Avail. UMI, Order No. DA9831430, 1998, 131 p.; C.A., 129 (1998) 316544d.
- 1580 Fountoulakis, M. and Takacs, B.: Design of protein purification pathways: application to the proteome of *Haemophilus influenzae* using heparin chromatography. *Protein Expression Purif.*, 14 (1998) 113-119; C.A., 130 (1999) 35186.
- 1581 Fountoulakis, M., Takács, M.-F. and Takács, B.: Enrichment of low-copy-number gene products by hydrophobic interaction chromatography. *J. Chromatogr. A*, 833 (1999) 157-168.
- 1582 Galaev, I.Yu.: (New methods of protein purification. Expanded bed chromatography). *Biokhimiya (Moscow)*, 63 (1998) 737-743 - a review with 28 refs.
- 1583 Galaev, I.Yu.: New methods of protein purification. Expanded bed chromatography. *Biochemistry (Moscow)*, 63 (1998) 619-624; C.A., 129 (1998) 327792.

- 1584 Henzel, W.J., Tropea, J. and Dupont, D.: Protein identification using 20-minute Edman cycle and sequence mixture analysis. *Anal. Biochem.*, 267 (1999) 148-160.
- 1585 Ji, Y., Akerboom, T.P.M., Sies, H. and Thomas, J.A.: S-Nitrosylation and S-glutathiolation of protein sulfhydryls by S-nitroso glutathione. *Arch. Biochem. Biophys.*, 362 (1999) 67-78.
- 1586 Liapis, A.I., Sadikoglu, H. and Crosser, O.K.: Frontal chromatography of proteins: The effect on column performance of the restricted diffusion of molecules in porous chromatographic adsorbents. *J. Chromatogr. A*, 828 (1998) 345-356.
- 1587 Papageorgopoulos, C., Caldwell, K., Shackleton, C., Schweinrubber, H. and Hellerstein, M.K.: Measuring protein synthesis by mass isotopomer distribution analysis (MIDA). *Anal. Biochem.*, 267 (1999) 1-16.
- 1588 Patwardhan, A.V., Goud, G.N., Pasquinelli, R.S., Koepsel, R.R. and Attai, M.M.: Phage-displayed libraries for the selection of optimal affinity peptides for protein purification using Ni-nitrotriacetic acid chromatography. *Biotechnol. Tech.*, 12 (1998) 421-424; *C.A.*, 129 (1998) 227613h.
- 1589 Staby, A., Johansen, N., Wahlstrøm, H. and Mollerup, I.: Comparison of loading capacities of various proteins and peptides in culture medium and in pure state. *J. Chromatogr. A*, 827 (1998) 311-318.
- 1590 Suto, R.K., Whalen, M.A., Bender, B.R. and Finke, R.G.: Synthesis of  $\gamma$ -phosphate-linked nucleoside affinity chromatography resins for protein purification, including ribonucleoside triphosphate reductase. *Nucleosides Nucleotides*, 17 (1998) 1453-1471; *C.A.*, 129 (1998) 230935v.
- 1591 Weitzhandler, M., Farnan, D., Horvath, J., Rohrer, J.S., Slingsby, R.W., Avdalovic, N. and Pohl, C.: Protein variant separations by cation-exchange chromatography on tentacle-type polymeric stationary phases. *J. Chromatogr. A*, 828 (1998) 365-372.
- 1592 Xu, W. and Regnier, F.E.: Protein-protein interactions on weak-cation-exchange sorbent surfaces during chromatographic separations. *J. Chromatogr. A*, 828 (1998) 357-364.
- 1593 Yang, L.: Online coupling of capillary electrophoresis and liquid chromatography with electrospray ionization mass spectrometry for protein characterization. Avail. UMI, Order No. DA9826588, 1998, 109 p.; *C.A.*, 129 (1998) 287017d.
- See also 1091, 1099, 1183, 1184, 1196, 1206, 1239, 1240, 1257, 1287.
- 19b. *Proteins of cells, viruses and subcellular particles*
- 1594 Ciccaglione, A.R., Marcantonio, C., Equestre, M., Jones, I.M. and Rapicetta, M.: Secretion and purification of HCVE1 protein forms as glutathione-S-transferase fusion in the baculovirus insect cell system. *Virus Res.*, 55 (1998) 157-165; *C.A.*, 129 (1998) 200278r.
- 1595 Gonzalez, R.F. and Dobbs, L.G.: Purification and analysis of RT140, a type I alveolar epithelial cell apical membrane protein. *Biochim. Biophys. Acta*, 1429 (1998) 208-216.
- 1596 Hall, M.P., Burson, K.K. and Huestis, W.H.: Interactions of a vesicular stomatitis virus G protein fragment with phosphatidylserine: NMR and fluorescence studies. *Biochim. Biophys. Acta*, 1415 (1998) 101-113.
- 1597 Itoh, K., Nakagomi, O., Suzuki, K., Inoue, K., Tada, H. and Suzuki, T.: Recombinant human monoclonal Fab fragments against rotavirus from phage display combinatorial libraries. *J. Biochem. (Tokyo)*, 125 (1999) 123-129.
- 1598 Martin, H., Eckerskorn, C., Gärtner, F., Rassow, J., Lottspeich, F. and Pfanner, N.: The yeast mitochondrial intermembrane space: purification and analysis of two distinct fractions. *Anal. Biochem.*, 265 (1998) 123-128.
- 1599 Müller, B. and Kräusslich, H.-G.: Characterization of human T-cell leukemia virus type 1 integrase expressed in *Escherichia coli*. *Eur. J. Biochem.*, 259 (1999) 79-87.
- 1600 Quaite-Randall, E. and Joachimiak, A.: Purification of chaperonins. *J. Chromatogr. B*, 722 (1999) 153-177 - a review with 80 refs.
- 1601 Veldhuizen, E.J.A., Batenburg, J.J., Vandenbussche, G., Putz, G., van Golde, L.M.G. and Haagsman, H.P.: Production of surfactant protein C in the baculovirus expression system: the information required for correct folding and palmitoylation of SP-C is contained within the mature sequence. *Biochim. Biophys. Acta*, 1416 (1999) 295-308.
- See also 1580, 1927.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*
- 1602 Moen, A.A.: Method for detecting the presence of an immunologically reactive molecule in a sample. *PCT Int. Appl. WO 98 39,656* (Cl. G01N33/538), 11 Sep. 1998, NL Appl. 10/6,680, 29 Jul. 1997; 21 p.; *C.A.*, 129 (1998) 229672a.
- See also 1540, 1597, 1650, 1658, 1672, 1685, 1690.
- 19d. *Microbial and plant proteins*
- 1603 Bhardwaj, S. and Day, R.A.: Analysis of reverse phase chromatographic separated *Bacillus subtilis* membrane proteins. *Anal. Lett.*, 31 (1998) 2625-2634.
- 1604 Brodersen, J., Bäumer, S., Abken, H.-J., Gottschalk, G. and Depenmeier, U.: Inhibition of membrane-bound electron transport of the methanogenic archaeon *Methanocarcina mazei* Gö 1 by diphenyleneiodonium. *Eur. J. Biochem.*, 259 (1999) 218-224.
- 1605 Caldas, T.D., El Yaagoubi, A., Kohiyama, M. and Richarme, G.: Purification of elongation factors EF-Tu and EF-G from *Escherichia coli* by covalent chromatography on thiol-Sepharose. *Protein Expression Purif.*, 14 (1998) 65-70; *C.A.*, 130 (1999) 35183.
- 1606 Chow, L.-P., Chou, M.-H., Ho, C.-Y., Chuang, C.-C., Pan, F.-M., Wu, S.-H. and Lin, J.-Y.: Purification, characterization and molecular cloning of trichoanguin, a novel type I ribosome-inactivating protein from the seeds of *Trichosanthes anguina*. *Biochim. J.*, 338 (1999) 211-219.
- 1607 De Cock, H., Schäfer, U., Potgeiter, M., Demel, R., Müller, M. and Tommassen, J.: Affinity of the periplasmic Skp of *Escherichia coli* phospholipids, lipopolysaccharides and non-native outer membrane proteins. Role of Skp in the biogenesis of outer membrane protein. *Eur. J. Biochem.*, 259 (1999) 96-103.

- 1608 Doi-Kawano, K., Kouzuma, Y., Yamasaki, N. and Kimura, M.: Molecular cloning, functional expression, and mutagenesis of cDNA encoding a cysteine proteinase inhibitor from sunflower seeds. *J. Biochem. (Tokyo)*, 124 (1998) 911-916.
- 1609 Garcia, M.C., Torre, M. and Marina, M.L.: A perfusion reversed-phase chromatographic method for ultrarapid determination of soybean proteins in soybean infant formulas and soybean milks: Method development and validation. *J. Chromatogr. Sci.*, 36 (1998) 527-534.
- 1610 Geoghegan, K.F., Dixon, H.B.F., Rosner, P.J., Hoth, L.R., Lanzetti, A.J., Borzilleri, K.A., Marr, E.S., Pezzullo, L.H., Martin, L.B., LeMotte, P.K. et al.: Spontaneous  $\alpha$ -N-6-phosphogluconylation of a "His Tag" in *Escherichia coli*: the cause of extra mass of 258 or 178 Da in fusion proteins. *Anal. Biochem.*, 267 (1999) 169-184.
- 1611 Güereca, L. and Bravo, A.: The oligomeric state of *Bacillus thuringiensis* Cry toxins in solution. *Biochim. Biophys. Acta*, 1429 (1999) 342-350.
- 1612 Kumar, M., Dattagupta, S., Kannan, K.K. and Hosur, M.V.: Purification, crystallisation and preliminary X-ray diffraction study of ribosome inactivating protein: saporin. *Biochim. Biophys. Acta*, 1429 (1999) 506-511.
- 1613 Martinez Gonzalez, J., Jimenez Gonzalez, A. and Rodriguez Cabriero, F.: Purification of *Trichinella spiralis* tubulin: comparison of several analytic procedures. *Vet. Parasitol.*, 77 (1998) 115-121; C.A., 129 (1998) 257281r.
- 1614 Minuth, T., Frey, G., Lindner, P., Rachel, R., Stetter, K.O. and Jaenicke, R.: Recombinant homo- and hetero-oligomers of an ultrastable chaperonin from the archaeon *Pyrodictium occultum* show chaperone activity *in vitro*. *Eur. J. Biochem.*, 258 (1998) 837-845.
- 1615 Ohashi, T. and Erickson, H.P.: Oligomeric structure and tissue distribution of ficolins from mouse, pig and human. *Arch. Biochem. Biophys.*, 360 (1998) 223-232.
- 1616 Srinivasan, U. and Bell, J.A.: A convenient method for affinity purification of maltose binding protein fusions. *J. Biotechnol.*, 62 (1998) 163-167; C.A., 129 (1998) 272449v.
- 1617 Tan, Y.-J., Beerheide, W. and Ting, A.E.: Biophysical characterization of the oligomeric state of bax and its complex formation with Bcl-X<sub>L</sub>. *Biochem. Biophys. Res. Commun.*, 255 (1999) 334-339.
- 1618 Tsiotis, G., Psylinalakis, M., Woplensinger, B., Lustig, A., Engel, A. and Ghanotakis, D.: Investigation of the structure of spinach photosystem II reaction center complex. *Eur. J. Biochem.*, 259 (1999) 320-324.
- 1619 Votyakova, T.V., Wallace, H.M., Dunbar, B. and Wilson, S.B.: The covalent attachment of polyamines to proteins in plant mitochondria. *Eur. J. Biochem.*, 260 (1999) 250-257.
- See also* 2395, 2542, 2587.
- 19e. *Proteins of blood, serum and blood cells*
- 1620 Adcock, W.L., MacGregor, A., Davies, J.R., Hattarki, M., Anderson, D.A. and Goss, N.H.: Chromatographic removal and heat inactivation of hepatitis A virus during manufacture of human albumin. *Biotechnol. Appl. Biochem.*, 28 (1998) 85-94; C.A., 129 (1998) 215735m.
- 1621 Andersen, P.J.: A dimeric form of prothrombin on membrane surfaces. *Biochem. J.*, 336 (1998) 631-638.
- 1622 Bellotti, V., Stoppani, M., Mangione, P., Sunde, M., Robinson, C., Asti, L., Brancaccio, D. and Ferri, G.:  $\beta$ 2-Microglobulin can be refolded into a native state from ex vivo amyloid fibrils. *Eur. J. Biochem.*, 258 (1998) 61-67.
- 1623 Dancette, O.P., Tabouret, J.-L., Tournier, E., Charcosset, C. and Blond, P.: Purification of immunoglobulins G by protein A/G affinity membrane chromatography. *J. Chromatogr. B*, 723 (1999) 61-68.
- 1624 Gauthier, S.Y., Kay, C.M., Sykes, B.D., Walker, V.K. and Davies, P.L.: Disulfide bond mapping and structural characterization of spruce budworm antifreeze protein. *Eur. J. Biochem.*, 258 (1998) 445-453.
- 1625 Hansen, P., Scoble, J.A., Hanson, B. and Hoogenraad, N.J.: Isolation and purification of immunoglobulins from chicken eggs using thiophilic interaction chromatography. *J. Immunol. Methods*, 215 (1998) 1-7; C.A., 129 (1998) 301338r.
- 1626 Hinman, C.L. and Stevens-Truss, R.: In-line affinity chromatographic removal of specific antibody from rabbits with experimental myasthenia gravis as a prelude to immunotherapy. *Immunopharmacol. Immunotoxicol.*, 20 (1998) 233-249; C.A., 129 (1998) 215354m.
- 1627 Jacob, L. (A purification strategy for antibodies). *LaborPraxis*, 22 (1998) 22-25; C.A., 129 (1998) 329456b.
- 1628 Jones, R.M.L., Schweikart, F., Frutiger, S., Jaton, J.-C. and Hughes, G.J.: Thiol-disulfide redox buffers maintain a structure of immunoglobulin A that is essential for optimal *in vitro* binding to secretory component. *Biochim. Biophys. Acta*, 1429 (1998) 265-274.
- 1629 Kim, H. and Li-Chan, E.C.Y.: Separation of immunoglobulin G from Cheddar cheese whey by avidin-biotinylated IgY chromatography. *J. Food Sci.*, 63 (1998) 429-434; C.A., 129 (1998) 160758p.
- 1630 Koyama, H., Omura, K., Ejima, A., Kasanuma, Y., Watanabe, C. and Satoh, H.: Separation of selenium-containing proteins in human and mouse plasma using tandem high performance liquid chromatography columns coupled with inductively coupled plasma-mass spectrometry. *Anal. Biochem.*, 267 (1999) 84-91.
- 1631 Kudo, S. and Kawano, K.: Association and dissociation properties of natural human interferon  $\gamma$ . *J. Chromatogr. B*, 723 (1999) 25-30.
- 1632 Moio, L., Marchisano, C. and Addeo, F.: Isolation of specific oligoclonal antibodies against bovine  $\alpha$ s1-casein by FPLC tandem immunoaffinity of the polyclonal antibodies. *J. Dairy Res.*, 65 (1998) 515-520; C.A., 129 (1998) 259470a.
- 1633 Schweikart, F. and Lullau, E.: Chromatographic methods for immunoglobulin A purification. *Bioforum Int.*, 1 (1997) 119-121; C.A., 129 (1998) 215271g.
- 1634 Suzuki, Y., Takada, J., Isaka, K., Takayama, M. and Grudzinskas, J.G.: Isolation of pregnancy-associated plasma protein A. *Trophoblast Res.*, 9 (1997) 13-25; C.A., 129 (1998) 255633n.
- 1635 Theberge, R., Connors, L., Skinner, M., Skare, J. and Costello, C.F.: Characterization of transthyretin mutants from serum using immunoprecipitation, HPLC/electrospray ionization and matrix-assisted laser desorption/ionization mass spectrometry. *Anal. Chem.*, 71 (1999) 452-459.
- 1636 Tleugabulova, D., Falcón, V. and Pentón, E.: Evidence for the denaturation of recombinant hepatitis B surface antigen on aluminium hydroxide gel. *J. Chromatogr. B*, 720 (1998) 153-163.

For additional information see C.A.:

129 (1998) 227800s, 257342m, 301359y, 312938n.

See also 1106, 1567, 1570, 1573, 1646, 1652.

**19f. Structural and muscle proteins**

- 1637 Brandt, J., Krogh, T.N., Jensen, C.H., Frederiksen, J.K. and Teisner, B.: Thermal instability of the trimeric structure of the N-terminal propeptide of human procollagen type I in relation to assay technology. *Clin. Chem. (Washington)*, 45 (1999) 47-53.
- 1638 Inada, H., Goto, H., Tanabe, K., Nishi, Y., Kaibuchi, K. and Inagaki, M.: Tho-associated kinase phosphorylates desmin, the myogenic intermediate filament protein, at unique amino-terminal sites. *Biochem. Biophys. Res. Commun.*, 253 (1998) 21-25.
- 1639 Khoroshev, M.I., Munson, S.J. and Bikle, D.D.: Six putative IQ motifs to the recombinant chicken intestinal brush border myosin I are involved in calmodulin binding. *Arch. Biochem. Biophys.*, 361 (1999) 94-100.
- 1640 Maruta, S., Ueyehara, Y., Homma, K., Sugimoto, Y. and Wakabayashi, K.: Formation of the myosin•ADP•gallium fluoride complex and its solution structure by small-angle synchrotron x-ray scattering. *J. Biochem. (Tokyo)*, 125 (1999) 177-185.
- 1641 Vuletic, J.L. and Osawa, Y.: Chemiluminescence assay for oxidatively modified myoglobin. *Anal. Biochem.*, 265 (1998) 375-380.

See also 1647.

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

- 1642 Kratzmeier, M., Albig, W., Meergans, T. and Doenecke, D.: Changes in the protein pattern of H1 histones associated with apoptotic DNA fragmentation. *Biochem. J.*, 337 (1999) 319-327.
- 1643 Thorne, A.W., Cary, P.D. and Crane-Robinson, C.: Extraction and separation of core histones and non-histone chromosomal proteins. In: Gould, H. (Editor), *Chromatin*, Oxford University Press, Oxford, 1998, pp. 35-57; C.A., 129 (1998) 227732w.

**19h. Chromoproteins and metalloproteins**

- 1644 Arteel, G.E., Mostert, V., Oubrahim, H., Breviba, K., Abel, J. and Sies, H.: Protection by selenoprotein P in human plasma against peroxynitrite-mediated oxidation and nitration. *Biol. Chem.*, 379 (1998) 1201-1205. C.A., 129 (1998) 228833s.
- 1645 Chassaigne, H. and Lobinski, R.: Characterization of metallothionein isoforms by reversed-phase high-performance liquid chromatography with on-line post-column acidification and electrospray mass spectrometric detection. *J. Chromatogr. A*, 829 (1998) 127-136.
- 1646 Gotoh, T., Sano, T., Shibuya, A., Yamaki, M., Imai, K. and Ebina, S.: Hexagonal bilayer structuring activity of linker chains of an annelid giant hemoglobin from the polychete *Perinereis aibuhitensis*. *Arch. Biochem. Biophys.*, 360 (1998) 75-84.
- 1647 Gu, Q.-P., Beilstein, M.A., Barofsky, E., Ream, W. and Whanger, P.D.: Purification, characterization, and glutathione binding to selenoprotein W from monkey muscle. *Arch. Biochem. Biophys.*, 361 (1999) 25-33.

1648 Hensbergen, P.J., Donker, M.H., van Velzen, M.J.M., Roelofs, D., van der Schors, R.C., Huziker, P.E. and van Straalen, N.M.: Primary structure of a cadmium-induced metallothionein from the insect *Orchesella cincta* (Collembola). *Eur. J. Biochem.*, 259 (1999) 197-203.

1649 Kabzinski, A.K.M.: Application of covalent affinity chromatography with thiol-disulfide interchange for determination of environmental exposure to heavy metals based on the quantitative isolation of Cd-thionein from human breast milk. *Biomed. Chromatogr.*, 12 (1998) 217-225; C.A., 129 (1998) 212590z.

1650 Kerwin, B.A., Akers, M.J., Apostol, I., Moore-Einsel, C., Etter, J.E., Hess, E., Lippincott, J., Levine, J., Mathews, A.J., Revilla-Sharp, P. et al.: Acute and long-term stability studies of deoxy hemoglobin and characterization of ascorbate-induced modifications. *J. Pharm. Sci.*, 88 (1999) 79-88.

1651 Mutlib, A.E. and Klein, J.T.: Application of liquid chromatography/mass spectrometry in accelerating the identification of human liver cytochrome P450 isoforms involved in the metabolism of iloperidone. *J. Pharmacol. Exp. Ther.*, 286 (1998) 1285-1293; C.A., 129 (1998) 339441g.

1652 Paleari, R., Paglietti, E., Mosca, A., Mortarino, M., Maccioni, L., Satta, S., Cao, A. and Galanello, R.: Posttranslational deamidation of proteins: the case of hemoglobin J Sardegna [ $\alpha$ 50(CD)His $\rightarrow$ Asn $\rightarrow$ Asp]. *Clin. Chem. (Washington)*, 45 (1999) 21-28.

1653 Salmain, M., Gorfti, A. and Jaouen, G.: Side-chain selective and covalent labelling of proteins by organometallic complexes of heavy transition metals. Possible application in radio-crystallography proteins. *Eur. J. Biochem.*, 258 (1998) 192-199.

1654 Suzuki, K.T., Sasakura, C. and Yoneda, S.: Binding sites for the (Hg-Se) complex on selenoprotein P. *Biochim. Biophys. Acta*, 1429 (1998) 102-112.

1655 Wagner, M., Sonntag, D., Grimm, R., Pich, A., Eckerskorn, C., Söhling, B. and Andreesen, J.R.: Substrate-specific selenoprotein B of glycine reductase from *Eubacterium acidaminophilum*. Biochemical and molecular analysis. *Eur. J. Biochem.*, 260 (1999) 38-49.

For additional information see C.A.:

130 (1999) 22504, 35350.

See also 1243, 1567, 1568, 1574, 1591, 1662, 1822.

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

1656 Atoda, H., Ishikawa, M., Mizuno, H. and Morita, T.: Coagulation factor X-binding protein from *Deinagkistrodon acutus* venom is a Gla domain-binding protein. *Biochemistry*, 37 (1998) 17361-17370.

1657 Ginger, M.R., Piotte, C.P., Otter, D.E. and Grigor, M.R.: Identification, characterisation and cDNA cloning of two caseins from the common brushtail possum (*Trichosurus vulpecula*). *Biochim. Biophys. Acta*, 1427 (1999) 92-104.

1658 Grundy, J.E., Wirtanen, L.Y. and Beauregard, M.: Addition of a poly-(6X) His tag to milk bundle-1 and purification using immobilized metal-affinity chromatography. *Protein Expression Purif.*, 13 (1998) 61-66; C.A., 129 (1998) 158059t.

- 1659 Hassani, O., Mansyekkem O., Cestèle, S., Bourdeaus, M., Roche, H. and Sampieri, F.: Role of lysine and tryptophan residues in the biological activity of toxin VII (TS  $\gamma$ ) from the scorpion *Tityus serrulatus*. *Eur. J. Biochem.*, 260 (1999) 76-86.
- 1660 Jennings, B.R., Spearman, C.W.N., Kirsch, R.E. and Shephard, E.G.: A novel high molecular weight fibrinogenase from the venom of *Bitis arietans*. *Biochim. Biophys. Acta*, 1427 (1999) 82-91.
- 1661 Kristiansen, K.R., Otte, J., Ipsen, R. and Qvist, K.B.: Large-scale preparation of b-lactoglobulin A and B by ultrafiltration and ion-exchange chromatography. *Int. Dairy J.*, 8 (1998) 113-118; C.A., 130 (1999) 37483.
- 1662 Li-Chan, E.C.Y., Ler, S.S., Kummer, A. and Akita, E.M.: Isolation of lactoferrin by immunoaffinity chromatography using yolk antibodies. *J. Food Biochem.*, 22 (1998) 179-195; C.A., 129 (1998) 312317.
- 1663 Lin, S.-R., Chang, L.-S. and Chang, C.-C.: Disulfide isomers of  $\alpha$ -neurotoxins from king cobra (*Ophiophagus hannah*) venom. *Biochem. Biophys. Res. Commun.*, 254 (1999) 104-108.
- 1664 Matsumoto, K. and Yoshiyama, H.: (Chromatographic method for purification of proteins and its application in purification of human hepatocyte growth factor). *Jpn. Kokai Tokkyo Koho*, JP 10 215,875 [98 215,875] (Cl. C12N15/09), 18 Aug. 1998, Appl. 97/23,845, 6 Feb. 1997; 8 pp.; C.A., 129 (1998) 186410u.
- 1665 Oshikawa, K. and Terada, S.: Ussuristatin 2, a novel KGD-bearing disintegrin from *Agiistrodon ussuriensis* venom. *J. Biochem. (Tokyo)*, 125 (1999) 31-35.
- 1666 Pirker, R.A., Pont, J., Pöhnl, R., Schitz, W., Griesmacher, A. and Müller, M.M.: Usefulness of chromogranin A as a marker for detection of relapses of carcinoid tumours. *Clin. Chem. Lab. Med.*, 36 (1998) 837-840.
- 1667 Siigur, E., Samel, M., Tönnismägi, K., Subbi, J., Reintamm, T. and Siigur, J.: Isolation, properties and N-terminal amino acid sequence of a factor V activator from *Vipera lebetina* (Levantine viper) snake venom. *Biochim. Biophys. Acta*, 1429 (1998) 239-248.
- 1668 Sostmann, K. and Guichard, E.: Immobilized  $\beta$ -lactoglobulin on a HPLC column: a rapid way to determine protein-flavor interaction. *Food Chem.*, 62 (1998) 509-513; C.A., 129 (1998) 259507t.
- 1669 Yeh, C.-H., Peng, H.-C., Yih, J.-B. and Huang, T.-F.: A new short chain RGD-containing disintegrin, accutin, inhibits the common pathway of human platelet aggregation. *Biochim. Biophys. Acta*, 1425 (1998) 493-504.
- See also 1092, 1571, 1629, 1674, 1686, 1688, 1691, 1763, 1795, 1822.
- 19j. Proteins of brain, cerebrospinal fluid and eye
- 1670 Fu, S., Dean, R., Southan, M. and Truscott, R.: The hydroxyl radical in lens nuclear cataractogenesis. *J. Biol. Chem.*, 273 (1998) 28603-28609.
- 1671 Sloboda, R.D. and Belfi, L.M.: Purification of tubulin and microtubule-associated proteins by membrane ion-exchange chromatography. *Protein Expression Purif.*, 13 (1998) 205-209; C.A., 129 (1998) 213682t.
- See also 1565, 1572.
- 19k. Proteins of neoplastic tissue and transformed cells
- 1672 Hizel, C., Maurizis, J.-C., Rio, P., Communal, Y., Chassagne, J., Favé, D., Bignon, Y.-J. and Bernard-Gallon, D.J.: Isolation, purification and quantification of BRCA1 protein from tumour cells by affinity perfusion chromatography. *J. Chromatogr. B*, 721 (1999) 163-170.
- 19l. Specific binding and receptor proteins
- 1673 Alexeev, T., Krivoshein, A., Shevalier, A., Kudelina, I., Telyakova, O., Vincent, A., Utkin, Y., Hucho, F. and Tsetlin, V.: Physico-chemical and immunological studies on the N-terminal domain of the *Torpedo acetylcholine receptor*  $\alpha$ -subunit expressed in *Escherichia coli*. *Eur. J. Biochem.*, 259 (1999) 310-319.
- 1674 Baba, K., Abe, T.K., Tsunashawa, S. and Odani, S.: Characterization and primary structure of a fatty acid-binding protein and its isoforms from the liver of the Amphibia, *Rana catesbeiana*. *J. Biochem. (Tokyo)*, 125 (1999) 115-122.
- 1675 Cox, B.J. and Bunce, N.J.: Gel-filtration chromatographic method for determining relative binding affinities: rat hepatic estrogen receptor as an example system. *Anal. Biochem.*, 267 (1999) 357-365.
- 1676 Di Pietro, S.M., Veerkamp, J.H. and Santomé, J.A.: Isolation, amino acid sequence determination and binding properties of two fatty-acid-binding proteins from axolotl (*Ambystoma mexicanum*) liver. Evolutionary relationship. *Eur. J. Biochem.*, 259 (1999) 127-134.
- 1677 Fujimoto, Y., Nagata, R., Fukasawa, H., Yano, K., Azuma, M., Iida, A., Sugimoto, S., Shudo, K. and Hashimoto, Y.: Purification and cDNA cloning of cytokinin-specific binding protein from mung bean (*Vigna radiata*). *Eur. J. Biochem.*, 258 (1998) 794-802.
- 1678 Greenberg, Z., Stoch, S.A., Traianedes, K., Teng, H., Rosenblatt, M. and Chorev, M.: Covalent immobilization of recombinant human  $\alpha_1\beta_3$  integrin on a solid support with retention of functionality. *Anal. Biochem.*, 266 (1999) 153-164.
- 1679 Hage, T., Reinemer, P. and Sebald, W.: Crystals of a 1:1 complex between human interleukin-4 and the extracellular domain of its receptor  $\alpha$  chain. *Eur. J. Biochem.*, 258 (1998) 831-836.
- 1680 Hitcock, R.S., Ward, S., Wilkinson, A.-S., Caspers, P., Mensch, B., Page, M.G.P. and Wharton, C.W.: Hydrogen bonding and protein perturbation in  $\beta$ -lactam acyl-enzymes of *Streptococcus pneumoniae* penicillin-binding protein PBP2X. *Biochem. J.*, 338 (1999) 153-159.
- 1681 Igarashi, T., Yokomizo, T., Tsutsumi, O., Taketani, Y., Shimizu, T. and Izumi, T.: Characterization of the leukotriene B<sub>4</sub> receptor in porcine leukocytes. Separation and reconstitution with heterotrimeric GTP-binding proteins. *Eur. J. Biochem.*, 259 (1999) 419-425.
- 1682 Ito, K., Haga, T., Lameh, J. and Sadée, W.: Sequestration of dopamine D2 receptors depends on coexpression of G-protein-coupled receptor kinases 2 or 5. *Eur. J. Biochem.*, 260 (1999) 112-119.
- 1683 Kaplan, K.B. and Sorger, P.K.: Purification of sequence-specific DNA-binding proteins by affinity chromatography. In: Creighton, T.E. (Editor), *Protein Funct.* (2nd Ed.), IRL Press, Oxford, 1997, pp. 245-278; C.A., 129 (1998) 257133u.

- 1684 Lavagna, C., Poiree, J., Fournel, S. and Rampal, P.: Purification of a new intestinal anti-proliferative factor from normal human small intestine. *Eur. J. Biochem.*, 259 (1999) 821-828.
- 1685 Lian, D.-j. and Xu, G.-j.: (An improved affinity chromatography system for the purification of engineered maltose-binding fused product). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 25 (1998) 283-284; C.A., 129 (1998) 188408y.
- 1686 Murphy, E.J., Edmondson, R.D., Russell, D.H., Colles, S. and Schroeder, F.: Isolation and characterization of two distinct forms of liver fatty acid binding protein from the rat. *Biochim. Biophys. Acta*, 1436 (1999) 413-425.
- 1687 Sabbah, M., Kang, K.-I., Tora, L. and Redeuilh, G.: Oestrogen receptor facilitates the formation of preinitiation complex assembly: involvement of the general transcription factor TFIIB. *Biochem. J.*, 336 (1998) 639-646.
- 1688 Sorrentino, S., D'Alessandro, A.M., Maras, B., di Cicco, L., D'Andrea, G., de Prisco, R., Bossa, F., Libonati, M. and Oratore, A.: Purification of a 76-kDa iron-binding protein from human seminal plasma by affinity chromatography specific for ribonuclease: structural and functional identity with milk lactoferrin. *Biochim. Biophys. Acta*, 1430 (1999) 103-110.
- 1689 Wang, C., Vastro, A.F., Wilkes, D.M. and Altenberg, G.A.: Expression and purification of the first nucleotide-binding domain and linker region of human multidrug resistance gene product: comparison of fusions to glutathione S-transferase, thioredoxin and maltose-binding protein. *Biochem. J.*, 338 (1999) 77-81.
- 1690 Xie, Y., Lashuel, H.A., Miroy, G.J., Dikler, S. and Kelly, J.W.: Recombinant human retinol-binding protein refolding, native disulfide formation, and characterization. *Protein Expression Purif.*, 14 (1998) 31-37; C.A., 130 (1999) 35312.
- See also 1248, 1447, 1537, 1566, 1607, 1616, 1672, 1742, 1750.
- 19m. *Urinary proteins*
- 1691 Mao, Y., Moore, Y., Ronald, J., Wagnon, K.B., Pierce, J.T., Debbaran, K.H., Smith, C.S., Dill, J.A. and Fuciarelli, A.F.: Analysis of  $\alpha_2u$ -globulin in rat urine and kidneys by liquid chromatography-electrospray ionization mass spectrometry. *Chem. Res. Toxicol.*, 11 (1998) 953-961; C.A., 129 (1998) 212594d.
- 19n. *Other proteins (incl. proteinous inhibitors of enzymic activity)*
- 1692 Awadé, A.C. and Efstatouli, T.: Comparison of three liquid chromatographic methods for egg-white protein analysis. *J. Chromatogr. B*, 723 (1999) 69-74.
- 1693 Chang, J.: Denatured states of tick anticoagulant peptide. Compositional analysis of unfolded scrambled isomers. *J. Biol. Chem.*, 274 (1999) 123-128.
- 1694 Chopin, V., Stefano, G.B. and Salzet, M.: Amino-acid-sequence determination and biological activity of tessulin, a naturally occurring trypsin-chymotrypsin inhibitor isolated from the leech *Theromyzon tessulatum*. *Eur. J. Biochem.*, 258 (1998) 662-668.
- 1695 Dosio, F., Arpicco, S., Canevari, S., Figini, M. and Gastaldi, D.: Single-step purification of immunotoxins containing a high ionic charge ribosome inactivating protein clavin by carboxymethyl high-performance membrane chromatography. *J. Chromatogr. A*, 830 (1999) 329-335.
- 1696 Kurioka, A., Yamazaki, M. and Hirano, H.: Primary structure and possible functions of a trypsin inhibitor of *Bombyx mori*. *Eur. J. Biochem.*, 259 (1999) 120-126.
- 1697 Li, N., Kendrick, B.S., Manning, M.C., Carpenter, J.F. and Dueman, J.G.: Secondary structure of antifreeze proteins from overwintering larvae of the beetle *Dendrodoea canadensis*. *Arch. Biochem. Biophys.*, 360 (1998) 25-32.
- 1698 Liu, Y., Arshavsky, V.Y. and Ruoho, A.E.: Interaction sites of the C-terminal region of the cGMP phosphodiesterase inhibitory subunit with the GDP-bound transducin  $\alpha$ -subunit. *Biochem. J.*, 337 (1999) 281-288.
- 1699 Maibeche-Coisne, M., Longhi, S., Jacquin-Joly, E., Brunel, C., Egloff, M.-P., Gastinel, L., Cambillau, C., Tegoni, M. and Naginan-Le Meillour, P.: Molecular cloning and bacterial expression of a general odorant-binding protein from the cabbage armyworm *Mamestra brassicae*. *Eur. J. Biochem.*, 258 (1998) 768-774.
- 1700 Reverter, D., Vendrell, J., Canals, F., Horstmann, J., Avilés, F.X., Fritz, H. and Sommerhoff, C.P.: A carboxypeptidase inhibitor from the medical leech *Hirudo medicinalis*. Isolation, sequence analysis, cDNA cloning, recombinant expression, and characterization. *J. Biol. Chem.*, 273 (1998) 32927-32933.
- For additional information see C.A.:  
129 (1998) 285535v.
- See also 1266, 1624, 1625, 1653.
20. ENZYMES AND ENZYME ACTIVITY ESTIMATION
- 1701 Freitag, R.: Utilization of enzyme-substrate interactions in analytical chemistry. *J. Chromatogr. B*, 722 (1999) 279-301 - a review with 96 refs.
- 20a. *Oxidoreductases*
- 1702 Bartley, G.E., Scolnik, P.A. and Beyer, P.: Two *Arabidopsis thaliana* carotene desaturases, phytoene desaturase and  $\xi$ -carotene desaturase, expressed in *Escherichia coli*, catalyze a poly-*cis* pathway to yield pro-lycopene. *Eur. J. Biochem.*, 259 (1999) 396-403.
- 1703 Bruneau, J.-M., Yea, C.M., Spinella-Jaegle, S., Fudali, C., Woodward, K., Robson, P.A., Sautès, C., Westwood, R., Kuo, E.A., Williamson, R.A. and Ruuth, E.: Purification of human dihydroorotate dehydrogenase and its inhibition by A72 1726, the active metabolite of leflunomide. *Biochem. J.*, 336 (1998) 299-303.
- 1704 Burke, N.S. and Crawford, D.L.: Use of azo dye ligand chromatography for the *Streptomyces viridosporus* T7A. *Appl. Microbiol. Biotechnol.*, 49 (1998) 523-530; C.A., 129 (1998) 158294r.
- 1705 Capeillere-Blandin, C.: Oxidation of quaiacol by myeloperoxidase: a two-electron-oxidized quaiacol transient species as a mediator of NADPH oxidation. *Biochem. J.*, 336 (1998) 395-404.
- 1706 Cross, A.R., Erickson, R.W., Ellis, B.A. and Curnette, J.T.: Spontaneous activation of NADPH oxidase in a cell-free system: unexpected multiple effects of magnesium ion concentrations. *Biochem. J.*, 338 (1999) 229-233.

- 1707 Forbes, L.V., Truong, O., Wientjes, F.B., Moss, S.J. and Segal, A.W.: The major phosphorylation site of the NADPH oxidase component p67<sup>phox</sup> is Thr<sup>233</sup>. *Biochem. J.*, 338 (1999) 99-105.
- 1708 Fukuhara, M., Kurose, K., Aiba, N., Matsunaga, N., Omata, W., Kato, K. and Kimura, M.: A major phenobarbital-inducible P450 isozyme, CYP2A14, in the Chinese hamster liver: purification, characterization, and cDNA cloning. *Arch. Biochem. Biophys.*, 359 (1998) 241-248.
- 1709 Grigoryev, D.N., Kato, K., Njar, V.C.O., Long, B.J., Ling, Y.-Z., Wang, X., Mohler, J. and Brodie, A.M.H.: Cytochrome P450c17-expressing *Escherichia coli* as a first-step screening system for 17 $\alpha$ -hydroxylase-C<sub>17,20</sub>-lyase inhibitors. *Anal. Biochem.*, 267 (1999) 319-330.
- 1710 Imamura, Y., Migita, T., Otagiri, M., Choshi, T. and Hibino, S.: Purification and catalytic properties of a tetrameric carbonyl reductase from rabbit heart. *J. Biochem. (Tokyo)*, 125 (1999) 41-47.
- 1711 Jeong, J.S., Kwon, S.J., Kang, S.W., Rhee, S.G. and Kim, K.: Purification and characterization of a second type thioredoxin peroxidase (type II TPx) from *Saccharomyces cerevisiae*. *Biochemistry*, 38 (1999) 776-783.
- 1712 Kminkova, M. and Kucera J.: Single-step separation of lactate dehydrogenase using thiophilic chromatography. *Collect. Czech. Chem. Commun.*, 63 (1998) 851-856; *C.A.*, 129 (1998) 213341f.
- 1713 Lessard, I.A.D., Domingo, G.J., Borges, A. and Perham, R.N.: Expression of genes encoding the E2 and E3 components of the *Bacillus stearothermophilus* pyruvate dehydrogenase complex and the stoichiometry of subunit interaction in assembly *in vitro*. *Eur. J. Biochem.*, 258 (1998) 491-501.
- 1714 Lunzer, R., Mammun, Y., Haltrich, D., Kulbe, K.D. and Nidetzky, B.: Structural and functional properties of a yeast xylitol dehydrogenase, a Zn<sup>2+</sup>-containing metalloenzyme similar to medium-chain sorbitol dehydrogenase. *Biochem. J.*, 336 (1998) 91-99.
- 1715 McDougall, G.J.: Purification of coniferyl alcohol oxidase from lignifying xylem of Sitka spruce using immobilized metal affinity chromatography. *J. Plant. Physiol.*, 153 (1998) 539-544; *C.A.*, 130 (1999) 34872.
- 1716 Montoya, G., Te Kaat, K., Rodgers, S., Nitschke, W. and Sinning, I.: The cytochrome bc<sub>1</sub> complex from *Rhodovulum sulfidophilum* is a dimer with six quinones per monomer and an additional 6-kDa component. *Eur. J. Biochem.*, 259 (1999) 709-718.
- 1717 Moran, G.R. and Fitzpatrick, P.F.: A continuous fluorescence assay for tryptophan hydroxylase. *Anal. Biochem.*, 266 (1999) 148-152.
- 1718 Newton, D.C., Montgomery, H.J. and Guillemette, J.G.: The reductase domain of the human inducible nitric oxide synthase is fully active in the absence of bound calmodulin. *Arch. Biochem. Biophys.*, 359 (1998) 249-257.
- 1719 Park, H.-S. and Park, J.-W.: Fluorescence labeling of the leukocyte NADPH oxidase subunit p47<sup>phox</sup>: evidence for amphiphile-induced conformational changes. *Arch. Biochem. Biophys.*, 360 (1998) 165-172.
- 1720 Saraswathi, M., Nakanishi, T. and Shimizu, A.: Relative quantification of glycated Cu-Zn superoxide dismutase in erythrocytes by electrospray ionization mass spectrometry. *Biochim. Biophys. Acta*, 1426 (1999) 483-490.
- 1721 Sasaki, T., Sawada, N., Takeyama, K.-i., Kato, S. and Inouye, K.: Enzymatic properties of mouse 25-hydroxyvitamin D<sub>3</sub> 1 $\alpha$ -hydroxylase expressed from *Escherichia coli*. *Eur. J. Biochem.*, 259 (1999) 731-738.
- 1722 Shaw, D., Odom, J.D. and Dunlap, R.B.: High expression and steady-state kinetic characterization of methionine site-directed mutants of *Escherichia coli* methionyl- and selenomethionyl-dihydrofolate reductase. *Biochim. Biophys. Acta*, 1429 (1999) 401-410.
- 1723 Tajima, K., Hashizaki, M., Yamamoto, K., Narimatsu, S. and Mizutani, T.: Purification and some properties of two enzymes from rat liver cytosol that catalyze carbonyl reduction of 6-tert-butyl-2,3-epoxy-5-cyclohexene-1,4-dione, a metabolite of 3-tert-butyl-4-hydroxyanisol. *Arch. Biochem. Biophys.*, 361 (1999) 207-214.
- 1724 Wagner, J.T., Lüdemann, H., Farber, P.M., Lottspeich, F. and Krauth-Siegel, R.L.: Glutamate dehydrogenase, the marker protein of *Plasmodium falciparum*. Cloning, expression and characterization of the malarial enzyme. *Eur. J. Biochem.*, 258 (1998) 813-819.
- 1725 Williams, C.H. and Lawson, J.: Mechanism-based inhibition of monoamine oxidase by 3-aryl- $\Delta^3$ -pyrrolines. *Biochem. J.*, 336 (1998) 63-67.
- 1726 Yoshihara, S. and Ohta, S.: Involvement of hepatic aldehyde oxidase in conversion of 1-methyl-4-phenyl-2,3-dihydropyridinium (MPDP<sup>+</sup>) to 1-methyl-4-phenyl-5,6-dihydro-2-pyridone. *Arch. Biochem. Biophys.*, 360 (1998) 93-98.

See also 1183, 1590, 1748.

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

- 1727 Beyer, S., Mayer, G. and Piepersberg, W.: The StrQ protein encoded in the gene cluster for 5'-hydroxystreptomycin of *Streptomyces glaucescens* GLA.O is a  $\alpha$ -D-glucose-1-phosphate cytidyltransferase (CDP-D-glucose synthase). *Eur. J. Biochem.*, 258 (1998) 1059-1067.
- 1728 Cartwright, J.L. and McLennan, A.G.: Formation of a covalent N<sup>2</sup>-guanylhistidyl reaction intermediate by the GTP:GTP guanylyltransferase from the brine shrimp Artemia. *Arch. Biochem. Biophys.*, 361 (1999) 101-105.
- 1729 Diczfalussy, M.A., Björkhem, I., Einarsson, C. and Alexson, S.E.H.: Formation of fatty acid ethyl esters in rat liver microsomes. Evidence for a key role for acyl-CoA:ethanol O-acyltransferase. *Eur. J. Biochem.*, 259 (1999) 404-411.
- 1730 Faure, M., Glomot, F., Bledsoe, R., Hutson, S. and Papet, I.: Purification and cloning of the mitochondrial branched-chain amino acid aminotransferase from sheep placenta. *Eur. J. Biochem.*, 259 (1999) 104-111.
- 1731 Fuchikami, Y., Yoshimura, T., Gutierrez, A., Soda, K. and Esaki, N.: Construction and properties of a fragmentary D-amino acid aminotransferase. *J. Biochem. (Tokyo)*, 124 (1998) 905-910.
- 1732 Ha, C.-R. and Iuchi, I.: Enzyme responsible for egg envelope (chorion) hardening in fish: purification and partial characterization of two transglutaminases associated with their substrate, unfertilized egg chorion, of the rainbow trout, *Oncorhynchus mykiss*. *J. Biochem. (Tokyo)*, 124 (1998) 917-926.

- 1733 Khan, A.I., Chowdhry, B.Z. and Yon, R.J.: Wheat-germ aspartate transcarbamoylase-revised purification, stability and re-evaluation of regulatory kinetics in terms of the Mond-Wyman-Changeux model. *Eur. J. Biochem.*, 259 (1999) 71-78.
- 1734 Kim, S., Park, G.H., Joo, W.A., Paik, W.K., Cook, R.J. and Williams, K.R.: Identification of protein-arginine N-methyltransferase as 10-formyltetrahydrofolate dehydrogenase. *J. Biol. Chem.*, 273 (1998) 27374-27382.
- 1735 Oberg, K.A., Ruysschaert, J.-M., Azarkan, M., Smolders, N., Zerhouni, S., Wintjens, R., Amrani, A. and Looze, Y.: Papaya glutamine cyclase, a plant enzyme highly resistant to proteolysis, adopts an all- $\beta$  conformation. *Eur. J. Biochem.*, 258 (1998) 214-222.
- 1736 Zhang, S.W., Fu, X.Y., Cao, S.L., Shen, Z.H. and Gu, J.X.: Down-regulation of  $\beta$ 1,4-galactosyltransferase gene expression by cell-cycle suppressor gene p16. *Biochim. Biophys. Acta*, 1444 (1999) 49-54.
- See also 1372, 1594, 1755.
- 20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.)*
- 1737 Antonsson, B., Marshall, C.J., Montessuit, S. and Arkinstall, S.: An *in vitro* 96-well plate assay of the mitogen-activated protein kinase cascade. *Anal. Biochem.*, 267 (1999) 294-299.
- 1738 Bruni, P., Vandoolaeghe, P., Rousseau, G.G., Hue, L. and Rider, M.H.: Expression and regulation of 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase isozymes in white adipose tissue. *Eur. J. Biochem.*, 259 (1999) 756-761.
- 1739 Chefalo, P.J., Oh, J., Rafie-Kolpin, M., Kan, B. and Chen, J.-J.: Heme-regulated  $\alpha$ F-2 $\alpha$  kinase purifies as a hemoprotein. *Eur. J. Biochem.*, 258 (1998) 820-830.
- 1740 Ellinger, T. and Ehricht, R.: Single-step purification of T7 RNA polymerase with a 6-histidine tag. *BioTechniques*, 25 (1998) 640; *C.A.*, 129 (1998) 341085n.
- 1741 Halford, W.P., Falco, V.C., Gebhardt, B.M. and Carr, D.J.J.: The inherent quantitative capacity of the reverse transcription-polymerase chain reaction. *Anal. Biochem.*, 266 (1999) 181-191.
- 1742 Heesom, K.J., Avison, M.B., Diggle, T.A. and Denton, R.M.: Insulin-stimulated kinase from rat fat cells that phosphorylates initiation factor 4E-binding protein 1 on the rapamycin-insensitive site (serine-111). *Biochem. J.*, 336 (1998) 39-48.
- 1743 Heilker, R., Freuler, F., Pulfer, R., di Padova, F. and Eder, J.: All three I $\kappa$ B isoforms and most Rel family members are stable associated with the I $\kappa$  kinase 1/2 complex. *Eur. J. Biochem.*, 259 (1999) 253-261.
- 1744 Jimeno, P., Luque, J., Garcia-Perez, A.I. and Pinilla, M.: A comparative study by a single chromatographic procedure of glycolytic regulatory kinase isoenzymes in rat erythroid cells as a function of differentiation-maturation process. *Biochem. Mol. Biol. Int.*, 45 (1998) 1211-1225; *C.A.*, 129 (1998) 314048w.
- 1745 Kanemitsu, F. and Kira, S.: Characterization of isoforms of human mitochondrial creatine kinase by isoelectric focusing. *J. Chromatogr. B*, 721 (1999) 171-177.
- 1746 Lam, L.P.Y., Chow, R.Y.K. and Berger, S.A.: A transforming mutation enhances the activity of the c-Kit soluble tyrosine kinase domain. *Biochem. J.*, 338 (1999) 131-138.
- 1747 Panneman, H., Ruijter, G.J.G., van den Broeck, H.C. and Visser, J.: Cloning and biochemical characterization of *Aspergillus niger* hexokinase. The enzyme is strongly inhibited by physiological concentrations of trehalose 6-phosphate. *Eur. J. Biochem.*, 258 (1998) 223-232.
- 1748 Raspi, G., Lo Moro, A., Spinetti, M. and Tesi, G.:  $\rho$ -Hydroxymercuribenzoate as thiol-protein modifier for simultaneous determination of glycolytic enzymes by hydrophobic-interaction chromatography. *Chromatographia*, 49 (1999) 47-53.
- 1749 Takao, K., Xu, Y.J., Samejima, K., Shirahata, A. and Nitsu, M.: Preparation and usefulness of some fluorogenic substrates for assay of arginyl-tRNA-protein transferase by HPLC. *Anal. Biochem.*, 267 (1999) 373-381.
- 1750 Uehara, T., Tokomitsu, Y. and Nomura, Y.: Pertussis toxin-sensitive and insensitive intracellular signalling pathways in undifferentiated 3T3-L1 cells stimulated by insulin converge with phosphatidylinositol 3-kinase upstream of the Ras mitogen-activated protein kinase cascade. *Eur. J. Biochem.*, 259 (1999) 801-808.
- See also 1599, 1754.
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-.)*
- 1751 Altintas, M.M., Özer, N. and Ülgen, K.Ö.: Purification of TaqI endonuclease from *Thermus aquaticus*. *J. Chromatogr. A*, 828 (1998) 373-381.
- 1752 Chitlaru, T., Kronman, C., Zeevi, M., Kam, M., Harel, A., Ordentlich, A., Velan, B. and Shafferman, A.: Modulation of circulatory residence of recombinant acetylcholinesterase through biochemical or genetic manipulation of sialylation levels. *Biochem. J.*, 336 (1998) 647-658.
- 1753 Desmarais, S., Friesen, R.W., Zamboni, R. and Ramachandran, C.: [Difluoro(phosphono)-methyl]phenylalanine-containing peptide inhibitors of protein tyrosine phosphatases. *Biochem. J.*, 337 (1999) 219-223.
- 1754 Geoffroy, V., Fouque, F., Nivet, V., Clot, J.-P., Lugnier, C., Desbuquois, B. and Benelli, C.: Activation of a cGMP-stimulated cAMP phosphodiesterase by protein kinase C in a liver Golgi-endosomal fraction. *Eur. J. Biochem.*, 259 (1999) 892-900.
- 1755 Hefner, J., Ketchum, R.E.B. and Croteau, R.: Cloning and functional expression of a cDNA encoding geranylgeranyl diphosphate synthase from *Taxus canadensis* and assessment of the role of this prenyltransferase in cells induced for taxol production. *Arch. Biochem. Biophys.*, 360 (1998) 62-74.
- 1756 Hiroyama, M. and Takenawa, T.: Purification and characterization of a lysophosphatidic acid-specific phosphatase. *Biochem. J.*, 336 (1998) 483-489.
- 1757 Keshavarz-Shokri, A., Suntornwat, O. and Kitos, P.A.: Identification of serine esterases in tissue homogenates. *Anal. Biochem.*, 267 (1999) 406-411.
- 1758 Lin, H., Choi, J.H. and Vancura, A.: Phosphoinositide-specific phospholipase C interacts with phosphatidylinositol kinase homology TOR2. *Biochem. Biophys. Res. Commun.*, 252 (1998) 285-289.
- 1759 Maccarrone, M., Bari, M. and Agro, A.F.: A sensitive and specific radiochromatographic assay of fatty acid amide hydrolase activity. *Anal. Biochem.*, 267 (1999) 314-318.

- 1760 McCall, M.R., la Belle, M., Forte, T.M., Krauss, R.M., Takanami, Y. and Tribble, D.L.: Dissociable and nondissociable forms of platelet-activating factor acetylhydrolase in human plasma LDL: implications for LDL oxidative susceptibility. *Biochim. Biophys. Acta*, 1437 (1999) 23-36.
- 1761 McClellan, J.S., Coblenz, W.B., Sapp, M., Rulewicz, G., Gaines, D.I., Hawkins, A., Ozment, C., Bearden, A., Merritt, S., Cunningham, J., Palmer, B. et al.: DNA cloning *in vitro* expression, and biochemical characterization of cholinesterase 1 and cholinesterase 2 from amphioxus. Comparison with cholinesterase 1 and cholinesterase 2 produced *in vivo*. *Eur. J. Biochem.*, 258 (1998) 419-429.
- 1762 Nagao, T., Shimada, Y., Sugihara, A. and Tominaga, Y.: C-Terminal peptide of *Fusarium heterosporum* lipase is necessary for its increasing thermostability. *J. Biochem. (Tokyo)*, 124 (1998) 1124-1129.
- 1763 Puri, V., Arora, A. and Gupta, C.M.: Probing the role of C-1 ester group in *Naja naja* phospholipase A<sub>2</sub>-phospholipid interactions using butanetriol-containing phosphatidylcholine analogues. *Eur. J. Biochem.*, 259 (1999) 586-591.
- 1764 Rocío Marcos, Sánchez-Yagüe, J., Hernández-Hernández, A. and Llanillo, M.: Amphiphilic and hydrophilic forms of acetylcholinesterase from sheep platelets. *Biochim. Biophys. Acta*, 1415 (1998) 163-173.
- 1765 Shinoda, H., Hattori, M., Shimizu, A., Samejima, T. and Satoh, T.: Hydrophobic interactions of Val75 are critical for oligomeric thermostability of inorganic pyrophosphatase from *Bacillus stearothermophilus*. *J. Biochem. (Tokyo)*, 125 (1999) 58-63.
- 1766 Toyoda, T., Sugimoto, H. and Yamashita, S.: Sequence, expression in *Escherichia coli*, and characterization of lysophospholipase II. *Biochim. Biophys. Acta*, 1437 (1999) 182-193.
- 1767 Vasiljeva, L.Yu., Zheleznyaya, L.A. and Matvienko, N.I.: (Site-specific endonuclease SscL1 I from the *Staphylococcus* sp. strain L1). *Biokhimiya (Moscow)*, 63 (1998) 252-258.
- 1768 Villa-Moruzzi, E., Puntoni, F., Bardelli, A., Vigna, E., de Rosa, S. and Comoglio, P.M.: Protein tyrosine phosphatase PTP-S binds to the juxta-membrane region of the hepatocyte growth factor receptor Met. *Biochem. J.*, 336 (1998) 235-239.
- 1769 Vissi, E., Toth, E.C., Kovacs, T., Magyar, Z., Horvath, G.V., Bagossi, P., Gergely, P., Dudits, D. and Dombradi, V.: Protein phosphatase 1 catalytic subunit isoforms from alfalfa: biochemical characterization and cDNA cloning. *Arch. Biochem. Biophys.*, 360 (1998) 206-214.
- 1770 Yang, M.M.P. and Chen, G.H.K.: Purification and pharmaceutical use of Nase CV from *Coriolus versicolor*. U.S. US 5,824,648 (Cl. 514-14; A61K38/00), 20 Oct. 1998, US Appl. 983,238, 30 Nov. 1992; 26 p.; C.A., 129 (1998) 313104z.
- See also 1281, 1569.
- 20e. *Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.)*
- 1771 Bame, K.J., Hassall, A., Sanderson, C., Venkatesan, I. and Sun, C.: Partial purification of heparanase activities in Chinese hamster ovary cells: evidence for multiple intracellular heparanases. *Biochem. J.*, 336 (1998) 191-200.
- 1772 Benen, J.A.E., Kester, H.C.M. and Visser, J.: Kinetic characterization of *Aspergillus niger* N400 endopolysaccharidases I, II and C. *Eur. J. Biochem.*, 259 (1999) 577-585.
- 1773 Gonzalez-Stawinski, G.V., Parker, W., Holzknecht, Z.E., Huber, N.S. and Platt, J.L.: Partial sequence of human platelet heparitinase and evidence of its ability to polymerize. *Biochim. Biophys. Acta*, 1429 (1999) 431-438.
- 1774 Hashimoto, W., Miki, H., Nankai, H., Sato, N., Kawai, S. and Murata, K.: Molecular cloning of two genes for the  $\alpha$ -D-glucosidase in *Bacillus* sp. GL1 and identification of one as a galactan-degrading enzyme. *Arch. Biochem. Biophys.*, 360 (1998) 1-9.
- 1775 Henriksson, G., Nutt, A., Henriksson, H., Pettersson, B., Srahler, J., Johansson, G. and Pettersson, G.: Endoglucanase 28 (Cell2A), a new *Phanerochaete chrysosporium* cellulase. *Eur. J. Biochem.*, 259 (1999) 88-95.
- 1776 Ito, Y., Yoshikawa, A., Hotan, T., Fukuda, S., Sugimura, K. and Imoto, T.: Amino acid sequences of lysozymes newly purified from invertebrates imply wide distribution of a novel class in the lysozyme family. *Eur. J. Biochem.*, 259 (1999) 456-461.
- 1777 Libnessart, N. and Preiss, J.: Arginine residue 384 at the catalytic center is important for branching enzyme II from maize endosperm. *Arch. Biochem. Biophys.*, 360 (1998) 135-141.
- 1778 Matsunura, N. and Tanuma, S.-i.: Involvement of cytosolic NAD<sup>+</sup> glycohydrolase in ADP-ribose metabolism. *Biochem. Biophys. Res. Commun.*, 253 (1998) 246-252.
- 1779 Varrot, A., Hastrup, S., Schülein, M. and Davies, G.J.: Crystal structure of the catalytic core domain of the family 6 cellobiohydrolase II, Cel6A, from *Humicola insolens*, at 1.92 Å resolution. *Biochem. J.*, 337 (1999) 297-304.
- 1780 Vlasenko, E.Yu., Ryan, A.I., Shoemaker, C.F. and Shoemaker, S.P.: The use of capillary viscometry, reducing end-group analysis, and size exclusion chromatography combined with multi-angle laser light scattering to characterize endo-1,4-b-D-glucanases on carboxymethylcellulose: a comparative evaluation of the three methods. *Enzyme Microb. Technol.*, 23 (1998) 350-359; C.A., 130 (1999) 1580.
- 1781 Yoshida, K.-i., Moriguchi, H., Sumi, S., Horimi, H., Kitahara, S., Umeda, H. and Ueda, Y.: Alterations of asparagine-linked sugar chains of N-acetyl β-D-hexosaminidase during human renal oncogenesis: a preliminary study using serial lectin affinity chromatography. *J. Chromatogr. B*, 723 (1999) 75-80.
- 20f. *Other hydrolases*
- 1782 Ahn, K., Herman, S.B. and Fahnoe, D.C.: Soluble human endothelin-converting enzyme-1: expression, purification, and demonstration of pronounced pH sensitivity. *Arch. Biochem. Biophys.*, 359 (1998) 258-268.
- 1783 Antonenkov, V.D., van Veldhoven, P.P., Waelkens, E. and Manhaerts, G.P.: Comparison of the stability and substrate specificity of purified peroxisomal 3-oxoacyl-CoA thiolases A and B from rat liver. *Biochim. Biophys. Acta*, 1437 (1999) 136-141.
- 1784 Basak, A., Cooper, S., Robarge, A.G., Banik, U.K., Chrétien, M. and Seidah, N.G.: Inhibition of proprotein convertases-1, -7 and furin by diterpenes of *Adrographis paniculata* and their succinyl esters. *Biochem. J.*, 338 (1999) 107-113.
- 1785 Boudreault, A., Gauthier, D. and Lazare, C.: Proprotein convertase PC1/3-related peptides are potent slow tight-binding inhibitors of murine PC1/3 and H furin. *J. Biol. Chem.*, 273 (1998) 31574-31580.

- 1786 Cerretani, M., di Renzo, L., Serafini, S., Vitelli, A., Gennari, N., Gianchi, E., Pessi, A., Urbani, A., Colloca, S., de Francesco, R. et al.: A high-throughput radiometric assay for hepatitis C virus NS3 protease. *Anal. Biochem.*, 266 (1999) 192-197.
- 1787 Chambers, L., Brown, A., Pritchard, D.I., Sreedharan, S., Brocklehurst, K. and Kalsheker, N.A.: Enzymatically active papain preferentially induces an allergic response in mice. *Biochem. Biophys. Res. Commun.*, 253 (1998) 837-840.
- 1788 Fujino, T., Tada, T., Beppu, M. and Kikugawa, K.: Purification and characterization of a serine protease in erythrocyte cytosol that is adherent to oxidized membranes and preferentially degrades proteins modified by oxidation and glycation. *J. Biochem. (Tokyo)*, 124 (1998) 1077-1085.
- 1789 Hudaky, P., Kaslik, G., Venekei, I. and Graf, L.: The differential specificity of chymotrypsin A and B is determined by amino acid. *Eur. J. Biochem.*, 259 (1999) 528-533.
- 1790 Kimoto, M., Miyatake, S., Sasagawa, T., Yamashita, H., Okita, M., Oka, T., Ogawa, T. and Tsuji, H.: Purification, cDNA cloning and expression of human N<sup>G</sup>,N<sup>G</sup>-dimethylarginine dimethyl-amino hydrolase. *Eur. J. Biochem.*, 358 (1998) 863-868.
- 1791 Lee, H.-J., Tomioka, S., Kinbara, K., Masumoto, H., Jeong, S.-Y., Sorimachi, H., Ishiura, S. and Suzuki, K.: Characterization of a human digestive tract-specific calpain, nCL-4, expressed in the baculovirus system. *Arch. Biochem. Biophys.*, 362 (1999) 22-31.
- 1792 Oishi, M., Ogasawara, Y., Ishii, K. and Tanabe, S.: Assay of nicotinamide deamidase activity using high-performance liquid chromatography. *J. Chromatogr. B*, 720 (1998) 59-64.
- 1793 Sousa, C. and Karmali, A.: One-step purification of urease from *Canavalia ensiformis* by immobilized metal affinity chromatography. *Int. J. Bio-Chromatogr.*, 4 (1998) 15-25; C.A., 129 (1998) 312593w.
- 1794 Takao, K., Takai, S., Shiota, N., Song, K., Nishimura, K., Ishihara, T. and Miyazaki, M.: Lack of effect of carbohydrate depletion on some properties of human mast cell chymase. *Biochim. Biophys. Acta*, 1427 (1999) 74-81.
- 1795 Terada, S., Hori, J., Fujimura, S. and Kimoto, E.: Purification and amino acid sequence of brevilysin L6, a non-hemorrhagic metalloprotease from *Agkistrodon halys brevicaudus* venom. *J. Biochem. (Tokyo)*, 125 (1999) 64-69.
- 1796 Vaillier, J., Arselin, G., Graves, P.-V., Camougrand, N. and Velours, J.: Isolation of supernumerary yeast ATP synthase subunits e and i. Characterization of subunit i and disruption of its structural gene ATP18. *J. Biol. Chem.*, 274 (1999) 543-548.
- 1797 Valenzuela, J.G., Charlab, R., Galperin, M.Y. and Ribeiro, J.M.C.: Purification, cloning, and expression of an apyrase from the bed bug *Cimex lectularius*. A new type of nucleotide-binding enzyme. *J. Biol. Chem.*, 273 (1998) 30583-30590.
- 1798 Wilks, S., Chen, W.-E. and Magnusson, R.P.: Properties of the proteasome activator subunit PA28 $\alpha$  and its des-tyrosyl analog. *Arch. Biochem. Biophys.*, 359 (1998) 283-290.
- 1799 Zylinska, L., Gromadzinska, E. and Lachowicz, L.: Short-time effects of neuroactive steroids on rat cortical Ca<sup>2+</sup>-ATPase activity. *Biochim. Biophys. Acta*, 1437 (1999) 257-264.

See also 1207, 1256, 1660.

#### 20g. Lyases

- 1800 Groth, G. and Schirwitz, K.: Rapid purification of membrane intrinsic F<sub>1</sub>-domain of chloroplast ATP synthase in monodisperse form suitable for 3D-crystallization. *Eur. J. Biochem.*, 260 (1999) 15-21.
- 1801 Hoenke, S. and Dimroth, P.: Formation of catalytically active S-acetyl(malonate decarboxylase) required malonyl-coenzyme A. Acyl carrier protein transacylase as auxiliary enzyme. *Eur. J. Biochem.*, 259 (1999) 181-187.
- 1802 Itoh, A. and Vick, B.A.: The purification and characterization of fatty acid hydroperoxide lyase in sunflower. *Biochim. Biophys. Acta*, 1436 (1999) 531-540.
- 1803 Kotova, L.V., Lapteva, N.A. and Vaintraub, I.A.: An improved method of purification of protein deaminase from germinating seeds. *Nahrung*, 42 (1998) 168-169; C.A., 129 (1998) 199629x.

See also 1748.

#### 20h. Isomerases

- 1804 Fujita, T., Suzuki, K., Tada, T., Yoshihara, Y., Hamaoka, R., Uchida, K., Matuo, Y., Sasaki, T., Hanafusa, T. and Taniguchi, N.: Human erythrocyte bi-phosphoglycerate mutase: inactivation by glycation *in vivo* and *in vitro*. *J. Biochem. (Tokyo)*, 124 (1998) 1237-1244.
- 1805 Richarme, G.: Protein-disulfide isomerase activity of elongation factor EF-Tu. *Biochem. Biophys. Res. Commun.*, 252 (1998) 156-161.

See also 1748.

#### 20i. Ligases

- 1806 Guan, X., Diez, T., Prasad, T.K., Nikolau, B.J. and Wurtele, E.S.: Geranyl-CoA carboxylase: a novel biotin-containing enzyme in plants. *Arch. Biochem. Biophys.*, 362 (1999) 12-21.
- 1807 Johnson, J.D., Muuronen, W.W. and Lambeth, D.O.: Characterization of the ATP- and GTP-specific succinyl-CoA synthetases in pigeon. The enzymes incorporate the same  $\alpha$ -subunit. *J. Biol. Chem.*, 273 (1998) 27573-27579.
- 1808 Tu, Z. and Anders, M.W.: Identification of an important cysteine residue in human glutamate-cysteine ligase catalytic subunit by site-directed mutagenesis. *Biochem. J.*, 336 (1998) 675-680.

#### 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

- 1809 Astot, C., Dolezal, K., Moritz, H. and Sandberg, G.: Precolumn derivatization and capillary liquid chromatographic/frit-fast atom bombardment mass spectrometric analysis of cytokinins in *Arabidopsis thaliana*. *J. Mass Spectrom.*, 33 (1998) 892-902; C.A., 129 (1998) 327827z.

- 1810 Genkov, T., Ivanov, I. and Ivanova, I.: Analysis of cytokinins by immunoassay and high performance liquid chromatography of *in vitro* cultivated *Dianthus caryophyllus*. *Bulg. J. Plant Physiol.*, 22 (1996) 95-104; C.A., 129 (1998) 287497h.
- 1811 Gjerde, D.T. and Taylor, P.D.: Band array display of polynucleotide separations. *PCT Int. Appl.* WO 98 40,395 (Cl. C07H21/04), 17 Sep. 1998, US Appl. 41,095, 14 Mar. 1997; 32 pp.; C.A., 129 (1998) 240846f.
- 1812 Huber, C.G. and Buchmeiser, M.R.: On-line cation exchange for suppression of adduct formation in negative-ion electrospray mass spectrometry of nucleic acids. *Anal. Chem.*, 70 (1998) 5288-5295.
- 1813 Janikowski, J., Puttemans, W., Zilberman, M. and Schmitz, H.: Purification of chemically synthesised dinucleoside(5',5') polyphosphates by displacement chromatography. *J. Chromatogr. B*, 719 (1998) 63-70.
- 1814 Lee, C.H., Lee, J.W. and Row, K.H.: Optimum solvent selectivity and gradient mode for deoxyribonucleosides in reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 828 (1998) 337-344.
- 1815 Mengeling, B.J. and Turco, S.J.: A high-yield, enzymatic synthesis of GDP-D-[<sup>3</sup>H]arabinose and GDP-L-[<sup>3</sup>H]fucose. *Anal. Biochem.*, 267 (1999) 227-233.
- 1816 Ni, J., Liu, T., Kolbanovskiy, A., Krzeminski, J., Amih, S. and Geacintov, N.E.: Mass spectrometric sequencing of site-specific carcinogen-modified oligodeoxyribonucleotides containing bulky benzo[a]pyrene diol epoxide-deoxyquanosyl adducts. *Anal. Biochem.*, 264 (1998) 222-229.
- 1817 Shingfield, K.J. and Offer, N.W.: Simultaneous determination of purine metabolites, creatinine and pseudouridine in ruminant urine by reversed-phase high-performance liquid chromatography. *J. Chromatogr. B*, 723 (1999) 81-94.
- 1818 Siccaldi, D., de Ranieri, A., Jayawardene, A. and Gambertoglio, J.G.: High-performance liquid chromatographic method for the determination of intracellular dTTP pools. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2947-2956.
- 1819 Toshchakov, V.Yu., Bashkina, L.V., Onishchenko, N.A. and Shumakov, V.I.: (An isocratic, reversed-phase HPLC method for the determination of postischemic efflux of purines and pyrimidines at reperfusion of isolated liver). *Biokhimiya (Moscow)*, 63 (1998) 259-264.
- 1820 Yamamoto, T., Moriwaki, Y., Takahashi, S., Fujita, T., Tsutsumi, Z., Yamakita, J.-i., Shimizu, K., Shioda, M., Ohta, S. and Higashino, K.: Determination of adenosine and deoxyadenosine in urine by high-performance liquid chromatography with column switching. *J. Chromatogr. B*, 719 (1998) 55-61.
- 1821 Zhao, C., Kumar, R. and Hemminki, K.: Measurement of 7-methyl- and 7-(2-hydroxyethyl)guanine DNA adducts in white blood cells of smokers and nonsmokers. *Biomarkers*, 3 (1998) 327-334; C.A., 129 (1998) 226703a.
- For additional information see C.A.:  
129 (1998) 239271h, 293976e.
- See also 1182, 1236, 1316, 1531, 1968, 2117, 2122, 2138, 2144.
- 21b. *Nucleic acids, RNA*
- See 1091, 1092.
- 21c. *Nucleic acids, DNA*
- 1822 Dong, J., Park, J.-S. and Lee, S.-H.: *In vitro* analysis of the zinc-finger motif in human replication protein A. *Biochem. J.*, 337 (1999) 311-317.
- 1823 Levison, P.R., Badger, S.E., Hathi, P., Davies, M.J., Bruce, I.J. and Grimm, V.: New approaches to the isolation of DNA by ion-exchange chromatography. *J. Chromatogr. A*, 827 (1998) 337-344.
- 1824 Riley, T.A., Reynolds, M.A., Snyder, L.R. and Klem, R.E.: Preparation and normal phase column chromatography purification of DNA. U.S. US 5,811,538 (Cl. 536-25.4; C12P19/34), 22 Sep. 1998, US Appl. 178,837, 30 Dec. 1993; 48 pp.; C.A., 129 (1998) 276239z.
- See also 1091, 1559, 1821.
- 21e. *Structural studies on DNA and DNA mapping*
- 1825 Scalni, A., Monti, M., Acquaviva, R., Tell, G., Damante, G., Formisano, S. and Pucci, P.: Topology of the thyroid transcription factor 1 homeodomain-DNA complex. *Biochemistry*, 38 (1999) 64-72.
- 21f. *Complex mixtures of nucleic acids, their fragments and PCR products*
- 1826 Ausio, J. and Moore, S.C.: Reconstitution of chromatin complexes from high-performance liquid chromatography-purified histones. *Methods (Orlando)*, 15 (1998) 333-342; C.A., 129 (1998) 327822u.
- 1827 Bachmair, F., Huber, C. and Daxenbichler, G.: Quantitation of gene expression by means of HPLC analysis of RT-PCR products. *Clin. Chim. Acta*, 279 (1999) 25-34.
- 1828 Schnapp, G., Rodi, H.-P., Rettig, W.J., Schnapp, A. and Damm, K.: One-step affinity purification protocol for human telomerase. *Nucleic Acids Res.*, 26 (1998) 331-3313; C.A., 129 (1998) 185906y.
22. *ALKALOIDS*
- 1829 Bentley, M.C., Abrar, M., Kelk, M., Cook, J. and Phillips, K.: Validation of an assay for the determination of cotinine and 3-hydroxycotinine in human saliva using automated solid-phase extraction and liquid chromatography with tandem mass spectrometric detection. *J. Chromatogr. B*, 723 (1999) 185-194.
- 1830 Gurley, B.J., Wang, P. and Gardner, S.F.: Ephedrine-type alkaloid content of nutritional supplements containing *Ephedra sinica* (Ma-huang) as determined by high performance liquid chromatography. *J. Pharm. Sci.*, 87 (1998) 1547-1553.
- 1831 Hurlbut, J.A., Carr, J.R., Singleton, E.R., Faul, K.C., Madson, M.R., Storey, J.M. and Thomas, T.L.: Solid-phase extraction cleanup and liquid chromatography with ultraviolet detection of ephedrine alkaloids in herbal products. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1121-1127.
- 1832 Schänzle, G., Li, S., Mikus, G. and Hofmann, U.: Rapid, highly sensitive method for the determination of morphine and its metabolites in body fluids by liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 721 (1999) 55-65.

- 1833 Sellergren, B., Zander, Å., Renner, T. and Swietlow, A.: Rapid method for analysis of nicotine and nicotine-related substances in chewing gum formulations. *J. Chromatogr. A.*, 829 (1998) 143-152.
- 1834 Yang, F., Zhang, T., Zhang, R. and Ito, Y.: Application of analytical and preparative high-speed counter-current chromatography for separation of alkaloids from *Coptis chinensis* Franch. *J. Chromatogr. A.*, 829 (1998) 137-141.

For additional information see C.A.:  
129 (1998) 207266u, 221230j, 229810u, 293955x.

See also 2193, 2195.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

### 23a. Porphyrins and other pyrroles

- 1835 Zuijderhoudt, F.M.J. and Bok, J.D.: Comparison of the Bio-Rad Porphyrin Column Test with a simple spectrophotometric test for total urine porphyrin concentration. *Ann. Clin. Biochem.*, 35 (1998) 418-421; C.A., 129 (1998) 158815m.

See also 1725.

### 23c. Indole derivatives and plant hormones (gibberellins)

- 1836 Kai, M., Iida, H., Nohta, H., Lee, M.K. and Ohta, K.: Fluorescence derivatizing procedure for 5-hydroxytryptamine and 5-hydroxyindoleacetic acid using 1,2-diphenylethylenediamine reagent and their sensitive liquid chromatographic determination. *J. Chromatogr. B*, 720 (1998) 25-31.
- 1837 Páez, X. and Hernández, L.: Plasma serotonin monitoring by blood microdialysis coupled to high-performance liquid chromatography with electrochemical detection in humans. *J. Chromatogr. B*, 720 (1998) 33-38.
- 1838 Vaccher, C., Fourmaintraux, E., Belloli, E., Vaccher, M.P. and Bonte, J.P.: Enantiomeric resolution of melatonin ligands receptors by liquid chromatography on amylose chiral stationary phases. *Chromatographia*, 48 (1998) 790-796.
- 1839 Zakharova, E.A., Shcherbakov, A.A., Brudnik, V.V., Skripko, N.G., Bulkin, N.S. and Ignatov, V.V.: Biosynthesis of indole-3-acetic acid in *Azospirillum brasiliense*. Insights from quantum chemistry. *Eur. J. Biochem.*, 259 (1999) 572-576.

See also 1494, 1506.

### 23d. Pyridine derivatives

- 1840 Jan, M.R., Shah, J., Shah, A. and Gul, F.: Separation, identification and determination of nicotinic acids and nicotinamide in cigarette tobacco and smoke (Part I). *J. Chem. Soc. Pak.*, 19 (1997) 306-309; C.A., 129 (1998) 198887d.
- 1841 Waksmundzka-Hajnos, M., Hawryl, M. and Hawryl, A.: Selectivity of separation of heterocyclic bases in normal phase chromatographic systems. *Chem. Anal. (Warsaw)*, 43 (1998) 561-574; C.A., 129 (1998) 297703m.

See also 1236.

### 23e. Other N-heterocyclic compounds

- 1842 Beil, D., Kinder, H., Paschke, A., Steinhart, H., Vieluf, D., Behrndt, H. and Ring, J.: Determination of histamine and leukotrienes from basophils in cell supernatants by high-performance liquid chromatography. *J. Chromatogr. Sci.*, 36 (1998) 284-286.
- 1843 Beyrich, T. and Theiss, R.: Enantioselektive Verteilung und enzymkatalysierte Spaltbarkeit chiraler Chinazolinoylcardsäureestern. *Pharmazie*, 53 (1998) 853-858.
- 1844 Delapine, B., Hurtaud-Pessel, D. and Sanders, P.: Simultaneous determination of six quinolones in pig muscle by liquid chromatography-atmospheric pressure chemical ionisation mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2743-2747.
- 1845 Lee, H.W., Oh, C.H., Geyer, A., Pfeiderer, W. and Park, Y.S.: Characterization of a novel unconjugated pteridine glycoside, cyanopterin, in *Synechocystis* sp. PCC 6803. *Biochim. Biophys. Acta*, 1410 (1999) 61-70.
- 1846 Roberts, J.K. and Hughes, M.J.: The use of heptafluorobutyric acid as a volatile ion-pair reagent in the high-performance liquid chromatographic isolation of SB-223070. *J. Chromatogr. A*, 828 (1998) 297-302.
- 1847 You, J.M., Lao, W.J., Fan, X.J., Ou, Q.Y. and Jia, X.L.: Study of the chromatographic behavior and inclusion constants of new fluorescence agents by use of cyclodextrin additives under conditions of steady- and dynamic-state equilibrium and with fluorescence detection. *Chromatographia*, 49 (1999) 95-104.

For additional information see C.A.:  
129 (1998) 197348f.

See also 1250, 1817, 1841, 2183.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 1848 Lan, S.-J., Hsieh, D.C., Hillyer, J.W., Fancher, R.M., Rinehart, K.J., Warrack, B.M. and White, R.E.: Metabolism of  $\alpha$ -phosphonosulfonate squalene synthase inhibitors. I. Disposition of a farnesylethyl  $\alpha$ -phosphonosulfonate and ester prodrugs in rats. *Drug Metab. Disp.*, 26 (1998) 993-1000.
- 1849 Miron, T., Rabinkov, A., Mirelman, D., Weiner, L. and Wilchek, M.: A spectrophotometric assay for alicin and alliinase (*alliin* lyase) activity reaction of 2-nitro-5-thiobenzoate with thiosulfonates. *Anal. Biochem.*, 265 (1998) 317-325.
- 1850 Pflugmacher, S., Wiegand, C., Oberemm, A., Beattie, K.A., Krause, E., Codd, G.A. and Steinberg, C.E.W.: Identification of an enzymatically formed glutathione conjugate of the cyanobacterial hepatotoxin microcystin-LR: the first step of detoxication. *Biochim. Biophys. Acta*, 1425 (1998) 527-533.
- 1851 Suter, M.J.-F., Riediker, S. and Giger, W.: Selective determination of aromatic sulfonates in landfill leachates and groundwater using microbore liquid chromatography coupled with mass spectrometry. *Anal. Chem.*, 71 (1999) 897-904.

For additional information see C.A.:  
129 (1998) 188584c, 310144b.

See also 1498, 1504, 1507, 1522, 2204.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 1852 Blennow, A., Bay-Smidt, A.M., Olsen, C.E. and Møller, B.L.: Analysis of starch-bound glucose 3-phosphate and glucose 6-phosphate using controlled acid treatment combined with high-performance anion-exchange chromatography. *J. Chromatogr. A*, 829 (1998) 385-391.
- 1853 Katagi, M., Tatsuno, M., Nishikawa, M. and Tsuchihashi, H.: On-line solid-phase extraction liquid chromatography-continuous flow fast atom bombardment mass spectrometric and tandem mass spectrometric determination of hydrolysis products of nerve agents alkyl methylphosphonic acids by *p*-bromo-phenacyl derivatization. *J. Chromatogr. A*, 833 (1999) 169-179.
- 1854 Yang, G., Huang, M., Li, G., Du, A., Dai, Q., Gao, R., Chen, R. and Wang, Q.: (Separation of organic phosphonate enantiomers on chiral stationary phase by high performance liquid chromatography). *Sepu*, 16 (1998) 427-429; C.A., 130 (1999) 46867.

For additional information see C.A.:  
129 (1998) 254153q, 299735x.

See also 1277, 1443, 1813, 1819, 1848.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

- 1855 Sato, T., Hanada, T., Arioka, M., Ando, K., Sugiyama, J., Uramoto, M., Yamasaki, M. and Kitamoto, K.: S19159, a modulator of neurite outgrowth produced by the ascomycete *Preussia aerulans*. I. Producing strain, fermentation, isolation and biological activity. *J. Antibiot.*, 51 (1998) 897-901.

26a. Organometallic compounds

- 1856 Corneelis, R., Zhang, X., Mees, L., Christensen, J.M., Byralsen, K. and Dyrschel, C.: Speciation measurements by HPLC-HGAAS of dimethylarsinic acid and arsenobetaine in three candidate lyophilized urine reference materials. *Analyst (Cambridge)*, 123 (1998) 2883-2886.
- 1857 Hsu, C.-I.W. and White, T.L.: Development of high-performance liquid chromatographic methods for measuring tetraphenylborate decomposition products in radioactive alkaline solutions. *J. Chromatogr. A*, 828 (1998) 461-467.

- 1858 Li, F., Goessler, W. and Irgolic, K.J.: Determination of trimethylselenonium iodide, selenomethionine, selenious acid, and selenic acid using high-performance liquid chromatography with on-line detection by inductively coupled plasma mass spectrometry or flame atomic absorption spectrometry. *J. Chromatogr. A*, 830 (1999) 337-344.

- 1859 Liu, W. and Lee, H.K.: Chemical modification of analytes in speciation analysis by capillary electrophoresis, liquid chromatography and gas chromatography. *J. Chromatogr. A*, 834 (1999) 45-63 - a review with 123 refs.

- 1860 Van Fleet-Stalder, V. and Chasteen, T.G.: Using fluorine-induced chemiluminescence to detect organo-metalloids in the headspace of phototrophic bacterial cultures amended with selenium and tellurium. *J. Photochem. Photobiol. B*, 43 (1998) 193-203; C.A., 129 (1998) 213717h.
- 1861 Wilken, R.-D. and Falter, R.: Determination of methylmercury by the species-specific isotope addition method using a newly developed HPLC-ICP MS coupling technique with ultrasonic nebulization. *Appl. Organomet. Chem.*, 12 (1998) 551-557; C.A., 129 (1998) 225111u.

For additional information see C.A.:  
129 (1998) 299749e.

See also 1529, 1748, 2106, 2261.

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

- 1862 Grümpling, R. and Hirner, A.V.: HPLC-IPC-OES determination of water-soluble silicone (PDMS) degradation products in leachates. *Fresenius J. Anal. Chem.*, 363 (1999) 347-352.

26c. Coordination compounds

- 1863 Das, O. and Roy, U.S.: Extraction chromatographic studies of aluminum-(III) with versatic acid and its analytical applications. *J. Indian Chem. Soc.*, 75 (1998) 467-469; C.A., 129 (1998) 239227y.

- 1864 Leopold, I., Gunther, D. and Neumann, D.: Application of high performance liquid chromatography-inductively coupled plasma mass spectrometry to the investigation of phytocelatin complexes and their role in heavy metal detoxification in plants. *Analisis*, 26 (1998) M28-M32; C.A., 130 (1999) 22450.

- 1865 Liu, H.L., Ohmori, Y., Kojima, M. and Yoshikawa, Y.: Stereochemistry of six-coordinate octahedral silicon(IV) complexes containing 2,2'-bipyridine. *J. Coord. Chem.*, 44 (1998) 257-268; C.A., 129 (1998) 350141e.

- 1866 Nakano, Y., Kawaguchi, T. and Yoshikawa, Y.: Complete chromatographic resolution of axially chiral  $\beta$ -diketonate complexes on Cellulofine C-200. *J. Coord. Chem.*, 43 (1998) 193-197; C.A., 129 (1998) 285375t.

- 1867 Okamoto, M. and Okada, H.: (Separation of cyclohexane-1,2-diamineplatinum(II)-dicarboxylate isomers). *Jpn. Kokai Tokkyo Koho JP 10 239,296 [98 239,296]* (Cl. G01N30/48), 11 Sep. 1998, Appl. 97/40,597, 25 Feb. 1997; 7 pp.; C.A., 129 (1998) 285412c.

For additional information see C.A.:  
129 (1998) 197212g, 242208y, 310141y.

See also 1278.

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

- 1868 Ake, M., Fabre, H., Malan, A.K. and Mandrou, B.: Column liquid chromatography determination of vitamins A and E in powdered milk and local flour: a validation procedure. *J. Chromatogr. A*, 826 (1998) 183-189.

- 1869 Argoudelis, C.J.: Identification of the vitamers of vitamin B<sub>6</sub> excreted by yeast mutant growing in a glucose minimal culture medium. *J. Chromatogr. B*, 721 (1999) 21-29.
- 1870 Belz, S. and Nau, H.: Determination of folate patterns in mouse plasma, erythrocytes, and embryos by HPLC coupled with a microbiological assay. *Anal. Biochem.*, 265 (1998) 157-166.
- 1871 Bouvier, F., Backhaus, R.A. and Camara, B.: Induction and control of chromoplast-specific carotenoid genes by oxidative stress. *J. Biol. Chem.*, 273 (1998) 30651-30659.
- 1872 Chu, K-O. and Tin, K-C.: Analysis of commercial multi-vitamin preparation by HPLC with diode array detection. *Anal. Lett.*, 31 (1998) 2707-2715.
- 1873 Cirunay, J.J.N., Heyden, Y.V. and Plaizier-Vercammen, J.: Separation from related compounds and assay of calcipotril by high-performance liquid chromatography. *J. Chromatogr. Sci.*, 36 (1998) 417-421.
- 1874 Hirayama, S.: Determination of small amounts of niacin in vinegar: comparison of liquid chromatographic method with microbiological methods. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1273-1276.
- 1875 Huber, A.M., Davidson, K.W., O'Brien-Morse, M.E. and Sadowski, J.A.: Gender differences in hepatic phylloquinone and menaquinones in the vitamin K-deficient and -supplemented rat. *Biochim. Biophys. Acta*, 1426 (1999) 43-52.
- 1876 Jurukovski, V. and Simon, M.: Reduced lecithin:retinol acyl transferase activity in cultured squamous cell carcinoma lines results in increased substrate-driven retinoic acid synthesis. *Biochim. Biophys. Acta*, 1436 (1999) 479-490.
- 1877 Li, Z., Peng, G. and Zhang, S.: (Separation and determination of carotenoids in *Fructus lycii* by isocratic non-aqueous reversed-phase liquid chromatography). *Sepu*, 16 (1998) 340-343; *C.A.*, 129 (1998) 241973g.
- 1878 Oliver, J., Palou, A. and Pons, A.: Semi-quantification of carotenoids by high-performance liquid chromatography: saponification-induced losses in fatty foods. *J. Chromatogr. A*, 829 (1998) 393-399.
- 1879 Osseyi, E.S., Wehling, R.L. and Albrecht, J.A.: Liquid chromatographic method for determining added folic acid in fortified cereal products. *J. Chromatogr. A*, 826 (1998) 235-240.
- 1880 Russell, L.F., Brooks, L. and McRae, K.B.: Development of a robotic-HPLC determination of riboflavin vitamers in food. *Food Chem.*, 63 (1998) 125-131; *C.A.*, 129 (1998) 274902m.
- 1881 Witkowski, A., Witkowska, H.E., Knudsen, J. and Smith, S.: Ether bond cleavage in an arylazido photoaffinity probe induced by ultraviolet light. *Anal. Biochem.*, 267 (1999) 412-415.
- 1882 Yang, C.-S., Chang, S.-C., Tsai, P.-J., Chen, W.-Y. and Kuo, J.-S.: Simultaneous measurement of ascorbic acid and glutathione: application of microdialysis and on-line HPLC with Ag/Hg electrode in anesthetized rat liver. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3139-3148.
- For additional information see *C.A.*:  
 129 (1998) 188468t, 225238r, 270713c, 281094c, 335856w.
- See also 1197, 1403, 1845, 1975, 1978, 2057, 2195, 2258.
28. ANTIBIOTICS
- 1883 Abbasi, H. and Hellenäs, K-E.: Modified determination dihydrostreptomycin in kidney muscle and milk by HPLC. *Analyst (Cambridge)*, 123 (1998) 2725-2727.
- 1884 Aguero, J., Peris, J.E. and San-Martin, E.: Validation of high-performance chromatographic method for the determination of cefotaxime in biological samples. *Fresenius J. Anal. Chem.*, 363 (1999) 289-293.
- 1885 Bahn, Y.-S., Park, J.-M., Bai, D.-H., Takase, S. and Yu, J.-H.: YUAOO1, a novel aldose reductase inhibitor isolated from alkophilic *Corynebacterium* sp. YUA25. I. Taxonomy, fermentation, isolation and characterization. *J. Antibiot.*, 51 (1998) 902-907.
- 1886 Blond, A., Peduzzi, J., Goulard, C., Chiuchiolo, M.J., Baerthelemy, M., Preigent, Y., Salomon, R.A., Farias, R.N., Moreno, F. and Rebiffat, S.: The cyclic structure of microcin J25, a 21-residue peptide antibiotic from *Escherichia coli*. *Eur. J. Biochem.*, 259 (1999) 747-755.
- 1887 Boison, J.O. and Keng, L.I.-Y.: Improvement in the multiresidue liquid chromatographic analysis of residues of mono- and dibasic penicillins in bovine muscle tissues. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1267-1272.
- 1888 Boison, J.O. and Keng, L.I.-Y.: Multiresidue liquid chromatographic method for determining residues of mono- and dibasic penicillins in bovine muscle tissue. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1113-1120.
- 1889 Carmona-Ibanez, G., del Val Bermejo-Sanz, M., Rius-Alarco, F. and Martin-Villodre, A.: Experimental studies on the influence of surfactants on intestinal absorption of drugs. Cefadroxil as model drug and sodium taurocholate as natural model surfactant: studies in rat colon and in rat duodenum. *Arzneim.-Forsch.*, 49 (1999) 44-50.
- 1890 Clarke, S.D., Hill, H.M., Liddicoat, T.N. and Noctor, T.A.G.: Bioanalysis of antibiotics and antivirals in unusual matrixes by LC-MS-MS (API). *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 91-94; *C.A.*, 129 (1998) 310317k.
- 1891 Cooper, A.D., Tarbin, J.A., Farrington, W.H.H. and Shearer, G.: Aspects of extraction, spiking and distribution in the determination of incurred residues of chloramphenicol in animal tissues. *Food Addit. Contam.*, 15 (1998) 637-644; *C.A.*, 129 (1998) 289323x.
- 1892 Cooper, A.D., Tarbin, J.A., Farrington, W.H.H. and Shearer, G.: Effects of extraction and spiking procedures on the determination of incurred residues of oxytetracycline in cattle kidney. *Food Addit. Contam.*, 15 (1998) 645-650; *C.A.*, 129 (1998) 289324y.
- 1893 Daferner, M., Anke, T., Hellwig, V., Steglich, W. and Sterner, O.: Strobilurin N, tetrachloropyrocatechol and tetrachloropyrocatechol methyl ether: new antibiotics from a *Mycena* species. *J. Antibiot.*, 51 (1998) 816-822.
- 1894 De Braekeleer, K., de Juan, A. and Massart, D.L.: Purity assessment and resolution of tetracycline hydrochloride samples analysed using high-performance liquid chromatography with diode array detection. *J. Chromatogr. A*, 832 (1999) 67-86.

- 1895 De Brujin, P., Verweij, J., Loos, W.J., Kolk, H.J., Planting, A.S.T., Kooter, K., Stoter, G. and Sparreboom, A.: Determination of doxorubicin and doxorubicinol in plasma of cancer patients by high-performance liquid chromatography. *Anal. Biochem.*, 266 (1999) 216-221.
- 1896 Dietrich, R., Usleber, E. and Martlbauer, E.: The potential of monoclonal antibodies against ampicillin for the preparation of multi-immunoaffinity chromatography for penicillins. *Analyst (Cambridge)*, 123 (1998) 2749-2754.
- 1897 Du, Y., You, Z. and Liao, J.: (Determination of ofloxacin in skin cleansers by HPLC). *Huagong Shikan*, 12 (1998) 26-27, 48; C.A., 129 (1998) 193479b.
- 1898 Edder, P., Cominoli, A. and Corvi, C.: Determination of streptomycin residues in food by solid-phase extraction and liquid chromatography with post-column derivatization and fluorometric detection. *J. Chromatogr. A*, 830 (1999) 345-351.
- 1899 El-Shanawani, A.A.: HPLC analysis of clavulanic acid, amoxicillin, ticarcillin and their related substances in vials, tablets and suspensions. *Acta Pol. Pharm.*, 55 (1998) 15-19; C.A., 129 (1998) 193776w.
- 1900 Grynkiewicz, G., Zagrodzka, J. and Priebe, W.: Enantioselective high-performance liquid chromatography of chiral intermediates in the total synthesis of 4-demethoxydaunomycinone. *J. Chromatogr. A*, 830 (1999) 191-195.
- 1901 Guittot, J., Laffont, A., Brzeau, J., Rochet-Mingret, L., Bonnefoy, M. and Bureau, J.: Determination of ceftazidime in plasma using high-performance liquid chromatography and electrochemical detection. Application for individualizing dosage regimens in elderly patients. *J. Chromatogr. B*, 719 (1998) 151-157.
- 1902 Hanes, S.D., Herring, V.L. and Wood, G.C.: Alternative method for determination of ceftazidime in plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 719 (1998) 245-250.
- 1903 Hooper, A. and Rickards, R.W.: 3-Amino-5-hydroxybenzoic acid in antibiotic biosynthesis. XI. Biological origins and semisynthesis of thionaphthomycins, and the structures of naphthomycins I and J. *J. Antibiot.*, 51 (1998) 845-851.
- 1904 Hormazábal, V. and Yndestad, M.: Determination of benzylpenicillin and other beta-lactam antibiotics in plasma and tissues using liquid chromatography-mass spectrometry for residual and pharmacokinetic studies. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3099-3110.
- 1905 Hülsmann, H., Heinze, S., Ritzau, M., Schlegel, B. and Gräfe, U.: Isolation and structure of peltaibolin, a new peltaibol from sepedonium strains. *J. Antibiot.*, 51 (1998) 1055-1058.
- 1906 Ishiyama, D., Futamata, K., Futamata, M., Kasuya, D., Kamo, S., Yamashita, F. and Kanazawa, S.: Novel selective inhibitors for human topoisomerase I, BM2419-1 and -2 derived from Saintopin. *J. Antibiot.*, 51 (1998) 1069-1074.
- 1907 Jutel-Gaugain, M., Sönders, P., Laurentie, M., Anger, B., Roudaut, B. and Maris, P.: Results of a European interlaboratory study for the determination of oxytetracycline in pig muscle by HPLC. *Analyst (Cambridge)*, 123 (1998) 2767-2771.
- 1908 Kakeya, H., Morishita, M., Ikeno, A., Kobinata, K., Yano, T. and Osada, H.: Factumycin and its new derivative RP-1009 enhance thronine-phosphorylation of a 60-kDa protein in *Streptomyces griseus*. *J. Antibiot.*, 51 (1998) 963-966.
- 1909 Karanam, B.V., Miller, R.R., Colletti, A., Montgomery, T., Carey, K.D., Hawkins, T., Tang, Y.S., Lavin, M., Stearns, R.A., Chiu, S.H.L. and Vincent, S.H.: Disposition of L-732,531, a potent immunosuppressant, in rats and baboons. *Drug Metab. Disp.*, 26 (1998) 949-957.
- 1910 Kato, A., Nakaya, S., Kokubo, N., Aiba, Y., Ohashi, Y. and Hirata, H.: A new anti-MRSA antibiotic complex, WAP-8294A I. Taxonomy, isolation and biological activity. *J. Antibiot.*, 51 (1998) 929-935.
- 1911 Kennedy, T.C., Webb, G., Cannell, R.J.P., Kinsman, O.S., Middleton, R.F., Sidebottom, P.J., Taylor, N.L., Dawson, M.J. and Buss, A.D.: Novel inhibitors of fungal protein synthesis produced by a strain of *Graphium putredinis*. Isolation, characterization and biological properties. *J. Antibiot.*, 51 (1998) 1012-1018.
- 1912 Keri, V., Nagyne, A.E., Deak, L., Mako, G. and Miskolczy, I.: Chromatographic purification of cyclosporin A. *PCT Int. Appl. WO 98 42,734* (Cl. C07K7/64), 1 Oct. 1998, HU Appl. 97/9,700,645, 25 Mar. 1997; 21 p.; C.A., 129 (1998) 254973g.
- 1913 Ki, S.W., Kasahara, K., Kwon, H.J., Eishima, J., Takesako, K., Cooper, J.A., Yoshida, M. and Horinouchi, S.: Identification of radicicol as an inhibitor of *in vivo* Ras/Raf interaction with the yeast two-hybrid screening system. *J. Antibiot.*, 51 (1998) 936-944.
- 1914 Kikuchi, Y., Teramura, T., Sekino, J., Nishimura, T., Miura, H., Watanabe, T. and Higuchi, S.: Sensitive and specific method for the determination of josamycin in human plasma by liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 720 (1998) 81-87.
- 1915 Kunze, B., Jansen, R., Sasse, F., Höfle, G. and Reichenbach, H.: Apicularens A and B, new cytostatic macrolides from *Chondromyces* species (mycobacteria): production, physico-chemical and biological properties. *J. Antibiot.*, 51 (1998) 1075-1080.
- 1916 Liang, Y., Denton, M.B. and Bates, R.B.: Stability studies of tetracycline in methanol solution. *J. Chromatogr. A*, 827 (1998) 45-55.
- 1917 Macek, J., Ptacek, P. and Klima, J.: Determination of roxithromycin in human plasma by high-performance liquid chromatography with spectrophotometric detection. *J. Chromatogr. B*, 723 (1999) 233-238.
- 1918 Makino, K., Hirakawa, M., Goto, Y., Nakashima, K., Kataoka, Y. and Oishi, R.: Quality evaluation by capillary electrophoresis of amphotericin B injection after filtration through various membrane filters. *Electrophoresis (Weinheim)*, 19 (1998) 2930-2934.
- 1919 Matsumoto, N., Momose, I., Umekita, M., Konoshita, N., Chino, M., Iinuma, H., Sawa, T., Hamada, M. and Takeuchi, T.: Diporamycin, a new antimicrobial antibiotic produced by *Streptomyces griseoauranthiacus* MK393-AF2 I. Taxonomy, fermentation, isolation, physico-chemical properties and biological activities. *J. Antibiot.*, 51 (1998) 1087-1092.
- 1920 Matsuzaki, K., Tahara, H., Inokoshi, J., Tanaka, H., Masuma, R. and Omura, S.: New brominated and halogen-less derivatives and structure-activity relationship of azaphilones inhibiting gp120-CD4 binding. *J. Antibiot.*, 51 (1998) 1004-1011.
- 1921 Menet, M.-C. and Thiebaut, D.: Preparative purification of antibiotics for comparing hydrostatic and hydrodynamic mode counter-current chromatography and preparative high-performance liquid chromatography. *J. Chromatogr. A*, 831 (1999) 203-216.

- 1922 Moats, W.A., Romanowski, R.D. and Medina, M.B.: Identification of  $\beta$ -lactam antibiotics in tissue samples containing unknown microbial inhibitors. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1135-1140.
- 1923 Moreno, M.A., Frutos, P. and Ballesteros, M.P.: Extraction and liquid-chromatographic determination of amphotericin B in oil-water lacithin-based microemulsions. *Chromatographia*, 48 (1998) 803-806.
- 1924 Musson, D.G., Birk, K.L., Cairns, A.M., Majumdar, A.K. and Rogers, J.D.: High-performance liquid chromatographic methods for the determination of a new carbapenem antibiotic, L-749,345, in human plasma and urine. *J. Chromatogr. B*, 720 (1998) 99-106.
- 1925 Ono, M., Sakuda, S., Ikeda, H., Furihata, K., Nakayama, J., Suzuki, A. and Isogai, A.: Structures and biosynthesis of aflastatins: novel inhibitors of aflatoxin production by *Aspergillus parasiticus*. *J. Antibiot.*, 51 (1998) 1019-1028.
- 1926 Orwa, J.A., Bosmans, F., Depuydt, S., Roets, E. and Hoogmartens, J.: Liquid chromatographic method for separation of lincomycin from its related substances. *J. Chromatogr. A*, 829 (1998) 161-166.
- 1927 Osawa, A.E., Sitrin, R. and Lee, S.S.: Purification of pneumocandins by preparative silica-gel high-performance liquid chromatography. *J. Chromatogr. A*, 831 (1999) 217-225.
- 1928 Pasterny (Di Marco), M., Ducharme, M.P., Descamps, V., Felix, G. and Wainer, I.W.: On-line deconjugation of chloramphenicol- $\beta$ -D-glucuronide on an immobilized  $\beta$ -glucuronidase column. Application to the direct analysis of urine samples. *J. Chromatogr. A*, 828 (1998) 135-140.
- 1929 Patel, Y.P., Shah, N., Bhoir, I.C. and Sundaresan, M.: Simultaneous determination of five antibiotics by ion-pair high-performance liquid chromatography. *J. Chromatogr. A*, 828 (1998) 287-290.
- 1930 Posyniak, A., Zmudzki, J., Semeniuk, S., Niedzielska, J. and Ellis, R.: Determination of tetracycline residues in animal tissues by liquid chromatography. *Biomed. Chromatogr.*, 12 (1998) 294-299; C.A., 130 (1999) 24213.
- 1931 Saito, T., Aoki, F., Hirai, H., Inagaki, T., Matsunaga, Y., Sakakibara, T., Sakemi, S., Suzuki, Y., Watanabe, S., Suga, O., Sujaku, T., Smogowicz, A.A. et al.: Erinacine E as a kappa opioid receptor agonist and its new analogs from basidiomycete, *Hericium ramosum*. *J. Antibiot.*, 51 (1998) 983-990.
- 1932 Sastre Toráño, J. and Guchelaar, H.-J.: Quantitative determination of the macrolide antibiotics erythromycin, roxithromycin, azithromycin and clarithromycin in human serum by high-performance liquid chromatography using pre-column derivatization with 9-fluorenylmethoxy carbonylchloride and fluorescence detection. *J. Chromatogr. B*, 720 (1998) 89-97.
- 1933 Shalaby, A.: Simple HPLC method for the analysis of some pharmaceuticals. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3161-3171.
- 1934 Snyder, N.J., Cooper, R.D.G., Briggs, B.S., Zmijewski, M., Mullen, D.L., Kaiser, R.E. and Nicas, T.I.: Enzymatic deacetylation of teicoplanin followed by reductive alkylation: synthesis and antibacterial activity of new glycopeptides. *J. Antibiot.*, 51 (1998) 945-951.
- 1935 Suhren, G. and Knappstein, K.: Detection of incurred dihydrostreptomycin residues in milk by liquid chromatography and preliminary confirmation methods. *Analyst (Cambridge)*, 123 (1998) 2797-2801.
- 1936 Suzuki, K., Nagao, K., Monnai, Y., Yagi, A. and Yueda, M.: Topostatin, a novel inhibitor of topoisomerases I and II produced by *Thermomonospora alba* strain No. 1520 I. Taxonomy, fermentation, isolation and biological activities. *J. Antibiot.*, 51 (1998) 991-998.
- 1937 Sweeney, D.J. and Coleman, M.R.: Determination of apramycin in swine kidney tissue by liquid chromatography with fluorescence detection. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1141-1145.
- 1938 Tsai, T.-H., Cheng, F.-C., Hung, L.-C. and Chen, C.-F.: On-line microdialysis coupled with microbore liquid chromatography for the determination of unbound chloramphenicol and its glucuronide in rat blood. *J. Chromatogr. B*, 720 (1998) 165-169.
- 1939 Valassis, I.N., Parissi-Poulou, M. and Macheras, P.: Quantitative determination of cefepime in plasma and vitreous fluid by high-performance liquid chromatography. *J. Chromatogr. B*, 721 (1999) 249-255.
- 1940 Van Tellingen, O., Kemper, M., Tijssen, F., van Asperen, J., Nooitjen, W.J. and Beijnen, J.H.: High-performance liquid chromatographic bio-analysis of PSC 833 in human and murine plasma. *J. Chromatogr. B*, 719 (1998) 251-257.
- 1941 Vander Heyden, Y., Saevels, J., Roets, E., Hoogmartens, J., De-colin, D., Quaglia, M.G., van den Bossche, W., Leemans, R., Smeets, O., van de Vaart, F., Mason, B., Taylor, G.C., Underberg, W., Bult, A., Chiap, P., Crommen, J., de Beer, J., Hansen, S.H. and Massart, D.L.: Interlaboratory studies on two high-performance liquid chromatographic assays for tylosin (tartrate). *J. Chromatogr. A*, 830 (1999) 3-28.
- 1942 Vertesy, L., Stark, A. and Ehlers, E.: Process for the preparation of meonomycin A. *Eur. Pat. Appl. EP 872,556 (Cl. C12P19/26)*, 21 Oct. 1998, DE Appl. 19,716,013, 17 Apr. 1997; 6 p.; C.A., 129 (1998) 289262b.
- 1943 Weimann, A. and Bojesen, G.: Analysis of tetracyclines in raw urine by column-switching high-performance liquid chromatography and tandem mass spectrometry. *J. Chromatogr. B*, 721 (1999) 47-54.
- 1944 Wu, Y. and Zhang, Y.: (Building of Sepharose 4B-D-Ala-D-Ala affinity chromatography procedure for screening glycopeptide antibiotics). *Zhongguo Kangshengsu Zazhi*, 23 (1998) 246-270; C.A., 130 (1999) 43438.

For additional information see C.A.:  
129 (1998) 2655144.

See also 1557, 2143, 2153.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

### 29a. General techniques

- 1945 Aguera, A. and Fernandez-Alba, A.R.: GC-MS and LC-MS evaluation of pesticide degradation products generated through advanced oxidation processes: an overview. *Analisis*, 26 (1998) M123-M130; C.A., 130 (1999) 1285 - a review with 39 refs.
- 1946 Hennion, M.-C.: Automation in multiresidue analysis of pesticides using online solid-phase extraction and liquid chromatography. *Analisis*, 26 (1998) M131-M136; C.A., 129 (1998) 264998h.

- 1947 Lacassie, E., Dreyfuss, M.-F., Daguet, J.L., Vignaud, M., Marquet, P. and Lachâtre, G.: Liquid chromatography-electrospray mass spectrometry multi-residue determination of pesticides in apples and pears. *J. Chromatogr. A*, 830 (1999) 135-143.
- 1948 Pichon, V., Bouzige, M. and Hennion, M.-C.: New trends in environmental trace-analysis of organic pollutants: class-selective immunoextraction and clean-up in one step using immunosorbents. *Anal. Chim. Acta*, 376 (1998) 21-35.

For additional information see C.A.:  
129 (1998) 188481s, 342808n.

See also 1957.

#### 29b. Chlorinated insecticides

- 1949 Vetter, W., Klobes, U., Luckas, B., Hottinger, G. and Schmidt, G.: Determination of (+/-) elution orders of chiral organochlorines by liquid chromatography with a chiral detector and by enantioselective gas chromatography. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1245-1251.

See also 1186, 1296.

#### 29c. Phosphorus insecticides

- 1950 Hernández, F., Serrano, R., Pitarch, E. and López, F.J.: Automated sample clean-up procedure for organophosphorus pesticides in several aquatic organisms using normal phase liquid chromatography. *Anal. Chim. Acta*, 374 (1998) 215-229.
- 1951 Hogendoorn, E.A., Ossendrijver, F.M., Dijkman, E. and Baumann, R.A.: Rapid determination of glyphosate in cereal samples by means of pre-column derivatisation with 9-fluorenylmethyl chloroformate and coupled-column liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 833 (1999) 67-73.

See also 1262.

#### 29d. Carbamates

- 1952 Abad, A., Moreno, M.J., Pelegrí, R., Martínez, M.I., Sáez, A., Gamón, M. and Montoya, A.: Determination of carbaryl, carbofuran and methiocarb in cucumbers and strawberries by monoclonal enzyme immunoassays and high-performance liquid chromatography with fluorescence detection. An analytical comparison. *J. Chromatogr. A*, 833 (1999) 3-12.

For additional information see C.A.:  
129 (1998) 215821m.

See also 1961.

#### 29e. Herbicides

- 1953 Castro, R., Moyano, E. and Galceran, M.T.: Ion-pair liquid chromatography-atmospheric pressure ionization mass spectrometry for the determination of quaternary ammonium herbicides. *J. Chromatogr. A*, 830 (1999) 145-154.

- 1954 Chimuka, L., Nindi, M.M. and Joensson, J.A.: Supported liquid membrane enrichment studies of natural water samples applied to liquid chromatographic determination of triazine herbicides. *Int. J. Environ. Anal. Chem.*, 68 (1997) 429-445; *C.A.*, 129 (1998) 320795d.
- 1955 Gong, A. and Ye, C.: Analysis of trace atrazine and simazine in environmental samples by liquid chromatography-fluorescence detection with pre-column derivatization reaction. *J. Chromatogr. A*, 827 (1998) 57-63.
- 1956 Laganà, A., Fago, G., Marino, A. and Mosso, M.: Soil column extraction followed by liquid chromatography and electrospray ionization mass spectrometry for the efficient determination of aryloxyphenoxypropionic herbicides in soil samples at ng g<sup>-1</sup> levels. *Anal. Chim. Acta*, 375 (1998) 107-116.
- 1957 Megersa, N., Solomon, T. and Jönsson, J.Å.: Supported liquid membrane extraction for sample work-up and preconcentration of methoxy-s-triazine herbicides in a flow system. *J. Chromatogr. A*, 830 (1999) 203-210.
- 1958 Takeuchi, T., Fukuma, D. and Matsui, J.: Combinatorial molecular imprinting: an approach to synthetic polymer receptors. *Anal. Chem.*, 71 (1999) 285-290.

For additional information see C.A.:  
129 (1998) 315184z.

#### 29f. Fungicides

- 1959 Di Muccio, A., Girolimetti, S., Barbini, D.A., Pelosi, P., Generali, T., Vergori, L., de Merulis, G., Leonelli, A. and Stefanelli, P.: Selective clean-up applicable to aqueous acetone extracts for the determination of carbendazim and thiabendazole in fruits and vegetables by high-performance liquid chromatography with UV detection. *J. Chromatogr. A*, 833 (1999) 61-65.
- 1960 Griffin, R.J. and Harvison, P.J.: *In vivo* metabolism and disposition of the nephrotoxic N-(3,5-dichlorophenyl)succinimide in Fischer 344 rats. *Drug Metab. Disp.*, 26 (1998) 907-913.
- 1961 Levine, R.A., Luchtefeld, R.G., Hopper, M.L. and Salmon, G.D.: Automated method for cleanup and determination of benomyl and thiabendazole in table-ready foods. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1217-1223.
- 1962 Niewiadomy, A., Matysiak, J., Zabinska, A., Rozylo, J.K., Senczyna, B. and Jozwiak, K.: Reversed-phase high-performance liquid chromatography in quantitative structure-activity relationship studies of new fungicides. *J. Chromatogr. A*, 828 (1998) 431-438.
- 1963 Weissmahr, K.W., Houghton, C.L. and Sedlak, D.L.: Analysis of dithiocarbamate fungicides Ziram, Maneb, and Zineb and the flotation agent ethylxanthogenate by ion-pair reversed-phase HPLC. *Anal. Chem.*, 70 (1998) 4800-4804.
- 1964 Yamazaki, Y. and Ninomiya, T.: Determination of bitertanol residues in strawberries by liquid chromatography with fluorescence detection and confirmation by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1252-1256.

## 29g. Other types of pesticides and various agrochemicals

- 1965 Chilmonczyk, Z., Kscinska, H. and Polec, I.: Application of chiral chromatographic parameters in quantitative structure-activity relationship analysis of homologous malathion derivatives. *J. Chromatogr. B*, 720 (1998) 65-69.
- 1966 Di Muccio, A., Pelosi, P., Barbini, D.A., Generali, T., Girolimetti, S., Stefanelli, P., Leonelli, A., Amendola, G., Vergori, L. and Fresquet, E.V.: Determination of pyrethroid pesticide residues in fatty materials by solid-matrix dispersion partition, followed by mini-column size-exclusion chromatography. *J. Chromatogr. A*, 833 (1999) 19-34.
- 1967 Diserens, H. and Henzelin, M.: Determination of abamectin residues in fruits and vegetables by high-performance liquid chromatography. *J. Chromatogr. A*, 833 (1999) 13-18.
- 1968 Liu, C.-M. and Tzeng, Y.-M.: Quantitative analysis of thuringiensins by high-performance liquid chromatography using adenosine monophosphate as an internal standard. *J. Chromatogr. Sci.*, 36 (1998) 340-344.
- 1969 Mol, H.G.J., van Dam, R.C.J., Vreeken, R.J. and Steijger, O.M.: Determination of daminozide in apples and apple leaves by liquid chromatography-mass spectrometry. *J. Chromatogr. A*, 833 (1999) 53-60.
- 1970 Ramesh, A. and Balasubramanian, M.: Rapid preconcentration method for the determination of azadirachtin-A and -B, nimbin and salannin in neem oil samples by using graphitised carbon solid phase extraction. *Analyst (Cambridge)*, 124 (1999) 19-21.
- 1971 Yu, F.: (Analysis of RH-5849 by HPLC). *Nongyao*, 37 (1998) 23-24; *C.A.*, 129 (1998) 185382z.

See also 2111.

## 30. SYNTHETIC AND NATURAL DYES

## 30a. Synthetic dyes

- 1972 Chen, Q.-C., Mou, S.-f., Hou, X.-p., Riviello, J.M. and Ni, Z.-m.: Determination of eight synthetic food colorants in drinks by high-performance ion chromatography. *J. Chromatogr. A*, 827 (1998) 73-81.
- 1973 Doerge, D.R., Churchwell, M.I., Gehring, T.A., Yu, M.P. and Plakas, S.M.: Analysis of malachite green and metabolites in fish using liquid chromatography atmospheric pressure chemical ionization mass spectrometry. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1625-1634; *C.A.*, 130 (1999) 37426.
- 1974 Heppert, K.E. and Davies, M.I.: Using a microdialysis shunt probe to monitor phenolphthalein glucuronide in rats with intact and diverted bile flow. *Anal. Chim. Acta*, 379 (1999) 359-366.
- 1975 Sakhi, A.K., Gundersen, T.E., Ulven, S.M., Blomhoff, R. and Lundanes, E.: Quantitative determination of endogenous retinoids in mouse embryos by high-performance liquid chromatography with on-line solid-phase extraction, column switching and electrochemical detection. *J. Chromatogr. A*, 828 (1998) 451-460.

- 1976 Tarbin, J.A., Barnes, K.A., Bygrave, J. and Farrington, W.H.H.: Screening and confirmation of triphenylmethane dyes and their leuco metabolites in trout muscle using HPLC-vis and ESP-LC-MS. *Analyst (Cambridge)*, 123 (1998) 2567-2571.
- 1977 Thompson, H.C., Jr., Rushing, L.G., Gehring, T. and Lochmann, R.: Persistence of gentian violet and leucogentian violet in channel catfish (*Ictalurus punctatus*) muscle after water-borne exposure. *J. Chromatogr. B*, 723 (1999) 287-291.

See also 2173.

## 30b. Chloroplast and other natural pigments

- 1978 Hegazi, M.M., Pérez-Ruzafa, A., Almela, L. and Candela, M.-E.: Separation and identification of chlorophylls and carotenoids from *Caulerpa prolifera*, *Jania rubens* and *Padina pavonica* by reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 829 (1998) 153-159.
- 1979 Parrilla, P., Kaim, P., Hogendoorn, E.A. and Baumann, R.A.: An internal surface reversed phase column for the effective removal of humic acid interferences in trace analysis of mecoprop in soils with coupled column RPLC-UV. *Fresenius J. Anal. Chem.*, 363 (1999) 79-82.
- 1980 Rodriguez, F., Zapata, M. and Garrido, J.L.: High performance liquid chromatographic separation of chlorophyll c forms from marine phytoplankton on octylsilica bonded phases. *Chromatographia*, 48 (1998) 677-680.

For additional information see C.A.:  
129 (1998) 193772s.

See also 1197, 1468, 1876, 1877, 1878, 1880, 2190.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 1981 Celik, A.H., Dawkins, J.V., Price, D. and Forrest, M.J.: Separation of oligomers from poly(vinyl chloride) by coupled column chromatography. *Int. J. Polym. Anal. Charact.*, 4 (1998) 189-203; *C.A.*, 129 (1998) 189857f.
- 1982 Gillespie, D.T., Hammons, H.K. and Bryan, S.R.: Size exclusion chromatography for polymer analysis. *Spec. Chem.*, 18 (1998) 228-231; *C.A.*, 129 (1998) 343847m - a review without refs.
- 1983 Kolpak, F.J., Brady, J.E. and Fujinari, E.M.: The determination of compositional and molecular weight distributions of cationic polymers using chemiluminescent nitrogen detection (CLND) in aqueous size exclusion chromatography. *Dev. Food Sci.*, 39 (Instrumental Methods in Food and Beverage Analysis) (1998) 467-473; *C.A.*, 129 (1998) 160750e - a review with many refs.
- 1984 Mori, S.: Effect of the sulfonation of sodium poly(styrenesulfonate) compounds on the elution behavior in aqueous size exclusion chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2935-2945.
- 1985 Mourey, T.H. and Balke, S.T.: Detecting local polydispersity with multidetector SEC from reconstructed DRI chromatograms. *J. Appl. Polym. Sci.*, 70 (1998) 831-835; *C.A.*, 129 (1998) 276616v.

- 1986 Nguyen, S.H., Berek, D. and Chiantore, O.: Reconcentration of diluted polymer solutions by full adsorption/desorption procedure. 1. Eluent switching approach studied by size exclusion chromatography. *Polymer*, 39 (1998) 5127-5132; C.A., 129 (1998) 217168c.
- 1987 Palkar, S.A., Murphy, R.E. and Schure, M.R.: Charge and hydrophobicity fractionation of colloidal-size polymers using electrical field-flow fractionation and liquid chromatography. *ACS Symp. Ser.*, 693(Particle Size Distribution III) (1998) 196-206; C.A., 129 (1998) 162031v.
- 1988 Pasch, H. and Rode, K.: Chromatographic investigations by macromolecules in the critical range of liquid chromatography: 11. Polymer blend separation using a reversed stationary phase. *Polymer*, 39 (1998) 6377-6383; C.A., 129 (1998) 316787k.
- 1989 Peng, P.: (Study on the calibration equation of gel permeation chromatography of preceramic polymer-polytitanocarbosilane). *Sepu*, 16 (1998) 436-438; C.A., 130 (1999) 4269.
- 1990 Penton, Z., Betz, V. and Neumann, W.H.: (Determination of vinylchloride in polymer samples by automated solid-phase micro-extraction (SPME)). *GIT Spez. Chromatogr.*, 18 (1998) 90-91; C.A., 129 (1998) 245776t.
- 1991 Philipsen, H.J.A., Claewsens, H.A., Bosman, M., Klumperman, B. and German, A.L.: Bormal phase gradient polymer elution chromatography of polyester resins. *Chromatographia*, 48 (1998) 623-630.
- 1992 Prougenes, P.I., Berek, D. and Meira, G.R.: Size exclusion chromatography of polymers with molar mass detection. Computer simulation study on instrumental broadening biases and proposed correction method. *Polymer* 1999, 40 (1998) 117-124; C.A., 129 (1998) 33122a.
- 1993 Pulda, J.: Characterization of hydroxyl-terminated polybutadienes using two-dimensional chromatography. *Polym. Mater. Sci. Eng.*, 78 (1998) 61; C.A., 129 (1998) 277247n.
- 1994 Teraoka, I., Xu, Y., Senak, L. and Wu, C.-S.: Separation of poly(vinylpyrrolidone) by high osmotic pressure chromatography. *Polym. Mater. Sci. Eng.*, 79 (1998) 434-435; C.A., 129 (1998) 245769t.
- 1995 Willis, J.N., Jr. and Liu, X.: Uses of hyphenated technologies in the polymer industry. *Polym. Mater. Sci. Eng.*, 78 (1998) 51; C.A., 129 (1998) 276811e.
- 1996 Xu, Y. and Teraoka, I.: Separation of random copolymer by phase fluctuation chromatography. *Polym. Mater. Sci. Eng.*, 79 (1998) 56-57; C.A., 129 (1998) 231245g.
- 1997 Zammit, M.D., Davis, T.P. and Suddaby, K.G.: Factors influencing detector matching in multidetector SEC: solvent and concentration effects. *Polymer*, 39 (1998) 5789-5798; C.A., 129 (1998) 245771n.
- For additional information see C.A.:  
 129 (1998) 231138z;  
 130 (1999) 14357, 38891, 39333, 40478.
- See also 1151, 1422.
- 32. DRUG ANALYSIS**
- For additional information see C.A.:  
 129 (1998) 183801m.
- 32a. *Drug analysis, general techniques*
- 1998 Anonymous: Pharmaceutical application of LC-MS. *Chromatogr. Sci. Ser.*, 79 (1999) 405-463; C.A., 129 (1998) 265505g - a review with 131 refs.
- 1999 Ayrton, J., Dear, G.J., Leavens, W.J., Mallett, D.N. and Plumb, R.S.: Optimisation and routine use of generic ultra-high flow-rate liquid chromatography with mass spectrometric detection for the direct on-line analysis of pharmaceuticals in plasma. *J. Chromatogr. A*, 828 (1998) 199-207.
- 2000 Davies, M.I.: A review of microdialysis sampling for pharmacokinetic applications. *Anal. Chim. Acta*, 379 (1999) 227-249 - a review with 136 refs.
- 2001 Gao, V.C.X., Luo, W.C., Ye, Q. and Thoollen, M.: Column switching in high-performance liquid chromatography with tandem mass spectrometric detection for high-throughput preclinical pharmacokinetic studies. *J. Chromatogr. A*, 828 (1998) 141-148.
- 2002 Grill, C.M. and Miller, L.: Separation of a racemic pharmaceutical intermediate using closed-loop steady state recycling. *J. Chromatogr. A*, 827 (1998) 359-371.
- 2003 Hanai, T., Miyazaki, R. and Kinoshita, T.: Quantitative analysis of human serum albumin-drug interactions using reversed-phase and ion-exchange liquid chromatography. *Anal. Chim. Acta*, 378 (1999) 77-82.
- 2004 Hawes, E.M.: 1996 ASPET N-glucuronidation of xenobiotic symposium. N<sup>+</sup>-glucuronidation, a common pathway in human metabolism of drugs with a tertiary amine group. *Drug Metab. Disp.*, 26 (1998) 830-837.
- 2005 Heizmann, P., Richter, W.F., Theil, F.P., Saulnier, E. and Schenk, P.: Analytical pitfalls with drug stability measurements in early assay development. *Methodol. Surv. Bioanal. Drugs*, 25(Drug Development Assay Approaches) (1998) 196-200; C.A., 129 (1998) 241984m.
- 2006 Lim, H.K., Stellingweif, S., Sisenwine, S. and Chan, K.W.: Rapid drug metabolite profiling using fast liquid chromatography, automated multiple-stage mass spectrometry and receptor-binding. *J. Chromatogr. A*, 831 (1999) 227-241.
- 2007 Maisch, A.: Polar selectivity in reversed-phase HPLC. *LaborPraxis*, 22 (1998) 50-55; C.A., 129 (1998) 325532a.
- 2008 Mann, G.: Some considerations on the use of preparative liquid chromatography in the pharmaceutical industry. *Analusis*, 26 (1998) M76-M82; C.A., 129 (1998) 335548z.
- 2009 McCalley, D.V. and Brereton, R.G.: High-performance liquid chromatography of basic compounds. Problems, possible solutions and tests of reversed-phase columns. *J. Chromatogr. A*, 828 (1998) 407-420.
- 2010 Mislanova, C. and Oravcova, J.: (Separation methods in the monitoring of chiral drugs the direct injection of biological samples). *Chem. Listy*, 92 (1998) 711-721; C.A., 129 (1998) 339394u - a review with 134 refs.
- 2011 Nagamatsu, S., Murazumi, K. and Makino, S.: Chiral separation of a pharmaceutical intermediate by a simulated moving bed process. *J. Chromatogr. A*, 832 (1999) 55-65.
- 2012 Nishimura, K., Chonan, T. and Hirama, Y.: (Simultaneous determination of 10 kinds of veterinary drugs by high performance liquid chromatography). *Hokkaidoritsu Eisei Kenkyusho*, 48 (1998) 81-84; C.A., 130 (1999) 43452.

- 2013 Parish, H., Petesch, R., Hettiarachchi, K. and Olson, L.: The role of liquid chromatography in analytical support for drug development. *Am. Lab. (Shelton)*, 30 (1998) 36-38; C.A., 129 (1998) 347349y.
- 2014 Pettersson, C. and Persson, B.-A.: HPLC application for chiral pharmaceutical analysis. *Chromatogr. Sci. Ser.*, 78 (1998) 669-693; C.A., 129 (1998) 293943s - a review with 261 refs.
- 2015 Steward, J.T., Siliveru, M., Bachman, W.J., Venkateshwaran, T.G., Delinsky, D.C. and Matuszewski, B.K.: Enhanced HPLC determination of selected drugs in serum using post-column irradiation and fluorescence/electrochemical detection. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 170-176; C.A., 129 (1998) 310322h.
- 2016 Venn, R.F., Howard, A. and Russell, D.: Development and use of a deep-UV laser-induced fluorescence detector for HPLC: applicability to pharmaceutical bioanalysis. *Methodol. Surv. Bioanal. Drugs*, 25(Drug Development Assay Approaches) (1998) 166-169; C.A., 129 (1998) 250262b.
- For additional information see C.A.:  
129 (1998) 235711d, 335852w.
- See also 1156, 1235, 1259, 2044, 2172, 2175, 2194.
- 32b. *Antirheumatics and antiinflammatory drugs*
- 2017 Barrell, K.J., Laban, G.A., Jenkins, A.H., Woodward, A.J. and Maddock, J.: HPLC determination of diclofenac and its fluorescent carbazole acetic acid in human aqueous humor with a bovine substitute matrix. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 95-96; C.A., 129 (1998) 310318m.
- 2018 De Veau, E.J.I.: Determination of non-protein bound phenylbutazone in bovine plasma using ultrafiltration and liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 721 (1999) 141-145.
- 2019 Hammad, M.A. and Müller, B.W.: Factors affecting solubility and stability of indomethacin in mixed micelles. *Pharmazie*, 53 (1998) 790-794.
- 2020 Iwaki, M., Ogiso, T., Inagawa, S. and Kakehi, K.: *In vitro* regioselective stability of  $\beta$ -1-O- and 2-O-acyl glucuronides of naproxen and their covalent binding to human serum albumin. *J. Pharm. Sci.*, 88 (1999) 52-57.
- 2021 Jaworowicz, D.J., Jr., Filipowski, M.T. and Boje, K.M.K.: Improved high-performance liquid chromatographic assay for nimesulide. *J. Chromatogr. B*, 723 (1999) 293-299.
- 2022 Luo, Z. and Huang, S.: (HPLC determination of paracetamol, isopropylphenazone and caffeine in Melton tablets). *Fenxi Ceshi Xuebao*, 17 (1998) 66-68; C.A., 129 (1998) 221249x.
- 2023 Machinist, J.M., Mayer, M.D., Roberts, E.M., Surber, B.W. and Rodrigues, A.D.: Identification of the human liver cytochrome P450 enzymes involved in the *in vitro* metabolism of a novel 5-lipoxygenase inhibitor. *Drug Metab. Disp.*, 26 (1998) 970-976.
- 2024 Meyring, M., Strickmann, D., Chankvetadze, B., Blaschke, G., Desiderio, C. and Fanali, S.: Investigation of the *in vitro* biotransformation of R-(+)-thalidomide by HPLC, nano-HPLC, CEC and HPLC-APCI-MS. *J. Chromatogr. B*, 723 (1999) 255-264.
- 2025 Proniuk, S., Lerkpulsawad, S. and Blanchard, J.: A simplified and rapid high-performance liquid chromatographic assay for ketoprofen in isopropyl myristate. *J. Chromatogr. Sci.*, 36 (1998) 495-498.
- 2026 Rautio, J., Taipale, H., Gynther, J., Vepsalainen, J., Nevalainen, T. and Jarvinen, T.: *In vitro* evaluation of acyloxyalkylesters as dermal prodrugs of ketoprofen and naproxen. *J. Pharm. Sci.*, 87 (1998) 1622-1628.
- 2027 Ravisankar, S., Vasudevan, M., Gandhimathi, M. and Suresh, B.: Reversed-phase HPLC method for the determination of acetaminophen, ibuprofen and chlorzoxazone in formulations. *Talanta*, 46 (1998) 1577-1581; C.A., 129 (1998) 127274e.
- 2028 Reepneyer, J.C., Revelle, L.K. and Vidavsky, I.: Detection of clobetasol propionate as an undeclared steroid in zinc pyrithione formulations by high-performance liquid chromatography with rapid-scanning ultraviolet spectroscopy and mass spectrometry. *J. Chromatogr. A*, 828 (1998) 239-246.
- 2029 Robinson, P.R., Rees, L.W. and Maddock, J.: A sensitive method for the determination of budesonide in plasma using LC-MS-MS (API). *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 88-89; C.A., 129 (1998) 310315h.
- 2030 Shinde, V.M. and Raman, R.: Simultaneous determination of paracetamol and chlormezanone in tablets by reversed-phase HPLC. *Indian Drugs*, 35 (1998) 521-523; C.A., 129 (1998) 193802b.
- For additional information see C.A.:  
129 (1998) 221246w, 221255w, 225236p, 335846v.
- See also 2090, 2127.
- 32c. *Autonomic and cardiovascular drugs*
- 2031 Bareggi, S.R., Gambaro, V., Valenti, M. and Benvenuti, C.: Pharmacodynamics and pharmacokinetics of pinacidil in normotensive volunteers after repeated doses of a new slow-release tablet formulation. *Arzneim.-Forsch.*, 49 (1999) 21-25.
- 2032 Bergés, R., Segura, J., de la Torre, X. and Ventura, R.: Analytical methodology for enantiomers of salbutamol in human urine for application in doping control. *J. Chromatogr. B*, 723 (1999) 173-184.
- 2033 Buist, S.C., Hsu, C.-Y.L. and Walters, R.R.: Sensitive determination of a new antiarrhythmic agent, trecetilide, in plasma by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 828 (1998) 259-265.
- 2034 Caccamese, S. and Principato, G.: Resolution of the enantiomers of tetrahydrozoline by chiral HPLC. The racemization of the enantiomers via an imine-enamine tautomerism. *Tetrahedron: Asymmetry*, 9 (1998) 2939-2945; C.A., 129 (1998) 343211z.
- 2035 Cheng, Y.-F., Neue, U.D. and Bean, L.: Straightforward solid-phase extraction method for the determination of verapamil and its metabolite in plasma in a 96-well extraction plate. *J. Chromatogr. A*, 828 (1998) 273-281.
- 2036 Eiermann, B., Edlund, P.O., Thernberg, A., Dalen, P., Dahl, M-L and Bertilsson, L.: 1- and 3-hydroxylations, in addition to 4-hydroxylation, of debrisoquine are catalyzed by cytochrome P450 2D6 in humans. *Drug Metab. Disp.*, 26 (1998) 1096-1101.

- 2037 Enders, C., Herderich, M. and Ebel, S.: Structure elucidation of "related substances" of acebutolol by LC-MS/MS. *Pharmazie*, 54 (1999) 124-131.
- 2038 Fakt, C. and Stenhoff, H.: Determination of an ultrashort-acting antihypertensive dihydropyridine, clevidipine, in blood using capillary gas chromatography-mass spectrometry and of the primary metabolite using liquid chromatography and fluorescence detection. *J. Chromatogr. B*, 723 (1999) 211-219.
- 2039 Hagiwara, J., Sakai, Y. and Narimatsu, S.: Uniform-sized molecularly imprinted polymer material for propranolol. Recognition of propranolol and its metabolites. *Anal. Sci.*, 14 (1998) 823-826; *C.A.*, 129 (1998) 254287m.
- 2040 Joo, E.-H., Chang, W.-I., Oh, I., Shin, S.-C., Na, H.-K. and Lee, Y.-B.: High-performance liquid chromatographic determination of trimebutine and its major metabolite, N-monodesmethyl trimebutine, in rat and human plasma. *J. Chromatogr. B*, 723 (1999) 239-246.
- 2041 Klippert, P., Jeanniot, J.-P., Polv , S., Lef vre, C. and Merdjan, H.: Determination of ivabradine and its N-demethylated metabolite in human plasma and urine, and in rat and dog plasma by a validated high-performance liquid chromatographic method with fluorescence detection. *J. Chromatogr. B*, 719 (1998) 125-133.
- 2042 Malan, S.F., Dockendorf, G., van der Walt, J.J., van Rooyen, J.M. and van der Schyf, C.J.: Enantiomeric resolution of the calcium channel antagonist 8-benzylamino-8,11-oxapentacyclo[5.4.0.0<sup>2,6</sup>.0<sup>3,10</sup>.0<sup>5,9</sup>]undecane (NPG 1-01). *Pharmazie*, 53 (1998) 859-862.
- 2043 Martinez, I.R., Villanueva Camanas, R.M. and Garcia Alvarez-Coque, M.C.: Micellar liquid chromatography: a worthy technique for the determination of  -agonists in urine samples. *Anal. Chem.*, 71 (1999) 319-326.
- 2044 Patel, Y.P., Patil, S., Bhoir, I.C. and Sundaresan, M.: Isocratic, simultaneous reversed-phase high-performance liquid chromatographic estimation of six drugs for combined hypertension therapy. *J. Chromatogr. A*, 828 (1998) 283-286.
- 2045 Pawula, M., Watson, D., Teramura, T., Watanabe, T., Higuchi, S. and Cheng, K.N.: Sensitive and specific liquid chromatographic-tandem mass spectrometric assay for barnidipine in human plasma. *J. Chromatogr. B*, 719 (1998) 113-123.
- 2046 Rahman, M. and Lau-Cam, C.A.: Evaluation of the effect of polyethylene glycol 400 on the nasal absorption of nicardipine and verapamil in the rat. *Pharmazie*, 54 (1999) 132-136.
- 2047 Schaefer, W.H., Politowski, J., Hwang, B., Dixson, F., Jr., Goalwin, A., Gutzeit, L., Anderson, K., Debrosse, C., Bean, M. and Rhodes, G.R.: Metabolism of carvedilol in dogs, rats, and mice. *Drug Metab. Disp.*, 26 (1998) 958-969.
- 2048 Streel, B., Zimmer, C., Sibenaler, R. and Ceccato, A.: Simultaneous determination of nifedipine and dehydronedipine in human plasma by liquid chromatography-tandem mass spectrometry. *J. Chromatogr. B*, 720 (1998) 119-128.
- 2049 Thoma, K. and Ziegler, I.: Development of an automated flow-through dissolution system for poorly soluble drugs with poor chemical stability in dissolution media. *Pharmazie*, 53 (1998) 784-790.
- 2050 Zhong, D. and Chen, X.: Enantioselective determination of propafenone and its metabolites in human plasma by liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 721 (1999) 67-75.

For additional information see C.A.:

- 129 (1998) 197506f, 225237q, 235716j, 285536w;  
130 (1999) 43367.

See also 1177, 1267, 2187.

### 32d. Central nervous system drugs

- 2051 Al-Dirbashi, O., Kuroda, N., Menichini, F., Noda, S., Minemoto, M. and Nakashima, K.: Enantioselective high-performance liquid chromatography with fluorescence detection of methamphetamine and its metabolites in human urine. *Analyst (Cambridge)*, 123 (1998) 2333-2337.
- 2052 Andrssson, M., Hultin, U.-K. and Sokolowski, A.: Effect of amine additives on the resolution of antipsychotic and antidepressant drugs on a cyanoalkyl HPLC column. *Chromatographia*, 48 (1998) 770-776.
- 2053 Aravagiri, M., Marder, S.R., Wirshing, D. and Wirshing, W.C.: Plasma concentrations of risperidone and its 9-hydroxy metabolite and their relationship to dose in schizophrenic patients: simultaneous determination by a high performance liquid chromatography with electrochemical detection. *Pharmacopsychiatry*, 31 (1998) 102-109; *C.A.*, 129 (1998) 239388b.
- 2054 Brunnenberg, M., Lindenblatt, H., Gouzoulis-Mayfrank, E. and Kovar, K.-A.: Quantitation of N-ethyl-3,4-methylenedioxymethamphetamine and its major metabolites in human plasma by high-performance liquid chromatography and fluorescence detection. *J. Chromatogr. B*, 719 (1998) 79-85.
- 2055 Catabay, A., Taniguchi, M., Jinno, K., Pesek, J.J. and Williamsen, E.: A-21 separation of 1,4-benzodiazepines and analogs using cholestryl-10-undecenoate bonded phase in microcolumn liquid chromatography. *Chromatography*, 19 (1998) 108-111; *C.A.*, 130 (1999) 7487.
- 2056 Coller, J.K., Somogyi, A.A. and Bochner, F.: Quantification of flunitrazepam's oxidative metabolites, 3-hydroxylflunitrazepam and desmethylflunitrazepam, in hepatic microsomal incubations by high-performance liquid chromatography. *J. Chromatogr. B*, 719 (1998) 87-92.
- 2057 Dogan, H.N. and Duran, A.: Simultaneous spectrophotometric determination of aspirin, acetaminophen and ascorbic acid in pharmaceutical preparations. *Pharmazie*, 53 (1998) 781-784.
- 2058 Escuder-Gilabert, L., Sagrado, S., Vukkabyeva-Camanas, R.M. and Medina-Hernandez, M.J.: Analysis of pharmaceutical preparations containing local anesthetics by micellar liquid chromatography and spectrophotometric detection. *Chromatographia*, 49 (1999) 85-90.
- 2059 Feng, M.R., Loo, J. and Wright, J.: Disposition of the antipsychotic agent CL-1007 in rats, monkeys, dogs and human cytochrome P450 2D6 extensive metabolizers. Species comparison and allometric scaling. *Drug Metab. Disp.*, 26 (1998) 982-988.
- 2060 Gu, X.Q., Fryirs, B. and Mather, L.E.: High-performance liquid chromatographic separation and nanogram quantitation of bupivacaine enantiomers in blood. *J. Chromatogr. B*, 719 (1998) 135-140.
- 2061 Gunaratna, C. and Kissinger, P.T.: Investigation of stereoselective metabolism of amphetamine in rat liver microsomes by microdialysis and liquid chromatography with precolumn chiral derivatization. *J. Chromatogr. A*, 828 (1998) 95-103.

- 2062 Hefnawy, M.M. and Stewart, J.T.: Resolution of nomifensine enantiomers on selected achiral and chiral stationary phases using high performance liquid chromatography. *Anal. Lett.*, 32 (1999) 159-171.
- 2063 Hrobonova, K., Lehotay, J., Gazdikova, J. and Cizmarik, J.: HPLC studies of the hydrolysis of carbisocaine enantiomers. *Pharmazie*, 53 (1998) 879-880.
- 2064 Ikinici, G., Capan, Y., Senel, S., Dalkara, T. and Hincal, A.A.: Formulation and *in vitro/in vivo* investigation of carbamazepine controlled-release matrix tablets. *Pharmazie*, 54 (1999) 139-141.
- 2065 Jones, B.C., Hyland, R., Ackland, M., Tyman, C.A. and Smith, D.A.: Interaction of terfenadine and its primary metabolites with cytochrome P450 2D6. *Drug Metab. Disp.*, 26 (1998) 875-882.
- 2066 Joseph-Charles, J. and Bertucat, M.: Isocratic high-performance liquid chromatography for the simultaneous separation of eleven tricyclic imipramine-derived compounds of therapeutic interest. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3047-3064.
- 2067 Ju, C. and Utrecht, J.P.: Detection of 2-hydroxyiminostilbene in the urine of patients taking carbamazepine and its oxidation to a reactive iminoquinone intermediate. *J. Pharmacol. Exp. Ther.*, 288 (1999) 51-56.
- 2068 Kapetanovic, I.M., Torchin, C.D., Thimpson, C.D., Miller, T.A., McNeilly, P.J., Macdonald, T.L., Kupferberg, H.J., Perhach, J.L., Sofia, R.D. and Strong, J.M.: Potentially reactive cyclic carbamate metaboite of the antiepileptic drug felbamate produced by human liver tissue *in vitro*. *Drug Metab. Disp.*, 26 (1998) 1089-1095.
- 2069 Kassahun, K., Mattiuz, E., Franklin, R. and Gillespie, T.: 1996 ASPET N-glucuronidation of xenobiotic symposium. Olanzapine 10-N-flucuronide. A tertiary N-glucuronide unique to humans. *Drug Metab. Disp.*, 26 (1998) 848-855.
- 2070 Kosel, M., Eap, C.B., Amey, M. and Baumann, P.: Analysis of the enantiomers of citalopram and its demethylated metabolites using chiral liquid chromatography. *J. Chromatogr. B*, 719 (1998) 234-238.
- 2071 Larsimont, V., Meins, J., Fieger-Büsches, H. and Blume, H.: Validated high-performance liquid chromatographic assay for the determination of promazine in human plasma. Application to pharmacokinetic studies. *J. Chromatogr. B*, 719 (1998) 222-226.
- 2072 Le Guellec, C., Gaudet, M.L. and Breteau, M.: Improved selectivity for high-performance liquid chromatographic determination of clonazepam in plasma of epileptic patients. *J. Chromatogr. B*, 719 (1998) 227-233.
- 2073 Leclercq, I., Horsmans, Y. and Desager, J.-P.: Estimation of chlorzoxazone hydroxylase activity in liver microsomes and of the plasma pharmacokinetics of chlorzoxazone by the same high-performance liquid chromatographic method. *J. Chromatogr. A*, 828 (1998) 291-296.
- 2074 Maris, F.A., Dingler, E. and Niehues, S.: High-performance liquid chromatographic assay with fluorescence detection for the routine monitoring of the antidepressant mirtazapine and its demethyl metabolite in human plasma. *J. Chromatogr. B*, 721 (1999) 3090-316.
- 2075 Martins, J.M. and Farinha, A.: (Evaluation of an HPLC method for the evaluation of omeprazole capsule stability). *Rev. Port. Farm.*, 48 (1998) 77-82; C.A., 129 (1998) 235721g.
- 2076 Molins-Legua, C., Campíns-Falcó, P. and Sevillano Cabeza, A.: Off-line dansylation of amines using C<sub>18</sub> solid-phase packings: study of the fluorescence and chemiluminescence detection by post-column derivatization with oxalic acid bis(2,4,6-trichlorophenyl ester)/H<sub>2</sub>O<sub>2</sub> in liquid chromatography. Determination of amphetamines in urine samples. *Anal. Chim. Acta*, 378 (1999) 83-93.
- 2077 Moriyama, M., Yamashita, S., Domoto, H., Furuno, K., Araki, H. and Gomita, Y.: Determination of plasma phenobarbital concentration by high-performance liquid chromatography in rat offspring. *J. Chromatogr. B*, 723 (1999) 301-305.
- 2078 Musshoff, F. and Madea, B.: First experience with REMEDI HS urine benzodiazepine assay. *Clin. Chem. Lab. Med.*, 36 (1998) 803-808.
- 2079 Nnane, I.P., Damani, L.A. and Hutt, A.J.: Development and validation of stability indicating high-performance liquid chromatographic assays for ketotifen in aqueous and silicon oil formulations. *Chromatographia*, 48 (1998) 797-802.
- 2080 Portier, E.J.G., de Blok, K., Butter, J.J. and van Boxtel, C.J.: Simultaneous determination of fentanyl and midazolam using high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 723 (1999) 313-318.
- 2081 Raggi, M.A., Bugamelli, F., Mandrioli, R., De Ronchi, D. and Volterra, V.: Development and validation of an HPLC method for the simultaneous determination of clozapine and desmethylclozapine in plasma of schizophrenic patients. *Chromatographia*, 49 (1999) 75-80.
- 2082 Reif, S., le Corre, P., Dollo, G., Chevanne, F. and le Verge, R.: High-performance liquid chromatographic determination of ropivacaine, 3-hydroxy-ropivacaine, 4-hydroxy-ropivacaine and 2',6'-pipecoloxylidide in plasma. *J. Chromatogr. B*, 719 (1998) 239-244.
- 2083 Sano, T., Sato, K., Kobayashi, K., Mizuno, Y. and Katsumata, Y.: Quantitation of midazolam in serum by column-switching capillary HPLC/FAB-MS using a deuterium-labeled internal standard. In: Takatori, T. and Takasu, A. (Editors), *Curr. Top. Forensic Sci., Proc. Meet. Int. Assoc. Forensic Sci.*, 14th 1996, 2, Shunderson Communications, Ottawa, 1997, pp. 235-236; C.A., 129 (1998) 157756f.
- 2084 Sauvage, M.F., Marquet, P., Rousseau, A., Buxeraud, J., Raby, C. and Lachatre, G.: Determination of trimeprazine and its main metabolites in mouse serum and thyroid by liquid chromatography-electrospray-mass spectrometry. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3173-3185.
- 2085 Shirsat, V.A., Gabhe, S.Y. and Deshpande, S.G.: High-performance liquid chromatographic determination of sumatriptan succinate from pharmaceutical preparation. *Indian Drugs*, 35 (1998) 404-407; C.A., 129 (1998) 166284c.
- 2086 Sorensen, L.K. and Hansen, H.: Determination of fenbendazole and its metabolites in trout by a high-performance liquid chromatographic method. *Analyst (Cambridge)*, 123 (1998) 2559-2562.
- 2087 Sueyasu, M., Fujito, K., Makino, K., Shuto, H., Kataoka, Y. and Oishi, R.: Improved method of determining thiamylal enantiomers in human serum by high-performance liquid chromatography. *J. Chromatogr. B*, 723 (1999) 307-311.

- 2088 Swart, K.J., Sutherland, F.C.H., van Essen, G.H., Hundt, H.K.L. and Hundt, A.F.: Determination of fluspirilene in human plasma by liquid chromatography-tandem mass spectrometry with electrospray ionisation. *J. Chromatogr. A*, 828 (1998) 219-227.
- 2089 Tagliaro, F., de Battisti, Z., Groppi, A., Nakahara, Y., Scarella, D., Valentini, R. and Marigo, M.: High sensitivity simultaneous determination in hair of the major constituents of ecstasy (3,4-methylenedioxymethamphetamine, 3,4-methylenedioxymphetamine and 3,4-methylenedioxymethylamphetamine) by high-performance liquid chromatography with direct fluorescence detection. *J. Chromatogr. B*, 723 (1999) 195-202.
- 2090 Tratishayakul, V., Phadoongsombut, N., Kamaung, S., Wongwisesri, S. and Mathruod, P.: Fourier transform infrared spectrometric determination of paracetamol and ibuprofen in tablets. *Pharmazie*, 54 (1999) 11-114.
- 2091 Tulunay, F.C., Onaran, H.O., Ergün, H., Ucar, A., Usanmaz, S., Embil, K. and Tylunay, M.: Pharmacokinetics of phenbromate after oral administration to healthy subjects. *Arzneim.-Forsch.*, 48 (1998) 1068-1071.
- 2092 Varin, F., Couture, J. and Gao, H.: Determination of neostigmine in human plasma and cerebrospinal fluid by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 723 (1999) 319-323.
- 2093 Venkata Sarveshwar Rao, V., Rambhan, D., Ramesh Rao, B. and Srinivasu, P.: Pharmacokinetics of a single dose of phenylpropanolamine following oral administration at two different times of the day. *Arzneim.-Forsch.*, 48 (1998) 1087-1090.
- 2094 Vree, T.B., Lagerwerf, A.J., Bleeker, C.P. and de Groot, P.M.R.M.: Direct high-performance liquid chromatography determination of propofol and its metabolite quinol with their glucuronide conjugates and preliminary pharmacokinetics in plasma and urine of man. *J. Chromatogr. B*, 721 (1999) 217-228.
- 2095 Walter, S., Bauer, S., Roots, I. and Brockmöller, J.: Quantification of the antipsychotics flupentixol and haloperidol in human serum by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 720 (1998) 231-237.
- 2096 Walters, R.R. and Buist, S.C.: Improved enantioselective method for the determination of the enantiomers of reboxetine in plasma by solid-phase extraction, chiral derivatization, and column-switching high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 828 (1998) 167-176.
- 2097 Wang, S. and Porter, M.D.: Enantiomeric separations of benzodiazepines by electrochemically modulated liquid chromatography. *J. Chromatogr. A*, 828 (1998) 157-166.
- 2098 Wangemann, M., Retzow, A., Evers, G., Mazur, D., Schur, B. and Blume, H.: Bioavailability study of two carbamazepine containing sustained release formulations after multiple oral dose administration. *Arzneim.-Forsch.*, 48 (1998) 1131-1137.
- 2099 Wienkers, L.C., Steenwyk, R.C., Hauer, M.J., Fleishaker, J.C. and Pearson, P.G.: Biotransformation of tirlazad in human: 3. Tirlazad A-ring reduction by human liver microsomal 5 $\alpha$ -reductase type 1 and type 2. *J. Pharmacol. Exp. Ther.*, 287 (1998) 583-590.
- 2100 Woolf, E.J. and Matuszewski, B.K.: Simultaneous determination of omeprazole and 5'-hydroxyomeprazole in human plasma by liquid chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 828 (1998) 229-238.
- 2101 Yeh, G.-C., Sheu, M.-T., Yen, C.-L., Wang, Y.-W., Liu, C.-H. and Ho, H.-O.: High-performance liquid chromatographic method for determination of tramadol in human plasma. *J. Chromatogr. B*, 723 (1999) 247-253.
- 2102 Zalko, D., Devrauwer, L., Bories, G. and Tulliez, J.: Metabolism of clenbuterol in rats. *Drug Metab. Disp.*, 26 (1998) 891-899.
- For additional information see C.A.:  
129 (1998) 254295n.
- See also 1197, 1221, 1651, 1933, 2027, 2186, 2192.
- 32e. *Chemotherapeutics (exc. cytostatics and antibiotics)*
- 2103 Bao, J., Sauer, J.-M., Smith, R.L., Kuester, R.K., Kattnig, M.J. and Sipes, I.G.: Sulphydryl-dependent biotransformation and macromolecular binding of 1,2-dibromo-2,4-dicyanobutane in blood. *Drug Metab. Disp.*, 26 (1998) 1001-1007.
- 2104 Benetton, S.A., Kedor-Hackmann, E.R.M., Santoro, M.I.R.M. and Borges, V.M.: Reversed-phase high performance liquid chromatographic determination of rifampin in the presence of its acid-induced degradation products. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3215-3221.
- 2105 Chang, M., Sood, V.K., Wilson, G.J., Kloosterman, D.A., Sanders, P.E., Schuette, M.R., Judy, R.W., Voorman, R.L., Maio, S.M. and Slatter, J.G.: Absorption, distribution, metabolism, and excretion of atevirdine in the rat. *Drug Metab. Disp.*, 26 (1998) 1008-1018.
- 2106 Denise, H., Giraud, C., Barrett, M. and Baltz, T.: Affinity chromatography using trypanocidal arsenical drugs identifies a specific interaction between glycerol-3-phosphate dehydrogenase from *Trypanosoma brucei* and Cymelarsan. *Eur. J. Biochem.*, 259 (1999) 339-346.
- 2107 Hyun, M.H., Jin, J.S. and Lee, W.: A new HPLC chiral stationary phase for the direct resolution of racemic quinolone antibacterials containing a primary amino group. *Bull. Korean Chem. Soc.*, 19 (1998) 819-821; C.A., 129 (1998) 257553f.
- 2108 Laban, G.A., Bryant, M.A., Barrell, K.J., Woodward, A.J. and Maddock, J.: A simple versatile method for determining acyclovir and penciclovir in biological fluids. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 90; C.A., 129 (1998) 310316j.
- 2109 Murata, M., Tama, I., Sai, Y., Nagata, O., Kato, H., Sugiyama, Y. and Tsuji, A.: Hepatobiliary transport kinetics of HSR-903, a new quinolone antibacterial agent. *Drug Metab. Disp.*, 26 (1998) 1113-1119.
- 2110 Romvári, Z., Fekete, J., Kermény, S., Pokol, G., Gebefügi, I. and Kettrup, A.: Determination of two metabolites of albendazole, albendazole-sulfoxide and albendazole-sulfone in cow's milk using an HPLC method - a systematic approach to optimize extraction conditions. *Chromatographia*, 48 (1998) 777-784.
- 2111 Scarano, G., Esposito, M., Grasso, L., Soprano, V. and Oliviero, G.: Use of automated solid-phase extraction equipment for the determination of ivermectin residues in animal liver by HPLC. *Analyst (Cambridge)*, 123 (1998) 2551-2553.
- 2112 Schinazi, R.F., Chu, C.K. and Du, J.: Synthesis anti-human immunodeficiency virus, and anti-hepatitis b virus activities of 1,3-oxaselenolane nucleosides. *PCT Int. Appl. WO 98 41,522 (Cl. C07D421/04)*, 24 Sep. 1998, US Appl. 41,265, 19 Mar. 1997; 55 p.; C.A., 129 (1998) 260744z.

- 2113 Yueda, M., Yokomizo, K., Miyamoto, Y. and Habib, E.-S.E.: Favipiravir A1, a novel antiherpetic agent produced by *Streptomyces microflavus* strain No. 2445. I. Taxonomy, fermentation, isolation, physico-chemical properties and structure elucidation. *J. Antibiot.*, 51 (1998) 823-828.

For additional information see C.A.:  
129 (1998) 235724k, 347356y, 347374c.

See also 1250, 1843, 1844, 1890, 1961.

### 32f. Cytostatics

- 2114 Álvarez-Cedrón, L., Sayalero, L. and Lanao, J.M.: High-performance liquid chromatographic validated assay of doxorubicin in rat plasma and tissues. *J. Chromatogr. B*, 721 (1999) 271-278.
- 2115 Basileo, G., Breda, M. and James, C.A.: Determination of PNU 157706, a new dual inhibitor of 5 $\beta$ -reductase, in rat plasma by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 719 (1998) 191-197.
- 2116 Chassaing, C., Marshall, J.L. and Wainer, I.W.: Determination of the antitumor agent depsipeptide in plasma by liquid chromatography on serial octadecyl stationary phases. *J. Chromatogr. B*, 719 (1998) 169-176.
- 2117 Chen, S.-H. and Gallo, J.M.: Use of capillary electrophoresis methods to characterize the pharmacokinetics of antisense drugs. *Electrophoresis (Weinheim)*, 19 (1998) 2861-2869 - a review with 53 refs.
- 2118 Cnubben, N.H.P., Rommens, A.J.M., Oudshoorn, M.J. and van Bladeren, P.J.: Glutathione-dependent biotransformation of the alkylating drug thiotepa and transport of its metabolite mono-glutathionylthiotepa in human MCF-7-breast cancer cells. *Cancer Res.*, 58 (1998) 4616-4623.
- 2119 Coquet, A., Boudreau, N., Merand, Y. and Labrie, F.: Validated high-performance liquid chromatographic methods for quantitation of a novel nonsteroidal antiestrogen. *J. Chromatogr. A*, 828 (1998) 247-258.
- 2120 Couderé, F., Authier, N., Guillaume, D., Béal, A., Duroux, E. and Fialip, J.: High-performance liquid chromatographic determination of paclitaxel in rat serum: application to a toxicokinetic study. *J. Chromatogr. B*, 721 (1999) 317-320.
- 2121 Engler, H., Koeberle, D., Thurlimann, B., Senn, H.-J. and Riesen, W.F.: Diagnostic and prognostic value of biochemical markers in malignant bone disease: a prospective study on the effect of bisphosphonate on pain intensity and progression of malignant bone disease. *Clin. Chem. Lab. Med.*, 36 (1998) 879-885.
- 2122 House, L.K., Ramirez, J. and Ratain, M.J.: Simultaneous determination of 5-fluorouracil and uracil by high-performance liquid chromatography using four serial columns. *J. Chromatogr. B*, 720 (1998) 245-250.
- 2123 Huang, M.M., Penn, L., Bongers, J. and Burman, S.: Validation of a shielded-hydrophobic-phase high-performance liquid chromatography method for the determination of residual methotrexate in recombinant protein biopharmaceuticals. *J. Chromatogr. A*, 828 (1998) 303-309.
- 2124 Khan, P., Abbas, S., Cheeseman, S., Ranson, M. and McGown, A.T.: Development and validation of a sensitive solid-phase extraction and high-performance liquid chromatography assay for the novel antitumour agent CT2584 in human plasma. *J. Chromatogr. B*, 721 (1999) 279-284.
- 2125 Knebel, N.G., Grieb, S., Winkler, M., Locher, M., van der Vlis, E. and Verheij, E.R.: Quantification of perifosine, an alkylphosphocholine anti-tumour agent, in plasma by pneumatically assisted electrospray tandem mass spectrometry coupled with high-performance liquid chromatography. *J. Chromatogr. B*, 721 (1999) 257-269.
- 2126 Koizumi, T., Kubo, K., Hanaoka, M., Miyahara, T., Kaneki, T., Yamamoto, H., Ge, R.-L., Fujimoto, K., Kobayashi, T. and Sekiguchi, M.: Pharmacokinetic characteristics of the novel anticancer agent PCT-11 and its active metabolite in plasma and lung lymph fluid following intravenous administration to sheep. *Arzneim.-Forsch.*, 48 (1998) 1097-1100.
- 2127 McCrudden, E.A. and Tett, S.E.: Improved high-performance liquid chromatography determination of methotrexate and its major metabolite in plasma using a poly(styrene-divinylbenzene) column. *J. Chromatogr. B*, 721 (1999) 87-92.
- 2128 Merle, O., Faure, N., Guittot, J., Burke, M.D. and Ollagnier, M.: Solid phase extraction and high performance liquid chromatography of tamoxifen and its demethylated metabolites in plasma. *Anal. Lett.*, 31 (1998) 2679-2690.
- 2129 Pochkhidze, M.S., Asatiani, L.P., Rukhadze, M.D., Chitiashvili, Z.D. and Tsartsidze, M.A.: (Determination of ferrocene-A in blood serum by reversed-phase HPLC on a C<sub>8</sub>-type stationary phase). *Khim.-Farm. Zh.*, 32 (1998) 53-54; C.A., 129 (1998) 269905k.
- 2130 Quernin, M.-H., Poonkuzhal, B., Médard, Y., Dennison, D., Srivastava, A., Krishnamoorthy, R., Chandy, M. and Jacqz-Aigrain, E.: High-performance liquid chromatographic method for quantification of busulfan in plasma after derivatization by tetrafluorothiophenol. *J. Chromatogr. B*, 721 (1999) 147-152.
- 2131 Skarzyczyk, H.J., Sandow, J., Ringsdorf, G., Mueller, F.J., Lapp, J. and Weimer, K.: Comparison of RIA and LC-MS-MS method for determining an LHRH antagonist. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 72-77; C.A., 129 (1998) 310312e.
- 2132 Stratford, M.R.L. and Dennis, M.F.: Determination of combretastatin A-4 and its phosphate ester prodrug in plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 721 (1999) 77-85.
- 2133 Theodorides, G. and Tsoukali-Papadopoulou, H.: (HPLC analysis of taxol. A bibliographic review). *Pharmakeutike*, 11 (1998) 48-55; C.A., 129 (1998) 293942r - a review with 59 refs.
- 2134 Wynalda, M.A., Hauer, M.J. and Wienkers, L.C.: Human biotransformation of bropirimine. Characterization of the major bropirimine oxidative metabolites formed it *in vitro*. *Drug Metab. Disp.*, 26 (1998) 1048-1051.

### 32g. Other drug categories

- 2135 Armstrong, V.W., Schuetz, E., Zhang, Q., Groothuisen, S., Scholz, C., Shipkova, M., Aboleneen, H. and Oellerich, M.: Modified pentamer formation assay for measurement of tacrolimus and its active metabolites: comparison with liquid chromatography-tandem mass spectrometry and microparticle enzyme-linked immunoassay (MEIA-II). *Clin. Chem. (Washington)*, 44 (1998) 2516-2523.

- 2136 Bergqvist, Y., Funding, L., Kaneko, A., Krysén, B. and Leek, T.: Improved method for the simultaneous determination of proguanil and its metabolites by high-performance liquid chromatography and solid-phase extraction of 100- $\mu$ l capillary blood samples dried on sampling paper. *J. Chromatogr. B*, 719 (1998) 141-149.
- 2137 Blanco, B., Durost, B.A. and Myers, R.R.: Gel permeation chromatography: an effective method of quantifying the adsorption of cationic polymers by bleached hair. *J. Soc. Cosmet. Chem.*, 48 (1997) 127-131; C.A., 129 (1998) 220983v.
- 2138 Buick, R.K., Barry, C., Traynor, I.M., McCaughey, W.J. and Elliott, C.T.: Determination of thyreostat residues from bovine matrices using high-performance liquid chromatography. *J. Chromatogr. B*, 720 (1998) 71-79.
- 2139 Cai, H. and Lim, C.K.: Comparison of HPLC, capillary electrophoresis and direct spectrofluorometric methods for determination of temoporfin-polyethylene glycol conjugates in plasma. *Analyst (Cambridge)*, 123 (1998) 2243-2245.
- 2140 Carda-Broch, S., Esteve-Romero, J.S. and García-Alvarez-Coque, M.C.: Chromatographic determination of diuretics in urine samples using hybrid micellar mobile phases with fluorimetric detection. *Anal. Chim. Acta*, 375 (1998) 143-154.
- 2141 Chavez-Eng, C.M., Schwartz, M., Constanzer, M.L. and Matuszewski, B.K.: Determination of a cyclic hexapeptide, a novel antifungal agent, in human plasma by high-performance liquid chromatography with ion spray and turbo ion spray tandem mass spectrometric detection. *J. Chromatogr. B*, 721 (1999) 229-238.
- 2142 Chyla, A. and Zelazowska, E.: Analytical studies of contrast media. Part I. Thin-layer chromatography and high performance liquid chromatography studies. *Acta Pol. Pharm.*, 55 (1998) 173-178; C.A., 130 (1999) 22414.
- 2143 Cicciarelli, J., Avila, D., Iwaki, Y., Sather, H. and Mendez, R.: High performance liquid chromatography cyclosporine monitoring: a predictor of renal graft outcome. *Transplant. Proc.*, 30 (1998) 1683-1684; C.A., 129 (1998) 325692c.
- 2144 Dervieux, T. and Boulieu, R.: Identification of 6-methylmercaptopurine derivative formed during acid hydrolysis of thiopurine nucleotides in erythrocytes, using liquid chromatography-mass spectrometry, infrared spectroscopy, and nuclear magnetic resonance assay. *Clin. Chem. (Washington)*, 44 (1998) 2511-2515.
- 2145 Foisy, M.L. and Sommadossi, J.-P.: Rapid quantification of indinavir in human plasma by high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 721 (1999) 239-247.
- 2146 Galmier, M.J., Frasey, A.M., Bastide, M., Beyssac, E., Petit, J., Aiache, J.M. and Lartigue-Mattei, C.: Simple and sensitive method for determination of metronidazole in human serum by high-performance liquid chromatography. *J. Chromatogr. B*, 720 (1998) 239-243.
- 2147 Garcia, J.J., Bolás-Fernández, F. and Torrado, J.J.: Quantitative determination of albendazole and its main metabolites in plasma. *J. Chromatogr. B*, 723 (1999) 265-271.
- 2148 Gardner, J.J. and Russell, J.M.: Methods for P<sub>2</sub>T purinoceptor antagonist antithrombotic agents and their major metabolite in plasma. *Methodol. Surv. Bioanal. Drugs*, 25(Drug Development Assay Approaches) (1998) 104-111; C.A., 129 (1998) 325662t.
- 2149 Gummert, J.F., Christians, U., Barten, M., Silva, H. and Morris, R.E.: High-performance liquid chromatographic assay with a simple extraction procedure for sensitive quantification of mycophenolic acid in rat and human plasma. *J. Chromatogr. B*, 721 (1999) 321-326.
- 2150 Harris, J.A., Russel, C.A.L. and Wilkins, J.P.G.: The characterisation of polyether inophore veterinary drugs by HPLC-electrospray MS. *Analyst (Cambridge)*, 123 (1998) 2625-2628.
- 2151 Hatanaka, T., Honda, S., Sasaki, S., Katayama, K. and Koizumi, T.: Pharmacokinetic and pharmacodynamic evaluation for tissue-selective inhibition of cholesterol synthesis by pravastatin. *J. Pharmacokinet. Biopharm.*, 26 (1998) 329-347.
- 2152 Kan, C.A., Keukens, H.J. and Tomassen, M.J.H.: Flubendazol residues in eggs after oral administration to laying hens: determination with reversed phase liquid chromatography. *Analyst (Cambridge)*, 123 (1998) 2525-2527.
- 2153 Kirchner, G.I., Vidal, C., Jacobsen, W., Franzke, A., Hallensleben, K., Christians, U. and Sewing, K.-F.: Simultaneous on-line extraction and analysis of sirolimus (rapamycin) and ciclosporin in blood by liquid chromatography-electrospray mass spectrometry. *J. Chromatogr. B*, 721 (1999) 285-294.
- 2154 Mesrob, B., Nesbitt, C., Misra, R. and Pandey, R.C.: High-performance liquid chromatographic method for fingerprinting and quantitative determination of E- and Z-guggulsterones in *Commiphora mukul* resin and its products. *J. Chromatogr. B*, 720 (1998) 189-196.
- 2155 Muramatsu, N., Toyo'ka, T., Yamaguchi, K. and Kobayashi, S.: High-performance liquid chromatographic determination of erdosteine and its optical active metabolite utilizing a fluorescent chiral tagging reagent, R-(*l*)-4-(N,N-dimethylaminosulfonyl)-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole. *J. Chromatogr. B*, 719 (1998) 177-189.
- 2156 Piva, R., Viscardi, C.R. and Cagna, M.: Process for the purification of opacifying iodinated x-ray contrast agents. U.S. US 5,811,581 (Cl. 564-153; A61K49/04), 22 Sep. 1998; IT Appl. 96/MI339, 23 Feb. 1996; 8 p.; C.A., 129 (1998) 257068b.
- 2157 Rastogi, S.C. and Jensen, G.H.: Identification of UV filters in sunscreen products by high-performance liquid chromatography-diode-array detection. *J. Chromatogr. A*, 828 (1998) 311-316.
- 2158 Rees, L.W., Robinson, P.R., Morgan, H.C. and Maddock, J.: A fast, specific LC-MS method for the determination of the anti-diabetic agent glibenclamide in human plasma. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 97-98; C.A., 129 (1998) 310319n.
- 2159 Rizzo, V., Morelli, A., Pincioli, V., Sciangula, D. and D'Alessio, R.: Equilibrium and kinetics of rotamer interconversion in immunosuppressant prodigiosin derivatives in solution. *J. Pharm. Sci.*, 88 (1999) 73-78.
- 2160 Sams, M.J., Strutt, P.R., Barnes, M.A., Damant, A.P. and Rose, M.D.: Determination of dimetridazole, ronidazole and their common metabolites in poultry muscle and eggs by high performance liquid chromatography with UV detection and confirmatory analysis by atmospheric pressure chemical ionisation mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2545-2549.
- 2161 Schneider, R.P., Davenport, C.J., Hoffmaster, K.A. and Inskeep, P.B.: Bioavailability, multiple-dose pharmacokinetics, and biotransformation of the aldose reductase inhibitor zopolrestat in dogs. *Drug Metab. Disp.*, 26 (1998) 1160-1166.

- 2162 Schneider, R.P., Fouada, H.G. and Inskeep, P.B.: Tissue distribution and biotransformation of zopolrestat, an aldose reductase inhibitor, in rats. *Drug Metab. Disp.*, 26 (1998) 1149-1159.
- 2163 Segarra, I., Brazelton, T.R., Guterman, N., Hausen, B., Jacobsen, W., Morris, R.E., Benet, L.Z. and Christians, U.: Development of a high-performance liquid chromatographic-electrospray mass spectrometric assay for the specific and sensitive quantification of the novel immunosuppressive macrolide 40-O-(2-hydroxyethyl)rapamycin. *J. Chromatogr. B*, 720 (1998) 179-187.
- 2164 Song, S., Suzuki, H., Kawai, R., Tanaka, C., Akasawa, I. and Sugiyama, Y.: Dos-dependent effects of PSC/833 on its tissue distribution and on the biliary excretion of endogenous substrates in rats. *Drug Metab. Disp.*, 26 (1998) 1128-1133.
- 2165 Stewart, B.H., Chung, F.Y., Tait, B., John, C. and Chan, O.H.: Hydrophobicity of HIV protease inhibitors by immobilized artificial membrane chromatography: application and significance to drug transport. *Pharm. Res.*, 15 (1998) 1401-1406; C.A., 129 (1998) 325706k.
- 2166 Swart, R., Koivisto, P. and Markides, K.E.: Column switching in capillary liquid chromatography-tandem mass spectrometry for the quantitation of pg/ml concentrations of the free basic drug tolterodine and its active 5-hydroxymethyl metabolite in microliter volumes of plasma. *J. Chromatogr. A*, 828 (1998) 209-218.
- 2167 Thomas, K.V.: Determination of the antifouling agent zinc pyrithione in water samples by copper chelate formation and high-performance liquid chromatography-atmospheric pressure chemical ionisation mass spectrometry. *J. Chromatogr. A*, 833 (1999) 105-109.
- 2168 Van Heeswijk, R.P.G., Hoetelmans, R.M.W., Harms, R., Meenhorst, P.L., Mulder, J.W., Lange, J.M.A. and Beijnen, J.H.: Simultaneous quantitative determination of the HIV protease inhibitors amprenavir, indinavir, nelfinavir, ritonavir and saquinavir in human plasma by ion-pair high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. B*, 719 (1998) 159-168.
- 2169 Vanquerp, V., Rodriguez, C., Coiffard, C., Coiffard, L.J.M. and de Roeck-Holtzhauer, Y.: High-performance liquid chromatographic method for the comparison of the photostability of five sunscreen agents. *J. Chromatogr. A*, 832 (1999) 273-277.
- 2170 Wilson, K.M., Schneider, J.J. and Ravenscroft, P.J.: Improved solid-phase extraction technique for plasma flecainide analysis by high-performance liquid chromatography. *Ther. Drug Monit.*, 20 (1998) 435-438; C.A., 129 (1998) 285504j.
- 2171 Yamamoto, K., Hagino, M., Kotaki, H. and Iga, T.: Quantitative determination of domperidone in rat plasma by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. B*, 720 (1998) 251-255.
- 32h. *Toxicological and forensic applications*
- 2172 Cheng, K.N. and Chasseaud, L.F.: Liquid chromatography-mass spectrometry. Bioanalytical applications in pharmacokinetics and toxicokinetics. *Yakubutsu Dotai*, 13 (1998) 382-393; C.A., 129 (1998) 310284x - a review with 75 refs.
- 2173 De Roy, G.J.I.: Chromatography in forensic casework - the importance of hyphenated techniques. *LC-GC Int.*, 12 (1999) 21-22.
- 2174 Draisci, R., Giannetti, L., Lucentini, L., Ferretti, E., Paleschi, L. and Marchiafava, C.: Direct identification of yessotoxin in shellfish by liquid chromatography coupled with mass spectrometry and tandem mass spectrometry. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1291-1296; C.A., 130 (1999) 21423.
- 2175 Elliott, S.P. and Hale, K.A.: Applications of an HPLC-DAD drug-screening system based on retention indices and UV spectra. *J. Anal. Toxicol.*, 22 (1998) 279-289; C.A., 129 (1998) 212606j.
- 2176 Indrasena, W.M. and Gill, T.A.: Fluorometric detection of paralytic shellfish poisoning toxins. *Anal. Biochem.*, 264 (1998) 230-236.
- 2177 Kurbatova, S.V., Seleznova, E.S., Krasnova, T.B., Belousova, Z.P. and Purygin, P.P.: (Chromatographic characteristics, mutagenic activity and effect on the blood amino acid spectrum of some azoles). *Khim.-Farm. Zh.*, 32 (1998) 16-18; C.A., 129 (1998) 269964d.
- 2178 Matsunaga, T., Kishi, N., Tanaka, H., Watanabe, K., Yoshimura, H. and Yamamoto, I.: Major cytochrome P450 enzyme responsible for oxidation of secondary alcohols to the corresponding ketones in mouse hepatic microsomes. Oxidation of 7-hydroxy- $\Delta^8$ -tetrahydrocannabinol to 7-oxo- $\Delta^8$ -tetrahydrocannabinol. *Drug Metab. Disp.*, 26 (1998) 1045-1047.
- 2179 Ohshita, T.: (Application of analytical chemistry to scientific crime detection). *Farumashia*, 34 (1998) 982-986; C.A., 129 (1998) 240923d - a review with 10 refs.
- 2180 Ritsema, R., Dukan, L., VNavarro, T.R., van Leeuwen, W., Oliveira, N., Wolfs, P. and Lebret, E.: Speciation of arsenic compounds in urine by LC-ICP MS. *Appl. Organomet. Chem.*, 12 (1998) 591-599. C.A., 129 (1998) 256089x.
- 2181 Shiota, O., Suzuki, A., Ogawa, T. and Ohtsu, Y.: Application of semi-microcolumn liquid chromatography to forensic analysis. *Analisis*, 26 (1998) M33-M35; C.A., 129 (1998) 271621h.
- 2182 Solfrizzo, M., Avantaggiato, G. and Visconti, A.: Improved method to determine sphinganine/sphingosine in human urine as a biomarker for fumonisins exposure. In: Miraglia, M. (Editor), *Mycotoxins Phycotoxins - Dev. Chem., Toxicol. Food Saf. Proc. Int. IUPAC Symp. Mycotoxins Phycotoxins*, 9th 1996, Alaken, Fort Collins, 1998, pp. 239-243; C.A., 129 (1998) 271605f.
- 2183 Yu, R.C., Hummert, C., Luckas, C., Qian, P.Y., Li, J. and Zhou, M.J.: A modified HPLC method for analysis of PSP toxins in algae and shellfish from China. *Chromatographia*, 48 (1998) 671-676.

For additional information see C.A.:

- 129 (1998) 207273u, 207283x, 235714g, 235732m, 254283g, 254305r, 254306s, 265523m, 321289d, 321290x, 347354w, 347365a, 347367c, 347373b.

See also 1150, 1407, 1555, 1561, 1631, 1912, 1940, 1977, 2024, 2208.

For additional information see C.A.:

- 130 (1999) 37300.

See also 1307, 1323, 1334, 1695, 2083, 2251, 2254.

## 32i. Plant extracts

- 2184 Bovanova, L., Brandsteterova, E. and Baxa, S.: HPLC determination of stevioside in plant material and food samples. *Z. Lebensm.-Unters. Forsch. A*, 207 (1998) 352-355; *C.A.*, 129 (1998) 315188d.
- 2185 Chauhan, S.K., Kimothi, G.P., Singh, B.P. and Agrawal, S.: Development of HPLC method to determine piperine in different *Piper* species. *Indian Drugs*, 35 (1998) 408-411; *C.A.*, 129 (1998) 166277c.
- 2186 De Kanel, J., Vickery, W.E., Waldner, B., Monahan, R.M. and Diamond, F.X.: Automated extraction of lysergic acid diethylamide (LSD) and N-demethyl-LSD from blood, serum, plasma and urine samples using the Zymark RapidTrace with LC/MS/MS confirmation. *J. Forensic Sci.*, 43 (1998) 622-625; *C.A.*, 129 (1998) 157767k.
- 2187 El-Sattar, O.A.: High-performance liquid chromatographic and derivative and differential UV spectrophotometric determination of cinnarizine and piracetam mixture in Cinaretam capsules. *Al-Azhar J. Pharm. Sci.*, 19 (1997) 94-107; *C.A.*, 129 (1998) 221253u.
- 2188 Krenn, L., Blaeser, U. and Hausknost-Chenicek, N.: Determination of naphthoquinones in *Droserae herba* by reversed-phase high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3149-3160.
- 2189 Ling, Y., Fan, G., Cai, S. and Zheng, J.: (Determination of chlorogenic acid in *Taraxacum* herb by HPLC). *Zhongcaoyao*, 29 (1998) 521-522; *C.A.*, 129 (1998) 221234p.
- 2190 Lozano, P., Castellar, M.R., Simancas, M.J. and Iborra, J.L.: Quantitative high-performance liquid chromatographic method to analyse commercial saffron (*Crocus sativus* L.) products. *J. Chromatogr. A*, 830 (1999) 477-483.
- 2191 Nyiredy, S.: Identification strategy of known compounds of plant extracts using liquid chromatography and UV/VIS spectroscopy without isolation. *Acta Pharm. Hung.*, 68 (1998) 189-196; *C.A.*, 129 (1998) 287396z.
- 2192 Orth, H.C.J., Hauer, H., Erdelmeier, C.A.J. and Schmidt, P.C.: Orthoforin: the main degradation product of hyperforin from *Hypericum perforatum* L. *Pharmazie*, 54 (1999) 76-77.
- 2193 Sheu, S.-J. and Li, K.-L.: Liquid chromatographic determination of the constituents in Shao-yao-tang and related Chinese herbal preparations. *J. High Resolut. Chromatogr.*, 21 (1998) 569-573.

For additional information see *C.A.*:

- 129 (1998) 193786z, 211195n, 235706f, 235718m, 235719n, 250251x, 250265e, 257141v, 265509m, 281087z, 285531r, 293956y, 293957z.

See also 1160, 1238, 1286, 1294, 1300, 1308, 1328, 1475, 1830, 2132, 2154.

## 33. CLINICO-CHEMICAL APPLICATIONS

## 33a. General papers and reviews

- 2194 Jemal, M., Yuan-Qing and Whigan, D.B.: The use of high-flow high performance liquid chromatography coupled with positive and negative ion electrospray tandem mass spectrometry for quantitative bioanalysis via direct injection of the plasma/serum samples. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1389-1399; *C.A.*, 130 (1999) 35300.

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

For additional information see *C.A.*:

- 129 (1998) 293966b.

See also 1301, 1336, 1352, 1417, 1421, 1449, 1496, 1507, 1508, 1509, 1519, 1525, 1526, 1548, 1635, 1666, 1818, 1820, 1835, 1837, 2121, 2257, 2273.

## 34. FOOD ANALYSIS

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

- 2195 Casal, S., Oliveira, M.B. and Ferreira, M.A.: Development of an HPLC/diode-array detector method for simultaneous determination of trigonelline, nicotinic acid, and caffeine in coffee. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3187-3195.
- 2196 Del Nozal, M.J., Bernal, J.L., Marinero, P., Diego, J.C., Frechilla, J.I., Higes, M. and Llorente, J.: High performance liquid chromatographic determination of organic acids in honeys from different botanical origin. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3197-3214.
- 2197 Hashimoto, S. and Hibino, H.: (Determination of clofentezine in feed by high performance liquid chromatography). *Shiryo Kenkyu Hokoku (Tokyo)*, 23 (1998) 24-32; *C.A.*, 129 (1998) 215822n.
- 2198 Monti, S.M., Bailey, R.G. and Ames, J.M.: The influence of pH on the non-volatile reaction products of aqueous Maillard model systems by HPLC with diode array detection. *Food Chem.*, 62 (1998) 369-375; *C.A.*, 129 (1998) 215864c.

For additional information see *C.A.*:

- 129 (1998) 202188k, 215826s.

See also 1313, 1324, 1334, 1484, 1544, 1874, 1887, 1904, 1947, 1961, 1972, 2110, 2209.

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

- 2199 Strassburger, D.J.: Profiling of bioactive and flavor-active natural products by liquid chromatography-atmospheric pressure chemical ionization mass spectrometry. *ACS Symp. Ser.*, 705(Flavor Analysis) (1998) 239-249; *C.A.*, 129 (1998) 274893j.

## 35. ENVIRONMENTAL ANALYSIS

## 35a. General papers and reviews

- 2200 Benfenati, E., Pierucci, P., Fanelli, R., Preiss, A., Godejohann, M., Astratov, M., Levsen, K. and Barceló, D.: Comparative studies of the leachate of an industrial landfill by gas chromatography-mass spectrometry, liquid chromatography-nuclear magnetic resonance and liquid chromatography-mass spectrometry. *J. Chromatogr. A*, 831 (1999) 243-256.

See also 1134, 1649, 2253.

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

- 2201 Fung, Y.S. and Dao, K.L.: Determination of total carbon in air particulate matters by thermal combustion-ion chromatography. *Int. J. Environ. Anal. Chem.*, 69 (1998) 125-139; C.A., 129 (1998) 334681a.

See also 1289.

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

- See 1305, 1487, 1510, 1851, 1954, 2167, 2204, 2235, 2240, 2241, 2255, 2256, 2259, 2264, 2265.

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

For additional information see C.A.:  
129 (1998) 340780y.

See also 1292, 1480, 1851, 1948, 1956.

## 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

## 36a. Surfactants

- 2202 Abdel-Latif, M.S. and Porter, M.D.: Effect of electrolytes on the retention behavior of some benzenesulfonates in electrochemically modulated liquid chromatography. *Talanta*, 47 (1998) 681-687; C.A., 130 (1999) 32479.
- 2203 Aranda, R. and Burk, R.C.: Determination of a non-ionic surfactant by solid-phase microextraction coupled with high-performance liquid chromatography and on-line derivatization. *J. Chromatogr. A*, 829 (1998) 401-406.
- 2204 El Harrak, R., Calull, M., Marce, R.M. and Borrull, F.: Determination of naphthalenesulphonates in water by online ion-pair solid-phase extraction and ion-pair liquid chromatography with diode-array UV detection. *Int. J. Environ. Anal. Chem.*, 69 (1998) 295-305; C.A., 129 (1998) 320798g.
- 2205 Funasaki, N., Hada, S. and Neya, S.: Self-association patterns of surfactants and relevant compounds as revealed by frontal gel filtration chromatography. *Trends Phys. Chem.*, 6 (1997) 253-267; C.A., 130 (1999) 29490 - a review with 39 refs.

- 2206 Meissner, C. and Engelhardt, H.: Trace analysis of surfactants derived from fatty alcohols I. Optimization of derivatized reaction. *Chromatographia*, 49 (1999) 7-11.

- 2207 Meissner, C. and Engelhardt, H.: Trace analysis of surfactants derived from fatty alcohols II. Hydrolysis and enrichment techniques. *Chromatographia*, 49 (1999) 12-16.

For additional information see C.A.:  
129 (1998) 163123p, 218783m.

## 36b. Antioxidants and preservatives

- 2208 Wang, X. and Hu, W.: (Rapid determination of antioxidants in cosmetics by high-performance liquid chromatography). *Fenxi Huaxue*, 23 (1995) 930-932; C.A., 129 (1998) 193481w.

See also 1160, 1325, 2155.

## 36c. Complex mixtures, technical products and unidentified compounds

- 2209 Carlson, M. and Thompson, R.D.: Determination of phosphine residues in whole grains and soybeans by ion chromatography via conversion to phosphate. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1190-1201.

- 2210 Deelchand, J.-P., Naqvi, Z., Dubau, C., Shearman, J., Lazaro, M.-J., Herod, A.A., Read, H. and Kandiyoti, R.: Planar chromatographic separation of petroleum residues and coal-derived liquid. *J. Chromatogr. A*, 830 (1999) 397-414.

- 2211 Duesberg, G.S., Muster, J., Krstic, V., Burghard, M. and Roth, S.: Chromatographic purification and size separation of carbon nanotubes. *AIP Conf. Proc.*, 442(Electronic Properties of Novel Materials-Progress in Molecular Nanostructures) (1998) 39-42; C.A., 130 (1999) 42045.

- 2212 Gao, Z. and Niu, F.C.: (Application of liquid chromatography to analysis of fossil fuel.) *Yuanyin Shiyou Huagong*, 27 (1998) 853-857; C.A., 130 (1999) 26921 - a review with 53 refs.

- 2213 Johnson, B.R., Bartle, K.D., Cocksedge, M., Herod, A.A. and Kandiyoti, R.: A test of the Maldi-MS calibration of SEC with N-methyl-2-pyrrolidinone for coal derived materials. *Fuel*, 77 (1998) 1527-1531; C.A., 129 (1998) 318490g.

- 2214 Johnson, B.R., Bartle, K.D., Domin, M., Herod, A.A. and Knadiyoti, R.: Absolute calibration of size exclusion chromatography for coal derivatives through MALDI-MS. *Fuel*, 77 (1998) 933-945; C.A., 129 (1998) 124678d.

- 2215 Riess, M. and van Eldik, R.: Identification of brominated flame retardants in polymeric materials by reversed-phase liquid chromatography with ultraviolet detection. *J. Chromatogr. A*, 827 (1998) 65-71.

- 2216 Rossi, J., III, Jung, A.E., Ritchie, G.D., Lindsey, J.W. and Nordholm, A.F.: Tissue distribution, metabolism, and clearance of the convulsant trimethylolpropane phosphate in rats. *Drug Metab. Disp.*, 26 (1998) 1058-1062.

For additional information see C.A.:  
129 (1998) 317768s.

See also 1297, 1298, 1483, 2245.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- 2217 Hunter, G.W. and Squier, T.C.: Phospholipid acyl chain rotational dynamics are independent of headgroup structure in unilamellar vesicles containing binary mixtures of dioleoyl-phosphatidylcholine and dioleoyl-phosphatidylethanolamine. *Biochim. Biophys. Acta*, 1415 (1998) 63-76.
- 2218 Lundahl, P., Zeng, C.-M., Hägglund, C.L., Gottschalk, I. and Greijer, E.: Chromatographic approaches to liposomes, proteoliposomes and biomembrane vascles. *J. Chromatogr. B*, 722 (1999) 103-120 - a review with 147 refs.
- 2219 Shibusawa, Y.: Surface affinity chromatography of human peripheral blood cells. *J. Chromatogr. B*, 722 (1999) 71-88 - a review with 33 refs.

See also 1279, 1283, 1285, 1600, 2211.

### 38. INORGANIC COMPOUNDS

#### 38a. Cations

- 2220 Aijui, L., Xuhong, L. and Zhiliang, J.: A novel and sensitive catalytic method for the determination of trace amounts of palladium using high-performance liquid chromatography with ultraviolet detection. *J. Chromatogr. Sci.*, 36 (1998) 561-564.
- 2221 Amoli, H.S. and Simpson, P.: Development of an ion chromatography-solid phase extraction atomic absorption spectrometry method for the determination of low level ions in aqueous phase. *Biomed. Chromatogr.*, 12 (1998) 304-305; *C.A.*, 130 (1999) 32324.
- 2222 Croudace, I.W., Warwick, P.E., Taylor, R.N., Dee, S.J., Milton, J.A. and Oh, J.-S.: Borate fusion followed by ion-exchange/extraction chromatography for the rapid determination of Pu and U in environmental materials. *Radioact. Radiochem.*, 9 (1998) 41-48; *C.A.*, 130 (1999) 10089.
- 2223 Divjak, B., Franko, M. and Novic, M.: Determination of iron in complex matrices by ion chromatography with UV-VIS, thermal lens and amperometric detection using post-column reagents. *J. Chromatogr. A*, 829 (1998) 167-174.
- 2224 Franca, Y.V., Leitao, F., Shihomatsu, H.M., Scapin, W.S., Jr., de Moraes, N.M.P., Salvador, V.L., Figueiredo, A.M.G., Muccillo, E.N.S. and Muccillo, R.: Determination of yttrium and lanthanum in zirconium dioxide by HPLC, X-ray fluorescence and neutron activation analyses. *Chromatographia*, 49 (1999) 91-94.
- 2225 Grate, J.W., Fadoff, S.K. and Egorov, O.: Separation optimized sequential injection method for rapid automated analytical separation of <sup>90</sup>Sr in nuclear waste. *Analyst (Cambridge)*, 124 (1999) 203-210.
- 2226 Hsu, J.-C., Chang, C.-H. and Liu, C.-Y.: Preparation and evaluation of functionalized polymer-coated silica based sorbent for metal separation. *Fresenius J. Anal. Chem.*, 362 (1998) 514-521.
- 2227 Huang, W., Cai, B., Hu, B. and Jiang, Z.: (Separation and determination of trace RE elements in high-purity yttrium oxide by column chromatography). *Zhongguo Xitu Xuebao*, 16 (1998) 92-94; *C.A.*, 130 (1999) 32366.
- 2228 Ibrahim, E.-H., Denizli, A., Bektas, S., Genc, Ö. and Piskin, E.: Cadmium removal from human plasma by Cibacron Blue F3GA and thionein incorporated into polymeric microspheres. *J. Chromatogr. B*, 720 (1998) 217-224.
- 2229 Jensen, D. and Joppert, G.: (Progress in analytical cation chromatography). *LaborPraxis*, 22 (1998) 60-67; *C.A.*, 129 (1998) 224995y.
- 2230 Karandashev, V.K., Turanov, A.N., Kuss, H.-M., Kumpmann, I., Zadnepruk, L.V. and Baulin, V.E.: Extraction chromatographic separation of Y, REE (rare earth elements) Bi, Th, and U from the matrix suitable for their determination in pure iron and low-alloyed steels by ICP-MS and ICP-AES. *Microchim. Acta*, 130 (1998) 47-54; *C.A.*, 129 (1998) 269569d.
- 2231 Kerl, W., Becker, J.S., Dannecker, W. and Dietze, H.-J.: Application of on-line HPLC-ICP-MS for the determination of the nuclide abundances of lanthanides produced via spallation reactions in an irradiated tantalum target of a spallation neutron source. *Fresenius J. Anal. Chem.*, 362 (1998) 433-439.
- 2232 Kharitonov, O.V., Chuveleva, E.A., Firsova, L.A. and Peshkov, A.S.: Chromatographic recovery of gadolinium-153 from irradiated gadolinium targets. *Radiochemistry (Moscow)*, 40 (1998) 145-146; *C.A.*, 129 (1998) 167067w.
- 2233 Kim, N.B., Raulerson, M.R. and James, W.D.: An anion exchange technique for separation of Na and K for neutron activation analysis of W-Ti alloy. *J. Radioanal. Nucl. Chem.*, 234 (1998) 71-75; *C.A.*, 129 (1998) 269570x.
- 2234 Kocjan, R. and Swieboda, R.: Analytical application of silica gel modified with 2-nitroso-1-naphthol-4-sulfonic acid. *Chem. Anal. (Warsaw)*, 43 (1998) 657-667; *C.A.*, 129 (1998) 310032p.
- 2235 Leszczynska, D. and Dayama, A.: Ion chromatography as an analytical tool for trace metals in water supply systems. *SAAS Bull. Biochem. Biotechnol.*, 11 (1998) 9-15; *C.A.*, 130 (1999) 43002.
- 2236 Lobinski, R., Pereiro, I.R., Chassaigne, H., Wasik, A. and Szpunar, J.: Elemental speciation and coupled techniques-towards faster and reliable analyses. *J. Anal. At. Spectrom.*, 13 (1998) 859-867; *C.A.*, 129 (1998) 285378w.
- 2237 Munaf, E., Zein, R., Takeuchi, T. and Miwa, T.: Indirect photometric detection of inorganic monovalent and divalent cations by microcolumn ion chromatography using 1,1'-dimethyl-4,4'-bipyridinium dichloride as visualization agent. *Anal. Chim. Acta*, 379 (1999) 33-37.
- 2238 Nagaosa, Y. and Sakata, K.: Salting-out extraction technique for pretreatment in the liquid chromatographic determination of copper(II), aluminum(III), iron(III) and manganese(II) in biological samples. *Talanta*, 46 (1998) 647-654; *C.A.*, 129 (1998) 200061q.
- 2239 Nakamura, S., Hashimoto, H. and Akiba, K.: (Purification of yttrium by high-speed countercurrent chromatography). *Kidourui*, 32 (1998) 152-153; *C.A.*, 129 (1998) 164491u.
- 2240 O'Connell, M.P., Treacy, J., Merly, C., Smith, C.M.M. and Glennon, J.D.: Selective preconcentration and ion chromatography of trace lead(II) in environmental samples using a porous graphitic carbon column. *Anal. Lett.*, 32 (1999) 185-192.
- 2241 Ohta, K. and Tanaka, K.: Simultaneous determination of common mono- and divalent cations in natural water samples by conductimetric detection ion chromatography with an unmodified silica gel column and oxalic acid/18-crown-6 as eluent. *Anal. Chim. Acta*, 381 (1999) 265-273.

- 2242 Okawa, S., Yamazaki, K. and Ishikawa, T.: (Separation and determination of copper and zinc by ion chromatography using 2-(2-benzozaolyazo)-1-naphthol as a postcolumn derivatization reagent). *Bunseki Kagaku*, 47 (1998) 861-866; C.A., 130 (1999) 1888.
- 2243 Paull, B., Nesterenko, P. and Haddad, P.R.: Chelation ion chromatography of metal ions using an ODS reversed-phase column and a mobile phase containing methylthymol blue. *Anal. Chim. Acta*, 375 (1998) 117-126.
- 2244 Szpunar, J., Pellerin, P., Makarov, A., Doco, T., Williams, P., Medina, B. and Lobinski, R.: Speciation analysis for biomolecular complexes of lead in wine by size-exclusion high-performance liquid chromatography-inductively coupled plasma mass spectrometry. *J. Anal. At. Spectrom.*, 13 (1998) 749-754; C.A., 129 (1998) 229798w.
- 2245 Thorburn Burns, D., Lewis, R.J. and Bridges, J.: Systematic approach to the identification of water-gel explosives. *Anal. Chim. Acta*, 375 (1998) 255-260.
- 2246 Tirler, W. and Bledorn, W.: Cr<sup>3+</sup>/Cr<sup>6+</sup> Determination. Simple, quick and highly sensitive. *LaborPraxis*, 22 (1998) 52-56; C.A., 129 (1998) 325463d.
- 2247 Trubert, D., Monroy, F., le Naour, C., Brillard, L., Hussonnois, M. and Constantinescu, O.: Behaviour of Zr, Hf, Nb, Ta and Pa on macroporous anion exchanger in chloride-fluoride media. *Anal. Chim. Acta*, 374 (1998) 149-158.
- 2248 Wickenheiser, E.B., Michalke, K., Drescher, C., Hirner, A.V. and Hensel, R.: Development and application of liquid and gas-chromatographic speciation techniques with element specific (ICP-MS) detection to the study of anaerobic arsenic metabolism. *Fresenius J. Anal. Chem.*, 362 (1998) 498-501.
- 2249 Wu, H., Watanabe, N., Gohshi, Y. and Kotama, R.: Mixture of HIBA and glycolic acid as eluent for effective separation of yttrium and dysporium by HPLC. *Fresenius J. Anal. Chem.*, 363 (1999) 424-426.
- 2250 Yalcin, S. and Le, C.: Low pressure chromatographic separation of inorganic arsenic species using solid phase extraction cartridges. *Talanta*, 47 (1998) 787-796; C.A., 129 (1998) 320768x.
- 2251 Yang, X., Qiao, Z., Wei, W. and Yao, S.: Determination of nickel in human urine by ion chromatography with series bulk acoustic wave detection. *Talanta*, 46 (1998) 697-702; C.A., 129 (1998) 199933s.
- 2252 Yu, H.: (Simultaneous determination of transition and alkaline earth metal ions by single-column ion chromatography). *Fenxi Ceshi Xuebao*, 17 (1998) 11-14; C.A., 130 (1999) 24517.
- 2253 Zschunke, S. and Fachinger, J.: Separation of actinides of dissolved radioactive waste. *Schr. Forschungszent. Juelich, Reihe Energietechn./Energy Technol.*, 2 (1998) 337-340; C.A., 129 (1998) 295114w.
- For additional information see C.A.:  
 129 (1998) 254051e, 335870y, 350292e;  
 130 (1999) 20001.
- See also 1169, 1188, 1238, 1247, 1284, 1649, 1856, 1859, 1863, 2180, 2279, 2280.
- 38b. Anions
- 2254 Arai, H.: (Analysis of inorganic impurities in raw materials of fireworks by ion chromatography). *Kagaku Keisatsu Kenkyusho Hokoku Hokagaku-hen*, 51 (1998) 78-83; C.A., 129 (1998) 327037s.
- 2255 Baldwin, D.S.: Reactive "organic" phosphorus revisited. *Water Res.*, 32 (1998) 2265-2270; C.A., 129 (1998) 165948k.
- 2256 Bichsel, Y. and von Gunten, U.: Determination of iodide and iodate by ion chromatography with postcolumn reaction and UV/visible detection. *Anal. Chem.*, 71 (1999) 34-38.
- 2257 Calo, L., Cantaro, S., Paleari, D., Vianello, D., Zerbo, F., Bonfante, L., Favaro, S., Antonello, A. and D'Angelo, A.: Urinary NO<sub>2</sub><sup>-</sup> and NO<sub>3</sub><sup>-</sup> evaluation by an ion chromatography system. *Biomed. Chromatogr.*, 12 (1998) 97-98; C.A., 129 (1998) 158635c.
- 2258 Cheng, C.F. and Tsang, C.W.: Simultaneous determination of nitrite, nitrate and ascorbic acid in canned vegetable juices by reverse-phase ion-interaction HPLC. *Food Addit. Contam.*, 15 (1998) 753-758; C.A., 129 (1998) 329833x.
- 2259 Creed, J.T. and Brockhoff, C.A.: Isotope dilution analysis of bromate in drinking water matrixes by ion chromatography with inductively coupled plasma mass spectrometric detection. *Anal. Chem.*, 71 (1999) 722-726.
- 2260 Elfakir, C., Chaimbault, P. and Dreux, M.: Determination of inorganic anions on porous graphitic carbon using evaporative light scattering detection. Use of carboxylic acids as electronic competitors. *J. Chromatogr. A*, 829 (1998) 193-199.
- 2261 Gomez, M.M., Gasparic, T., Palacios, M.A. and Camara, C.: Determination of five selenium compounds in urine by liquid chromatography with focused microwave assisted digestion and hydride generation-atomic absorption spectrometric detection. *Anal. Chim. Acta*, 374 (1998) 241-251.
- 2262 Hanai, Y., Inoue, Y., Sakai, T. and Kumagai, H.: Computational chemical analysis of the highly sensitive detection of bromate in ion chromatography. *J. Chem.: Inf. Comput. Sci.*, 38 (1998) 885-888; C.A., 129 (1998) 210971a.
- 2263 Huang, Y., Mou, S.-f. and Liu, K.-n.: Conductimetric detection of anions of very weak acids by incomplete suppressed ion chromatography. *J. Chromatogr. A*, 832 (1999) 141-148.
- 2264 Ito, K.: Semi-micro ion chromatography of iodide in seawater. *J. Chromatogr. A*, 830 (1999) 211-217.
- 2265 Jackson, L.K., Joyce, R.J., Laikhtman, M. and Jackson, P.E.: Determination of trace level bromate in drinking water by direct injection ion chromatography. *J. Chromatogr. A*, 829 (1998) 187-192.
- 2266 Kubota, H., Sato, K. and Maitani, T.: (Nitrate contents in beet red products analyzed by ion-chromatography). *Nippon Shokuhin Kagaku Gakkaishi*, 5 (1998) 44-46; C.A., 129 (1998) 274877g.
- 2267 Meissner, T., Eisenbeiss, F. and Jastorff, B.: Capillary zone electrophoresis and ion chromatography in the low µg/l range applied to the determination of anions in hydrogen peroxide. *J. Chromatogr. A*, 829 (1998) 351-357.
- 2268 Nikonorov, V.V. and Moskvin, L.N.: Flow-injection determination of trace nitrite with chromatomembrane, extraction pre-concentration. *J. Anal. Chem.*, 53 (1998) 948-951; C.A., 129 (1998) 350314p.

- 2269 Novic, M., Divjak, B. and Pihlar, B.: On-column processes in ion chromatographic determination of nitrite and nitrate in heavy mineralised samples. *J. Chromatogr. A.*, 827 (1998) 83-89.
- 2270 Sharma, B.K., Rajamani, P. and Mathur, P.K.: Ion exchange chromatographic separation and MS analysis of isotopes of boron. *Solvent Extr. Ion Exchn.*, 16 (1998) 1321-1340; C.A., 129 (1998) 239209u.
- 2271 Umemura, T., Kamiya, S. and Haraguchi, H.: Characteristic conversion of ion pairs among anions and cations for determination of anions in electrostatic ion chromatography using water as a mobile phase. *Anal. Chim. Acta*, 379 (1999) 23-32.
- 2272 Wang, X.: (Analysis of inorganic anions by indirect photometric chromatography). *Haihuyan Yu Huagong*, 26 (1997) 17-19; C.A., 129 (1998) 169827t.
- 2273 Yagi, M., Adachi, J., Tatsuno, Y. and Mizuno, K.: Change in nitric oxide in humans due to application of a pneumatic tourniquet. *Clin. Chim. Acta*, 278 (1998) 67-74.
- 2274 Yang, X.Y., Wei, W.Z. and Yao, S.Z.: Determination of components in biological media by ion chromatography with series bulk acoustic wave detection. *Anal. Chim. Acta*, 378 (1999) 95-100.
- 2275 Yashin, A.Ya., Gur'ev, I.A. and Ageev, A.N.: Ion-chromatographic determination of cyanide, sulfide, and iodide ions using an amperometric detector with a silver indicator electrode. *J. Anal. Chem.*, 53 (1998) 928-930; C.A., 130 (1999) 37427.
- For additional information see C.A.:  
129 (1998) 239245c;  
130 (1999) 46776.
- See also 1157, 1188, 1199, 1238, 1284, 2221, 2245.
- 38d. *Volatile inorganic compounds*
- 2276 Stoyanovsky, D.A. and Cederbaum, A.I.: ESR and HPLC-EC analysis of ethanol oxidation to 1-hydroxyethyl radical: rapid reduction and quantification of POBN and PBN nitroxides. *Free Radical Biol. Med.*, 25 (1998) 536-545; C.A., 129 (1998) 272620u.
39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS
- 2277 Devol, T.A., Roane, J.E. and Harvey, J.T.: Scintillating extraction chromatographic resin for quantification of aqueous radioactivity. *IEEE Nucl. Sci. Symp. Conf. Rec.*, 1 (1997) 415-419; C.A., 129 (1998) 282400m.
- 2278 Egorov, O., Grate, J.W. and Ruzicka, J.: Automation of radiochemical analysis by flow injection techniques. Am-Pu separation using TRU-resin sorbent extraction column. *J. Radioanal. Nucl. Chem.*, 234 (1998) 231-235; C.A., 129 (1998) 297604e.
- 2279 Firsova, L.A., Chuveleva, E.A. and Kharitonov, O.V.: Chromatographic recovery of high-purity transplutonium elements using separating ions. *Radiochemistry (Moscow)*, 40 (1998) 254-256; C.A., 129 (1998) 307672s.
- 2280 Kharitonov, O.V., Chuveleva, E.A., Gelis, V.M. and Firsova, L.A.: Preparation of gram amounts of americium by displacement complexing chromatography. II. Separation of isotopically pure <sup>241</sup>A from solutions after processing of long-stored plutonium. *Radiochemistry (Moscow)*, 40 (1998) 130-132. C.A., 129 (1998) 181149f.
- 2281 Steinmetz, H.-J., Dolfen, M., Heimbach, H. and Odoj, R.: Rapid separation of radionuclides from radwaste samples using high-performance ion chromatography. *Schr. Forschungszent. Juelich, Reihe Energietech./Energy Technol.*, 2(Radioactive Waste Products 1997) (1998) 311-314; C.A., 129 (1998) 282460f.
- For additional information see C.A.:  
129 (1998) 207673t.
- See also 1153, 2222, 2232, 2253.

## Gas Chromatography

### 1. REVIEWS AND BOOKS

- 500 Berezkin, V.G. and Malyukova, I.V.: (Influence of carrier gas nature on the retention and HETP in gas-solid chromatography). *Usp. Khim.*, 67 (1998) 839-860 - a review with 145 refs.  
 501 McMaster, M. and McMaster, C.: *GC/MS: A Practical User's Guide*. Wiley-VCH, New York, 1998, 167 p.

See also 559, 588, 663, 678, 741, 808, 812.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 502 Lan, K. and Jorgenson, J.W.: Automated measurement of peak widths for the determination of peak capacity in complex chromatograms. *Anal. Chem.*, 71 (1999) 709-714.

#### 2b. Thermodynamics and theoretical relationships

- 503 Gonzalez, F.R.: Consistency of gas hold-up determinations. *J. Chromatogr. A*, 832 (1999) 165-172.

See also 511.

#### 2c. Relationship between structure and chromatographic behaviour

- 504 Berezkin, V.G. and Malyukova, I.V.: Linear dependence of retention factor of compounds chromatographed on average column pressure in capillary gas-solid chromatography. *J. Microcolumn Separ.*, 11 (1999) 125-129.  
 505 Kurbatova, S.V., Kolosova, E.A. and Kudryashov, S.Y.: (Sorption-structural correlations in gas-liquid chromatography of adamantane derivatives). *Zh. Fiz. Khim.*, 72 (1998) 1480-1484.  
 506 Yan, A., Zhang, R., Liu, M., Hu, Z., Hooper, M.A. and Zhao, Z.: Large artificial neural networks applied to the prediction of retention indexes of acyclic and cyclic alkanes, alkenes, alkohols, esters, ketones and ethers. *Comput. Chem. (Oxford)*, 22 (1998) 405-412; *C.A.*, 129 (1998) 339300k.  
 507 Zenkevich, I.G.: (Substantiation of the linear-logarithmic relationship between the gas chromatographic retention indices and the boiling temperatures of organic compounds). *Zh. Fiz. Khim.*, 72 (1998) 1468-1473; *C.A.*, 129 (1998) 350384m.

See also 556, 647.

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

- 508 Balard, H., Papirer, E., Khalfi, A. and Barthel, H.: Trimethylchlorosilane modified silica surfaces: characterization by inverse gas chromatography using PDMS oligomers as probes. *Compos. Interfaces*, 6 (1999) 19-25.

- 509 Dewulf, J., van Langenhove, H. and Everaert, P.: Determination of Henry's law coefficients by combination of the equilibrium partitioning in closed systems and solid-phase microextraction techniques. *J. Chromatogr. A*, 830 (1999) 353-363.  
 510 Erbs, M., Hansen, H.C.B. and Olsen, C.E.: Reductive dechlorination of carbon tetrachloride using iron(II) iron(III) hydroxide sulfate (Green rust). *Environ. Sci. Technol.*, 33 (1999) 307-311.  
 511 Görgényi, M. and Héberger, K.: Enthalpies of solution and excess enthalpies of oxo compounds by capillary gas chromatography. *J. Chromatogr. Sci.*, 37 (1999) 11-16.  
 512 Kubicek, V.: The use of gas chromatography in the calibration of the differential permeater. *Folia Pharm. Univ. Carol.*, 23 (1998) 45-50.  
 513 Sovova, H., Rat, V., Khachaturyan, M. and Vlcek, D.: Solubility of squalane and dinonyl phthalate in CO<sub>2</sub> with entrainers. *J. Supercrit. Fluids*, 14 (1999) 145-149.  
 514 Xie, B., Xia, C., Niu, J., Zhang, Z. and Yin, Y.: (GC-IR technique and its application to the study of catalytic reaction mechanisms). *Fenxi Cuihua*, 12 (1998) 299-303; *C.A.*, 129 (1998) 302287k.  
 515 Zambonin, C.G., Catucci, F. and Palmisano, F.: Solid phase microextraction coupled to gas chromatography-mass spectrometry for determination of the adsorption coefficients of triazines in soil. *Analyst (Cambridge, U.K.)*, 123 (1998) 2825-2828.

See also 774, 779, 785, 858.

### 3. GENERAL TECHNIQUES

#### 3a. Apparatus and accessories

- 516 Board of Supervisors of Louisiana State University and Agricultural and Mech.: Chromatograph with column extraction. *PCT Int. Appl. WO 98 50,129* (Cl. B01D15/08), 12 Nov. 1998, US Appl. 852,255, 6 May 1997; 27 pp.; *C.A.*, 129 (1998) 350394q.  
 517 Ichikawa, G., Mitani, H. and Kodama, R.: (Method and sampling apparatus for determining volatile components in soil by gas chromatography-mass spectrometry). *Jpn. Kokai Tokkyo Koho JP 10 325,832* [98 325,832] (Cl. G01N30/04), 8 Dec. 1998, Appl. 97/133,975, 23 May 1997; 6 pp.; *C.A.*, 130 (1999) 95050f.  
 518 Junyapoon, S., Ross, A.B., Bartle, K.D., Frere, B., Lewis, A.C. and Cooke, M.: Injection by programmed temperature vaporization injection (PTV) of gaseous samples for gas chromatography-atomic emission spectrometry (GC-AED). *J. High Resolut. Chromatogr.*, 22 (1999) 47-51.  
 519 Kolesar, E.S., Jr. and Reston, R.R.: Review and summary of a silicon micromachined gas chromatography system. *IEEE Trans. Compon., Packag., Manuf. Technol., Part B*, 21 (1998) 324-328.

- 520 Kurita, S.: (Gas chromatographic device). *Jpn. Kokai Tokkyo Koho* JP 10 300,734 [98 300,734] (Cl. G01N30/10), 13 Nov. 1998, Appl. 97/104,228, 22 Apr. 1997; 3 pp.; C.A., 130 (1999) 32423j.
- 521 Leclercq, P.A. and Cramers, C.A.: High-speed GC-MS. *Mass Spectrom. Rev.*, 17 (1998) 37-49; C.A., 130 (1999) 10120f.
- 522 Markham, D.A. and Langvardt, P.W.: Design and application of a new interface for a capillary gas chromatograph/radioactivity detection system. *Am. Lab. (Shelton)*, 30, No. 24 (1998) 24-28.
- 523 Maswadeh, W.M. and Snyder, A.P.: Hand-held temperature programmable modular gas chromatograph. *U.S. US 5,856,616* (Cl. 73-23.42; G01N30/04), 5 Jan. 1999, Appl. 821,893, 21 Mar. 1997; 15 pp.; C.A., 130 (1999) 75555w.
- 524 Matzke, C.M., Kottenstette, R.J., Casalnuovo, S.A., Frye-Mason, G.C., Hudson, M.L., Sasaki, D.Y., Manginell, R.P. and Wong, C.C.: Microfabricated silicon gas chromatographic micro-channels: fabrication and performance. *Proc. SPIE-Int. Soc. Opt. Eng.*, 3511 (1998) 262-268.
- 525 Mueller, J. and Lehmann, U.: (Miniaturized gas chromatographic device and method for its production). *Ger. Offen. DE 19,726,000* (Cl. G01N30/00), 19 Nov. 1998, Appl. 19,726,000, 13 May 1997; 6 pp.; C.A., 130 (1999) 20061b.
- 526 Oomiya, K. and Tsujide, H.: (Gas chromatographic apparatus). *Jpn. Kokai Tokkyo Koho* JP 10 325,834 [98 325,834] (Cl. G01N30/10), 8 Dec. 1998, Appl. 97/150,391, 22 May 1997; 5 pp.; C.A., 130 (1999) 104446u.
- 527 Ooya, T. and Koike, H.: (Gas chromatographic device). *Jpn. Kokai Tokkyo Koho* JP 10 260,171 [98 260,171] (Cl. G01N30/88), 29 Sep. 1998, Appl. 97/84,474, 17 Mar. 1997; 7 pp.; C.A., 129 (1998) 325545g.
- 528 Otsuki, S. and Oya, T.: (Gas chromatographic apparatus). *Jpn. Kokai Tokkyo Koho* JP 10 325,833 [98 325,833] (Cl. G01N30/08), 8 Dec. 1998, Appl. 97/150,285, 24 May 1997; 3 pp.; C.A., 130 (1999) 104444s.
- 529 Phillips, J.B., Gaines, R.B., Blomberg, J., van der Wielen, F.W.M., Dimandja, J.-M., Green, V., Granger, J., Patterson, D., Racovalis, L., de Geus, H.-J., de Boer, J., Haglund, P., Lipsky, J., Sinha, V. and Ledford, E.B., Jr.: A robust thermal modulator for comprehensive two-dimensional gas chromatography. *J. High Resolut. Chromatogr.*, 22 (1999) 3-10.
- 530 Rotchild, R.D.: Gas separation by continuous pressure-swing chromatography. *PCT Int. Appl. WO 98 57,727* (Cl. B01D53/047), 23 Dec. 1998, Appl. 97/SE1,099, 19 Jun. 1997; 19 pp.; C.A., 130 (1999) 68579d.
- 531 Saito, T., Ooya, T. and Yamagishi, Y.: (Gas chromatographic device). *Jpn. Kokai Tokkyo Koho* JP 10 260,170 [98 260,170] (Cl. G01N30/88), 29 Sep. 1998, Appl. 97/84,472, 17 Mar. 1997; 6 pp.; C.A., 129 (1998) 325544f.
- 532 Shoji, M.: (Gas chromatographic analyzer). *Jpn. Kokai Tokkyo Koho* JP 10 282,077 [98 282,077] (Cl. G01N30/18), 23 Oct. 1998, Appl. 97/93,571, 11 Apr. 1997; 3 pp.; C.A., 130 (1999) 10105e.
- 533 Shoji, M.: (Gas chromatography analysis device). *Jpn. Kokai Tokkyo Koho* JP 10 253,608 [98 253,608] (Cl. G01N30/26), 25 Sep. 1998, Appl. 97/59,696, 14 Mar. 1997; 4 pp.; C.A., 129 (1998) 310099r.
- 534 Shoji, M.: (Gas chromatography analysis device). *Jpn. Kokai Tokkyo Koho* JP 10 300,736 [98 300,736] (Cl. G01N30/18), 13 Nov. 1998, Appl. 97/107,993, 25 Apr. 1997; 3 pp.; C.A., 130 (1999) 46821z.
- 535 Tanihata, H.: (Gas chromatograph oven with fast cooling capacity). *Jpn. Kokai Tokkyo Koho* JP 10 339,726 [98 339,726] (Cl. G01N30/54), 22 Dec. 1998, Appl. 97/168,178, 9 Jun. 1997; 6 pp.; C.A., 130 (1999) 104510k.
- 536 Tipler, A., Patkin, A.J., Bajorinas, A.J., Cahill, J.E. and Carter, R.: Standardization of chromatographic systems. *Eur. Pat. Appl. EP 878,712* (Cl. G01N30/62), 18 Nov. 1998, US Appl. 46,671, 16 May 1997; 29 pp.; C.A., 129 (1998) 339329b.
- 537 Yuguchi, H.: (Carrier gas supply mechanism for GC and GC-MS). *Jpn. Kokai Tokkyo Koho* JP 10 319,000 [98 319,000] (Cl. G01N30/26), 4 Dec. 1998, Appl. 97/127,011, 16 May 1997; 4 pp.; C.A., 130 (1999) 75500z.

See also 540, 583, 585, 758, 767, 838.

### 3b. Detectors and detection reagents

- 538 Augusto, F. and Valente, A.L.P.: Enhanced sensitivity and selectivity of a gas chromatography-microwave-induced plasma atomic emission system (GC-MIP) at the 685.6-nm fluorine emission line. *J. Microcolumn Separ.*, 11 (1999) 23-27.
- 539 Beling, S., Blaser, G., Bock, J., Heinert, L., Traxler, M. and Kohl, D.: Signal conditioning for semiconductor gas sensors being used as detectors in gas-chromatographs and similar applications. *Sens. Actuators, B*, B52 (1998) 15-22.
- 540 Blomberg, J. and Brinkman, U.A.T.: Practical and theoretical aspects of designing a flame-ionization detector/mass spectrometer Deans' switch. Pressure-flow relations in gas chromatograph-detector interfaces using vacuum-outlet conditions. *J. Chromatogr. A*, 831 (1999) 257-265.
- 541 Bogdall, B.: (The right nose. Thermodesorption for the investigation of problems associated with smells). *LaborPraxis*, 22, No. 10 (1998) 70-72; C.A., 129 (1998) 319974e.
- 542 Brede, C., Lundanes, E., Greibrokk, T. and Pedersen-Bjergaard, S.: Simultaneous element-selective detection of C, F, Cl, Br, and I by capillary gas chromatography coupled with microplasma mass spectrometry. *J. High Resolut. Chromatogr.*, 21 (1998) 633-639.
- 543 Chang, P. and Shih, J.-S.: Application of piezoelectric Ru(III)/cryptand-coated quartz crystal gas chromatographic detector for olefins. *Anal. Chim. Acta*, 380 (1999) 55-62.
- 544 Chen, E.C.M., Carr, S., Wentworth, W.E. and Chen, E.S.D.: Modified kinetic model of the electron-capture detector. Molecular electron affinities and electron collection modes. *J. Chromatogr. A*, 827 (1998) 91-104.
- 545 Huebschmann, H.-J.: (GC/MS/MS for structure-specific detection. Part 2. Applications). *LaborPraxis*, 22, No. 10 (1998) 66-68.
- 546 Kawasoe, S., Kurita, S., Iida, K. and Chiba, H.: (Photoionization method and photoionization detector). *Jpn. Kokai Tokkyo Koho* JP 10 307,123 [98 307,123] (Cl. G01N27/64), 17 Nov. 1998, Appl. 97/117,177, 7 May 1997; 9 pp.; C.A., 130 (1999) 60358k.
- 547 Klee, M.S., Williams, M.D., Chang, I. and Murphy, J.: Superior ECD performance through design and application. *J. High Resolut. Chromatogr.*, 22 (1999) 24-28.

- 548 Nakagawa, K.: (Electron capture detector). *Jpn. Kokai Tokkyo Koho* JP 10 267,896 [98 267,896] (Cl. G01N27/64), 9 Oct. 1998, Appl. 97/91,498, 24 Mar. 1997; 5 pp.; C.A., 129 (1998) 339250u.
- 549 Shibamoto, S.: (Alkaline salt ionization detector). *Jpn. Kokai Tokkyo Koho* JP 10 282,058 [98 282,058] (Cl. G01N27/62), 23 Oct. 1998, Appl. 97/110,358, 11 Apr. 1997; 5 pp.; C.A., 130 (1999) 10104d.
- 550 Ueda, M.: (Thermal conductivity detector used for gas chromatograph). *Jpn. Kokai Tokkyo Koho* JP 11 14,581 [99 14,581] (Cl. G01N27/18), 22 Jan. 1999, Appl. 97/168,586, 25 Jun. 1997; 3 pp.; C.A., 130 (1999) 101383k.
- See also 522, 571, 572, 577, 632.
- 3c. *Sorbents and columns, packing procedures*
- 551 Conder, J.R., Gillies, R.J.M., Oweimreen, G.A. and Shihab, A.-K.I.: Wetting transition in alkane liquids on silanised diatomaceous gas chromatographic supports. *J. Chromatogr. A*, 829 (1998) 201-214.
- 552 Juvancz, Z., Markides, K.E., Rouse, C.A., Jones, K., Tarbet, B.J., Bradshaw, J.S. and Lee, M.L.: A polymeric high resolution Pirkle-type chiral stationary phase for GC and SFC. *Enantiomer*, 3 (1998) 89-94; C.A., 129 (1998) 339299s.
- 553 Kou, D., Lu, X., Li, S., Chen, L. and Huo, X.: (Preparation and separation characteristics of Bentone-34 capillary column). *Shiyou Huagong*, 27 (1998) 762-765; C.A., 130 (1999) 32476d.
- 554 Luo, C., Xu, H., Peng, H., Liu, Z. and Liang, C.: (Research on mixture of  $\beta$ -cyclodextrin polymer and polysiloxane as stationary phase of capillary chromatography). *Guangxi Huagong*, 27, No. 2 (1998) 41-43, 46; C.A., 129 (1998) 310140x.
- 555 Park, H.-M., Kim, Y.-M., Lee, D.-W. and Lee, K.-B.: Evaluation of natural crab shell as an adsorbent for preconcentrating airborne volatile organic compounds collected in a canister. *J. Chromatogr. A*, 829 (1998) 215-221.
- 556 Rohrschneider, L.: Characterisation of GC stationary phases in multilinear retention model. *Chromatographia*, 48 (1998) 728-738.
- 557 Wawrzyniak, R. and Wasik, W.: Synthesis and properties of mercaptosilicone modified by Ni(II) and Co(II) as stationary phases for capillary complexation gas chromatography. *Anal. Chim. Acta*, 377 (1998) 61-70.
- 558 Xu, H., Luo, C. and Tian, W.: (Preparation of  $\beta$ -cyclodextrin polymer glass capillary column by sol adsorption method). *Xiangtan Daxue Ziran Kexue Xuebao*, 20 (1998) 99-102; C.A., 129 (1998) 350355c.
- 559 Yan, C., Shangguan, Y., Xing, J., Zhang, X. and Wu, C.: (Advances in the stationary phases of gas chromatography). *Huaxue Tongbao*, No. 11 (1998) 1-8; C.A., 130 (1999) 75518m - a review with 22 refs.
- 560 Yan, C., Shangguan, Y., Xu, Z. and Wu, C.: (Preparation of catenary crown ether capillary chromatographic column). *Li-hua Jianyan, Huaxue Fence*, 34 (1998) 389-391; C.A., 130 (1999) 89810n.
- 561 Zeng, Z.R. and Liu, M.: Crown ether capped cyclodextrin used as stationary phase for capillary gas chromatography. *Chromatographia*, 48 (1998) 817-822.
- 562 Zhengquan, S. and Huixia, F.: Study on organic light rare earth adsorbent-cerium bis(octylphosphate). *Chin. J. React. Polym.*, 5 (1996) 49-56; C.A., 130 (1999) 10131k.
- See also 524, 533, 563, 577, 618.
- 3d. *Quantitative analysis*
- See 567, 602, 611, 613, 615, 844.
- 3e. *Preparative scale chromatography*
- See 584, 587.
- 3f. *Programmed temperature, pressure, vapors, gradients*
- 563 Smith, H. and Sacks, R.D.: Column selectivity programming and fast temperature programming for high-speed GC analysis of pureable organic compounds. *Anal. Chem.*, 70 (1998) 4960-4966.
- See also 523, 530, 647.
4. *SPECIAL TECHNIQUES*
- 4a. *Automation*
- 564 Schmid, J., Schuetze, D., Sauter, T. and Eschey, H.: Automated sample preparation for GC-MS and LC-MS-MS and automated reporting. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 213-218.
- 4b. *Computerization and modelling*
- 565 Johansson, P., Wikenstedt, B. and McDowall, R.D.: Retrospective validation of a chromatography data system. *LC-GC Int.*, 12 (1999) 88-102.
- 566 Prazen, B.J., Bruckner, C.A., Synovec, R.E. and Kowalski, B.R.: Second-order chemometric standardization for high-speed hyphenated gas chromatography: analysis of GC/MS and comprehensive GC<sub>x</sub>GC data. *J. Microcolumn Separ.*, 11 (1999) 97-107.
- See also 536, 855.
- 4c. *Combination with other physico-chemical techniques (MS, IR etc.)*
- 567 Andalo, C., Galletti, G.C. and Bocchini, P.: Quantitative gas chromatography/tandem mass spectrometry using resonant and non-resonant collisions in ion traps. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1777-1782.
- 568 Barshick, C.M., Barshick, S.A., Walsh, E.B., Vance, M.A. and Britt, P.F.: Application of isotope dilution to ion trap gas chromatography/mass spectrometry. *Anal. Chem.*, 71 (1999) 483-488.
- 569 Careri, M., Mazzoleni, V., Musci, M. and Molteni, R.: Effects of electron beam irradiation on cork volatile compounds by gas chromatography-mass spectrometry. *Chromatographia*, 49 (1999) 166-172.

570 Frech, W., Snell, J.P. and Sturgeon, R.E.: Performance comparison between furnace atomisation plasma emission spectrometry and microwave induced plasma-atomic emission spectrometry for the determination of mercury species in gas chromatography effluents. *J. Anal. At. Spectrom.*, 13 (1998) 1347-1353.

571 Miyakawa, H.: (Mass spectrometer for gas chromatograph). *Jpn. Kokai Tokkyo Koho* JP 10 307,121 [98 307,121] (Cl. G01N27/62), 17 Nov. 1998, Appl. 97/116,649, 7 May 1997; 3 pp.; C.A., 130 (1999) 60357j.

572 Mol, H.G.J., Hankemeier, T. and Brinkman, U.A.T.: Gas chromatography of organic microcontaminants using atomic emission and mass spectrometric detection combined in one instrument (GC-AED/MS). *LC-GC Int.*, 12 (1999) 108-114.

573 Zhang, Z. and McElvain, J.S.: Optimizing spectroscopic signal-to-noise ratio in analysis of data collected by a chromatographic/spectroscopic system. *Anal. Chem.*, 71 (1999) 39-45.

See also 501, 514, 518, 521, 538, 540, 564, 566, 601, 741, 753, 808, 812.

#### 4e. Functional analysis

574 Glastrup, J.: Diazomethane preparation for gas chromatographic analysis. *J. Chromatogr. A*, 827 (1998) 133-136.

See also 663, 761.

#### 4f. Trace analysis and preseparation techniques

575 Marriott, P. and Kinghorn, R.: Cryogenic solute manipulation in gas chromatography-the longitudinal modulation approach. *TrAC*, 18 (1999) 114-125.

576 Matz, G., Kibelka, G., Dahl, J. and Lennemann, F.: Experimental study on solvent-less sample preparation methods. Membrane extraction with a sorbent interface, thermal membrane desorption application and purge-and-trap. *J. Chromatogr. A*, 830 (1999) 365-376.

See also 877.

#### 4g. Enantiomers, separation

See 577, 590, 597, 692, 705, 707, 722, 747, 748, 749, 754, 790, 794, 804.

#### 4h. Other special techniques

577 Abdel-Rehim, M.: Review of interactive carrier gases including ammonia in gas liquid chromatography. *J. Microcolumn Separ.*, 11 (1999) 63-70.

578 Chen, W., Xu, Y.H. and Mitra, S.: Application of microtrap-GC for continuous monitoring of organic emissions from a catalytic incinerator. *J. Microcolumn Separ.*, 11 (1999) 239-245.

579 Dos Santos Pereira, A. and de Aquino Neto, F.R.: High-temperature high-resolution gas chromatography: breaching the barrier to the analysis of polar and high molecular weight compounds. *TrAC*, 18 (1999) 126-136.

- 580 Smith, R.M., Burgess, R.J., Chienthavorn, O. and Stuttard, J.R.: Superheated water: a new look at chromatographic eluents for reversed-phase liquid chromatography. *LC-GC Int.*, 12 (1999) 30-36.
- 581 Van Lieshout, M., van Deursen, M., Derkx, R., Janssen, H.-G. and Cramers, C.: A practical comparison of two recent strategies for fast gas chromatography: packed capillary columns and multicapillary columns. *J. Microcolumn Separ.*, 11 (1999) 155-162.

See also 530.

#### 4i. Supercritical fluid chromatography

- 582 Ehlers, D., Kirchhoff, J., Gerard, D. and Quirin, K.-W.: High performance liquid chromatography analysis of nutmeg and mace oils produced by supercritical CO<sub>2</sub> extraction-comparison with steam-distilled oils-comparison of East Indian, West Indian and Papuan oils. *Int. J. Food Sci. Technol.*, 33 (1998) 215-223.
- 583 Hirata, Y.: (Development of ancillary techniques in capillary supercritical fluid chromatography). *Bunseki Kagaku*, 48 (1999) 21-31.
- 584 Jusforgues, P. and Shaimi, M.: Preparative supercritical fluid chromatography. *Analisis*, 26 (1998) M55-M59.
- 585 Page, S.H., Benner, B.A.Jr., Small, J.A. and Choquette, S.J.: Restrictor plugging in off-line supercritical fluid extraction of environmental samples. Microscopic, chemical, and spectroscopic evaluations. *J. Supercrit. Fluids*, 14 (1999) 257-270.
- 586 Park, S.-J. and Yeo, S.-D.: Supercritical extraction of phenols from organically modified smectite. *Separ. Sci. Technol.*, 34 (1999) 101-113.
- 587 Pietsch, A. and Eggers, R.: The mixer-settler principle as a separation unit in supercritical fluid processes. *J. Supercrit. Fluids*, 14 (1999) 163-171.
- 588 Ray, M.S.: Equilibrium-staged separations: a bibliography update (1997). *Separ. Sci. Technol.*, 34 (1999) 139-156 - a review with 26 refs.
- 589 Vejrosta, J., Karásek, P. and Planeta, J.: Analyte collection in off-line supercritical fluid extraction. *Anal. Chem.*, 71 (1999) 905-909.
- 590 Villeneuve, M.S. and Anderegg, R.J.: Analytical supercritical fluid chromatography using fully automated column and modifier selection valves for the rapid development of chiral separations. *J. Chromatogr. A*, 826 (1998) 217-225.

See also 513, 552, 580, 659, 665, 685, 688, 690, 693, 696, 725, 738, 755, 783, 816, 822, 824, 849, 850, 861, 866, 867, 870.

### 5. HYDROCARBONS AND HALOGEN DERIVATIVES

#### 5a. Aliphatic hydrocarbons

- 591 Pinto, M. and Verstraete, W.: Measuring ethene in off-gases by GC and electronic nose. *Meded.-Fac. Landbouwkde. Toegepaste Biol. Wet. (Univ. Gent)*, 63 (1998) 21-27; C.A., 130 (1999) 6715m.

See also 505, 610, 840, 857, 865.

## 5b. Cyclic hydrocarbons, fullerenes

- 592 Cai, C., Mo, L. and Guan, J.: (Detection of residual toluene in medical plasters by purging-trapping GC-MS). *Fenxi Ceshi Xuebao*, 17, No. 4 (1998) 63-65; C.A., 129 (1998) 321281v.
- 593 Elke, K., Jermann, E., Begerow, J. and Dunemann, L.: Determination of benzene, toluene, ethylbenzene and xylenes in indoor air at environmental levels using diffusive samplers in combination with headspace solid-phase microextraction and high-resolution gas chromatography-flame ionization detection. *J. Chromatogr. A*, 826 (1998) 191-200.
- 594 Fustinoni, S., Giampiccolo, R., Puvirenti, S., Buratti, M. and Colombi, A.: Headspace solid-phase microextraction for the determination of benzene, toluene, ethylbenzene and xylenes in urine. *J. Chromatogr. B*, 723 (1999) 105-115.
- 595 Guthrie, E.A., Bortiatynski, J.M., van Heemst, J.D.H., Richman, J.E., Hardy, K.S., Kovach, E.M. and Hatcher, P.G.: Determination of [<sup>13</sup>C]pyrene sequestration in sediment microcosms using flash pyrolysis-GC-MS and <sup>13</sup>C NMR. *Environ. Sci. Technol.*, 33 (1999) 119-125.
- 596 Matisova, E.: Quantitative analysis of aromatic hydrocarbons in complex hydrocarbon mixtures by high resolution capillary gas chromatography. *Chem. Listy*, 92 (1998) 870-874.
- 597 Ramos, L., Hernández, L.M. and González, M.J.: Simultaneous separation of coplanar and chiral polychlorinated biphenyls by off-line pyrenyl-silica liquid chromatography and gas chromatography. Enantiomeric ratios of chiral congeners. *Anal. Chem.*, 71 (1999) 70-77.
- 598 Song, X. and Zhang, Y.: (Determination of aromatic hydrocarbons in air by capillary chromatography). *Huagong Zidonghua Ji Yibiao*, 25, No. 2 (1998) 45-47; C.A., 130 (1999) 70348w.

See also 578, 781, 834, 844, 866.

## 5c. Halogen derivatives

- 599 Bartulewicz, J., Bartulewicz, E., Gawłowski, J. and Niedzielski, J.: Simple and rapid method for the determination of methylene chloride, ethylene dichloride, trichloroethylene and tetrachloroethylene in atmospheric air. *Chem. Anal. (Warsaw)*, 43 (1998) 887-895.
- 600 Bergstrom, U. and Jansson, B.: Gas chromatographic method for the analysis of chlorinated paraffins in biological samples. *Organohalogen Compd.*, 35 (1998) 403-406.
- 601 Haglund, P. and Harju, M.: Electron impact mass spectrometric response factors and fragmentation of all 209 PCB congeners. *Organohalogen Compd.*, 35 (1998) 39-42.
- 602 Ikonomou, M.G., Sather, P., He, T., Crewe, N. and Fraser, T.: Full congener polychlorinated biphenyls analysis by GC/HRMS. QA/QC considerations. *Organohalogen Compd.*, 35 (1998) 33-37.
- 603 Järnberg, U.G., Asplund, L.T., Egebäck, A.-L., Jansson, B., Unger, M. and Wideqvist, U.: Polychlorinated naphthalene congener profiles in background sediments compared to a degraded halowax 1014 technical mixture. *Environ. Sci. Technol.*, 33 (1999) 1-6.
- 604 Jia, J., He, Y., Fang, H., Huang, J. and Zhou, S.: (Study on headspace solid-phase microextraction for determination of chloroform in drinking water). *Huanjing Kexue*, 19, No. 4 (1998) 79-81, 87; C.A., 130 (1999) 71104a.

- 605 Kodba, Z.C. and Marsel, J.: Microwave assisted extraction and sonification of polychlorobiphenils from river sediments and risk assesment by toxic equivalency factors. *Chromatographia*, 49 (1999) 21-27.
- 606 Matsumura, T., Tsubota, H., Ikeda, Y., Chisaki, Y., Ito, H. and Morita, M.: Response factor of all 209 chlorobiphenyl compounds on capillary column SGE HT8. *Organohalogen Compd.*, 35 (1998) 141-144.
- 607 Misawa, K., Wakisaka, M., Sainoo, T. and Hozumi, K.: (Development of an automatic analyzer for organic halogens using a gas-chromatographic technique). *Bunseki Kagaku*, 47 (1998) 889-894; C.A., 130 (1999) 20045z.
- 608 Molina, L., Cabes, M., Diaz-Ferrero, J., Coll, M., Martí, R., Broto-Puig, F., Comellas, L. and Rodriguez-Larena, M.C.: Separation of non-ortho PCB congeners on pre-packed carbon tubes. Application to analysis in sewage sludge and soil samples. *Organohalogen Compd.*, 35 (1998) 151-154.
- 609 Nilsson, M.-L., Bengtsson, S. and Kylin, H.: Determination of chlorinated paraffins in environmental samples. *Organohalogen Compd.*, 35 (1998) 435-438.
- 610 O'Doherty, S.J., Nickless, G., Bassford, M., Pajot, M. and Simmonds, P.: Separation of hydrohalocarbons and chlorofluorocarbons using a cyclodextrin gas solid chromatography capillary column. *J. Chromatogr. A*, 832 (1999) 253-258.
- 611 Parlar, H., Coelhan, M., Saraci, M., Lahaniatis, E.S., Lachermeier, C., Koske, G., Nitz, S. and Leupold, G.: Quantification of C<sub>10</sub>-chloroparaffines with purely synthesized chloroalkanes as standards. *Organohalogen Compd.*, 35 (1998) 395-398.
- 612 Tanabe, S. and Nakada, H.: (Analysis for environmental monitoring: analysis of biological samples by GC/MS; PCB analysis of seal blubber). *Bunseki*, (1998) 638-646; C.A., 130 (1999) 77188c.
- 613 Tomy, G.T., Westmore, J.B., Stern, G.A., Muir, D.C.G. and Fisk, A.T.: Interlaboratory study on quantitative methods of analysis of C<sub>10</sub>-C<sub>13</sub> polychloro-n-alkanes. *Anal. Chem.*, 71 (1999) 446-451.
- 614 Trigg, R.J., Keenan, G.A., McMullan, D. and Conner, A.I.: Automated SFE combined with GC-MS for the determination of organochlorine compounds in sludge and sediment. *Int. J. Environ. Anal. Chem.*, 70 (1998) 47-57.
- 615 Van der Velde, E.G., Linders, S.H.M.A., Hijman, W.C., Marsman, J.A., den Hartog, R.S. and Liem, A.K.D.: Determination of PCBs in biological samples using SFE in combination with GC-MS. Results of method validation studies. *Organohalogen Compd.*, 35 (1998) 1-4.
- 616 Wawrzyniak, R. and Wasik, W.: Capillary complexation gas chromatography in analysis of halohydrocarbons. *Chromatographia*, 49 (1999) 147-154.
- 617 Westermann, B. and Gerhards, P.: (Fast PCB analyses in used oils by GC/MS). *LaborPraxis*, 22, No. 11 (1998) 68-71.

See also 510, 631, 750, 751, 844.

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

- 618 Alishoev, V.R. and Berezhkin, V.G.: (Capillary gas chromatography of hydrocarbons and related compounds with helium and ammonia carrier gases). *Neftekhimiya*, 38 (1998) 315-318; C.A., 130 (1999) 104501h.

## 6. ALCOHOLS

- 619 Ji, X.: (Synthesis of intermediate for centchroman and intermolecular dehydration in process of GC-MS). *Zhongguo Yaowu Huaxue Zazhi*, 7 (1997) 297-299; C.A., 130 (1999) 38270d.
- 620 Politowicz, M. and Posniak, M.: Gas chromatographic determination of diethylene glycol in workplace air. *Acta Chromatogr.*, 8 (1998) 154-161.

## 7. PHENOLS

- 621 Bolz, U., Koerner, W. and Hagenmaier, H.: Development and validation of a GC/MS-method for determination of phenolic xenoestrogens in aquatic samples. *Organohalogen Compd.*, 35 (1998) 93-96.
- 622 Crespin, M.A., Cárdenas, S., Gallego, M. and Valcárcel, M.: Discrimination of structural isomers of chlorinated phenols in waters using gas chromatography-mass spectrometry in the negative chemical ionization mode. *J. Chromatogr. A*, 830 (1999) 165-174.
- 623 Hardt, J. and Angerer, J.: Gas chromatographic method with mass-selective detection for the determination of 2-isopropoxyphenol in human urine. *J. Chromatogr. B*, 723 (1999) 139-145.
- 624 Kim, J.-B. and Park, J.-R.: The simultaneous determination of phenolic compounds by GC and GC/MS. *J. Food Sci. Nutr.*, 3 (1998) 111-118.
- 625 Leblanc, Y.G., Gilbert, R. and Hubert, J.: Determination of pentachlorophenol and its oil solvent in wood pole samples by SFE and GC with postcolumn flow splitting for simultaneous detection of the species. *Anal. Chem.*, 71 (1999) 78-85.
- 626 Tsuda, T., Takino, A., Kojima, M., Harada, H. and Muraki, K.: Gas chromatographic-mass spectrometric determination of 4-nonylphenols and 4-tert.-octylphenol in biological samples. *J. Chromatogr. B*, 723 (1999) 273-279.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

## 8a. Flavonoids

- 627 Lin, M.-C., Tsai, M.-J. and Wen, K.-C.: Supercritical fluid extraction of flavonoids from *Scutellariae Radix*. *J. Chromatogr. A*, 830 (1999) 387-395.
- 628 Watson, D.G. and Oliveira, E.J.: Solid-phase extraction and gas chromatography-mass spectrometry determination of kaempferol and quercetin in human urine after consumption of *Ginkgo biloba* tablets. *J. Chromatogr. B*, 723 (1999) 203-210.

## 8b. Aflatoxins and other mycotoxins

- 629 Kotal, F., Holadová, K., Hajslová, J., Poustka, J. and Radová, Z.: Determination of trichothecenes in cereals. *J. Chromatogr. A*, 830 (1999) 219-225.
- 630 Radová, Z., Holadová, K. and Hajslová, J.: Comparison of two clean-up principles for determination of trichothecenes in grain extract. *J. Chromatogr. A*, 829 (1998) 259-267.

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

- 631 Grainger, J., Dimandja, J.-M., Green, V., Liu, Z. and Patterson, D.G.Jr.: Fast gas chromatography/high-resolution mass spectrometry and comprehensive two-dimensional gas chromatography/high-resolution mass spectrometry analysis of PCDDs, PCBs, and PCDFs as multigroup analytes. *Organohalogen Compd.*, 35 (1998) 28A-28D.
- 632 Staples, E.J., McGuire, D., Watson, G.W., Viswanathan, S. and Matsuda, T.: Screening for dioxin/furan using a fast GC and SAW detector. *Organohalogen Compd.*, 35 (1998) 183-186.

## 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 633 Blanch, G.P., del Castillo, M.L.R. and Herranz, M.: Enantiomer analysis of chiral lactones in foods by on-line coupled reversed-phase liquid chromatography-gas chromatography. *J. Chromatogr. Sci.*, 36 (1998) 589-594.
- 634 Cighetti, G., Debiasi, S., Paroni, R. and Allevi, P.: Free and total malondialdehyde assessment in biological matrices by gas chromatography-mass spectrometry: what is needed for an accurate detection. *Anal. Biochem.*, 266 (1999) 222-229.
- 635 Demillequand, M., Cérésiat, M., Belmans, M., Kemps, L. and Marchand-Brynaert, J.: Analytical separation of the four stereoisomers of isopropyl 2,3-epoxybutanoate by gas chromatography. *J. Chromatogr. A*, 832 (1999) 259-264.
- 636 Ghassempour, A., Arshadi, M.R. and Adimi, B.: Modified GC-MS for determination of 1,4-dioxirane in cosmetic products. *Orient. J. Chem.*, 14 (1998) 287-291; C.A., 130 (1999) 85894v.
- 637 Kamiura, T., Tajima, Y. and Nakahara, T.: (Determination of crotonaldehyde in air by capillary gas chromatography/mass spectrometry). *Kankyo Kagaku*, 8 (1998) 807-812.
- 638 Li, J., Zhang, Y. and Qian, W.: (Determination of piperonyl butoxide by gas chromatography). *Nongyao Kexue Yu Guanli*, 19 (1998) 11-12; C.A., 130 (1999) 34395a.
- 639 Ostertag-Henning, C.: Analysis of long-chain alkenones by GC-MIP-AED and problems arising from different extraction techniques. *Mineral. Mag.*, 62A, Pt. 2 (1998) 1116-1117; C.A., 130 (1999) 56103f.

See also 511.

## 10. CARBOHYDRATES

## 10a. Mono and oligosaccharides. Structural studies

- 640 Chiesa, L.M., Radice, L., Biondi, P.A. and Belloli, R.: Sensitive determination of glycoprotein monosaccharides by gas chromatography with electron capture detection. *J. High Resolut. Chromatogr.*, 21 (1998) 671-673.
- 641 Hama, Y., Nakagawa, H., Kurosawa, M., Sumi, T., Xia, X. and Yamaguchi, K.: A gas chromatographic method for the sugar analysis of 3,6-anhydrogalactose-containing algal galactans. *Anal. Biochem.*, 265 (1998) 42-48.

- 642 Osborn, H.M.I., Loche, F., Mosley, L. and Read, D.: Analysis of polysaccharides and monosaccharides in the root mucilage of maize (*Zea mays* L.) by gas chromatography. *J. Chromatogr. A*, 831 (1999) 267-276.
- See also 643, 810.
- 10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*
- See 642.
- ### 11. ORGANIC ACIDS AND LIPIDS
- 11a. *Organic acids and simple esters*
- 643 Adams, M.A., Chen, Z.L., Landman, P. and Colmer, T.D.: Simultaneous determination by capillary gas chromatography of organic acids, sugars, and sugar alcohols in plant tissue extracts as their trimethylsilyl derivatives. *Anal. Biochem.*, 266 (1999) 77-84.
- 644 Buratti, M., Pellegrino, O., Valla, C., Fustinoni, S., Brambilla, G. and Colombi, A.: Gas chromatography-electron-capture detection of urinary methylipuric acid isomers as biomarkers of environmental exposure to xylene. *J. Chromatogr. B*, 723 (1999) 95-104.
- 645 Do Nascimento, R.F., Cardoso, D.R., Neto, B.S.L. and Franco, D.W.: Determination of acids in Brazilian sugar cane spirits and other alcoholic beverages by HRGC-SPE. *Chromatographia*, 48 (1998) 751-757.
- 646 Kebriaeizadeh, A., Valaie, M. and Zarghi, A.: Determination of valproic acid in human plasma by gas chromatography. *Pharm. Pharmacol. Commun.*, 4 (1998) 525-527.
- 647 Kittiratanapiboon, K., Jeyashoke, N. and Krisnangkura, K.: Forecasting retention times of fatty acid methyl esters in temperature-programmed gas chromatography. *J. Chromatogr. Sci.*, 36 (1998) 541-546.
- 648 Molkenut, J. and Precht, D.: Precision of milk fat quantitation in mixed fats by analysis of butyric acid. *Chromatographia*, 48 (1998) 758-762.
- 649 Paik, M.-J., Lee, K.-O. and Shin, H.-S.: Determination of very-long-chain fatty acids in serum by gas chromatography-nitrogen-phosphorus detection following cyanomethylation. *J. Chromatogr. B*, 721 (1999) 3-11.
- 650 Rizova, V., Nikodinovski, M. and Stafilov, T.: Modification of method for determination of fatty acids in peanuts by capillary gas chromatography. *Acta Pharm. (Zagreb)*, 48 (1998) 289-294.
- 651 Sehat, N., Kramer, J.K.G., Mossoba, M.M., Yurawecz, M.P., Roach, J.A.G., Eulitz, K., Morehouse, K.M. and Ku, Y.: Identification of conjugated linoleic acid isomers in cheese by gas chromatography, silver ion high performance liquid chromatography and mass spectral reconstructed ion profiles. Comparison of chromatographic elution sequences. *Lipids*, 33 (1998) 963-971.
- 652 Stratton, H.M., Brooks, P.R. and Seviour, R.J.: Analysis of the structural diversity of mycolic acids of Rhodococcus and Gordonia isolates from activated sludge foams by selective ion monitoring gas chromatography-mass spectrometry (SIM GC-MS). *J. Microbiol. Methods*, 35 (1999) 53-63.
- 653 Tian, S. and Xue, F.: (Analysis of chloroacetic acid by gas-liquid chromatography). *Huaxue Shijie*, 39 (1998) 153-155; C.A., 130 (1999) 89832w.
- 654 Wagner, K., Mockel, P., Jahreis, G. and Flachowsky, G.: (Gas chromatographic determination of trans C<sub>18:1</sub>-fatty acids in milk fat and trans-fatty acid content in milk fat in feed forms). *Schriftenr. Bundesminist. Ernaehr., Landwirtsch. Forsten, Reihe A: Angew. Wiss.*, 469 (1998) 10-22; C.A., 130 (1999) 80813h.
- 655 Yue, H. and Zhai, W.: (Determination of fatty acid content in walnut oil). *Huaxue Yanjiu Yu Yingyong*, 10 (1998) 79-81; C.A., 130 (1999) 13302c.
- 656 Zhang, C., Zi, M., Gao, C. and Li, Z.: (Method of determining carboxylic acids using the capillary GC). *Yunnan Daxue Xuebao, Ziran Kexueban*, 20(Suppl.) (1998) 411-415; C.A., 130 (1999) 37407s.
- See also 624, 842, 853, 871.
- 11b. *Prostaglandins*
- 657 Lawson, J.A., Li, H., Rokach, J., Adiyaman, M., Hwang, S.-W., Khanapure, S.P. and Fitzgerald, G.A.: Identification of two major F<sub>2</sub> isoprostanes, 8,12-iso- and 5-epi-8,12-iso-isoprostane F<sub>2α</sub>-VI, in human urine. *J. Biol. Chem.*, 273 (1998) 29295-29301.
- 11c. *Lipids and their constituents*
- 658 Collomb, M., Buetikofer, U., Spahni, M. and Buehler, T.: (Analysis of triglycerides. Part 3. Comparison of methods of MLR, PLS, and PCA regression for the determination of foreign fats in milk fat using capillary GC). *Mitt. Geb. Lebensmittelunters. Hyg.*, 89 (1998) 617-624; C.A., 130 (1999) 3163u.
- 659 Eckard, P.R., Taylor, L.T. and Slack, G.C.: Method development for the separation of phospholipids by subcritical fluid chromatography. *J. Chromatogr. A*, 826 (1998) 241-247.
- 660 Fontecha, J., Diaz, V., Fraga, M.J. and Juarez, M.: Triglyceride analysis by gas chromatography in assessment of authenticity of goat milk fat. *J. Am. Oil Chem. Soc.*, 75 (1998) 1893-1896.
- 661 Martinez, D., Borrull, F., Calull, M., Ruana, J. and Colom, A.: Application of solid-phase extraction membrane disks in the determination of haloacetic acids in water by gas chromatography-mass spectrometry. *Chromatographia*, 48 (1998) 811-816.
- 662 Nakamura, T. and Yamasita, M.: (Properties and applications of fatty acid esters prepared from polyglycerol of high purity). *Gekkan Fudo Kemikaru*, 14, No. 12 (1998) 77-83; C.A., 130 (1999) 80481y.
- 663 Vosmann, K. and Weber, N.: (Trimethylsulfonium hydroxide derivatization of lipids for gas chromatography - advantages and benefits of the method). *Schriftenr. Bundesminist. Ernaehr., Landwirtsch. Forsten, Reihe A: Angew. Wiss.*, 469 (1998) 67-74; C.A., 130 (1999) 78129w - a review with 38 refs.
- See also 738, 820, 872.

**11d. Lipoproteins and their constituents**

- 664 Boyd, L.C., Nwosu, V.C., Young, C.L. and MacMillian, L.: Monitoring lipid oxidation and antioxidant effects of phospholipids by headspace gas chromatographic analyses of rancimat trapped volatiles. *J. Food Lipids*, 5 (1998) 269-282.
- 665 Montanari, L., Fantozzi, P., Snyder, J.M. and King, J.W.: Selective extraction of phospholipids from soybeans with supercritical carbon dioxide and ethanol. *J. Supercrit. Fluids*, 14 (1999) 87-93.

See also 659.

**12. ORGANIC PEROXIDES**

- 666 Ledea, O., Molero, J., Diaz, M., Jardines, D., Rosado, A. and Correa, T.: (Analysis of ozonides and peroxide compounds in the ozonation of methyl oleate). *Rev. CENIC, Cienc. Quim.*, 29, No. 2 (1998) 75-78; *C.A.*, 129 (1998) 343262s.

**13. STEROIDS****13b. Pregnane and androstane derivatives**

- 667 Dehennin, L., Bonnaire, Y. and Plou, P.: Urinary excretion of 19-norandrosterone of endogenous origin in man: quantitative analysis by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 721 (1999) 301-307.
- 668 Ferchaud, V., Bizec, B.L., Monteau, F. and Andre, F.: Determination of the exogenous character of testosterone in bovine urine by gas chromatography-combustion-isotope ratio mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2617-2620.
- 669 Le Bizec, B., Monteau, F., Gaudin, I. and André, F.: Evidence for the presence of endogenous 19-norandrostosterone in human urine. *J. Chromatogr. B*, 723 (1999) 157-172.
- 670 Scherer, C., Wachter, U. and Wudy, S.A.: Determination of testosterone in human hair by gas chromatography-selected ion monitoring mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2661-2663.

**13c. Estrogens**

- 671 Lee, H.-B. and Peart, T.E.: Determination of 17 $\beta$ -estradiol and its metabolites in sewage effluent by solid-phase extraction and gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 81 (1998) 1209-1216.

**13d. Sterols**

- 672 Beaumier-Gallon, G., Dubois, C., Portugal, H. and Lairon, D.: Postprandial studies on dietary cholesterol in human subjects using stable isotopes and gas chromatography-mass spectrometry analysis. *Atherosclerosis (Shannon)*, 141(Suppl. 1) (1998) S81-S85.

- 673 Bodzek, D., Bakowski, W., Wielkoszynski, T., Janoszka, B., Jaremczuk, B., Tarnawski, R. and Tyrpien, K.: TLC and GC-MS determination of cholesterol in consumable fats. *Acta Chromatogr.*, 8 (1998) 122-143.
- 674 Botsoglou, N., Fletouris, D., Psomas, I. and Mantis, A.: Rapid gas chromatographic method for simultaneous determination of cholesterol and  $\alpha$ -tocopherol in eggs. *J. Assoc. Off. Anal. Chem. Int.*, 81 (1998) 1177-1184.
- 675 Fletouris, D.J., Botsoglou, N.A., Psomas, I.E. and Mantis, A.I.: Rapid determination of cholesterol in milk and milk products by direct saponification and capillary gas chromatography. *J. Dairy Sci.*, 81 (1998) 2833-2840.
- 676 Toivo, J., Piironen, V., Kalo, P. and Varo, P.: Gas chromatographic determination of major sterols in edible oils and fats using solid-phase extraction in sample preparation. *Chromatographia*, 48 (1998) 745-750.
- 13e. *Bile acids and alcohols*
- 677 Abukawa, D., Nakagawa, M., Iinuma, K., Nio, M., Ohi, R. and Goto, J.: Hepatic and serum bile acid compositions in patients with biliary atresia: a microanalysis using gas chromatography-mass spectrometry with negative ion chemical ionization detection. *Tohoku J. Exp. Med.*, 185 (1998) 227-237.
- 678 Bata, A.K. and Salen, G.: Gas chromatography of bile acids. *J. Chromatogr. B*, 723 (1999) 1-16 - a review with 191 refs.
- 679 Scalia, S., Williams, J.R., Shim, J.-H., Law, B. and Morgan, E.D.: Supercritical fluid extraction of bile acids from bovine bile raw materials. *Chromatographia*, 48 (1998) 785-789.
- 680 Vreken, P., van Rooij, A., Denis, S., van Grunsven, E.G., Cuevas, D.A. and Wanders, R.J.A.: Sensitive analysis of serum 3 $\alpha$ , 7 $\alpha$ , 12 $\alpha$ , 24-tetrahydroxy-5 $\beta$ -cholest-26-oic acid diastereomers using gas chromatography-mass spectrometry and its application in peroxisomal D-bifunctional protein deficiency. *J. Lipid Res.*, 39 (1998) 2452-2458.
- 13g. *Other steroids*
- 681 Choi, M.H., Chung, B.C., Kim, M., Choi, J. and Kim, Y.: Determination of four anabolic steroid metabolites by gas chromatography/mass spectrometry with negative ion chemical ionization and tandem mass spectrometry. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1749-1755.
- 682 Hamoir, T., Pottie, G., Courteyn, D., Brabander, H.D., Delahaut, P. and Leyssens, L.: Comparison of purification procedures for the isolation and detection of anabolic residues in faeces using gas chromatography-mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2621-2624.
- 683 Keskin, S., Ozer, D. and Temizer, A.: Gas chromatography-mass spectrometric analysis of clenbuterol from urine. *J. Pharm. Biomed. Anal.*, 18 (1998) 639-644.
- 684 Van Puymbroeck, M., Leyssens, L., Raus, J., van Puymbroeck, M., Vanderzande, D., Gelan, J., Raus, J., Kuilman, M.E.M., Maas, R.F.M., Witkamp, R.F. and Witkamp, R.F.: Identification of some important metabolites of boldenone in urine and feces of cattle by gas chromatography-mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2681-2686.

## 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. *Terpenes*

- 685 Baysal, T. and Starmans, D.A.J.: Supercritical carbon dioxide extraction of carvone and limonene from caraway seed. *J. Supercrit. Fluids*, 14 (1999) 225-234.
- 686 Cai, Y., Ye, F. and Li, L.: (GC, GC/MS analysis of camphor). *Fujian Fenxi Ceshi*, 7, No. 2 (1998) 872-874; C.A., 130 (1999) 75537s.
- 687 Oprean, R., Tamas, M. and Roman, L.: Comparison of GC-MS and TLC techniques for asarone isomers determinaton. *J. Pharm. Biomed. Anal.*, 18 (1998) 227-234.

15b. *Essential oils*

- 688 Antonelli, A. and Fabbri, C.: Essential oils: SPE fractionation. *Chromatographia*, 49 (1999) 125-130.
- 689 Benn, S.: Potent odorants in peppermint and cornmint oils characterized by GC-O and AEDA. *Perfum. Flavor.*, 23, No. 5 (1998) 5-16; C.A., 130 (1999) 71256b.
- 690 Budich, M., Heilig, S., Wesse, T., Leibküchler, V. and Brunner, G.: Countercurrent deterpenation of citrus oils with supercritical CO<sub>2</sub>. *J. Supercrit. Fluids*, 14 (1999) 105-114.
- 691 Cha, Y., Wu, Y. and Lu, S.: (Identification of adulterants in *Vetiveria zizanoides* oil samples by GC-MS). *Fenxi Ceshi Xuebao*, 17 (1998) 51-52; C.A., 130 (1999) 43098h.
- 692 Coleman, W.M.III., Perfetti, T.A. and Lawrence, B.M.: Automatic injection solid-phase microextraction-chiral-gas chromatography-mass selective detection analyses of essential oils. *J. Chromatogr. Sci.*, 36 (1998) 575-578.
- 693 Ferreira, S.R.S., Nikolov, Z.L., Doraiswamy, L.K., Meireles, M.A.A. and Petenate, A.J.: Supercritical fluid extraction of black pepper (*Piper nigrum* L.) essential oil. *J. Supercrit. Fluids*, 14 (1999) 235-245.
- 694 Hu, Y., Du, Q. and Tang, Q.: (Determination of chemical constituents of the volatile oil from *Curcuma longa* by gas chromatography-mass spectroemtry). *Sepu*, 16 (1998) 528-529.
- 695 Miller, M.E. and Stuart, J.D.: Comparison of gas-sampled and SPME-sampled static headspace for the determination of volatile flavor components. *Anal. Chem.*, 71 (1999) 23-27.
- 696 Mira, B., Blasco, M., Berna, A. and Subirats, S.: Supercritical CO<sub>2</sub> extraction of essential oil from orange peel. Effect of operation conditions on the extract composition. *J. Supercrit. Fluids*, 14 (1999) 95-104.
- 697 Oruña-Concha, M.J., López-Hernández, J., Simá-Lozano, J.A., Simá-Gándara, J., González-Castro, M.J. and de la Cruz García, C.: Determination of volatile components in fresh, frozen, and freeze-dried padrón-type peppers by gas chromatography-mass spectrometry using dynamic headspace sampling and microwave desorption. *J. Chromatogr. Sci.*, 36 (1998) 583-588.

See also 817.

15c. *Bitter substances*

See 871.

## 16. NITRO AND NITROSO COMPOUNDS

- 698 Kastler, J. and Ballschmiter, K.: Identification of alkyl dinitrates in ambient air of Central Europe. *Fresenius J. Anal. Chem.*, 363 (1999) 1-4.

See also 831, 832, 845.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. *Amines and polyamines*

- 699 Khuhawar, M.Y., Memon, A.A., Jaipal, P.D. and Bhanger, M.I.: Capillary gas chromatographic determination of putrescine and cadaverine in serum of cancer patients using trifluoroacetylacetone as derivatizing reagent. *J. Chromatogr. B*, 723 (1999) 17-24.

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

- 700 Baltussen, E., David, F., Sandra, P., Janssen, H.-G. and Cramers, C.: Capillary GC determination of amines in aqueous samples using sorptive preconcentration on polydimethylsiloxane and polyacrylate phases. *J. High Resolut. Chromatogr.*, 21 (1998) 645-648.
- 701 Mills, G.A., Walker, V. and Mughal, H.: Quantitative determination of trimethylamine in urine by solid-phase microextraction and gas chromatography-mass spectrometry. *J. Chromatogr. B*, 723 (1999) 281-285.
- 702 Rimbach, G., Brandt, K. and Weigand, E.: Gas chromatographic determination of trimethylamine in urine. *Agribiol. Res.*, 51 (1998) 213-218; C.A., 130 (1999) 92284z.

See also 842.

## 18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. *Amino acids and their derivatives*

- 703 Basiuk, V.A.: Pyrolysis of valine and leucine at 500°C: identification of less-volatile products using gas chromatography-Fourier transform infrared spectroscopy-mass spectrometry. *J. Anal. Appl. Pyrolysis*, 47 (1998) 127-143.
- 704 Budzikiewicz, H., Dallakian, P., Griesbeck, A.G. and Heckroth, H.: Phytochemistry of three N-acetoacetyl amino acid methyl esters: structure elucidation of the radiation products by gas chromatography/mass spectrometry. *J. Mass Spectrom.*, 33 (1998) 1256-1260.
- 705 Erbe, T. and Brueckner, H.: Chiral amino acid analysis of vinegars using gas chromatography. Selected ion monitoring mass spectrometry. *Z. Lebensm.-Unters. Forsch. A*, 207 (1998) 400-409; C.A., 129 (1998) 315191z.
- 706 Gao, S., Mooberry, E.S. and Steele, J.L.: Use of <sup>13</sup>C nuclear magnetic resonance and gas chromatography to examine methionine catabolism by lactococci. *Appl. Environ. Microbiol.*, 64 (1998) 4670-4675.

- 707 Schieber, A., Brückner, H. and Ling, J.R.: GC-MS analysis of diaminopimelic acid stereoisomers and amino acid enantiomers in rumen bacteria. *Biomed. Chromatogr.*, 13 (1999) 46-50.

## 19. PROTEINS

### 19d. Microbial and plant proteins

- 708 Reeves, J.B.III. and Francis, B.A.: Pyrolysis-gas chromatography for the analysis of proteins: with emphasis on forages. *ACS Symp. Ser.*, 707 (1998) 47-62.

## 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

- 709 England, T.G., Jenner, A., Aruoma, O.I. and Halliwell, B.: Determination of oxidative DNA base damage by gas chromatography-mass spectrometry. Effect of derivatization conditions on artifactual formation of certain base oxidation products. *Free Radical Res.*, 29 (1998) 321-330.

See also 818.

### 21f. Complex mixtures of nucleic acids, their fragments and PCR products

- 710 Dizdaroglu, M.: Measurement of oxidative DNA damage using the technique of gas chromatography-mass spectrometry. In: Yu, B.P. (Editor), *Methods Aging Res.*, CRC, Boca Raton, 1999, pp. 607-620; *C.A.*, 130 (1999) 92412q.

See also 709.

## 22. ALKALOIDS

- 711 Klaffenbach, P., Kronenfeld, D. and Peterson, T.A.: Stability indicating method for the analysis of nicotine in transdermal drug delivery system by means of gas chromatography. *J. High Resolut. Chromatogr.*, 21 (1998) 649-652.

- 712 Mössner, S.G. and Wise, S.A.: Determination of polycyclic aromatic sulfur heterocycles in fossil fuel-related samples. *Anal. Chem.*, 71 (1999) 58-69.

See also 797.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

### 23a. Porphyrins and other pyrroles

- 713 Hung, T.-C. and Liu, B.-P.: Determination of tributyltin in sediments from the Machu and Taiwan coastal areas. *Acta Oceanogr. Taiwan.*, 37 (1998) 105-112.

### 23c. Indole derivatives and plant hormones (gibberellins)

- 714 Aboul-Enein, H.Y., Doneanu, C. and Covaci, A.: Capillary GC-MS determination of melatonin in several pharmaceutical tablet formulations. *Biomed. Chromatogr.*, 13 (1999) 24-26.

- 715 Hart, L.P., Casper, H., Schabenberger, O. and Ng, P.: Comparison of gas chromatography-electron capture and enzyme-linked immunosorbent assay for deoxynivalenol in milled fractions of naturally contaminated wheat. *J. Food Prot.*, 61 (1998) 1695-1697.

### 23d. Pyridine derivatives

- 716 Ji, A.J., Lawson, G.M., Anderson, R., Dale, L.C., Croghan, I.T. and Hurt, R.D.: A new gas chromatography-mass spectrometry method for simultaneous determination of total and free trans-3'-hydroxycotinine and cotinine in the urine of subjects receiving transdermal nicotine. *Clin. Chem. (Washington)*, 45 (1999) 85-91.

- 717 Ormand, J.R., McNett, D.A. and Bartels, M.J.: Semiautomated preparation of 3,5,6-trichloro-2-pyridinol in human urine using a zymate XP laboratory robot with quantitative determination by gas chromatography-negative-ion chemical ionization mass spectrometry. *J. Anal. Toxicol.*, 23 (1999) 35-40.

### 23e. Other N-heterocyclic compounds

- 718 Lesko, J., Kakalikova, L., Bobekova, V. and Leskova, L.: (Determination of protective substances in grapevine leaves. GC-MS analysis of cis- and trans-resveratrol). *Vinohrad (Bratislava)*, 36 (1998) 75-77; *C.A.*, 130 (1999) 1887j.

- 719 Ryan, T.W.: Resolution of the co-eluting impurity 3,4-dihydro-3,3-dimethylisoquinoline in phentermine base using HPLC-UV photodiode array detection followed by identification via GC-(EI+)-MS. *Anal. Lett.*, 31 (1998) 2375-2395.

- 720 Tittlemier, S.A., Simon, M., Jarman, W.M., Elliott, J.E. and Norstrom, R.J.: Identification of a novel  $C_{10}H_6N_2Br_4Cl_2$  heterocyclic compound in seabird eggs. A bioaccumulating marine natural product? *Environ. Sci. Technol.*, 33 (1999) 26-33.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 721 Becker, G. and Colmsjo, A.: Gas chromatography-atomic emission detection for quantification of polycyclic aromatic sulfur heterocycles. *Anal. Chim. Acta*, 376 (1998) 265-272.

- 722 Bergman, A., Ellerichmann, T., Franke, S., Huehnerfuss, H., Jakobsson, E., Koenig, W.A. and Larsson, C.: Gas chromatographic enantiomer separations of chiral PCB methyl sulfons and identification of selectively retained enantiomers in human liver. *Organohalogen Compd.*, 35 (1998) 339-342.

- 723 Bérubé, P.R., Parkinson, P.D. and Hall, E.R.: Measurement of reduced sulphur compounds contained in aqueous matrices by direct injection into a gas chromatograph with a flame photometric detector. *J. Chromatogr. A*, 830 (1999) 485-489.

- 724 Yang, B. and Schwarz, P.B.: Application of nitrogen-purging of malt extracts to measure two dimethylsulfide precursors by headspace gas chromatography. *J. Am. Soc. Brew. Chem.*, 56 (1998) 81-84.

See also 706, 728.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)
- 725 Eckard, P.R., Long, G.L., Taylor, L.T. and Slack, G.C.: Investigation of ion-pairing additives for the supercritical fluid extraction of triphenylphosphinetrifluorosulfonate, sodium salt. *J. Chromatogr. Sci.*, 36 (1998) 547-553.
- 726 Jones, A.M., Iacumin, P. and Young, E.D.: High resolution  $\delta^{18}\text{O}$  analysis of tooth enamel phosphate by isotope ratio monitoring gas chromatography mass spectrometry and ultraviolet laser fluorination. *Chem. Geol.*, 153 (1999) 241-248.
- 727 Nakajima, T., Sasaki, K., Ozawa, H., Sekijima, Y., Morita, H., Fukushima, Y. and Yanagisawa, N.: Urinary metabolites of sarin in a patient of the Matsumoto sarin incident. *Arch. Toxicol.*, 72 (1998) 601-603.
- 728 Sng, M.T. and Ng, W.F.: In-situ derivatisation of degradation products of chemical warfare agents in water by solid-phase microextraction and gas chromatographic-mass spectrometric analysis. *J. Chromatogr. A*, 832 (1999) 173-182.

See also 859.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

### 26a. Organometallic compounds

- 729 Amouroux, D., Tessier, E., Pecheyran, C. and Donard, O.F.X.: Sampling and probing volatile metal(loid) species in natural waters by in-situ purge and cryogenic trapping followed by gas chromatography and inductively coupled plasma mass spectrometry (P-CT-GC-ICP/MS). *Anal. Chim. Acta*, 377 (1998) 241-254.
- 730 Guidotti, M. and Vitali, M.: Determination of urinary mercury and methylmercury by solid phase microextraction and GC/MS. *J. High Resolut. Chromatogr.*, 21 (1998) 665-666.
- 731 Iijima, M. and Hoshino, Y.: (Determination of tributyltin and triphenyltin compounds in fish by derivatization with sodium tetraethylborate). *Jpn. J. Toxicol. Environ. Health*, 44 (1998) 371-377; *C.A.*, 129 (1998) 329849g.
- 732 Jiang, G.B., Xu, F.Z. and Zhang, F.J.: Diocetyltin and tributyltin detection at trace levels in water and beverages by capillary gas chromatography with flame photometric detection. *Fresenius J. Anal. Chem.*, 363 (1999) 256-260.
- 733 Yang, F. and Chan, Y.K.: Determination of methylcyclopentenylmanganeseetrincarbonyl (MMT) in aqueous samples by SPME-GC-AES. *Analyst (Cambridge)*, 124 (1999) 71-73.

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

- 734 Mester, Z., Vitányi, G., Morabito, R. and Fodor, P.: Speciation of dimethylarsinic acid and monomethylarsonic acid by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 832 (1999) 183-190.
- 735 Zhang, R., Mao, Y., Zhang, Y. and Zhao, R.: (Determination of diphenyldichlorosilane by capillary gas chromatography). *Sepu*, 16 (1998) 526-527.

### 26c. Coordination compounds

- 736 Hrouzek, J., Krupcik, J. and Skacani, I.: Detection limit of Ni(II) bis[di(2,2,2-trifluoroethyl)dithiocarbamate] determined by gas chromatography with electron capture detector. *Chem. Pap.*, 52 (1998) 662-666.
- 737 Murthy, K.S.R., Krupadam, R.J. and Anjaneyulu, Y.: Separation and estimation of lanthanides as mixed-ligand complexes with hexafluoroacetylacetone and tri-n-octylphosphine oxide using solvent extraction and gas chromatography. *J. Chromatogr. Sci.*, 36 (1998) 595-599.
- 727 VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 738 De Franca, L.F., Reber, G., Meireles, M.A.A., Machado, N.T. and Brunner, G.: Supercritical extraction of carotenoids and lipids from buriti (*Mauritia flexuosa*), a fruit from the Amazon region. *J. Supercrit. Fluids*, 14 (1999) 247-256.
- 739 De Greyt, W.F., Petrauskaité, V., Kellens, M.J. and Huyghaeart, A.D.: Analysis of tocopherols by gas-liquid and high-performance liquid chromatography. *Fett/Lipid*, 100 (1998) 503-507; *C.A.*, 129 (1998) 342812j.
- 740 Frega, N., Mozzon, M. and Bocci, F.: Identification and estimation of tocotrienols in the annatto lipid fraction by gas chromatography-mass spectrometry. *J. Am. Oil Chem. Soc.*, 75 (1998) 1723-1727.

See also 674.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

### 29a. General techniques

- 741 Aguera, A. and Fernandez-Alba, A.R.: GC-MS and LC-MS evaluation of pesticide degradation products generated through advanced oxidation processes: an overview. *Analisis*, 26, No. 6 (1998) M123-M130 - a review with 39 refs.
- 742 Akiyama, Y., Yoshioka, N. and Tsuji, M.: (Studies on pesticide degradation products in pesticide residue analysis). *Shokuhin Eiseigaku Zasshi*, 39 (1998) 303-309; *C.A.*, 130 (1999) 94603b.
- 743 Miliadis, G.E. and Malatou, P.T.: Analysis of pesticide residues in vegetables by gas capillary chromatography. *Int. J. Environ. Anal. Chem.*, 70 (1998) 29-36.
- 744 Oubina, A., Martinez, E., Gascon, J., Barcelo, D. and de Alleluia, I.B.: Monitoring of insecticides and fungicides in water and sediment samples in the Brazilian environment. *Int. J. Environ. Anal. Chem.*, 70 (1998) 75-91.
- 745 Shibata, Y., Oyama, M., Sato, H., Nakao, K., Tsuda, M., Sonoda, M. and Tanaka, F.: (Simultaneous cleanup method for multi pesticide residue analysis by GC and HPLC). *Shokuhin Eiseigaku Zashi*, 39 (1998) 241-250; *C.A.*, 129 (1998) 342808n.
- 746 Villén, J., Señoráns, F.J. and Herranz, M.: Very large volume sample introduction in capillary gas chromatography using a programmed temperature injector for pesticide analysis. *J. Microcolumn Separ.*, 11 (1999) 89-95.

29b. *Chlorinated insecticides*

- 747 Baycan-Keller, R., Oehme, M. and Galliker, B.: Optimization of individual column length of a tandem column system for the isomer- and enantiomer selective separation of toxaphenes. *Organohalogen Compd.*, 35 (1998) 229-233.
- 748 Klobes, U., Vetter, W., Luckas, B. and Hottinger, G.: Enantioselective determination of 2-endo,3-exo,5-endo,6-exo,8,8,9,10-octachloroborane (B8-1412) in environmental samples. *Organohalogen Compd.*, 35 (1998) 359-362.
- 749 Koske, G., Leupold, G., Angerhoefer, D. and Parlar, H.: Multidimensional gas chromatographic enantiomer quantification of some polycyclic xenobiotics in cod liver and fish oils. *Organohalogen Compd.*, 35 (1998) 363-366.
- 750 Najam, A.R., Korver, M.P., Williams, C.C., Burse, V.W. and Needham, L.L.: Analysis of a mixture of polychlorinated biphenyls and chlorinated pesticides in human serum by column fractionation and dual-column capillary gas chromatography with electron capture detection. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 177-185.
- 751 Pauwels, A., Wells, D.A., Covaci, A. and Schepens, P.J.C.: Improved sample preparation method for selected persistent organochlorine pollutants in human serum using solid-phase disk extraction with gas chromatographic analysis. *J. Chromatogr. B*, 723 (1999) 117-125.
- 752 Sestakova, B. and Mayerova, A.: (Analytical methods for testing content of pesticides in textile and clothing products). *Vlakna Text.*, 5 (1998) 43-45; *C.A.*, 129 (1998) 332015n.
- 753 Vetter, W. and Luckas, B.: Analytical artifacts during enantioselective determination of chiral organochlorines with GC/ECNI-MS. *Organohalogen Compd.*, 35 (1998) 367-370.
- 754 Vetter, W., Klobes, U., Luckas, B., Hottinger, G. and Schmidt, G.: Determination of (+/-) elution orders of chiral organochlorines by liquid chromatography with a chiral detector and by enantioselective gas chromatography. *J. Assoc. Off. Anal. Chem. Int.*, 81 (1998) 1245-1251.
- 755 Wang, J., Xu, Q., Jiao, K. and Cheng, G.: (Supercritical fluid extraction and gas chromatographic analysis of four organochlorine pesticides in vegetable). *Sepu*, 16 (1998) 506-507.

29c. *Phosphorus insecticides*

- 756 Bushway, R.J. and Fan, Z.: Determination of chloropyrifos in fruits and vegetables by ELISA and confirmation by GC-AED. *Food Agric. Immunol.*, 10 (1998) 215-221; *C.A.*, 130 (1999) 51471q.
- 757 Jin, H. and Webster, G.R.B.: GC-ECD determination of chloropyrifos, its oxon, and 3,5,6-trichloro-2-pyridinol in soil, elm bark, and litter following application for control of the elm bark beetle. *Int. J. Environ. Anal. Chem.*, 69 (1998) 307-316.
- 758 Jongenotter, G.A., Kerkhoff, M.A.T., van der Knaap, H.C.M. and Vandeginste, B.G.M.: Automated on-line GPC-GC-FPD involving co-solvent trapping and the on-column interface for the determination of organophosphorus pesticides in olive oils. *J. High Resolut. Chromatogr.*, 22 (1999) 17-23.
- 759 Sanz-Asensio, J., Martínez-Prado, A.P., Plaza-Medina, M., Martínez-Soria, M.T. and Pérez-Clavijo, M.: Behaviour of acephate and its metabolite methamidophos in apple samples. *Chromatographia*, 49 (1999) 155-160.

See also 763.

29d. *Carbamates*

- 760 Mulchandani, P., Gupta, S.K. and Mulchandani, V.: GLC and HPLC studies on residual effects of two carbamates on food quality of *Glycine max* L. and its possible reversion by neem. *Asian J. Chem.*, 10 (1998) 771-774; *C.A.*, 129 (1998) 329898x.

29e. *Herbicides*

- 761 Boucharat, C., Desauziers, V. and le Cloirec, P.: Experimental design for the study of two derivatization procedures for simultaneous GC analysis of acidic herbicides and water chlorination byproducts. *Talanta*, 47 (1998) 311-323.
- 762 Dalluge, J., Hankemeier, T., Vreuls, R.J.J. and Brinkman, U.A.T.: On-line coupling of immunoaffinity-based solid-phase extraction and gas chromatography for the determination of s-triazines in aqueous samples. *J. Chromatogr. A*, 830 (1999) 377-386.
- 763 Jiménez, J.J., Bernal, J.L., del Nozal, M.J., Martín, M.T. and Mayorga, A.L.: Solid-phase microextraction applied to the analysis of pesticide residues in honey using gas chromatography with electron-capture detection. *J. Chromatogr. A*, 829 (1998) 269-277.
- 764 Johnston, J.J., Furcolow, C.A., Volz, S.A., Mauldin, R.E., Primus, T.M., Savarie, P.J. and Brooks, J.E.: Quantitation of pyrethrum residues in brown tree snakes. *J. Chromatogr. Sci.*, 37 (1999) 5-10.
- 765 Nilsson, T., Baglio, D., Galdo-Miguez, I., Madsen, J.O. and Facchetti, S.: Derivatisation/solid-phase microextraction followed by gas chromatography-mass spectrometry for the analysis of phenoxy acid herbicides in aqueous samples. *J. Chromatogr. A*, 826 (1998) 211-216.
- 766 Pang, G.-F., Cao, Y.-Z., Fan, C.-L., Zhang, J.-J. and Li, X.-M.: Multiresidue gas chromatographic method for determining synthetic pyrethroid pesticides in agricultural products: collaborative study. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 186-197.
- 767 Villén, J., Señoráns, F.J., Herráiz, M. and Tabera, J.: Taguchi experimental design study of very large sample injection of pesticides in capillary gas chromatography. *J. Chromatogr. Sci.*, 36 (1998) 535-540.
- 768 Wenner, A. and Wortberg, M.: Use of automated SPME coupled to GC-AED for the determination of metazachlor in waste water. *J. High Resolut. Chromatogr.*, 21 (1998) 661-664.

See also 515.

29f. *Fungicides*

- 769 Cabras, P., Angioni, A., Garau, V.L., Pirisi, F.M. and Brandolini, V.: Gas chromatographic determination of azoxystrobin, fluazinam, kresomix-methyl, mepanipyrim, and tetraconazole in grapes, must, and wine. *J. Assoc. Off. Anal. Chem. Int.*, 81 (1998) 1185-1189.
- 770 Egea González, F.J., Martínez Vidal, J.L., Castro Cano, M.L. and Martínez, Galera, M.: Levels of metamidophos in air and vegetables after greenhouse applications by gas chromatography. *J. Chromatogr. A*, 829 (1998) 251-258.

- 771 Li, W., Zhao, W. and Leng, X.: (Determination of imibenconazole and its metabolite in pears and soil by gas chromatography). *Sepu*, 16 (1998) 508-509.
- 772 Yamazaki, Y. and Ninomiya, T.: Determination of bitertanol residues in strawberries by liquid chromatography with fluorescence detection and confirmation by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 81 (1998) 1252-1256.
- 773 Yuan, T., Sun, H. and Shi, H.: (Analysis of carbofuran, carbendazim and triadimefon in seed dressing). *Nongyao Kexue Yu Guanli*, 19(Suppl. 1) (1998) 34-35; *C.A.*, 130 (1999) 91566f.
31. PLASTICS AND THEIR INTERMEDIATES
- 774 Bate, D.M., Lehrle, R.S., Pattenden, C.S. and Place, E.J.: A critical comparison of procedures for evaluating rate constants in thermal degradation, illustrated by pyrolysis-g.c. results from four polymers. *Polym. Degrad. Stab.*, 62 (1998) 73-83.
- 775 Cheng, T.M.H. and Malawer, E.G.: Identification and determination of cross-linkers in cross-linked poly(vinylpyrrolidone) by pyrolysis-gas chromatography/mass spectrometry. *Anal. Chem.*, 71 (1999) 468-475.
- 776 Dieckmann, F., Pospiech, D., Uhlmann, P., Bohme, F. and Kricheldorf, H.R.: Inverse gas chromatographic study of some polyethers. *Polymer*, 40 (1998) 983-987.
- 777 Fabbri, D., Trombini, C. and Vassura, I.: Analysis of polystyrene in polluted sediments by pyrolysis-gas chromatography-mass spectrometry. *J. Chromatogr. Sci.*, 36 (1998) 600-604.
- 778 Gong, Y., Xu, X. and Lu, G.: (Gas chromatographic analysis of acrylonitrile and other impurities in acrylonitrile synthesis). *Fenxi Huaxue*, 26 (1998) 1281; *C.A.*, 130 (1999) 20053a.
- 779 Guo, Y., Gu, B., Lu, Z. and Du, Q.: Study on segmental interaction parameter between ethylene and vinyl acetate monomer units of EVA by inverse gas chromatography. *J. Appl. Polym. Sci.*, 71 (1999) 693-698.
- 780 Hetper, J. and Sobera, M.: Thermal degradation of novolac resins by pyrolysis-gas chromatography with a movable reaction zone. *J. Chromatogr. A*, 833 (1999) 277-281.
- 781 Kawamura, Y., Nishi, K., Sasaki, H. and Yamada, T.: (Determination method of styrene dimers and trimers in instant noodles contained in polystyrene cups). *Shokuhin Eiseigaku Zasshi*, 39 (1998) 310-314; *C.A.*, 129 (1998) 315181w.
- 782 Mao, S., Ohtani, H., Tsuge, S., Niwa, H. and Nagata, M.: Determination of short-chain branches in poly(vinyl chloride) and ethylene-vinylchloride copolymers by pyrolysis-hydrogenation-gas chromatography. *Polym. J. (Tokyo)*, 31 (1999) 79-83.
- 783 Sakurada, N., Fukuo, T., Arakawa, R., Ute, K. and Hatada, K.: Characterization of poly(methyl methacrylate) by matrix-assisted laser desorption/ionization mass spectrometry. A comparison with supercritical fluid chromatography and gel permeation chromatography. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1895-1898.
- 784 Sugita, T., Kawasaki, Y., Nagata, M., Ishiwata, H. and Yamada, T.: (Determination of vinyl acetate monomer in polyvinyl acetate for gum base by GC). *Shokuhin Eiseigaku Zasshi*, 39 (1998) 410-414; *C.A.*, 130 (1999) 94605d.
- 785 Wang, F.C.-Y. and Huang, Y.-B.: Composition and microstructure determination of the syndiotactic copolymer of *para*-methylstyrene and styrene by pyrolysis gas chromatography. *J. High Resolut. Chromatogr.*, 22 (1999) 11-16.
- 786 Yokoe, K., Ohtani, H. and Tsuge, S.: Evaluation of thermal migration of ester-type plasticizers in acrylonitrile-butadiene rubbers by highly sensitive automated thermal-desorption gas chromatography. *Int. J. Polym. Anal. Charact.*, 4 (1998) 547-563.
- See also 512, 852.
32. DRUG ANALYSIS
- 32a. *Drug analysis, general techniques*
- 787 Camarasu, C.C., Mezei-Szuts, M. and Varga, G.B.: Residual solvents determination in pharmaceutical products by GC-HS and GC-MS-SPME. *J. Pharm. Biomed. Anal.*, 18 (1998) 623-638.
- 32b. *Antirheumatics and antiinflammatory drugs*
- 788 Schroder, W., Matz, G. and Kubler, J.: Fast detection of preservatives on waste wood with GC/MS, GC-ECD and ion mobility spectrometry. *Field Anal. Chem. Technol.*, 2 (1998) 287-297.
- 789 Wang, L.: (Study of GC determination of piperazine and its co-products). *Lihua Jianyan, Huaxue Fence*, 34 (1998) 249-252; *C.A.*, 129 (1998) 350377m.
- 790 Wang, S.-J., Mao, H.-Q. and Zeng, S.: Enantioselective determination of R(-)- and S(+)-mexiletine in microsomal incubates by capillary gas chromatography. *J. Chin. Pharm. Sci.*, 7 (1998) 201-204.
- 32c. *Autonomic and cardiovascular drugs*
- 791 Fakt, C. and Stenhoff, H.: Determination of an ultrashort-acting antihypertensive dihydropyridine, clevipipine, in blood using capillary gas chromatography-mass spectrometry and of the primary metabolite using liquid chromatography and fluorescence detection. *J. Chromatogr. B*, 723 (1999) 211-219.
- 792 Khan-Raja, A., Robinson, P.R., Barrell, K.J. and Maddock, J.: Determination of glyceryl trinitrate (GTN) and its two dinitrate metabolites in human plasma using GC-MS. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 86-87.
- 793 Machnik, M., Geyer, H., Horning, S., Breidbach, A., Delahaut, P. and Schänzer, W.: Long-term detection of clenbuterol in human scalp hair by gas chromatography-high-resolution mass spectrometry. *J. Chromatogr. B*, 723 (1999) 147-155.
- 794 Rask, H.S., Angelo, H.R. and Christensen, H.R.: Enantioselective determination of Isradipine in human serum using chiral stationary phase liquid chromatography and gas chromatography with nitrogen selective detection. *Chirality*, 10 (1998) 808-812.
- 795 Xin, Y. and Ma, J.: (GC determination of 5-isosorbide mononitrate in tablets). *Yaowu Fenxi Zazhi*, 18 (1998) 337-338; *C.A.*, 130 (1999) 57305k.

## 32d. Central nervous system drugs

- 796 Hooijerink, D., Schilt, R., Brouwer, B. and van Bennekom, E.: Determination of embutramide and pentobarbital in meat and bone meal by gas chromatography-mass spectrometry. *Analyst (Cambridge)*, 123 (1998) 2513-2516.
- 797 Ji, S. and Wang, K.: (GC determination of morphine, codeine, papaverine nave of opium poppy (*Papaver somniferum*). *Zhongcaoyao*, 29 (1998) 526-528; C.A., 130 (1999) 77189d.
- 798 Namera, A., Watanabe, T., Yashiki, M., Iwasaki, Y. and Kojima T.: Simple analysis of tetracyclic antidepressants in blood using headspace-solid-phase microextraction and GC-MS. *J. Anal. Toxicol.*, 22 (1998) 396-400.
- 799 Nelson, M.H., Birnbaum, A.K., Nyhus, P.J. and Remmel, R.P.: A capillary GC-MS method for analysis of phenytoin and [ $^{13}\text{C}_3$ ]-phenytoin from plasma obtained from pulse dose pharmacokinetic studies. *J. Pharm. Biomed. Anal.*, 17 (1998) 1311-1323.
- 800 Ortúñoz, J., Pizarro, N., Farré, M., Mas, M., Segura, J., Camí, J., Brenneisen, R. and de la Torre, R.: Quantification of 3,4-methylenedioxymethamphetamine and its metabolites in plasma and urine by gas chromatography with nitrogen-phosphorus detection. *J. Chromatogr. B*, 723 (1999) 221-232.
- 801 Popa, D.-S., Oprean, R., Curea, E. and Preda, N.: TLC-UV densitometric and GC-MSD methods for simultaneous quantification of morphine and codeine in poppy capsules. *J. Pharm. Biomed. Anal.*, 18 (1998) 645-650.
- 802 Reubaert, K.J., Norli, H.R., Hemmersbach, P. and Rasmussen, K.E.: Determination of benzodiazepines in human urine and plasma with solvent modified solid phase micro extraction and gas chromatography; rationalisation of method development using experimental design strategies. *J. Pharm. Biomed. Anal.*, 18 (1998) 667-680.
- 803 Tarjanyi, Z., Kalasz, H., Hollosi, I., Bathori, M., Bartok, T., Lengyel, J., Magyar, K. and Fuerst, S.: Chromatographic investigation and computer simulation of L-deprenyl metabolism. *Eur. J. Drug Metab. Pharmacokinet.*, 23 (1998) 324-328; C.A., 129 (1998) 297891w.
- 804 Zeng, S., Zhang, L. and Chen, Y.Z.: Chiral gas chromatographic assay with flame ionization detection for amphetamine enantiomers in microsomal incubates. *Biomed. Chromatogr.*, 13 (1999) 33-36.
- 805 Zhang, A.Q., Mitchell, S.C. and Caldwell, J.: The application of capillary gas chromatography-selective ion mass spectrometry for the separation, identification and quantification of phenolic bupivacaine metabolites from human urine. *J. Pharm. Biomed. Anal.*, 17 (1998) 1139-1142.

## 32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 806 Reeves, V.B.: Confirmation of multiple sulfonamide residues in bovine milk by gas chromatography-positive chemical ionization mass spectrometry. *J. Chromatogr. B*, 723 (1999) 127-137.
- 807 Rirmada, R.S., Allegretti, P.E., Furlong, J.J.P. and Cafferata, L.F.R.: RP-HPLC and GC-MS techniques for the quantitative analysis of substituted 1,2,4-trioxanes and their thermolysis products in solution. *J. High Resolut. Chromatogr.*, 22 (1999) 67-69.

## 32f. Cytostatics

- 808 Guetens, G., de Boeck, G., van Cauwenbergh, K., de Brujin, E.A. and Tjaden, U.R.: Hyphenated analytical techniques in cancer research. *LC-GC Int.*, 12 (1999) 115-120.
- 809 Lai, W.-K., Pang, C.-P., Law, L.-K., Wong, R., Li, C.-K. and Yuen, P.M.-P.: Routine analysis of plasma busulfan by gas chromatography-mass fragmentography. *Clin. Chem. (Washington)*, 44 (1998) 2506-2510.

## 32g. Other drug categories

- 810 Blum, W., Aichholz, R., Ramstein, P., Fetz, A. and Raschdorf, F.: Determination of 2-hydroxypropyl- $\gamma$ -cyclodextrin in plasma of cynomolgus monkeys after oral administration by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 720 (1998) 171-178.
- 811 Lagorce, P., Perez, Y., Ortiz, J., Necciari, J. and Bressolle, F.: Assay method for the carboxylic acid metabolite of clopidogrel in human plasma by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 720 (1998) 107-117.

## 32h. Toxicological and forensic applications

- 812 De Roy, G.L.J.: Chromatography in forensic casework-the importance of hyphenated techniques. *LC-GC Int.*, 12 (1999) 121-123.
- 813 Georgakopoulos, C.G., Tsitsimpikou, C., Spyridaki, M.-H.E., Lyris, E., Cookaes, E.G. and Thieme, D.: Doping control analysis: the 6th World Championships of Athletics, Athens, Greece. *TrAC*, 18 (1999) 1-13.
- 814 Kushnir, M.M., Crossett, J., Brown, P.I. and Urry, F.M.: Analysis of gabapentin in serum and plasma by solid-phase extraction and gas chromatography-mass spectrometry for therapeutic drug monitoring. *J. Anal. Toxicol.*, 23 (1999) 1-6.
- 815 Namera, A., Yashiki, M., Ohtani, M., Kawakami, H. and Kojima, T.: Automated analysis of opiates in human urine using a combined system of PrepStation and gas chromatography-mass spectrometry. *Jpn. J. Forensic Toxicol.*, 16 (1998) 207-214.

## 32i. Plant extracts

- 816 Choi, Y.H., Kim J., Jeon, S.H., Yoo, K.-P. and Lee, H.-K.: Optimum SFE condition for lignans of *Schisandra chinensis* fruits. *Chromatographia*, 48 (1998) 695-699.
- 817 Hou, D., Zhang, W. and Hui, R.: Separation and determination of chemical constituents in the volatile oil of three traditional Chinese crude drugs. *J. Pharm. Biomed. Anal.*, 17 (1998) 1423-1426; C.A., 130 (1999) 17143z.

## 33. CLINICO-CHEMICAL APPLICATIONS

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

818 Struys, E.A., Jansen, E.E.W., ten Brink, H.J., Verhoeven, N.M., van der Knaap, M.S. and Jakobs, C.: An accurate stable isotope dilution gas chromatographic-mass spectrometric approach to the diagnosis of guanidinoacetate methyltransferase deficiency. *J. Pharm. Biomed. Anal.*, 18 (1998) 659-665.

See also 623, 646, 649, 657, 677, 680, 699, 716, 792.

## 34. FOOD ANALYSIS

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

819 Kinoshita, E., Ozawa, Y. and Aishima, T.: (Differentiation of soy sauce produced from whole soybeans and defatted soybeans by pattern recognition of GC and HPLC profiles). *Nippon Shoyu Kenkyusho Zasshi*, 24 (1998) 333-340; C.A., 130 (1999) 37494t.

820 Marsili, R.T.: Comparison of solid-phase microextraction and dynamic headspace methods for the gas chromatographic-mass spectrometric analysis of light-induced lipid oxidation products in milk. *J. Chromatogr. Sci.*, 37 (1999) 17-23.

821 Yordanov, N.D., Gancheva, V., Tarandjiiska, R., Velikova, R., Kulieva, L., Damyanova, B. and Popov, S.: Comparative investigation of irradiated meat by the methods of electron paramagnetic resonance and gas chromatography. *Spectrochim. Acta, Part A*, 54A (1998) 2421-2426.

822 Zou, W., Lusk, C., Messer, D. and Lane, R.: Fat contents of cereal foods: comparison of classical with recently developed extraction techniques. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 141-150.

See also 630, 633, 645, 648, 651, 654, 655, 660, 664, 665, 673, 674, 675, 708, 724, 731, 732, 738, 743, 755, 759, 763, 766, 769, 770, 771, 772, 796, 850.

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

823 Feng, Y.-W. and Acree, T.E.: Gas chromatography olfactometry in aroma analysis. *Foods Food Ingredients J. Jpn.*, 179 (1999) 57-66.

824 Gamse, T., Rogler, I. and Marr, R.: Supercritical CO<sub>2</sub> extraction for utilisation of excess wine of poor quality. *J. Supercrit. Fluids*, 14 (1999) 123-128.

825 Guan, S. and Pieper, H.J.: (Characteristic components of distillate tailings from fruit mashed for recognition of character impact compounds in off flavor using GC analysis). *Dtsch. Lebensm.-Rundsch.*, 94 (1998) 365-374; C.A., 129 (1998) 301924d.

826 Penton, Z.: Determining volatiles in beer with automated SPME and GC/MS/ECD. *Chem. N.Z.*, 62, No. 2 (1998) 41-43; C.A., 130 (1999) 80490a.

- 827 Procida, G., Conte, L.S., Fiorasi, S., Comi, G. and Favretto, L.G.: Study on volatile components in salami by reverse carrier gas headspace gas chromatography-mass spectrometry. *J. Chromatogr. A*, 830 (1999) 175-182.
- 828 Zhu, M., Aviles, F.J., Conte, E.D., Miller, D.W. and Perschbacher, P.W.: Microwave mediated distillation with solid-phase micro-extraction: determination of off-flavors, geosmin and methylisoborneol, in catfish tissue. *J. Chromatogr. A*, 833 (1999) 223-230.

See also 676, 697, 701, 758.

## 35. ENVIRONMENTAL ANALYSIS

35a. *General papers and reviews*

- 829 Castillo, M., Barceló, D., Pereira, A.S. and Neto, F.R.A.: Characterization of organic pollutants in industrial effluents by high-temperature gas chromatography-mass spectrometry. *TrAC*, 18 (1999) 26-36.

See also 593, 609.

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

- 830 Bartelt, R.J. and Zilkowski, B.W.: Nonequilibrium quantitation of volatiles in air streams by solid-phase microextraction. *Anal. Chem.*, 71 (1999) 92-101.

- 831 Bhadra, R., Wayment, D.G., Hughes, J.B. and Shanks, J.V.: Confirmation of conjugation processes during TNT metabolism by axenic plant roots. *Environ. Sci. Technol.*, 33 (1999) 446-452.

- 832 Bolzacchini, E., Meinardi, S., Orlandi, M., Rindone, B., Hjorth, J. and Restelli, G.: Nighttime tropospheric chemistry: kinetics and product studies in the reaction of 4-alkyl- and 4-alkoxytoluenes with NO<sub>3</sub> in gas phase. *Environ. Sci. Technol.*, 33 (1999) 461-468.

- 833 Izumikawa, S. and Hoshi, J.: (Study on the determination of volatile organic compounds by solid adsorbent adsorption and gas chromatography mass spectrometry). *Zenkoku Kogaiken Kaishi*, 23, No. 2 (1998) 66-75; C.A., 129 (1998) 320735j.

- 834 Luniewski, R., Kanabe, B., Nasri, L., Hubber, P., Au, L., Yang, P. and Buonocore, N.: Gas chromatograph/isotope dilution mass spectrometric analysis of airborne benzo[a]pyrene using deuterium and <sup>13</sup>C-labeled benzo[a]pyrene: a critical evaluation. *J. Air Waste Manage. Assoc.*, 48 (1998) 1085-1092.

- 835 Pankow, J.F., Luo, W., Isabelle, L.M., Bender, D.A. and Baker, R.J.: Determination of a wide range of volatile organic compounds in ambient air using multisorbent adsorption/thermal desorption and gas chromatography/mass spectrometry. *Anal. Chem.*, 70 (1998) 5213-5221.

- 836 Suzuki, S.: (Mass spectrometry of air pollutants). *J. Mass Spectrom. Soc. Jpn.*, 46 (1998) 459-470; C.A., 130 (1999) 99509k.

- 837 Tao, X., Liu, Y. and Ji, Y.: (GC determination of air vinyl acetate). *Zhonghua Laodong Weisheng Zhiyebing Zazhi*, 16 (1998) 185-186; C.A., 130 (1999) 35176s.

- 838 Terada, K., Onishi, T., Kono, S. and Kato, J.: (Apparatus for measurement of air pollution materials using gas chromatography). *Jpn. Kokai Tokkyo Koho* JP 10 339,725 [98 339,725] (Cl. G01N30/08), 22 Dec. 1998, Appl. 97/165,004, 7 Jun. 1997; 5 pp.; *C.A.*, 130 (1999) 104459a.
- 839 Zeh, H.: The determination of VOC emission from latex paints during and after application. Methods, performance, precision. *Faerg Lack Scand.*, 44, No. 3 (1998) 4-10; *C.A.*, 130 (1999) 85085g.
- 840 Zhou, X.: (Capillary GC method for determination of cyclohexane in workshop air). *Gongye Weisheng Yu Zhiyebing*, 24 (1998) 240-241; *C.A.*, 130 (1999) 28397m.

See also 555, 598, 599, 620, 637, 698, 770.

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

- 841 Da Rocha, E.C., Augusto, F. and Valente, A.L.P.: Membrane extraction with a sorbent interface (MESI): an efficient and fast cleanup method for the hollow silicone membrane. *J. Microcolumn Separ.*, 11 (1999) 29-35.
- 842 Van Doorn, H., Grabanski, C.B., Miller, D.J. and Hawthorne, S.B.: Solid-phase microextraction with pH adjustment for the determination of aromatic acids and bases in water. *J. Chromatogr. A*, 829 (1998) 223-233.

See also 604, 621, 622, 626, 661, 700, 732, 733, 744, 762, 765, 768, 843, 851.

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

- 843 Ciupe, R. and Spangenberg, J.: Gas chromatographic screening of oil in contaminated soil and water samples.  *GIT Lab. J.*, 2 (1998) 182-184.
- 844 Wegener, J.W.M., Cofino, W.P., Maier, E.A. and Kramer, G.N.: The preparation, testing and certification of two freshwater sediment reference materials for polycyclic aromatic hydrocarbons and polychlorinated biphenyls: BCR CRM 535 and CRM 536. *TrAC*, 18 (1999) 14-25.
- 845 Williams, D. and Pappas, G.: Ultra-rapid soil screening with the use of GC-SAW technology for TNT/DNT and related nitroaromatic contaminants. *Field Anal. Chem. Technol.*, 2 (1998) 299-308; *C.A.*, 130 (1999) 56603u.

See also 515, 517, 595, 603, 605, 608, 614, 713, 744, 771, 777, 876.

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

*36a. Surfactants*

- 846 Finke, J., Kobold, U., Duelffer, T., Pongratz, S., Puhlmann, A. and Rudolphi, A.: (Characterization of ethoxylates with high-temperature gas chromatography and its application in quality control). *Tenside, Surfactants, Deterg.*, 35 (1998) 478-479; *C.A.*, 130 (1999) 83215a.

- 847 Kawauchi, A. and Uchiyama, T.: Quick identification of polycarboxylates in laundry detergents by *in situ* pyrolysis-methylation gas chromatography/mass spectrometry. *J. Anal. Appl. Pyrolysis*, 48 (1998) 35-43.
- 848 Uchiyama, T. and Kawauchi, A.: Quick identification of polyterephthalate in laundry detergents by simultaneous pyrolysis methylation-gas chromatography/mass spectrometry. *J. Surfactants Deterg.*, 1 (1998) 519-522.

See also 626.

*36b. Antioxidants and preservatives*

- 849 Cortesi, A., Kikic, I., Alessi, P., Turtoi, G. and Garnier, S.: Effect of chemical structure on the solubility of antioxidants in supercritical carbon dioxide: experimental data and correlation. *J. Supercrit. Fluids*, 14 (1999) 139-144.
- 850 Esquivel, M.M., Ribeiro, M.A. and Bernardo-Gil, M.G.: Supercritical extraction of savory oil: study of antioxidant activity and extract characterization. *J. Supercrit. Fluids*, 14 (1999) 129-138.
- 851 González-Casado, A., Navas, N., del Olmo, M. and Vilchez, J.L.: Determination of bisphenol A in water by micro liquid-liquid extraction followed by silylation and gas chromatography-mass spectrometry analysis. *J. Chromatogr. Sci.*, 36 (1998) 565-569.
- 852 Nam, S.-H. and Han, M.-H.: Reduction of antidegradants in vulcanized rubber; quantitative analysis by gas chromatography and its effect on crack resistance. *Korea Polym. J.*, 6 (1998) 281-286.

See also 786.

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

- 853 Bernier, U.R., Booth, M.M. and Yost, R.A.: Analysis of human skin emanations by gas chromatography/mass spectrometry. 1. Thermal desorption of attractants for the yellow fever mosquito (*Aedes aegypti*) from handled glass beads. *Anal. Chem.*, 71 (1999) 1-7.
- 854 Bleich, S., Hapla, F. and Sprung, R.: (Possible risk to develop nasal cancer by occupational exposure to wood dust containing methanol and methylacetate. Investigations of wood dust using headspace-gas chromatography). *Holz Roh-Werkst.*, 56 (1998) 367-372; *C.A.*, 130 (1999) 77347d.
- 855 Bruno, T.J., Bachmeyer, G.M. and Wertz, K.H.: Gas chromatographic retention parameters database for refrigerant mixture composition management. *Int. J. Refrig.*, 21 (1998) 639-647.
- 856 Chiavari, G., Colucci, A., Mazzeo, R. and Ravanelli, M.: Organic content evaluation of corrosion patinas in outdoor bronze monuments. *Chromatographia*, 49 (1999) 35-41.
- 857 Del Rio, J.C., Gutiérrez, A., González-Vila, F.J.: Analysis of impurities occurring in a totally chlorine free-bleached Kraft pulp. *J. Chromatogr. A*, 830 (1999) 227-232.
- 858 Diez, M.A., Domínguez, A., Barriocanal, C., Alvarez, R., Blanco, C.G. and Canga, C.S.: Hydrogen donor and acceptor abilities of pitches from coal and petroleum evaluated by gas chromatography. *J. Chromatogr. A*, 830 (1999) 155-164.

- 859 Dziwinski, E. and Szymanowski, J.: Composition of CYANEX 923, CYANEX 925, CYANEX 921 and TOPO. *Solvent Extr. Ion Exch.*, 16 (1998) 1515-1525; C.A., 130 (1999) 32497m.
- 860 Galletti, G.C., D'Antuono, L.F., Bocchini, P. and Rosolen, I.: Pyrolysis/gas chromatography/mass spectrometry of spelt (*Triticum spelta* L.) pericarp. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1801-1807.
- 861 Grajek, H., Witkiewicz, Z., Jankowska, H. and Swiatkowski, A.: (Chromatographic testing of the effectiveness of regeneration of coarse-grained activated carbons conducted with CO<sub>2</sub> in the supercritical state). *Przem. Chem.*, 77 (1998) 415-416.
- 862 Hernandez-Coronado, M.J., Hernandez, M., Rodriguez, J. and Arias, M.E.: Gas chromatography/mass spectrometry as a suitable alternative technique to evaluate the ability of streptomycetes to degrade lignin from lignocellulosic residues. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1744-1748.
- 863 Ivanov, A.A.: (Gas chromatography of dinitryl orthochlorobenzalmalic acid (CS gas) in animal tissues, washings off involved skin sites, and clothes). *Sud.-Med. Ekspert.*, 41, No. 3 (1998) 27-28.
- 864 Jiang, T. and Guan, Y.: (Analysis of lubricating oils by online coupled packed capillary liquid chromatography and high temperature capillary gas chromatography). *Sepu*, 16 (1998) 469-472.
- 865 Khatskevich, E.V., Konopelko, L.A. and Chunovkina, A.G.: (Metrological provisions for chromatographs for quality control of natural gas). *Izmer. Tekh.*, No. 7 (1998) 62-64; C.A., 130 (1999) 97791x.
- 866 Koyama, T., Taima, I. and Onoda, S.: (The analysis of aromatics in diesel fuel by supercritical fluid chromatography). *Aromatic-kusu*, 50 (1998) 408-413; C.A., 130 (1999) 97820f.
- 867 Lancas, F.M., Pereira, D.M. and Vilegas, J.H.Y.: Chromatographic and spectroscopic analysis of resins extracted from coal with ethanol in the supercritical state. *Energy Sources*, 20 (1998) 935-944.
- 868 Laniewski, K., Borén, H., Grimvall, A. and Ekelund, M.: Pyrolysis-gas chromatography of chloroorganic compounds in precipitation. *J. Chromatogr. A*, 826 (1998) 201-210.
- 869 Levine, B.K., Moores, A.J. and Mayfield, H.T.: Fuel spill identification by gas chromatography-genetic algorithms/pattern recognition techniques. *Anal. Lett.*, 31 (1998) 2805-2822.
- 870 Li, J.: Quantitative analysis of cosmetics waxes by using supercritical fluid extraction (SFE)/supercritical fluid chromatography (SFC) and multivariate data analysis. *Chemom. Intell. Lab. Syst.*, 45 (1999) 385-395.
- 871 McGinnis, T.P.: Quantitative determination of fatty and resin acids in Kraft black liquors as their trimethylsilyl derivatives by gas chromatography. *J. Chromatogr. A*, 829 (1998) 235-249.
- 872 Mottram, H.R., Dudd, S.N., Lawrence, G.J., Scott, A.W. and Evershed, R.P.: New chromatographic, mass spectrometric and stable isotope approaches to the classification of degraded animal fats preserved in archaeological pottery. *J. Chromatogr. A*, 833 (1999) 209-221.
- 873 Papazova, D. and Pavlova, A.: Development of a simple gas chromatographic method for differentiation of spilled oils. *J. Chromatogr. Sci.*, 37 (1999) 1-4.
- 874 Reverchon, E., Della Porta, G. and Lamberti, G.: Modelling of orange flower concrete fractionation by supercritical CO<sub>2</sub>. *Supercrit. Fluids*, 14 (1999) 115-121.
- 875 Sandoval, W., Cournoyer, M.E., Bustos, L., Quintana, D. and Ortega, L.: A new waste minimization method for the determination of total nonhalogenated volatile organic compounds in transuranic (TRU) wastes. *J. Radioanal. Nucl. Chem.*, 235 (1998) 221-224.
- See also 569, 582, 592, 596, 617, 625, 752, 835.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- See 862.
38. INORGANIC COMPOUNDS
- 38a. Cations
- 876 Barshick, C.M., Barshick, S.-A., Britt, P.F., Lake, D.A., Vance, M.A. and Walsh, E.B.: Development of a technique for the analysis of inorganic mercury salts in soils by gas chromatography/mass spectrometry. *Int. J. Mass Spectrom.*, 178 (1998) 31-41.
- 38b. Anions
- 877 Magnuson, M.L.: Determination of bromate as parts-per-trillion levels by gas chromatography-mass spectrometry with negative chemical ionization. *Anal. Chim. Acta*, 377 (1998) 53-60.
- See also 725.
- 38c. Permanent and rare gases
- 878 Yoh, M., Takeuchi, M. and Toda, H.: Simultaneous measurement of N<sub>2</sub>, O<sub>2</sub>, Ar, CO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>, and CO in aqueous and gaseous samples: a detection of N<sub>2</sub>/Ar shifts in environment. *Rikusugaku Zasshi*, 59 (1998) 147-157; C.A., 129 (1998) 347034s.
- 38d. Volatile inorganic compounds
- 879 Koreh, O., Rikker, T., Molnar, G., Mahara, B.M., Torkos, K. and Borossay, J.: (Study of decomposition of sulfur hexafluoride gas by gas chromatography/mass spectrometry). *Magy. Kem. Foly.*, 104 (1998) 444-451.
- 880 Wang, H., Zhang, Q., Dalla Lana, I.G. and Chuang, K.T.: Analysis of both sulfur and non-sulfur compounds using a single gas chromatograph with parallel sulfur chemiluminescence and thermal conductivity detectors. *J. Chromatogr. Sci.*, 36 (1998) 605-611.
- See also 723, 878.
39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS
- See 595, 726, 875.

## Planar Chromatography

### 1. REVIEWS AND BOOKS

- 184 Kreuzig, F.: The history of planar chromatography. *J. Planar Chromatogr.*, 11 (1998) 322-324.

See also 196, 203, 209, 298, 301.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 185 Hardman, D.J., Slater, J.H., Reid, A.G. and Lang, W.K.: Self-contained biochemical and immunochemical assay devices. *PCT Int. Appl. WO 98 32,018* (Cl. G01N33/543), 23 Jul. 1998, GB Appl. 97/759, 15 Jan. 1997; 44 pp.; C.A., 129 (1998) 158848z.  
 186 Kwieciński, L., Sanicka, M. and Rozyłko, S.K.: The effect of mobile phase composition on solute retention in reversed-phase planar chromatography. *J. Planar Chromatogr.*, 11 (1998) 350-352.  
 187 Lukács, M. and Kovács-Hadagy, K.: Impregnation of the "spread-out" column with a cationic ion-pairing compounds by means of continuous OPLC. *J. Planar Chromatogr.*, 11 (1998) 357-360.  
 188 Vovk, I., Franko, M., Gibkes, J., Prosek, M. and Bicanic, D.: Investigation by photoacoustic spectroscopy of the effect of drying conditions on the depth-distribution of compounds on TLC plates. *J. Planar Chromatogr.*, 11 (1998) 379-382.  
 189 Wawrzynowicz, T., Czaplańska, K.L. and Markowski, W.: The use of special development techniques for micropreparative TLC separation of closely related compounds. *J. Planar Chromatogr.*, 11 (1998) 388-393.

#### 2c. Relationship between structure and chromatographic behaviour

- 190 Limpan, E., Yamie, F. and Cebolla, S.: Prediction of the lipophilicity of some N-hydroxyethylamides of aryloxyalkylene and pyridine carboxylic acids by reversed-phase thin-layer chromatography. *J. Planar Chromatogr.*, 11 (1998) 342-345.

See also 191.

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

- 191 Demopoulos, V.J.: A correlation between  $R_f$  and  $\log P$  or  $\Delta \log P$  of a set of aromatic compounds. *Pharmazie*, 53 (1998) 880-881.  
 192 Rozyłko, J.K., Niewiadomy, A., Zabinska, A. and Matysiak, J.: RPTLC investigation of the hydrophobicity and biological activity of new fungicidal compounds. *J. Planar Chromatogr.*, 11 (1998) 450-456.

See also 285.

### 3. GENERAL TECHNIQUES

#### 3a. Apparatus and accessories

- 193 Bereznik, V.G. and Mardanov, R.G.: Polycolumn plates for TLC. *J. Planar Chromatogr.*, 11 (1998) 325-329.  
 194 Bereznik, V.G., Rumyantsev, V.Yu., Vorobeva, S.V., Dontsova, E.P. and Mardanov, R.G.: A new method for two-dimensional planar chromatography using paper fixed on polymer film. *J. Planar Chromatogr.*, 11 (1998) 438-440.

See also 185.

#### 3b. Detectors and detection reagents

- 195 Chau, F.-T., Chan, T.-P. and Wang, J.: TLCQA: quantitative study of thin-layer chromatography. *Bioinformatics*, 14 (1998) 540-541; C.A., 130 (1999) 12067.  
 196 Petrovic, S.C., King, D.F. and Dewald, H.D.: Electrochemical detection in thin-layer chromatography (TLC). A review and application of direct on-plate square-wave anodic stripping voltammetry for TLC. *Electroanalysis*, 10 (1998) 393-398; C.A., 129 (1998) 197197f - a review with many refs.  
 197 Summanen, J., Yrjönen, T., Hiltunen, R. and Vuorela, H.: Influence of densitometer and video-documentation settings in the detection of plant phenolics by TLC. *J. Planar Chromatogr.*, 11 (1998) 421-427.

#### 3c. Sorbents and columns, packing procedures

- 198 Karakas, R. and Yuksel, U.: Modification of Perlite for use as a thin-layer chromatographic adsorbent. *J. Chromatogr. Sci.*, 36 (1998) 499-504.

See also 194, 251.

#### 3d. Quantitative analysis

- 199 Cebolla, V.L., Vela, J., Membrado, L. and Ferrando, A.C.: Suitability of thin-layer chromatography-flame ionization detection with regard to quantitative characterization of different fossil fuel products. I. FID performances and response of pure compounds related to fossil fuel products. *J. Chromatogr. Sci.*, 36 (1998) 479-486.  
 200 Petrovic, M., Kastelan-Macan, M. and Babic, S.: Quantitative evaluation of 2D chromatograms with a CCD camera. *J. Planar Chromatogr.*, 11 (1998) 353-356.  
 201 Vela, J., Membrado, L., Cebolla, V.L. and Ferrando, A.: Suitability of thin-layer chromatography-flame ionization detection with regard to quantitative characterization of different fossil fuel products. II. Calibration methods concerning quantitative hydrocarbon-group type analysis. *J. Chromatogr. Sci.*, 36 (1998) 487-494.

3e. *Preparative scale chromatography*

See 287, 288, 289.

## 4. SPECIAL TECHNIQUES

4b. *Computerization and modelling*

See 195.

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

202 Anderson, R.M. and Busch, K.L.: Thin-layer chromatography coupled with mass spectrometry: Interfaces to electrospray ionization. *J. Planar Chromatogr.*, 11 (1998) 336-341.

203 Oka, N.: (Thin layer chromatography/fast atom bombardment mass spectrometry). In: Harada, K and Oka, H. (Editors), *LC/MS*, Kodansha, Tokyo, 1996, pp. 87-100; C.A., 130 (1999) 46842 - a review with 24 refs.

204 Wang, Y., Zi, F. and Yu, B.: (In situ thin layer chromatography combined with surface-enhanced near infrared Fourier transform Raman spectroscopy for the analysis of hyoscine scopolamine). *Fenxi Huaxue*, 26 (1998) 1406; C.A., 130 (1999) 43451.

205 Wilson, I.D. and Morden, W.: Practical applications of TLC and HPTLC-MS/MS. *LC-GC Int.*, 12 (1999) 72-80.

See also 259.

4d. *Affinity chromatography (advances)*

See 322.

4f. *Trace analysis and preseparation techniques*

206 Berezkin, V.G., Mardanov, R.G., Dedkov, Y.M., Radugina, O.G. and Kelina, S.Yu.: A planar chromatographic method for pre-concentration of impurities of low volatility by thermal desorption of the volatile main component. *J. Planar Chromatogr.*, 11 (1998) 457-459.

4g. *Enantiomers, separation*

207 Huang, M., Sun, J., Li, G., Yang, G., Yi, H., Gao, Z., Wang, J. Wang, J. and Li, S.: (Influence of temperature on separation of enantiomers on the microcrystalline cellulose triacetate column and thin-layer plate). *Shandong Daxue Xuebao, Ziran Kexueban*, 33 (1998) 293-297; C.A., 130 (1999) 32464.

See also 254.

4h. *Other special techniques*

208 Malinowska, I. and Rozylo, J.K.: Planar electrochromatography on silica and alumina. *J. Planar Chromatogr.*, 11 (1998) 411-416.

209 Mazurek, M. and Witkiewicz, Z.: Rotation planar chromatography. *Chem. Anal. (Warsaw)*, 43 (1998) 529-546; C.A., 130 (1999) 1860 - a review with 75 refs.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. *Aliphatic hydrocarbons*

210 Scheller, U., Zimmer, T., Becher, D., Schauer, F. and Schunck, W.-H.: Oxygenation cascade in conversion of *n*-alkanes to  $\alpha,\omega$ -diodic acids catalyzed by cytochrome P450 52A3. *J. Biol. Chem.*, 273 (1998) 32528-32534.

5b. *Cyclic hydrocarbons, fullerenes*

211 Feichtner, S., Pfeifer, P. and Schneider, H.: PAH in the black of candles? An identification method for school and instruction. *GIT Spez Chromatogr.*, 18 (1998) 92-97; C.A., 129 (1998) 259921y.

212 Kurbatova, S.V., Arutyunov, Yu.I., Moiseev, I.K. and Kudryashov, S.Yu.: (Characteristics of the chromatographic retention and efficiency of separation of some adamantine derivatives.) *Zh. Fiz. Khim.*, 72 (1998) 1485-1489; C.A., 130 (1999) 46907.

See also 199, 201, 208.

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

See 317.

## 7. PHENOLS

213 Bladek, J., Rostokowski, A. and Neffe, S.: The application of TLC to the determination of phenol residues in water. *J. Planar Chromatogr.*, 11 (1998) 330-335.

See also 186, 197, 227, 252, 307.

## 8. SUBSTANCES CONTAINING HETERO CYCLIC OXYGEN

8a. *Flavonoids*

214 El Bayoumi, A.: Modified H-point standard addition method and logarithmic function for the spectrophotometric and spectrodensitometric determination of hesperidin and diosmin in mixtures. *Anal. Lett.*, 32 (1999) 383-400.

215 Liu, J., Lou, L. and Wu, Q.: (Effect of enhancers of the baicalin transdermal therapeutic system). *Zhongguo Yaoxue Zazhi (Beijing)*, 32, No. 10 (1997) 598-600; C.A., 129 (1998) 153086q.

216 Petruczynik, A. and Bieganowska, M.L.: Retention parameters of coumarins and flavonoids of Florisil and silica layers. Part II. *J. Planar Chromatogr.*, 11 (1998) 267-271; C.A., 130 (1999) 46868.

See also 300, 306, 307.

8b. *Aflatoxins and other mycotoxins*

- 217 Domagala, J. and Kisza, J.: The method for determination of aflatoxin precursors in milk. *Pol. J. Food Nutr. Sci.*, 7 (1998) 117-123; C.A., 129 (1998) 160753h.
- 218 Milanez, T.V., Atui, M.B. and Lazzari, F.A.: (Comparison between immunoassay and thin-layer chromatography for the determination of aflatoxins, ochratoxin A and zearalenone in corn and corn meal). *Rev. Inst. Adolfo Lutz*, 67 (1998) 65-71; C.A., 129 (1998) 215843v.
- 219 Otta, K.H., Papp, E., Mincsovics, E. and Záray, Gy.: Determination of aflatoxins in corn by use of the personal OPLC basic system. *J. Planar Chromatogr.*, 11 (1998) 370-373.

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

- 220 Rischer, M., Adamczyk, M., Ratz, H., Hose, S., Marchesan, M., Paper, D.H., Franz, G., Wolf-Heuss, E. and Engel, J.: Quantitative determination of the iridoid glycosides aucubin and catalpol in *Plantago lanceolata* L. extracts by HPTLC and HPLC. *J. Planar Chromatogr.*, 11 (1998) 374-378.

See also 216, 300.

## 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 221 Siembida, R., Rozylo, T.K. and Jamrozek-Manko, A.: Aspects of the exact quantitative determination of formaldehyde in tooth tissue by TLC. *J. Planar Chromatogr.*, 11 (1998) 417-420.

## 10. CARBOHYDRATES

10a. *Mono and oligosaccharides. Structural studies*

- 222 Soczewinski, E., Wojciak, M. and Pachowicz, K.: Rapid thin layer chromatographic systems for the analysis of sugars. *Chem. Anal. (Warsaw)*, 43 (1998) 823-827; C.A., 129 (1998) 327828a.

See also 265, 275.

10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*

- 223 Jiang, R., Kuang, Y. and Wu, S.: (Isolation of immunoactive polysaccharide of lily and its components). *Disi Juhyi Daxue Xuebao*, 19 (1998) 188; C.A., 129 (1998) 265229v.

See also 224, 231.

10c. *Glycoproteins and their constituents*

- 224 Johansson, L., Johansson, P. and Miller-Podraza, H.: Detection of the lectins from *Mackia amurensis* and *Sambucus nigra* of 3- and 6-linked sialic acid in gangliosides with neolacto chains separated on thin layer chromatograms and blotted to PVDF membranes. *Anal. Biochem.*, 267 (1999) 239-241.

## 11. ORGANIC ACIDS AND LIPIDS

11a. *Organic acids and simple esters*

- 225 Clejan, S.: Analytical methods and steps to sample preparation for determination of molecular species of fatty acids. *Methods Mol. Biol. (Totowa)*, 105(Phospholipid Signaling Protocols) (1998) 243-253; C.A., 129 (1998) 146410n.
- 226 Robinson, B.S., Hill, C.S.T. and Ferrante, A.: Activation of phospholipase A<sub>2</sub> in human neutrophils by polyunsaturated fatty acids and its role in stimulation of superoxide production. *Biochem. J.*, 336 (1998) 611-617.
- 227 Smolarz, H.D. and Nowak, R.: Thin-layer chromatography of phenolic acids and their derivatives less common in plants. *Acta Pol. Pharm.*, 55 (1998) 239-242; C.A., 130 (1999) 35180.

See also 300.

11c. *Lipids and their constituents*

- 228 Hamasaki, H., Aoyagi, M., Kasama, T., Handa, S., Hirakawa, K. and Taki, T.: GT1b in human metastatic brain tumors: GT1b as a brain metastases-associated ganglioside. *Biochim. Biophys. Acta*, 1437 (1999) 93-99.
- 229 Hugosson, S., Ångström, J., Olsson, B.-M., Bergström, J., Fredlund, H., Olcen, P. and Teneberg, S.: Glycosphingolipid binding specificities of *Neisseria meningitidis* and *Haemophilus influenzae*: detection, isolation, and characterization of a binding-active glycosphingolipid from human oropharyngeal epithelium. *J. Biochem. (Tokyo)*, 124 (1998) 1138-1152.
- 230 Ivanova, A., Momchilova, S., Stefanov, K. and Yordanov, I.: Gas chromatography and silver ion thin-layer chromatography for the analysis of phospholipid changes in thylakoid membranes from bean leaves. *Dokl. Bulg. Akad. Nauk.*, 50 (1997) 79-82; C.A., 130 (1999) 1878.
- 231 Johansson, L. and Miller-Podraza, H.: Analysis of 3- and 6-linked sialyl acids in mixtures of gangliosides using blotting to polyvinylidene difluoride membranes, binding assays, and various mass spectrometry techniques with application to recognition by *Helicobacter pylori*. *Anal. Biochem.*, 265 (1998) 260-268.
- 232 Kim, Y.H., Choi, J.-S., Yoo, J.S., Park, Y.-M. and Kim, M.S.: Structural identification of glycerolipid molecular species isolated from cyanobacterium *Synechocystis* sp. PCC 6803 using fast atom bombardment tandem mass spectrometry. *Anal. Biochem.*, 267 (1999) 260-270.
- 233 Morii, H., Yagi, H., Akutsu, H., Nomura, N., Sako, Y. and Koga, Y.: A novel phosphoglycolipid archaetidyl(glucosyl)inositol with two sesterterpanyl chains from the aerobic hyperthermophilic archaeon *Aeropyrum pernix* K1. *Biochim. Biophys. Acta*, 1436 (1999) 426-436.
- 234 Muthing, J.: TLC in structure and recognition studies of glycosphingolipids. *Methods Mol. Biol. (Totowa)*, 76(Glycoanalysis Protocols) (1998) 183-195; C.A., 129 (1998) 146420r.
- 235 Nzai, J.M. and Proctor, A.: Phospholipids determination in vegetable oil by thin-layer chromatography and imaging densitometry. *Food Chem.*, 63 (1998) 571-576; C.A., 130 (1999) 3159.

- 236 Reggiori, G. and Conzelmann, A.: Biosynthesis of inositol phosphoceramides and remodeling of glycosylphosphatidylinositol anchors in *Saccharomyces cerevisiae* are mediated by different enzymes. *J. Biol. Chem.*, 273 (1998) 30550-30559.
- 237 Saeki, Y., Seya, T., Hazeki, K., Uti, M., Hazeki, O. and Akedo, H.: Involvement of phosphoinositide 3-kinase in regulation of adhesive activity of highly metastatic hepatoma cells. *J. Biochem. (Tokyo)*, 124 (1998) 1020-1025.
- 238 Salman, M., Lonsdale, J.T., Besra, G.S. and Brennan, P.J.: Phosphatidylinositol synthesis in mycobacteria. *Biochim. Biophys. Acta*, 1436 (1999) 437-450.
- 239 Sietsma, H., Nijhof, W., Dontje, B., Vellenga, E., Kamps, W.A. and Kok, J.W.: Inhibition of hemopoiesis *in vitro* by neuroblastoma-derived gangliosides. *Cancer Res.*, 58 (1998) 4840-4844.
- 240 Tyagi, R.K., Azrad, A., Degani, H. and Solomon, Y.: Stimulation of fructose 1,6-bisphosphate production in melanoma cells of  $\alpha$ -melanocyte-stimulating hormone  $^{31}\text{P}/^{13}\text{C}$ -NMR and  $^{32}\text{P}$ -labeling studies. *Eur. J. Biochem.*, 258 (1998) 68-77.
- 241 Uehara, T., Tokumitsu, Y. and Nomura, Y.: Pertussis toxin-sensitive and insensitive intracellular signalling pathways in undifferentiated 3T3-L1 cells stimulated by insulin converge with phosphatidylinositol 3-kinase upstream of the Ras mitogen-activated protein kinase cascade. *Eur. J. Biochem.*, 259 (1999) 801-808.

See also 224.

### 13. STEROIDS

#### 13c. Estrogens

- 242 Wiszkidenszky, A., Mahó, S., Végh, Z. and Ferenczi-Fodor, K.: Validated, stability-indicating semiquantitative purity test for alylestrenol drug substance and tablet by personal OPLC. *J. Planar Chromatogr.*, 11 (1998) 463-466.

#### 13d. Sterols

- 243 Barrero, A.F., Oltra, J.E., Poyatos, J.A., Jimenez, D. and Oliver, E.: Phycomysterols and other sterols from the fungus *Phycomyces blakesleeanus*. *J. Natural Prod.*, 61 (1998) 1491-1496.

#### 13e. Bile acids and alcohols

- 244 Dax, C.I. and Müllner, S.: Convenient and optimized method for sample pre-treatment for the analysis of bile acids in biological matrices. *Chromatographia*, 48 (1998) 681-689.

### 14. STEROID GLYCOSIDES AND SAPONINS

- 245 Cauhan, S.K., Singh, B.P., Kimothi, G.P. and Agarwal, S.: Determination of glycyrrhizin in *Glycyrrhiza glabra* and its extract by HPTLC. *Indian J. Pharm. Sci.*, 60 (1998) 251-252; C.A., 129 (1998) 265518p.
- 246 Qiu, X. and Cao, Y.: (Quantitative determination of ginsenoside Rg1 in YiqiHuiyang injection by TLC). *Yaowu Fenxi Zazhi*, 18 (1998) 92-94; C.A., 129 (1998) 153300e.

See also 309.

### 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

#### 15a. Terpenes

- 247 Fragoso-Serrano, M., Gonzalez-Chimeo, E. and Pereda-Miranda, R.: Novel labdane diterpenes from the insecticidal plant *Hyptis spicigera*. *J. Natural Prod.*, 62 (1999) 45-50.
- 248 Hefner, J., Ketchum, R.E.B. and Croteau, R.: Cloning and functional expression of a cDNA encoding geranylgeranyl diphosphate synthase from *Taxus canadensis* and assessment of the role of this prenyltransferase in cells induced for taxol production. *Arch. Biochem. Biophys.*, 360 (1998) 62-74.
- 249 Zjawiony, J.K., Bartyzel, P. and Hamann, M.T.: Chemistry of puupehenone: 1,6-conjugate addition to its quinone-methide system. *J. Natural Prod.*, 61 (1998) 1502-1508.

#### 15b. Essential oils

See 316.

#### 15c. Bitter substances

- 250 Galal, A.M., Ahmad, M.S., El-Feraly, F.S. and McPhail, A.T.: New products from the reactions of artemisin with ammonia and amines. *J. Natural Prod.*, 62 (1999) 54-58.

### 16. NITRO AND NITROSO COMPOUNDS

See 288, 289.

### 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

#### 17a. Amines and polyamines

- 251 Singh, D.K., Kumar, R. and Misra, R.: Thin layer chromatography of primary aromatic amines on zirconium molybdate-phosphate-silica gel G. *J. Indian Chem. Soc.*, 75 (1998) 269-270; C.A., 129 (1998) 269722y.
- 252 Waksmundzka-Hajonos, M. and Hawryl, A.: Comparison of the retention of phenols, aniline derivatives, and quinoline bases in normal-phase TLC with binary isoeluotropic eluents. *J. Planar Chromatogr.*, 11 (1998) 283-294; C.A., 120 (1999) 45870.

See also 189, 272, 315.

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

See 190, 249, 319.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. *Amino acids and their derivatives*

- 253 Cartwright, J.L. and McLennan, A.G.: Formation of a covalent N<sup>2</sup>-guanylylhistidyl reaction intermediate by the GTP:GTP guanylyltransferase from the brine shrimp *Artemia*. *Arch. Biochem. Biophys.*, 361 (1999) 101-105.
- 254 Darula, Z., Török, G., Wittmann, G., Mannekens, E., Iterbeke, K., Tóthi, G., Tourwé, D. and Péter, A.: A rapid, qualitative thin-layer chromatographic method for the separation of the enantiomers of unusual aromatic amino acids. *J. Planar Chromatogr.*, 11 (1998) 346-349.
- 255 Heesom, K.J., Avison, M.B., Diggle, T.A. and Denton, R.M.: Insulin-stimulated kinase from rat fat cells that phosphorylates initiation factor 4E-binding protein 1 on the rapamycin-insensitive site (serine-111). *Biochem. J.*, 336 (1998) 39-48.
- 256 Hodisan, T., Culea, M., Cimpoiu, C. and Cot, A.: (Study of free amino acids from plant extracts. II. Separation, identification, and determination of free amino acids from *Fagus sylvatica* by liquid chromatography (LC) and gas chromatography (GC)). *Rev. Chim. (Bucharest)*, 49 (1998) 393-397; C.A., 129 (1998) 235468e.
- 257 Pytowski, B., Hicklin, D.J., Kornhaber, G., Dellaratta, D.V. and Witte, L.: Identification and initial characterization of mSLK, a murine member of the Ste20 family of kinases. *Arch. Biochem. Biophys.*, 359 (1998) 310-319.
- 258 Tanimoto, T., Maekawa, K., Okada, S., Watanabe, N., Jingao, M. and Meguro, Y.: (Purity test of L-threonine in the Japanese Pharmacopoeia by thin-layer chromatography). *Iyakuhin Kenkyu*, 29 (1998) 284-289; C.A., 129 (1998) 166279e.
- 259 Wang, Y., Yu, B., Wang, T., Zhang, X. and Xu, Z.: (*In situ* thin layer chromatography-Fourier transform-surface-enhanced Raman scattering spectroscopy of amino acids). *Fenxi Huaxue*, 26 (1998) 1047-1051; C.A., 129 (1998) 297709t.
- 260 Yuesong, W., Leming, L. and Jun, Z.: Prediction of the thin-layer chromatographic retention of amino acids. *J. Planar Chromatogr.*, 11 (1998) 300-304; C.A., 130 (1999) 46871.

See also 292.

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

- 261 Chan, A.K., Persad, S., Litchfield, D.W. and Wright, J.A.: Ribonucleotide reductase R2 protein is phosphorylated at serine-20 by P34<sup>cdc2</sup> kinase. *Biochim. Biophys. Acta*, 1448 (1999) 363-371.
- 262 Pelander, A., Ojanperä, E. and Vuori, E.: Analysis of cyanobacterial heptatoxins by overpressured layer chromatography. *J. Planar Chromatogr.*, 11 (1998) 365-369.

19. PROTEINS

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

- 263 Kit, Yu.Ya., Shipitsin, M.V., Semenov, D.V., Richter, V.A. and Nevinsky, G.A.: (Phosphorylation of lipids tightly bound to the secretory immunoglobulin in the antibody preparations from human breast milk possessing protein kinase activity). *Biokhimiya (Moscow)*, 63 (1998) 852-858.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

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

- 264 Parker, G.J., Loijens, J.C. and Anderson, R.A.: Detection of phosphatidylinositol-4-phosphate 5-kinase activity using thin-layer chromatography. *Methods Mol. Biol. (Totowa)*, 105(Phospholipid Signaling Protocols) (1998) 127-139; C.A., 129 (1998) 158245a.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

- 265 Mengeling, B.J. and Turco, S.J.: A high-yield, enzymatic synthesis of GDP-D-[<sup>3</sup>H]arabinose and GDP-L-[<sup>3</sup>H]fucose. *Anal. Biochem.*, 267 (1999) 227-233.
- 266 Sasaki, T., Maehama, T., Yamamoto, T., Takasuga, S., Hoshino, S.-i., Nishina, H., Hazeki, O. and Katada, T.: Activation of c-Jun N-terminal kinase (JNK) by lysophosphatidic acid in Swiss 3T3 fibroblasts. *J. Biochem. (Tokyo)*, 124 (1998) 934-939.
- 267 Zhao, C., Kumar, R. and Hemminki, K.: Measurement of 7-methyl- and 7-(2-hydroxyethyl)guanine DNA adducts in white blood cells of smokers and non-smokers. *Biomarkers*, 3 (1998) 327-334; C.A., 129 (1998) 226703a.

See also 287, 288, 289.

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

See 267.

22. ALKALOIDS

- 268 Chauhan, S.K., Singh, A.P. and Agrawal, S.: Development of HPTLC method for the estimation of colchicine in different parts of *Gloriosa superba*. *Indian Drugs*, 35 (1998) 266-268; C.A., 129 (1998) 186259b.
- 269 Le Hoang, M.D., Sarbach, C., Prognon, P., Delvordre, P., Mignot, A. and Pradeau, D.: Stability of morphine hydrochloride solutions in portable single-use PCA systems. *J. Pharm. Clin.*, 17 (1998) 35-39; C.A., 129 (1998) 153113w.

See also 204.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23d. *Pyridine derivatives*

See 189, 190.

23e. *Other N-heterocyclic compounds*

- 270 Kepczynska, E., Bojarski, J. and Bojarski, A.J.: Determination of hydrophobicity of some N-alkyl derivatives of 1,2,3,4-tetrahydroisoquinoline by reversed-phase thin-layer chromatography. *Chem. Anal. (Warsaw)*, 43 (1998) 575-582; C.A., 130 (1999) 152.
- 271 Waksmundzka-Hajnos, M., Hawryl, M. and Hawryl, A.: Selectivity of separation of heterocyclic bases in normal phase chromatographic systems. *Chem. Anal. (Warsaw)*, 43 (1998) 561-574; C.A., 129 (1998) 297703m.

See also 252.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 272 Rozyla, J.K., Janicka, M., Zabinska, A. and Niewiadomy, A.: The influence of chromatographic system properties on the retention of organic solutes. *J. Planar Chromatogr.*, 11 (1998) 433-437.

See also 192.

## 25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 273 Kotynski, A., Kudzin, Z.H., Ciesielski, W. and Drabowicz, J.: Unusual induction in the iodine-azide induced reaction exhibited by organophosphorus compounds on thin-layer chromatography plates. *J. Chromatogr. A*, 831 (1999) 321-324.
- 274 Popiel, S., Witkiewicz, Z., Kapala, A. and Kwasny, M.: Thin-layer chromatography and enzymic analysis of phosphororganic compounds using 4-methylumbellifrone esters. *Chem. Anal. (Warsaw)*, 43 (1998) 733-742; C.A., 129 (1998) 327022h.
- 275 Wallis, G.L.F., Hemming, F.W. and Peberdy, J.F.: Investigation of the glycosyltransferase enzymes involved in the initial stages of the N-linked protein glycosylation pathway in *Aspergillus niger*. *Biochim. Biophys. Acta*, 1426 (1999) 91-98.

See also 240, 253, 257, 261, 264, 266.

## 28. ANTIBIOTICS

- 276 Liang, Y., Denton, M.B. and Bates, R.B.: Stability studies of tetracycline in methanol solution. *J. Chromatogr. A*, 827 (1998) 45-55.
- 277 Song, G., Yu, L., Wang, P., Zhou, Y. and Liang, H.: (Quantitative determination of related substances in ofloxacin injection by TLC). *Shenyang Yaode Daxue Xuebao*, 15 (1998) 65-67; C.A., 129 (1998) 193788b.

- 278 Tyaglov, B.V., Kuznetsov, E.V., Sizova, I.A. and Evenigorodskii, V.I.: (Application of chromatography technique for quantitative determination of moenomycin antibiotics in culture media). *Biotehnologiya*, No. 6 (1996) 50-54; C.A., 129 (1998) 287419j.

- 279 Zhang, Q., Zhang, Zh. and Tian, H.: (Determination of the residues of tetracycline antibiotics in honey by thin-layer chromatography). *Fenxi Ceshi Xuebao*, 17 (1998) 54-56; C.A., 130 (1999) 24190.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. *General techniques*

- 280 Huang, Zh. and Yao, H.: (Pesticide residues in fruits at market). *Nongyao Kexue Yu Guanli*, 19 (1998) 9-10; C.A., 130 (1999) 37470.

See also 200.

29b. *Chlorinated insecticides*

- 281 Babic, S., Petrovic, M. and Kastelan-Macan, M.: (Optimization of chromatographic separation of pesticides). *Kem. Ind.*, 47 (1998) 275-279; C.A., 129 (1998) 291703q.

- 282 Stresser, D.M. and Kupfer, D.: Human cytochrome P450-catalyzed conversion to the proestrogenic pesticide methoxychlor into an estrogen. Role of CYP2C19 and CYP1A2 in O-demethylation. *Drug Metab. Disp.*, 26 (1998) 868-874.

29c. *Phosphorus insecticides*

See 281.

## 30. SYNTHETIC AND NATURAL DYES

30a. *Synthetic dyes*

See 193, 194, 206.

30b. *Chloroplast and other natural pigments*

- 283 Ueno, E., Ohno, T., Oshima, H., Saito, I., Ito, Y., Oka, H., Kagami, T., Kijima, H. and Okazaki, K.: (Identification of small amounts of coal tar dyes in foods by reversed-phase TLC/scanning densitometry with sample concentration techniques). *Shokuhin Eiseigaku Zasshi*, 39 (1998) 286-291; C.A., 129 (1998) 215896q.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 284 Suedee, R., Songkram, Ch., Petmoreekul, A., Sangkunakup, S., Sankasa, S. and Kongyarit, N.: Thin-layer chromatography using synthetic polymers imprinted with quinine as chiral stationary phase. *J. Planar Chromatogr.*, 11 (1998) 272-276; C.A., 130 (1999) 46869.

## 32. DRUG ANALYSIS

## 32a. Drug analysis, general techniques

See 205.

## 32b. Antirheumatics and antiinflammatory drugs

- 285 Forgács, E., Cserháti, T., Kaliszan, R., Haber, P. and Nasai, A.: Reversed-phase thin-layer chromatographic determination of the hydrophobicity parameters of nonsteroidal anti-inflammatory drugs. *J. Planar Chromatogr.*, 11 (1998) 383-387.
- 286 Piranianowicz-Chaber, E., Marszałek, D., Helbin, E. and Herold, F.: Qualitative and quantitative analysis of new piperazinylbutylpyridopyrimidinylidine derivatives. *Acta Pol. Pharm.*, 55 (1998) 193-195; *C.A.*, 129 (1998) 339314t.

## 32c. Autonomic and cardiovascular drugs

- 287 Görlitzer, K. and Heinrich, C.: Untersuchungen zur Stabilität von 2,4-Bisaryl-1,2,3,4-tetrahydropyrimidin-5-carbonsäure-estern. *Pharmazie*, 53 (1998) 847-853.
- 288 Görlitzer, K. and Heinrich, C.: Zur chemischen und photochemischen Stabilität von 2,4-Bisaryl-1,2,3,4-tetrahydropyrimidinen mit stellungsisomeren Nitrophenyl-Gruppen. *Pharmazie*, 53 (1998) 843-847.
- 289 Gorlitzer, K., Heinrich, C. and Ernst, L.: Zur Photochemie von cis-5-Acetyl-6-methyl-2,4-bis(2-nitrophenyl)-1,2,3,4-tetrahydropyrimidin. *Pharmazie*, 53 (1998) 766-771.
- 290 Kelani, K.: Simultaneous determination of anphazoline hydrochloride and chlorpheniramine maleate by derivative spectrophotometry and by densitometry. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1128-1134.
- 291 Szikszay, Z., Végh, Z. and Ferenczi-Fodor, K.: Quantitative purity test for phthaloyl-amldipine by personal OPLC. *J. Planar Chromatogr.*, 11 (1998) 428-432.

## 32d. Central nervous system drugs

- 292 Costantini, A. and Paoli, F.: Melatonin: quantitative analysis in pharmaceutical oral dosage forms using thin-layer chromatography (TLC) densitometry. *Farmaco*, 53 (1998) 443-447; *C.A.*, 129 (1998) 221251s.
- 293 Klebovich, I., Mincsovics, E., Szúnyog, J., Ludányi, K., Karancsi, T., Ujczászy, K., Kiss, B.D. and Vékey, K.: Isolation and identification of metabolites of <sup>3</sup>H- and <sup>14</sup>C-deramciclane by OPLC-digital autoradiography on-line sample collection and mass spectrometry. *J. Planar Chromatogr.*, 11 (1998) 394-399.
- 294 Zhang, Y. and Liu, Y.: (Simultaneous determination of 10 psychosedatives in serum by TLC scanning). *Zhongguo Yaoxue Zazhi (Beijing)*, 33 (1998) 165-167; *C.A.*, 129 (1998) 287498k.

See also 290.

## 32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 295 Agbaba, D., Djurkovic, M., Brboric, J. and Zivanov-Stakic, D.: Simultaneous HPTLC determination of metronidazole and its impurity 2-methyl-5-nitroimidazole in pharmaceuticals. *J. Planar Chromatogr.*, 11 (1998) 447-449.

- 296 Bharath, S. and Hiremath, S.R.R.: Ocular delivery systems of pefloxacin mesylate. *Pharmazie*, 54 (1999) 55-58.

## 32g. Other drug categories

- 297 Chyla, A. and Zelazowska, E.: Analytical studies of contrast media. Part I. Thin-layer chromatography and high performance liquid chromatography studies. *Acta Pol. Pharm.*, 55 (1998) 173-178; *C.A.*, 130 (1999) 22414.

See also 192.

## 32h. Toxicological and forensic applications

- 298 Degterev, E.V., Gaevskii, A.V. and Zenkova, E.A.: (Use of thin-layer chromatography in the analysis of narcotic and hard drugs). *Khim.-Farm.Zh.*, 32 (1998) 48-54; *C.A.*, 130 (1999) 29292 - a review with 28 refs.
- 299 Mazurek, M., Adamczyk, G. and Witkiewicz, Z.: (Analysis of irritant and necrotic compounds by thin-layer chromatography on bonded phases). *Biuł. Wojsk. Akad. Tech.*, 47 (1998) 89-100; *C.A.*, 130 (1999) 34077.

## 32i. Plant extracts

- 300 Cisowski, W., Dembinska-Migas, W., Krauze-Baranowska, M., Luczkiewicz, M., Migas, P., Matysik, G. and Soczewinski, E.: Application of planar chromatography to the analysis of secondary metabolites in Callus cultures of different plant species. *J. Planar Chromatogr.*, 11 (1998) 441-446.
- 301 Hahn-Deinstrop, E. and Koch, A.: (*Ginkgo biloba* trains the brain). *Bioforum*, 21 (1998) 428-434; *C.A.*, 129 (1998) 193555y - a review without refs.
- 302 Hahn-Deinstrop, E., Koch, A. and Müller, M.: Guidelines for the assessment of the traditional herbal medicine "Olibanum" by application of HPTLC and DESAGA ProViDoc video documentation. *J. Planar Chromatogr.*, 11 (1998) 404-410.
- 303 He, Y., Che, X. and Xu, Y.: (Quantitative analysis of astragaloside IV in TongmaiJiangTang granules by TLC). *Huaxi Yaoxue Zazhi*, 13, No. 1 (1998) 57-58; *C.A.*, 129 (1998) 207263r.
- 304 Li, H., Wang, B. and Pang, Z.: (Determination of shikonin content with thin layer chromatography-chemiluminescence). *Fenxi Huaxue*, 26 (1998) 1282; *C.A.*, 129 (1998) 347370y.
- 305 Li, H., Zhu, Y., Chen, X., Su, W. and Liao, H.: (Determination of astragaloside in YuPinFeng granules). *Guangdong Yaoxueyuan Xuebao*, 14, No. 1 (1998) 7-9; *C.A.*, 129 (1998) 207262q.
- 306 Li, Y. and Lu, H.: (TLC differentiation of Bushengzhuanggu capsules). *Guangdong Yaoxueyuan Xuebao*, 14 (1998) 128-130; *C.A.*, 129 (1998) 293959b.
- 307 Males, Z. and Medic-Saric, M.: Optimization of thin-layer chromatographic analysis of flavonoids and phenolic acids of *Salviae folium*. *Acta Pharm. (Zagreb)*, 48 (1998) 85-92; *C.A.*, 129 (1998) 250253z.
- 308 Olah, N.-K., Muresan, L., Cimpan, G. and Gocan, S.: Normal-phase high-performance thin-layer chromatography and automated multiple development of hydroalcoholic extracts of *Artemisia abrotanum*, *Artemisia absinthium*, *Artemisia vulgaris*, and *Artemisia cina*. *J. Planar Chromatogr.*, 11 (1998) 361-364.

- 309 Vyshochina, G.I.: (Quantitative determination of erychroside and total sum of cardenolides in the aerial parts of *Erysimum cheiranthoides* L. by the TLC method). *Rastit. Resur.*, 34, No. 1 (1998) 105-110; C.A., 129 (1998) 227605g.
- 310 Wang, Anxun and Yao, Zonglin: (Identification of *Radix panax quinquefolium* preparation by TLC and TLCD). *Huaxi Yaoxue Zazhi*, 13, No. 1 (1998) 55-56; C.A., 129 (1998) 235702b.
- 311 Wang, S., He, H. and Fan, Y.: (TLC determination of schisandrin B in WuLin capsules). *Disi Junyi Daxue Xuebao*, 19 (1998) 478-479; C.A., 129 (1998) 347357z.
- 312 Xhen, H., Xu, A. and Wang, X.: (TLC identification of atroctyline in granule preparations). *Hebei Yide Daxue Xuebao*, 19, No. 1 (1998) C3; C.A., 129 (1998) 235710c.
- 313 Yang, X. and Lu, H.: (Study on quality control methods for ErKanNing syrup). *Huaxi Yaoxue Zazhi*, 13, No. 1 (1998) 49-50; C.A., 129 (1998) 235701a.
- 314 Yu, J., Lei, J., Fu, X. and Luo, S.: (Study on drug control method of TongMai Instant). *Guangdong Yaoxueyuan Xuebao*, 14, No. 1 (1998) 41-44; C.A., 129 (1998) 235711d.
- 315 Zhang, Y.: (Determination of chlorphenamine maleate in Xiao-jieling granules by TLC scanning). *Zhongguo Yiyuan Zazhi*, 18 (1998) 319-320; C.A., 129 (1998) 347364z.
- 316 Zhou, W., Liu, W. and An, D.: (Selection of the optimum solvent system for thin layer chromatography of *Agastache rugosus* volatile oil with the aid of a computer). *Zhongguo Yaoke Daxue Xuebao*, 29 (1998) 201-204; C.A., 129 (1998) 235697d.
- See also 197, 215, 245, 256.
- 34. FOOD ANALYSIS**
- 34b. *Complex mixtures (single compounds by cross-reference only)*
- See 283.
- 35. ENVIRONMENTAL ANALYSIS**
- 35c. *Water pollution (complex mixtures; single compounds by cross-reference only)*
- See 213.
- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*
- 317 Reimers, C., Schmidt, B., Stegmann, R. and Rainer, F.: Application of thin-layer chromatography in soils for the determination of the mineral oil content. *Umweltwiss. Schadst.-Forsch.*, 10 (1998) 200-204; C.A., 129 (1998) 235152x.
- 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES**
- 36a. *Surfactants*
- 318 Ishino, F. and Shinoda, N.: (A simple determination method of anionic surfactants and its application to teaching materials). *Kagaku to Kyoiku*, 46 (1998) 588-591; C.A., 129 (1998) 232332v.
- 319 Li, Q., Zhou, S. and Ji, H.: (Determinationation of phosphatidyl-choline of pulmonary surfactant by thin layer chromatography). *Zhongguo Shenghua Yaowu Zazhi*, 19 (1998) 127-128; C.A., 129 (1998) 341342u.
- 36c. *Complex mixtures, technical products and unidentified compounds*
- 320 Deelchand, J.-P., Naqvi, Z., Dubau, C., Shearman, J., Lazaro, M.-J., Herod, A.A., Read, H. and Kandiyoti, R.: Planar chromatographic separation of petroleum residues and coal-derived liquids. *J. Chromatogr. A*, 830 (1999) 397-414.
- 321 Sperline, R.P., Song, Y., Ma, E. and Freiser, H.: Organic constituents of cruds in Cu solvent extraction circuits. II. Photochemical and acid hydrolytic reactions of alkaryl hydroxyoxime reagents. *Hydrometallurgy*, 50, No. 1 (1998) 23-38; C.A., 129 (1998) 318954.
- 37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES**
- 322 Paek, S.-H., Lee, C.-W., Yook, S.-H., Kwon, O.-H. and Park, Y.-N.: Performance control strategies of one-step immuno-chromatographic assay system for *Salmonella typhimurium*. *Anal. Lett.*, 32 (1999) 335-360.
- 38. INORGANIC COMPOUNDS**
- 38a. *Cations*
- 323 Mancini, M.A.D., Zuanon, N.J. and Vallado, D.M.S.: (Determination of ferrous ion in pharmaceutical preparations through planar chromatography and spectrophotometry). *Ecletica Quim.*, 22 (1997) 133-145; C.A., 129 (1998) 153315p.
- 324 Schubert, G., Alar, V., Zivko-Babic, J. and Turina, S.: Determination of chromium and nickel in high-alloy steel by thin-layer chromatography with anodic sampling. *J. Planar Chromatogr.*, 11 (1998) 460-462.
- 325 Sharma, S.D., Misra, S. and Agarwal, A.: Planar chromatography of d-block metal ions on stannic phosphate silicate layers in buffered EDTA solutions: quantitative separation of zirconium from other metal ions. *J. Indian Chem. Soc.*, 75 (1998) 410-412; C.A., 129 (1998) 239191g.

## Gel Electrophoresis

### 1. REVIEWS AND BOOKS

- 708 Hochstrasser, D.F.: Proteome in perspective. *Clin. Chem. Lab. Med.*, 36 (1998) 825-836.  
 709 Levy, D.E.: Analysis of interferon-regulated proteins binding the interferon- $\alpha$ -stimulated response element. *Methods (Orlando)*, 15 (1998) 167-174; C.A., 129 (1998) 312922c - a review with 43 refs.

See also 710, 726, 734, 737, 755, 757, 801, 804, 808, 823, 824, 825, 970, 996, 1051, 1149, 1173, 1191, 1204, 1301, 1368.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 710 Chen, I. and Mort, J.: Electrophoresis in liquid development of electrophotographic images. *Proc. SPIE-Int. Soc. Opt. Eng.*, 3422 (1988) 16-26; C.A., 129 (1998) 209213y - a review with 24 refs.  
 711 Semenov, S.N.: Correlation analysis of fluctuations and continuous observation of electrophoresis. *Anal. Commun.*, 35 (1998) 301-305; C.A., 129 (1998) 269563x.  
 712 Soutar, A.K. and Wade, D.P.: Ligand blotting. In: Creighton, T.E. (Editor), *Protein Funct.* (2nd Ed.), IRL Press, Oxford, 1997, pp. 131-154; C.A., 129 (1998) 257300w.

See also 733.

#### 2b. Thermodynamics and theoretical relationships

- 713 Chanda, B. and Mathew, M.K.: Functional reconstitution of bacterially expressed human potassium channels in proteoliposomes: membrane potential measurements with JC-1 to assay ion channel activity. *Biochim. Biophys. Acta*, 1416 (1999) 92-100.

See also 1359.

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

- 714 Tinland, B., Pernodet, N. and Pluen, A.: Band broadening in gel electrophoresis: scaling laws for the dispersion coefficient measured by FRAP. *Biopolymers*, 46 (1998) 201-214; C.A., 129 (1998) 257219b.

See also 781, 848, 852, 1350.

### 3. GENERAL TECHNIQUES

#### 3a. Apparatus and accessories

- 715 De Boer, G.F. and Sova, O.: Separator for continuous flow isoelectric focusing for purifying biological substances. *PCT Int. Appl. WO 98 36,821* (Cl. B01D57/02), 27 Aug. 1998, Appl. 98/NL104, 20 Feb. 1998; 41 p.; C.A., 129 (1998) 232434e.  
 716 Harrington, M.G. and Packard, D.: Two dimensional electrophoresis apparatus. *U.S. US 5,837,116* (Cl. 204-606; G0127), 17 Nov. 1998, Appl. 691,001, 12 Jul. 1996; 11 p.; C.A., 129 (1998) 341432y.  
 717 Jacobson, J.M., Comiskey, B. and Albert, J.: Microencapsulated electrophoretic display material. *PCT Int. Appl. WO 98 41,899* (Cl. G02F1/167), 24 Sep. 1998, US Appl. 819,320, 18 Mar. 1997; 39 p.; C.A., 129 (1998) 268002b.  
 718 Lau, T.O., Steiner, U., Coates, E. and Acampora, T.S.: Gel casting and electrophoresis device. *PCT Int. Appl. WO 98 52,031* (Cl. G01N27/447), 19 Nov. 1998, US Appl. 46,349, 13 May 1997; 42 p.; C.A., 129 (1998) 341436c.  
 719 Monjo, Y., Kawakami, F. and Kawamura, Y.: Electrophoresis apparatus. *Jpn. Kokai Tokkyo Koho JP 10 282,055* [98 282,055] (Cl. G01N27/447), 23 Oct. 1998, Appl. 97/93,997, 11 Apr. 1997; 9 p.; C.A., 129 (1998) 341422v.  
 720 Monjo, Y., Kawakami, F. and Kawamura, Y.: Apparatus for preparation of gel for electrophoresis. *Jpn. Kokai Tokkyo Koho JP 10 288,598* [98 288,598] (Cl. G01N27/447), 27 Oct. 1998, Appl. 97/98,644, 16 Apr. 1997; 5 p.; C.A., 129 (1998) 341425y.  
 721 Sekiguchi, S.: Method and apparatus for recovering components separated by gel electrophoresis. *Jpn. Kokai Tokkyo Koho JP 10 282 056* [98 282,056] (Cl. G01N27/447), 23 Oct. 1998, App. 97/121,427, 4 Apr. 1997; 3 p.; C.A., 129 (1998) 341423w.  
 722 Silk, J.E.: Converting a scanner into a densitometer. *Am. Biotechnol. Lab.*, 16 (1998) 52; C.A., 129 (1998) 341336v.

See also 740, 1224.

#### 3b. Detectors and detection procedures

- 723 Chen, Q., Kobayashi, Y., Takeshita, H., Hoshi, T. and Anzai, J.: Avidin-biotin system-based enzyme multilayer membranes for biosensor applications. Optimization of loading of choline esterase and choline oxidase in the bioenzyme membrane acetylcholine biosensors. *Electroanalysis*, 10 (1998) 94-97; C.A., 129 (1998) 200046p.  
 724 Nemoto, R. and Mishina, Y.: (Fluorescent excitation light-injecting specimen cells). *Jpn. Kokai Tokkyo Koho JP 10 213,564* [98 213,564] (Cl. G01N27/447), 11 Aug. 1998, Appl. 97/31,105, 30 Jan. 1997; 6 pp.; C.A., 129 (1998) 222969u.  
 725 Yao, B., Xu, D. and Hou, X.: (Bacteriorhodopsin biomembrane photodetector). *Guangxue Xuebao*, 17 (1997) 1747-1751; C.A., 129 (1998) 199907m.

See also 743, 860, 966.

### 3c. Stabilization media for electrophoresis

- 726 Aizawa, K.: (Improvement of polyacrylamide gel media for electrophoresis. Enhancement of elasticity by polymer blending). *Tanpakushitsu Kakusan Koso*, 43 (1998) 2191-2198; C.A., 130 (1999) 12062 - a review with 35 refs.
- 727 Behrman, E.J. and Dean, D.H.: Sodium peroxydisulfate is a stable and cheap substitute for ammonium peroxydisulfate (persulfate) in polyacrylamide gel electrophoresis. *J. Chromatogr. B*, 723 (1999) 325-326.
- 728 Gustavsson, P.-E. and Larsson, P.-O.: Continuous superporous agarose beds for chromatography and electrophoresis. *J. Chromatogr. A*, 832 (1999) 29-39.

See also 718, 720.

### 3e. Preparative scale electrophoresis

- 729 Chen, N. and Chrambach, A.: Preparative application of commercial automated gel electrophoresis apparatus to subcellular-sized particles: Sequential isolations, fractions re-run, sodium dodecyl sulfate-polyacrylamide gel electrophoresis analysis, yield and purity. *Electrophoresis (Weinheim)*, 19 (1998) 3096-3102.
- 730 Weber, G. and Bocek, P.: Stability of continuous flow electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3094-3095.

See also 863, 888, 929.

### 3f. Programmed voltage and buffer gradients

- 731 Gejman, P.V., Cao, Q., Guedj, F. and Sommer, S.: The sensitivity of denaturing gradient gel electrophoresis: a blinded analysis. *Mutat. Res.*, 382 (1998) 109-114; C.A., 129 (1998) 226227y.

See also 763, 992.

## 4. SPECIAL TECHNIQUES

### 4a. Automation

See 796, 1244, 1257, 1335.

### 4b. Computerization and modelling

- 732 Wang, J., Liu, Z., Luo, J., Ding, F. and Yuan, N.: pH Value distribution model for multichannel flow electrophoresis. *Huagong Xuebao*, 49 (1998) 592-600; C.A., 129 (1998) 318212t.

See also 738, 937, 1207, 1257, 1275.

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

- 733 Zabreckz, J.R., Brown, E.K., Compton, B.J., Kretschmer, M.W., Fowler, E. and Bernardy, J.D.: Combining ELISA, RP-HPLC, and SDS-PAGE to define the potency of a complex biologic. *Pharm. Technol.*, 22 (1998) 36-45; C.A., 130 (1999) 17304.

See also 736, 796, 929, 967, 1360.

### 4d. Affinity electrophoresis

- 734 Shimura, K.: (Affinophoresis). *Seibutsu Butsuri Kagaku*, 42 (1998) 197-202; C.A., 129 (1998) 272438r - a review with 19 refs.

See also 996, 1049, 1244.

### 4e. Two dimensional databases

See 739, 799, 804, 809, 818, 855, 904, 926, 937, 947, 989.

### 4f. Isoelectric focusing

- 735 Hofmann, O., Che, D., Cruickshank, K.A. and Müller, U.R.: Adaptation of capillary isoelectric focusing to microchannels on a glass chip. *Anal. Chem.*, 71 (1999) 678-686.
- 736 Yang, L., Lee, C.S., Hofstadler, S.A. and Smith, R.D.: Characterization of microdialysis acidification for capillary isoelectric focusing - microelectrospray ionization mass spectrometry. *Anal. Chem.*, 70 (1998) 4945-4950.

See also 715, 904, 917.

### 4h. Two dimensional electrophoresis

- 737 Herbert, B.R., Sanchez, J.-C. and Bini, L.: Two-dimensional electrophoresis: the state of the art and future directions. In: Wilkins, M.R. (Editor), *Proteome Res.*, Springer, Berlin, 1997, pp. 13-33; C.A., 129 (1998) 213632b - a review with numerous refs.

- 738 Viguera, E., Rodriguez, A., Hernandez, P., Krimer, D.B., Trellez, O. and Schwartzman, J.B.: A computer model for the analysis of DNA replication intermediates by two-dimensional agarose gel electrophoresis. *Gene*, 217 (1998) 41-49; C.A., 130 (1999) 1148.

- 739 Yang, G.A.: Two-dimensional analysis of protein synthesis during meiotic maturation of bovine and human oocytes. In: Gomel, V. and Leung (Editors), *In Vitro Fert. Assisted Reprod. Proc. World Congr.*, P.C.K. Monduzzi, Bologna, 1997, pp. 349-352; C.A., 129 (1998) 242068c.

See also 716, 756, 762, 763, 767, 779, 797, 801, 807, 808, 813, 823, 824, 825, 849, 853, 866, 873, 877, 918, 929, 939, 944, 950, 973, 986, 988, 990, 991, 1147, 1154, 1197, 1201, 1243, 1256.

## 4i. Other special techniques

- 740 Day, N.M., Spanakis, E., Palamand, D., Weavind, G.P. and O'dell S.D.: Microplate-array diagonal-gel electrophoresis (MADGE) and melt-MADGE: tools for molecular-genetic epidemiology. *Trends Biotechnol.*, 16 (1998) 287-290; C.A., 129 (1998) 213759y.
- 741 Yang, T.H., Lee, C.J. and Chu, I.M.: A new approach to counteracting chromatographic electrophoresis. *Sep. Sci. Technol.*, 33 (1998) 1819-1831; C.A., 129 (1998) 272535v.

For additional information see C.A.:  
130 (1999) 22509, 43757.

See also 735, 1166.

## 10. CARBOHYDRATES

## 10a. Mono and oligosaccharides. Structural studies

- 742 Klein, A., Lebreton, A., Lemoine, J., Perini, J.-M., Roussel, P. and Michalski, J.-C.: Identification of urinary oligosaccharides by matrix-assisted laser desorption ionization time-of-flight mass spectrometry. *Clin. Chem. (Washington)*, 44 (1998) 2422-2428.
- 743 Westfall, D.A., Flores, R.R., Negrete, G.R., Martinez, A.O. and Haro, L.S.: High-resolution polyacrylamide gel electrophoresis of carbohydrates derivatized with a visible dye. *Anal. Biochem.*, 265 (1998) 232-237.

See also 1067.

## 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 744 Moriyama, T., Tozawa, T., Hirata, S. and Ikeda, H.: Detection of hydroxyethyl starch induced macroamylasemia. Comparison of electrophoresis and gel-permeation high-performance liquid chromatography. *Seibutsu Butsuri Kagaku*, 42 (1998) 131-136; C.A., 129 (1998) 227666c.
- 745 Zhou, X., Liu, J. and Zhang, M.: (Analysis of plasma free heparin using micellar electrokinetic capillary chromatography). *Zhonghua Yixue Jianyan Zazhi*, 20 (1997) 364-366; C.A., 129 (1998) 186319w.

See also 751.

## 10c. Glycoproteins and their constituents

- 746 Akasaki, K. and Tsuji, H.: Purification and characterization of a soluble form of lysosome-associated membrane glycoprotein-2 (LAMP-2) from rat liver lysosomal contents. *Biochem. Mol. Biol. Int.*, 46 (1998) 197-206; C.A., 130 (1999) 11720.
- 747 Ando, S., Aikawa, J.-I., Nakahara, Y. and Ogawa, T.: Synthesis and properties of neoglycoconjugates carrying a dimerization motif of glycophorin A transmembrane domain. *J. Carbohydr. Chem.*, 17 (1998) 633-645; C.A., 129 (1998) 203257u.

- 748 Cifuentes, A., Moreno-Arribas, M.V., de Frutos, M. and Díez-Masa, J.C.: Capillary isoelectric focusing of erythropoietin glycoforms and its comparison with flat-bed isoelectric focusing and capillary zone electrophoresis. *J. Chromatogr. A*, 830 (1999) 453-463.
- 749 Collett, A., Higgs, N.B., Sims, E., Rowland, M. and Warhurst, G.: Modulation of the permeability of H<sub>2</sub> receptor antagonists cimetidine and ranitidine by p-glycoprotein in rat intestine and the human colonic cell line Caco-2. *J. Pharmacol. Exp. Ther.*, 288 (1999) 171-178.
- 750 David, C.L., Orpiszewski, J., Zhu, X., Reissner, K.J. and Aswad, D.W.: Isoaspartate in chondroitin sulfate proteoglycans of mammalian brain. *J. Biol. Chem.*, 273 (1998) 32063-32070.
- 751 Escribano, J., Ríos, I. and Fernández, J.A.: Isolation and cytotoxic properties of a novel glycoconjugate from corms of saffron plant (*Crocus sativus* L.). *Biochim. Biophys. Acta*, 1426 (1999) 217-222.
- 752 Jiao, Y., Shashkina, E., Shashkin, P., Hansson, A. and Katz, A.: Manganese sulfate-dependent glycosylation of endogenous glycoproteins in human skeletal muscle is catalyzed by a nonglucose 6-P-dependent glycogen synthase and not glycogenin. *Biochim. Biophys. Acta*, 1427 (1999) 1-12.
- 753 Lee, Y.S., Kim, B.K. and Choi, E.-C.: Physicochemical properties of recombinant hepatitis S surface antigen expressed in mammalian cell (C127). *Arch. Pharmacal Res.*, 21 (1998) 521-526; C.A., 130 (1999) 37019.
- 754 Lopez, M., Tetaert, D., Julian, S., Gazon, M., Cerutti, M., Verbert, A. and Delannoy, P.: O-Glycosylation potential of lepidopteran insect cell lines. *Biochim. Biophys. Acta*, 1427 (1999) 49-61.
- 755 Popolo, L. and Vai, M.: The Gas1 glycoprotein, a putative wall polymer cross-linker. *Biochim. Biophys. Acta*, 1426 (1999) 385-400 - a review.
- 756 Samal, A.B., Timoshenko, A.V., Loiko, E.N., Kaltner, H. and Gabius, H.-J.: (Formation of lactose-resistant aggregates of human platelets induced by the mistletoe lectin and differential signaling responses to cell contact formation by the lectin or thrombin). *Biokhimiya (Moscow)*, 63 (1998) 611-619.
- 757 Savolainen, H.: Isolation and separation of proteoglycans. *J. Chromatogr. B*, 722 (1999) 255-262 - a review with 69 refs.
- 758 Szewczyk, B. and Summers, D.F.: Purification of glycoproteins and their use as immunogens. *Methods Mol. Biol. (Totowa)*, 80(Immunochemical Protocols (2nd Edition)) (1998) 87-93; C.A., 129 (1998) 158741j.
- 759 Van Klinken, J.-W.B., Einerhand, A.W.C., Büller, H. and Dekker, J.: Strategic biochemical analysis of mucins. *Anal. Biochem.*, 265 (1998) 103-116.
- 760 Zhao, G., Lin, J., Peng, S., Zhou, F. and Tang, Y.: (The diagnostic value of creatine kinase macro isoenzyme type 2 and ConA-binding oligosaccharide protein in serum of patients with gastric carcinoma). *Zhejiang Yike Daxue Xuebao*, 27 (1998) 124-126; C.A., 130 (1999) 1927.

For additional information see C.A.:  
130 (1999) 22516.

See also 767, 787, 851, 879, 892, 1057.

## 11. ORGANIC ACIDS AND LIPIDS

11a. *Organic acids and simple esters*

- 761 Melendez, R.F. and Bizzozero, O.A.: Palmitoylation of myelin PO protein is independent of its synthesis and parallels that of phospholipids. *J. Peripher. Ner. Syst.*, 1 (1996) 34-41; C.A., 130 (1999) 36064.

11c. *Lipids and their constituents*

See 1366.

11d. *Lipoproteins and their constituents*

- 762 Brites, F.D., Cavallero, E., de Geitere, C., Nicolaiew, N., Jacotot, B., Rosseneu, M., Fruchart, J.-C., Wikinski, R.L. and Castro, G.R.: Abnormal capacity to induce cholesterol efflux and a new LpA-I pre- $\beta$  particle in type 2 diabetic patients. *Clin. Chim. Acta*, 279 (1999) 1-14.
- 763 Clay, M.A., Cehic, D.A., Pyle, D.H., Rye, D.H. and Barter, P.J.: Formation of apolipoprotein-specific high-density lipoprotein particles from lipid-free apolipoproteins A-I and A-II. *Biochem. J.*, 337 (1999) 445-451.
- 764 Douglas, D.N., Fink, H.-S., Ridgway, N.D., Cook, H.W. and Byers, D.M.: Myristoylated alanine-rich C-kinase substrate is phosphorylated and translocated by a phorbol ester-insensitive and calcium-independent protein kinase C isoform in C6 glioma cell membranes. *Biochim. Biophys. Acta*, 1448 (1999) 439-449.
- 765 Hubel, C.A., Shakir, Y., Gallaher, M.J., McLaughlin, M.K. and Roberts, J.M.: Low-density lipoprotein particle size decreases during normal pregnancy in association with triglyceride increases. *J. Soc. Gynecol. Invest.*, 5 (1998) 244-250; C.A., 130 (1999) 36187.
- 766 Kornacki, J.A. and Oliver, D.B.: Lyme disease-causing *Borrelia* species encode multiple lipoproteins homologous to peptide-binding proteins of ABC-type transporters. *Infect. Immun.*, 66 (1998) 4115-4122; C.A., 129 (1998) 287600m.
- 767 Maserrini, P., Pitti, M., Ferraretti, A., Brunne, J. and Palestini, P.: Glycolipid-protein interaction in the mechanism of signal transduction: studies with a photoactivatable ganglioside analog. *Acta Biochim. Pol.*, 45 (1998) 393-401; C.A., 130 (1999) 36068.
- 768 Metcalf, V.J., Brennan, S.O., Chambers, G. and George, P.M.: High density lipoprotein (HDL), and not albumin, is the major palmitate binding protein in New Zealand long-finned (*Anguilla dieffenbachii*) and short-finned eel (*Anguilla australis schmidti*) plasma. *Biochim. Biophys. Acta*, 1429 (1999) 467-475.
- 769 Palaniyar, N., Semotok, J.L., Wood, D.D., Moscarello, M.A. and Harauz, G.: Human proteolipid protein (PLP) mediates winding and adhesion of phospholipid membranes but prevents their fusion. *Biochim. Biophys. Acta*, 1415 (1998) 85-100.
- 770 Sakata, N. and Dixon, J.L.: Ubiquitin-proteasome-dependent degradation of apolipoprotein B100 *in vitro*. *Biochim. Biophys. Acta*, 1437 (1999) 71-79.
- 771 Tanaka, K., Iguchi, H., Taketani, S., Nakata, R., Tokumaru, S., Sugimoto, T. and Kojo, S.: Facile degradation of apolipoprotein B by radical reactions and the presence of cleaved proteins in serum. *J. Biochem. (Tokyo)*, 125 (1999) 173-176.

- 772 Zhu, Y., Liao, H.-L., Wang, N., Friedli, O., Jr., Verna, L. and Stemerman, M.B.: Low-density lipoprotein activates Jun N-terminal kinase (JNK) in human endothelial cells. *Biochim. Biophys. Acta*, 1436 (1999) 557-564.

See also 969, 972, 975.

## 13. STEROIDS

13c. *Estrogens*

- 773 Smale, C.M., Elgar, D.F., Moore, C.H. and Blackwell, L.F.: Acid-polyacrylamide gel electrophoresis of lysozyme-estrone glucuronide conjugates. *Bioconjugate Chem.*, 9 (1998) 838-841; C.A., 130 (1999) 1577.

## 18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. *Amino acids and their derivatives*

- 774 Besant, P.G. and Attwood, P.V.: Problems with phosphoamino acid analysis using alkaline hydrolysis. *Anal. Biochem.*, 265 (1998) 187-190.

- 775 Heesom, K.J., Avison, M.B., Diggle, T.A. and Denton, R.M.: Insulin-stimulated kinase from rat fat cells that phosphorylates initiation factor 4E-binding protein 1 on the rapamycin-insensitive site (serine-111). *Biochem. J.*, 336 (1998) 39-48.

See also 761, 1029.

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

- 776 Chen, H. and Feng, Y.-M.: Hydrophilic Thr can replace the hydrophobic and absolutely conservative A3Val in insulin. *Biochim. Biophys. Acta*, 1429 (1998) 69-73.

- 777 Cho, Y.-J., Kim, S.-H., Im, Y.-S., Kim, I.-S., Kim, D.-S. and Choi, Y.J.: (Properties and utilization of undigested peptides in anchovy saucers: 2. Effect of fermentation periods on undigested peptides of anchovy saucers). *Han'guk Susan Hakhoechi*, 31 (1998) 393-398; C.A., 130 (1999) 3216.

- 778 Choi, Y.J., Kim, S.-H., Im, Y.-S., Kim, I.-S., Kim, D.-S. and Cho, Y.-J.: (Properties and utilization of undigested peptides in anchovy saucers: 1. Use of undigested peptides as a quality parameter of anchovy saucers). *Han'guk Susan Hakhoechi*, 31 (1998) 386-392; C.A., 130 (1999) 3215.

- 779 Gatti, A. and Traugh, J.A.: A two-dimensional peptide gel electrophoresis system for phosphopeptide mapping and amino acid sequencing. *Anal. Biochem.*, 266 (1999) 198-204.

- 780 Haro, L.S., Cubriel, A., Bustamante, J., Flores, R. and Martinez, A.O.: Divalent metal cation chelators enhance chromatographic separation of structurally similar macromolecules: separation of human growth hormone isoforms. *J. Chromatogr. B*, 720 (1998) 39-47.

- 781 Kwok, D.Y., Coffin, C.C., Lollo, C.P., Jovenal, J., Banaszczyk, M.G., Mullen, P., Phillips, A., Amini, A., Fabrycki, J., Bartholomew, R.M., Brostoff, S.W. and Carlo, D.J.: Stabilization of poly-L-lysine/DNA polyplexes for *in vivo* gene delivery to the liver. *Biochim. Biophys. Acta*, 1444 (1999) 171-190.
- 782 Mancinelli, L., Lugaro, G., de Angelis, L. and Gianfranceschi, G.L.: Mass spectral and electrophoretic characterization of acidic peptides bound to chromatin of pea bud. *Mol. Biol. Rep.*, 25 (1998) 163-172; *C.A.*, 129 (1998) 213169f.
- 783 Mayer, H.K., Rockenbauer, C. and Mlcak, H.: Evaluation of proteolysis in Parmesan cheese using electrophoresis and HPLC. *Lait*, 78 (1998) 425-438; *C.A.*, 130 (1999) 80615.
- 784 Nandedkar, T.D., Rajadhyaksha, M.S., Mukhopadhyaya, R.R., Rao, S.G.A. and Joshi, D.S.: Apoptosis in granulosa cells induced by intrafollicular peptide. *J. Biosci. (Bangalore)*, 23 (1998) 271-277; *C.A.*, 130 (1999) 36208.
- 785 Sunic, D., McNeil, J.D., Andress, D.L. and Belford, D.A.: Insulin-like growth factor binding protein-5 proteolytic activity in ovine articular chondrocyte culture. *Biochim. Biophys. Acta*, 1425 (1998) 567-576.
- See also 748, 797, 851, 864, 920, 1068, 1309.
- 18c. Elucidation of structure of proteins and enzymes
- 786 Brockstedt, E., Rickers, A., Kostka, S., Laubersheimer, A., Börken, B., Wittmann-Liebold, B., Bommert, K. and Otto, A.: Identification of apoptosis-associated proteins in a human Burkitt lymphoma cell line. Cleavage of heterogeneous nuclear ribonucleoprotein A1 by caspase 3. *J. Biol. Chem.*, 273 (1998) 28057-28064.
- 787 Demeule, M., Laplante, A., Murphy, G.F., Wenger, R.M. and Bélieau, R.: Identification of the cyclosporin-binding site in P-glycoprotein. *Biochemistry*, 37 (1998) 18110-18118.
- 788 Iglesias, T., Waldron, R.T. and Rozengurt, E.: Identification of *in vivo* phosphorylation sites required for protein kinase D activation. *J. Biol. Chem.*, 273 (1998) 27662-27667.
- 789 Ito, M., Narutaki, S., Uchida, K.-i. and Oda, K.: Identification of carboxyl residues in pepstatin-insensitive carboxyl proteinase from *Pseudomonas* sp. 101 that participate in catalysis and substrate binding. *J. Biochem. (Tokyo)*, 125 (1999) 210-216.
- 790 Itoh, Y. and Kobayashi, R.: Immunologic and microsequence analysis of human seminal-specific proteins. In: Takatori, T. and Takasu, A. (Editors), *Curr. Top. Forensic Sci., Proc. Meet. Int. Assoc. Forensic Sci.*, 14th 1996, 1, Shunderson Communications, Ottawa, 1997, pp. 44-47; *C.A.*, 129 (1998) 186333w.
- 791 Komatsu, H., Kanno, T., Matsumoto, Y. and Kodama, T.: Alcohol-induced biphasic inhibition of myosin subfragment 1 K-EDTA-ATPase. *Biochim. Biophys. Acta*, 1430 (1999) 14-24.
- 792 Nomura, T., Fujita, N. and Ishihama, A.: Mapping of subunit-subunit contact surfaces on the  $\beta$  subunit of *Escherichia coli* RNA polymerase. *Biochemistry*, 38 (1999) 1346-1355.
- 793 Tsuji, H., Komoto, M., Watanabe, H., Sasagawa, T., Oka, T., Yamashita, H. and Okita, M.: Epitope mapping of monoclonal antibodies against 4-aminobenzoate hydroxylase from *Agaricus bisporus*. *Biochim. Biophys. Acta*, 1425 (1998) 628-631.
- See also 855, 930, 1061, 1067.
19. PROTEINS
- 19a. General techniques
- 794 Aguilar, R.M., Bustamante, J.J., Hernandez, P.G., Martinez, A.O. and Haro, L.S.: Precipitation of dilute chromatographic samples (ng/ml) containing interfering substances for SDS-PAGE. *Anal. Biochem.*, 267 (1999) 344-350.
- 795 Alomirah, H.F., Alli, I. and Gibbs, B.F.: Identification of proteolytic products as indicators of quality in ground and whole meat. *J. Food Qual.*, 21 (1998) 299-316; *C.A.*, 129 (1998) 274861x.
- 796 Blackstock, W.P., Nishimura, T. and Fujita, Y.: (Proteomics in pharmaceutical industry). *Tanpakushitsu Kakusan Koso*, 43 (1998) 2214-2221. *C.A.*, 130 (1999) 11601.
- 797 Chin, H.W. and Rosenberg, M.: Monitoring proteolysis during Cheddar cheese ripening using two-dimensional gel electrophoresis. *J. Food Sci.*, 63 (1998) 423-428; *C.A.*, 129 (1998) 160757n.
- 798 Duffy, M.F., Noormohammadi, A.H., Baseggio, N., Browning, G.F. and Markham, P.F.: Polyacrylamide gel-electrophoresis separation of whole-cell proteins. *Methods Mol. Biol. (Totowa)*, 104 (1998) 267-277; *C.A.*, 129 (1998) 242063x.
- 799 Fountoulakis, M., Takács, M.-F. and Takács, B.: Enrichment of low-copy-number gene products by hydrophobic interaction chromatography. *J. Chromatogr. A*, 833 (1999) 157-168.
- 800 Ji, Y., Akerboom, T.P.M., Sies, H. and Thomas, J.A.: S-Nitrosylation and S-glutathiolation of protein sulphhydryls by S-nitroso glutathione. *Arch. Biochem. Biophys.*, 362 (1999) 67-78.
- 801 Lopez, M.F.: Proteome analysis. I. Gene products are where the biological action is. *J. Chromatogr. B*, 722 (1999) 191-202 - a review with 94 refs.
- 802 Matejec, R. and Schonert, H.: Determination of protein association constants by electrophoresis. *Biophys. Chem.*, 74 (1998) 99-106; *C.A.*, 129 (1998) 299789t.
- 803 Nemoto, T. and Sato, N.: Analysis of subunit structures of proteins by polyacrylamide gel electrophoresis. *Anal. Biochem.*, 265 (1998) 190-192.
- 804 Sanchez, J.-C., Wilkins, M.R., Appel, R.D., Williams, K.L. and Hochstatter, D.F.: Identifying proteins for proteome studies: a two-dimensional gel electrophoresis approach. In: Creighton, T.E. (Editor), *Protein Funct.* (2nd Ed.), IRL Press, Oxford, 1997, pp. 1-27; *C.A.*, 129 (1998) 257085e - a review with 42 refs.
- 805 Sedzik, J., Zhang, R. and Hjertén, S.: Ups and downs of protein crystallization: studies of protein crystals by high-performance capillary electrophoresis. *Biochim. Biophys. Acta*, 1426 (1999) 401-408.
- 806 Skarpeid, H.-J., Kvaal, K. and Hildrum, K.I.: Identification of animal species in ground meat mixtures by multivariate analysis of isoelectric focusing protein profiles. *Electrophoresis (Weinheim)*, 19 (1998) 3103-3109.
- 807 Stulik, J., Koupilova, K., Hernychova, L., Macela, A., Kaffenberger, W. and van Beuningen, D.: Comparison of the effectiveness of two different rehydration solutions on the solubilization of proteins separated by two-dimensional electrophoresis. *Chem. Listy*, 92 (1998) 743-745; *C.A.*, 130 (1999) 22403.
- 808 Tulp, A., Verwoerd, D. and Neefjes, J.: Electromigration for separations of protein complexes. *J. Chromatogr. B*, 722 (1999) 141-151 - a review with 55 refs.

- 809 Wilkins, M.R., Gasteiger, E., Wheeler, C.H., Lindskog, I., Sanchez, J.-C., Bairoch, A., Appel, R.D., Dunn, M.J. and Hochstrasser, D.F.: Multiple parameter cross-species protein identification using Multident - a world-wide web accessible tool. *Electrophoresis (Weinheim)*, 19 (1998) 3199-3206.
- 810 Yan, L.J. and Sohal, R.S.: Gel electrophoresis quantitation of protein carbonyls derivatized with tritiated sodium borohydride. *Anal. Biochem.*, 265 (1998) 176-182.
- For additional information see C.A.:  
130 (1999) 35380.
- See also 712, 773, 824.
- 19b. *Proteins of cells, viruses and subcellular particles*
- 811 Appsundaram, S., Schroeter, S., Giovanetti, E. and Blakely, R.D.: Acute regulation of norepinephrine transport: II. PKC-modulated surface expression of human norepinephrine transporter proteins. *J. Pharmacol. Exp. Ther.*, 287 (1998) 744-751.
- 812 Bassa, B.V., Roh, D.D., Vaziri, N.D., Kirschenbaum, M.A. and Kamanna, V.S.: Effect of inhibition of cholesterol synthetic pathway on the activation of Ras and MAP kinase in mesangial cells. *Biochim. Biophys. Acta*, 1449 (1999) 137-149.
- 813 Gonzalez, R.F. and Dobbs, L.G.: Purification and analysis of RTI40, a type I alveolar epithelial cell apical membrane protein. *Biochim. Biophys. Acta*, 1429 (1998) 208-216.
- 814 Hardwicke, P.M.D., Ryan, C. and Kalabokis, V.N.: A novel small protein associated with a conjugated trienoic chromophore from membranes of scallop adductor muscle: phosphorylation by protein kinase A. *Biochim. Biophys. Acta*, 1417 (1999) 1-8.
- 815 Ishihara, K., Yasuda, K. and Hatayama, T.: Molecular cloning, expression and localization of human 105 kDa heat shock protein, hsp105. *Biochim. Biophys. Acta*, 1444 (1999) 138-142.
- 816 Kotiranta, A., Haapasalo, M., Kari, K., Kerossuo, E., Olsen, I., Sorsa, T., Meurman, J.H. and Louonatmaa, K.: Surface structure, hydrophobicity, phagocytosis, and adherence to matrix proteins of *Bacillus cereus* cells with and without the crystalline surface protein layer. *Infect. Immun.*, 66 (1998) 4895-4902; C.A., 130 (1999) 12211.
- 817 Kuznetsova, T.A., Efimov, A.V., Ajrich, L.G., Kireeva, I.Yu., Marusich, E.I., Cappuccinelli, P., Fiori, P., Rappelli, P., Kurochkina, L.P., Poglazov, B.F. and Mesyazhinov, V.V.: (Properties of recombinant bacteriophage T4 tail sheath protein and its deletional fragments). *Biokhimiya (Moscow)*, 63 (1998) 833-841.
- 818 Lin, J.-D., Chan, E.-C., Weng, H.-F. and Sheu, C.-A.: Two-dimensional electrophoretic analysis of membranous protein from human thyroid tissues and cancer cell lines. *Electrophoresis (Weinheim)*, 19 (1998) 3213-3216.
- 819 Marcus, R.S., Holsapple, M.P. and Kaminski, N.E.: Lipopolysaccharide activation of murine splenocytes and splenic B cells increased the expression of aryl hydrocarbon receptor and aryl hydrocarbon receptor nuclear translocator. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1113-1118.
- 820 Martinson, T.A., Ikeuchi, M. and Plumley, F.G.: Oxygen-evolving diatom thylakoid membranes. *Biochim. Biophys. Acta*, 1409 (1998) 72-86.
- 821 Miyazawa, K., Mori, A. and Okudaira, H.: Establishment and characterization of a novel human rheumatoid fibroblast-like synoviocyte line, MH7A, immortalized with SV40 T antigen. *J. Biochem. (Tokyo)*, 124 (1998) 1153-1162.
- 822 Novina, S.D., Cheriyath, Y. and Roy, A.L.: Regulation of TFII-I activity by phosphorylation. *J. Biol. Chem.*, 273 (1998) 33443-33448.
- 823 Pasquali, C., Fialka, I. and Huber, L.A.: Subcellular fractionation, electromigration analysis and mapping of organelles. *J. Chromatogr. B*, 722 (1999) 89-102 - a review with 74 refs.
- 824 Patton, W.F.: Proteome analysis. II. Protein subcellular redistribution: linking physiology to genomics via the proteome and separation technologies involved. *J. Chromatogr. B*, 722 (1999) 203-223 - a review with 138 refs.
- 825 Quaite-Randall, E. and Joachimiak, A.: Purification and chaperonins. *J. Chromatogr. B*, 722 (1999) 153-177 - a review with 80 refs.
- 826 Samy, T.S.A., Schwacha, M.G., Chung, C.-S., Cioffi, W.G., Bland, K.I. and Chaudry, I.H.: Proteasome participates in the alteration of signal transduction in T and B lymphocytes following trauma-hemorrhage. *Biochim. Biophys. Acta*, 1453 (1999) 92-104.
- 827 Sasai, K., Aikawa, J.-i., Saburi, S., Tojo, H., Tanaka, S., Ogawa, T. and Shiota, K.: Functions of the N-glycans of rat leukemia inhibitory factor expressed in Chinese hamster ovary cells. *J. Biochem. (Tokyo)*, 124 (1998) 999-1003.
- 828 Snyder, C.H., Denke, E. and Trumppower, B.L.: Aromatic amino acids in the Rieske iron-sulfur protein do not form an obligatory conduit for electron transfer from the iron-sulfur cluster to the heme of cytochrome c<sub>1</sub> in the cytochrome bc<sub>1</sub> complex. *Biochim. Biophys. Acta*, 1410 (1999) 237-247.
- 829 Spenneberg, R., Osterloh, D. and Gerke, V.: Phospholipid vesicle binding and aggregation by four novel fish annexins are differently regulated by Ca<sup>2+</sup>. *Biochim. Biophys. Acta*, 1448 (1998) 311-319.
- 830 Syto, R., Murgolo, N.J., Braswell, E.H., Mui, P., Huang, E. and Windsor, W.T.: Structural and biological stability of the human interleukin 10 homodimer. *Biochemistry*, 37 (1998) 16943-16951.
- 831 Ueda, H., Morishita, R., Katoh-Semba, R., Kato, K. and Asano, T.: G protein  $\gamma$  subunits coimmunoprecipitated with antibodies against  $\alpha$  subunits: identification of major isoforms in cultured cells by silver stain and immunoblotting with conventional transfer procedure. *J. Biochem. (Tokyo)*, 124 (1998) 1033-1037.
- 832 Veldhuizen, E.J.A., Batenburg, J.J., Vandebussche, G., Putz, G., van Golde, L.M.G. and Haagsman, H.P.: Production of surfactant protein C in the baculovirus expression system: the information required for correct folding and palmitoylation of SP-C is contained within the mature sequence. *Biochim. Biophys. Acta*, 1416 (1999) 295-308.
- 833 Walter, D.M., Paul, K.S. and Waters, M.G.: Purification and characterization of a novel 13 S hetero-oligomeric protein complex that stimulates *in vitro* Golgi transport. *J. Biol. Chem.*, 273 (1998) 29565-29576.
- 834 Zhang, Y. and Spremulli, L.L.: Identification and cloning of human mitochondrial translational release factor 1 and the ribosome recycling factor. *Biochim. Biophys. Acta*, 1443 (1998) 245-250.

See also 764, 786, 801, 884, 905, 960, 965, 988, 1015, 1055, 1057, 1110.

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

- 835 Billing-Marczak, K., Przybyszewska, M. and Kuznicki, J.: Measurements of  $[Ca^{2+}]$  using fura-2 in glioma C6 cells expressing calretinin with GFP as a marker of transfection: no  $Ca^{2+}$ -buffering provided by calretinin. *Biochim. Biophys. Acta*, 1449 (1999) 169-177.
- 836 Bunai, K., Yamada, K., Hayashi, K., Nakamura, K. and Yamane, K.: Enhancing effect of *Bacillus subtilis* Ffh, a homologue of the SRP54 subunit of the mammalian signal recognition particle, on the binding of SecA to precursors of secretory proteins *in vitro*. *J. Biochem. (Tokyo)*, 125 (1999) 151-159.
- 837 Lin, Y.S., Nguyen, C., Mendoza, J.-L., Escandon, E., Fei, D., Meng, Y.G. and Modi, N.B.: Preclinical pharmacokinetics, interspecies scaling, and tissue distribution of a humanized monoclonal antibody against vascular endothelial growth factor. *J. Pharmacol. Exp. Ther.*, 288 (1999) 371-378.
- 838 Panetti, T.S., Kudryk, B.J. and Mosher, D.F.: Interaction of recombinant procollagen and propeptidase modules of thrombospondin-1 with heparin and fibrinogen/fibrin. *J. Biol. Chem.*, 274 (1999) 430-437.
- 839 Thomas, M.A., Karlen, S., D'Ercole, M. and Sanderson, C.J.: Analysis of the 5' and 3'UTRs in the post-transcriptional regulation of the interleukin-5 gene. *Biochim. Biophys. Acta*, 1444 (1999) 61-68.
- 840 Yaoi, K., Nakanishi, K., Kadotani, T., Imamura, M., Koizumi, N., Iwahana, H. and Sato, R.: cDNA cloning and expression of *Bacillus thuringiensis* Cry1Aa toxin binding 120 kDa aminopeptidase N from *Bombyx mori*. *Biochim. Biophys. Acta*, 1444 (1999) 131-137.
- See also 793, 817, 829, 832, 915, 916, 922, 958, 961, 963, 984, 1010, 1026, 1029, 1067, 1075, 1087, 1103, 1130.
- 19d. Microbial and plant proteins**
- 841 Avio, L. and Giavannetti, M.: The protein pattern of spores of arbuscular mycorrhizal fungi: comparison of species, isolates and physiological stages. *Mycol. Res.*, 102 (1998) 985-990; C.A., 130 (1999) 22609.
- 842 Bánya, L. and Patthy, L.: Amoebapore homologs of *Caenorhabditis elegans*. *Biochim. Biophys. Acta*, 1429 (1998) 259-264.
- 843 Blume, Y.B., Strashnyuk, N.M., Smertenko, A.P., Solodushko, V.G., Sidorov, V.A. and Gleba, Y.Y.: Alteration of  $\beta$ -tubulin in *Nicotiana plumbaginifolia* confers resistance to amiprophenox-methyl. *Theor. Appl. Genet.*, 97 (1998) 464-472; C.A., 130 (1999) 35732.
- 844 Cancino-Díaz, M.E., Pérez-Salazar, J.E., Domínguez-López, L., Escobar-Gutiérrez, A., Grandos-Arreola, J., Jiménez-Zamudio, L., Burgos-Vargas, R. and García-Latorre, E.: Antibody response to *Klebsiella pneumoniae* 60 kDa protein in familial and sporadic ankylosing spondylitis: role of HLA-B27 and characterization as a Gro-EL-like protein. *J. Rheumatol.*, 25 (1998) 1756-1764; C.A., 130 (1999) 2970.
- 845 Davis, R., Marquart, M.E., Lucius, D. and Picking, W.D.: Protein-protein interactions in the assembly of *Shigella flexneri* invasion plasmid antigens IpaB and IpaC into protein complexes. *Biochim. Biophys. Acta*, 1429 (1998) 45-56.
- 846 Devaney, E.: Electrophoresis of parasite proteins. In: Rogan, M.T. (Editor), *Anal. Parasitol.*, Springer, Berlin, 1997, pp. 32-65; C.A., 129 (1998) 200021b.
- 847 Dodeman, V.L., le Guilloux, M., Ducreux, G. and de Vienne, D.: Somatic and zygotic embryos of *Daucus carota* L. display different protein patterns until conversion to plants. *Plant Cell Physiol.*, 39 (1998) 1104-1110; C.A., 130 (1999) 35642.
- 848 Egorov, T.A., Odintsova, T.I., Shewry, P.R. and Tanham, A.S.: Characterization of high  $M_r$  wheat glutenin polymers by agarose gel electrophoresis and dynamic light scattering. *FEBS Lett.*, 43 (1998) 215-217; C.A., 129 (1998) 312331j.
- 849 Ekramoddoullah, A.K.M. and Tan, Y.: A modification for the improved analysis of differential protein accumulation by two-dimensional polyacrylamide gel electrophoresis. *Phytochem. Anal.*, 9 (1998) 159-161; C.A., 129 (1998) 227677g.
- 850 Güereca, L. and Bravo, A.: The oligomeric state of *Bacillus thuringiensis* Cry toxins in solution. *Biochim. Biophys. Acta*, 1429 (1999) 342-350.
- 851 Gupta, D.K., Ahmad, F. and Suhail, M.: Electrophoretic analysis of polypeptides and glycopeptides of erythrocyte membrane sampled from rats simulating mild insulin dependent diabetes mellitus. *Indian J. Exp. Biol.*, 36 (1998) 934-937; C.A., 130 (1999) 35239.
- 852 Heermann, R., Altendorf, K. and Jung, K.: The turgor sensor KdpD of *Escherichia coli* is a homodimer. *Biochim. Biophys. Acta*, 1415 (1998) 114-124.
- 853 Herbaud, M.-L., Guiseppi, A., Denizot, F., Haiach, J. and Kilhofer, M.-C.: Calcium signalling in *Bacillus subtilis*. *Biochim. Biophys. Acta*, 1448 (1998) 212-226.
- 854 Heredia, N.L., Labbe, R.G. and Garcia-Alvarado, J.S.: Alteration in sporulation, enterotoxin production, and protein synthesis by *Clostridium perfringens* type A following heat shock. *J. Food Prot.*, 61 (1998) 1143-1147; C.A., 130 (1999) 22755.
- 855 Hermann, T., Wersch, G., Uhlemann, E.-M., Schmid, R. and Burkowski, A.: Mapping and identification of *Corynebacterium glutamicum* proteins by two-dimensional gel electrophoresis and microsequencing. *Electrophoresis (Weinheim)*, 19 (1998) 3217-3221.
- 856 Hirohashi, T., Nishio, K. and Nakai, M.: cDNA sequence and overexpression of chloroplast chaperonin 21 from *Arabidopsis thaliana*. *Biochim. Biophys. Acta*, 1429 (1999) 512-515.
- 857 Hsu, N.-C., Guzov, V.M., Hsu, L.-C. and Chung, B.-c.: Characterization of the consequence of a novel Glu-380 to Asp mutation by expression of functional P450c21 in *Escherichia coli*. *Biochim. Biophys. Acta*, 1430 (1999) 95-102.
- 858 Ichikawa, N., Fukuda, M., Hashimoto, T. and Tagawa, K.: The carboxyl-terminal region of the yeast ATPase inhibitor is indispensable for the stability of the protein in mitochondria. *J. Biochem. (Tokyo)*, 124 (1998) 886-891.
- 859 Ikigai, H., Ono, T., Nakae, T., Otsuru, H. and Shimamura, T.: Two forms of *Vibrio cholerae* O1 E1 Tor hemolysin derived from identical precursor protein. *Biochim. Biophys. Acta*, 1415 (1999) 297-305.

- 860 Kajiwara, H. and Tomooka, N.: Comparative analysis of genus *Vigna* seeds using antiserum against a synthesized multiple antigenic peptide. *Electrophoresis (Weinheim)*, 19 (1998) 3110-3113.
- 861 Kunze, I., Hensel, G., Adler, K., Bernard, J., Neubohn, B., Nilsson, C., Stoltenburg, R., Kohwein, S.D. and Kunze, G.: The green fluorescent protein targets secretory proteins to the yeast vacuole. *Biochim. Biophys. Acta*, 1410 (1999) 287-298.
- 862 Lorca, G.L. and de Valdez, G.F.: Temperature adaptation and cryotolerance in *Lactobacillus acidophilus*. *Biotechnol. Lett.*, 20 (1998) 847-849; *C.A.*, 130 (1999) 22763.
- 863 Martinez Gonzales, J., Jimenez Gonzalez, A. and Rodriguez Caabeiro, F.: Purification of *Trichinella spiralis* tubulin: comparison of several analytic procedures. *Vet. Parasitol.*, 77 (1998) 115-121; *C.A.*, 129 (1998) 257281r.
- 864 Minuth, T., Frey, G., Lindner, P., Rachel, R., Stetter, K.O. and Jaenicke, R.: Recombinant homo- and hetero-oligomers of an ultrastable chaperonin from the arcaeon *Pyrodictium occultum* show chaperone activity *in vitro*. *Eur. J. Biochem.*, 258 (1998) 837-845.
- 865 Monroy, A.F., Sangwan, V. and Dhindsa, R.S.: Phenol-extracted plant proteins can be renatured and assayed in gel for protein kinase activity. *Anal. Biochem.*, 265 (1998) 183-185.
- 866 Naito, M., Izumi, S. and Yamada, T.: Two-dimensional electrophoretic analysis of humoral responses to culture filtrate of *Mycobacterium bovis* BCG in patients with leprosy and tuberculosis. *Int. J. Lepr. Other Mycobact. Dis.*, 66 (1998) 208-213; *C.A.*, 130 (1999) 23807.
- 867 Ramasamy, R., Yasawardena, S.G., Kanagaratnam, R., Buratti, E., Baralle, F.E. and Ramasamy, M.S.: Mammalian cell expression of malaria merozoite surface proteins and experimental DNA and RNA immunisation. *Biochim. Biophys. Acta*, 1453 (1999) 1-13.
- 868 Roos, W., Dordschbal, B., Steighardt, J., Hieke, M., Weiss, D. and Saalbach, G.: A redox-dependent, G-protein-coupled phospholipase A of the plasma membrane is involved in the elicitation of alkaloid biosynthesis in *Eschscholtzia californica*. *Biochim. Biophys. Acta*, 1448 (1999) 390-402.
- 869 Rosenfeld, R.D., Zeni, L., Welcher, A.A., Narhi, L.O., Hale, C., Marasco, J., Delaney, J., Gleason, T., Philo, J.S., Katta, V., Hui, J., Baumgartner, J. et al.: Biochemical, biophysical, and pharmacological characterization of bacterially expressed human agouti-related protein. *Biochemistry*, 37 (1998) 16041-16052.
- 870 Saito, Y., Yamanishi, T., Oka, T. and Nakano, A.: Identification of SEC12, SED4, truncated SEC16, and EKS1/HRD3 as multicopy suppressors of ts mutants of Sar1 GTPase. *J. Biochem. (Tokyo)*, 125 (1999) 130-137.
- 871 Skouloubris, S., Thibierge, J.-M., Labigne, A. and de Reuse, H.: The *Helicobacter pylori* UreI protein is not involved in urease activity but is essential for bacterial survival *in vivo*. *Infect. Immun.*, 66 (1998) 4517-4521; *C.A.*, 129 (1998) 287605s.
- 872 Sun, X., Wu, S., Sun, H., Zhang, L., Xia, Y. and Wang, Y.: (Analysis of various kinds of wheat storage proteins with electrophoresis). *Xibei Zhiwu Xuebao*, 18 (1998) 433-439; *C.A.*, 130 (1999) 12408.
- 873 Wang, T., Tong, Z., Kuang, T. and Tang, P.: (Analysis of N-terminal sequence of a 41 kD protein from a photoperiod-sensitive male-sterile mutant of rice). *Zhiwu Xuebao*, 39 (1997) 979-982; *C.A.*, 130 (1999) 22913.
- 874 Wright, D.S., Graham, L.D. and Jennings, P.A.: Cloning of a *Lysobacter enzymogenes* gene that encodes an arginyl endopeptidase (endoproteinase Arg/C). *Biochim. Biophys. Acta*, 1443 (1998) 369-374.
- 875 Zhang, C., Zhang, D. and Chen, M.: (Studies on the maize seed storage protein components and their characteristics). *Xibei Zhiwu Xuebao*, 18 (1998) 386-392; *C.A.*, 130 (1999) 12445.
- See also 766, 799, 836, 1010, 1015, 1017, 1019, 1087, 1130, 1149, 1272, 1277.
- 19e. *Proteins of blood, serum and blood cells*
- 876 Abuharfeil, N., Atmeh, R., Shabsoug, B. and Abo-Shehada, M.: Electrophoretic immunodesorption of proteins according to molecular weight by use of a double-membrane system. *Chromatographia*, 49 (1999) 81-84.
- 877 Akhand, A.A., Kato, M., Suzuki, H., Miyata, T. and Nakashima, I.: Level of HgC12-mediated phosphorylation of intracellular proteins determines death of thymic T-lymphocytes with or without DNA fragmentation. *J. Cell. Biochem.*, 71 (1998) 243-253; *C.A.*, 130 (1999) 21495.
- 878 Bergon Jimenez, E. and Bergon Sendin, M.: (Transferability of results between electrophoretic methods for the assessment of a monoclonal component). *Rev. Soc. Esp. Bioquim. Clin. Patol. Mol.*, 17 (1998) 227-231; *C.A.*, 129 (1998) 186317u.
- 879 Dong, J., Gao, S. and Lopez, J.A.: Synthesis, assembly, and intracellular transport of the platelet glycoprotein Ib-IX-V complex. *J. Biol. Chem.*, 273 (1998) 31449-31454.
- 880 Gedde, M.M., Yang, E. and Huestis, W.H.: Resolution of the paradox of red cell shape changes in low and high pH. *Biochim. Biophys. Acta*, 1417 (1999) 246-253.
- 881 Gysler, J., Schunack, W. and Jaehde, U.: Monitoring of chemotherapy-induced proteinuria using capillary zone electrophoresis. *J. Chromatogr. B*, 721 (1999) 207-216.
- 882 Haider, K.H. and Stimson, W.H.: Radiolabeled monoclonal antibodies (McAb): an alternate approach to the conventional methods for the assessment of cardiomyocyte damage in an experimental brain-death pig model. *Arch. Pharmacal Res.*, 21 (1998) 496-502; *C.A.*, 130 (1999) 35121.
- 883 Housby, J.N. and Southern, E.M.: Fidelity of DNA ligation: a novel experimental approach based on the polymerization of libraries of oligonucleotides. *Nucleic Acids Res.*, 26 (1998) 4259-4266; *C.A.*, 130 (1999) 22078.
- 884 Ji, P. and Haimovich, B.: Integrin  $\alpha_{IIb}\beta_3$ -mediated pp125FAK phosphorylation and platelet spreading on fibrinogen are regulated by PI 3-kinase. *Biochim. Biophys. Acta*, 1448 (1999) 543-552.
- 885 Jones, R.M.L., Schweikart, F., Frutiger, S., Jaton, J.-C. and Hughes, G.J.: Thiol-disulfide redox buffers maintain a structure of immunoglobulin A that is essential for optimal *in vitro* binding to secretory component. *Biochim. Biophys. Acta*, 1429 (1998) 265-274.
- 886 Kit, Yu.Ya., Shipitsin, M.V., Semenov, D.V., Richter, V.A. and Nevinsky, G.A.: (Phosphorylation of lipids tightly bound to the secretory immunoglobulin in the antibody preparations from human breast milk possessing protein kinase activity). *Biokhimiya (Moscow)*, 63 (1998) 852-858.

- 887 Lefevre, F. and Gillery, P.: (The presence of residual fibrinogen: a frequent trap in the interpretation of serum protein electrophoresis). *Ann. Biol. Clin.*, 55 (1997) 238-240; C.A., 130 (1999) 22413.
- 888 Lim, S., Manusu, H.P., Gooley, A.A., Williams, K.L. and Rylatt, D.B.: Purification of monoclonal antibodies from ascitic fluid using preparative electrophoresis. *J. Chromatogr. A*, 827 (1998) 329-335.
- 889 Nakagawa, M., Matsuo, T., Fujimoto, S. and Nishio, A.: Purification and characterization of 38-kDa protein in plasma of dietary magnesium-deficient rat. *Magnesium Res.*, 11 (1998) 171-178; C.A., 130 (1999) 13459.
- 890 Su, C.-Y., Shiao, M.-S. and Wang, C.-T.: Predominant inhibition of ganodermic acid S on the thromboxane A<sub>2</sub>-dependent pathway in human platelets response to collagen. *Biochim. Biophys. Acta*, 1437 (1999) 223-234.
- 891 Tleugabulova, D., Falcón, V. and Pentón, E.: Evidence for the denaturation of recombinant hepatitis B surface antigen on aluminium hydroxide gel. *J. Chromatogr. B*, 720 (1998) 153-163.
- 892 Yeh, C.-H., Peng, H.-C., Yih, J.-B. and Huang, T.-F.: A new short chain RGD-containing disintegrin, accutin, inhibits the common pathway of human platelet aggregation. *Biochim. Biophys. Acta*, 1425 (1998) 493-504.
- 893 Zhang, W.-M., Finne, P., Leinonen, J., Vesalainen, S., Mordling, S., Rannikko, S. and Stenman, U.-H.: Characterization and immunological determination of the complex between prostate-specific antigen and  $\alpha_2$ -macroglobulin. *Clin. Chem. (Washington)*, 44 (1998) 2471-2479.

For additional information see C.A.:  
130 (1999) 883, 22532.

See also 787, 839, 901, 917, 966, 967, 1056.

#### 19f. Structural and muscle proteins

- 894 Beall, A., Epstein, A., Woodrum, D. and Brophy, C.M.: Cyclosporine-induced renal artery smooth muscle contraction is associated with increases in the phosphorylation of specific contractile regulatory proteins. *Biochim. Biophys. Acta*, 1449 (1999) 41-49.
- 895 Boehm, M.L., Kendall, T.L., Thompson, V.F. and Goll, D.E.: Changes in the calpains and calpastatin during postmortem storage of bovine muscle. *J. Anim. Sci.*, 76 (1998) 2415-2434; C.A., 130 (1999) 3220.
- 896 Brandt, J., Krogh, T.N., Jensen, C.H., Frederiksen, J.K. and Teisner, B.: Thermal instability of the trimeric structure of the N-terminal propeptide of human procollagen type I in relation to assay technology. *Clin. Chem. (Washington)*, 45 (1999) 47-53.
- 897 DalleDonne, I., Milzani, A., Ciapparelli, C., Comazzi, M., Gioria, M.R. and Colombo, R.: The assembly of Ni<sup>2+</sup>-actin: some peculiarities. *Biochim. Biophys. Acta*, 1426 (1999) 32-42.
- 898 DiSanto, M.E., Wang, Z., Menon, C., Zheng, Y., Chacko, T., Hypolite, J., Broderick, G., Wein, A.J. and Chacko, S.: Expression of myosin isoforms in smooth muscle cells in the corpus cavernosum penis. *Am. J. Physiol.*, 275 (1998) C976-C987; C.A., 130 (1999) 36248.

- 899 Imamura, Y., Steiglitz, B.M. and Greenspan, D.S.: Bone morphogenetic protein-1 processes the NH<sub>2</sub>-terminal propeptide, and a furin-like proprotein convertase processes the COOH-terminal propeptide of pro- $\alpha$ 1(V)collagen. *J. Biol. Chem.*, 273 (1998) 27511-27517.
- 900 Joyeux, M., Lagneux, C., Bricca, G., Yellon, D.M., Demenge, P. and Ribout, C.: Heat stress-induced resistance to myocardial infarction in the isolated heart from transgenic [(mREN-2)27] hypertensive rats. *Cardiovasc. Res.*, 40 (1998) 124-130; C.A., 130 (1999) 36670.
- 901 Katrukha, A.G., Bereznikova, A.V., Filatov, V.L., Esakova, T.V., Kolosova, O.V., Pettersson, K., Lövgren, T., Bulargina, T.V., Trifonov, I.R. et al.: Degradation of cardiac troponin I: implication for reliable immunodetection. *Clin. Chem. (Washington)*, 44 (1998) 2433-2440.
- 902 Kimura, F., Nakada, K., Yonemura, I., Hirabayashi, T. and Miyazaki, J.-I.: Tissue-specific distribution of breast-muscle-type and leg-muscle-type troponin T isoforms in birds. *Biochim. Biophys. Acta*, 1426 (1999) 505-512.
- 903 Maruta, S., Uyehara, Y., Horima, K., Sugimoto, Y. and Wakabayashi, K.: Formation of the myosin-ADP-gallium fluoride complex and its solution structure by small-angle synchrotron X-ray scattering. *J. Biochem. (Tokyo)*, 125 (1999) 177-185.
- 904 Pineiro, C., Barros-Velazquez, J., Sotelo, C.G., Perez-Martin, R.I. and Gallardo, J.M.: Two-dimensional electrophoretic study of the water-soluble protein fraction in white muscle of gadoid fish species. *J. Agric. Food Chem.*, 46 (1998) 3991-3997.
- 905 Sanhai, W.R., Eckert, B.S. and Yeagle, P.L.: Altering the state of phosphorylation of rat liver keratin intermediate filaments by ethanol treatment *in vivo* changes their structure. *Biochim. Biophys. Acta*, 1429 (1999) 459-466.
- 906 Stephens, R.E.: Electrophoretic resolution of tubulin and tektin subunits by differential interaction with long-chain alkyl sulfates. *Anal. Biochem.*, 265 (1998) 356-360.
- 907 Urakami, Y., Okuda, M., Masuda, S., Saito, H. and Inui, K.-I.: Functional characteristics and membrane localization of rat multispecific organic cation transporters, OTC1 and OTC2, mediating tubular secretion of cationic drugs. *J. Pharmacol. Exp. Ther.*, 287 (1998) 800-805.
- 908 Voloshchuk, S.G., Belikova, Yu.O., Klushnik, T.P., Benevolensky, D.S. and Saks, V.A.: (Comparative analysis of respiration parameters and protein content of skinned fibers from different types of rat muscles). *Biokhimiya (Moscow)*, 63 (1998) 190-193.

See also 791, 986, 1062, 1193.

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

- 909 Albig, W., Runge, D.M., Kratzmeier, M. and Doenecke, D.: Heterologous expression of human H1 histones in yeast. *FEBS Lett.*, 435 (1998) 245-250; C.A., 130 (1999) 941.
- 910 Lu, Y. and Lotan, R.: Transcriptional regulation by butyrate of mouse galectin-1 gene in embryonal carcinoma cells. *Biochim. Biophys. Acta*, 1444 (1999) 85-91.
- 911 Talasz, H., Sapojnikova, N., Hellinger, W., Loidner, H. and Puschendorf, B.: *In vitro* binding of H1 histone subtypes to nucleosomal organized mouse mammary tumor virus long terminal repeat promotor. *J. Biol. Chem.*, 273 (1998) 32236-32243.

- 912 Thorne, A.W., Cary, P.D. and Crane-Robinson, C.: Extraction and separation of core histones and non-histone chromosomal proteins. In: Gould, H. (Editor), *Chromatin*, Oxford University Press, Oxford, 1998, pp. 35-57; C.A., 129 (1998) 227732w.
- 913 Wang, D. and Kudlow, J.E.: Purification and characterization of TEF1, a transcription factor that controls the human transforming growth factor- $\alpha$  promoter. *Biochim. Biophys. Acta*, 1449 (1999) 50-62.
- See also 939, 1098, 1118.
- 19h. *Chromoproteins and metalloproteins*
- 914 Doppenschmitt, S., Langguth, P., Regardh, C.G., Andersson, T.B., Hilgendorf, C. and Spahn-Langguth, H.: Characterization of binding properties to human P-glycoprotein: development of a [ $^3$ H]verapamil radioligand-binding assay. *J. Pharmacol. Exp. Ther.*, 288 (1999) 348-357.
- 915 Kerwin, B.A., Akers, M.J., Apostol, I., Moore-Einsel, C., Etter, J.E., Hess, E., Lippincott, J., Levine, J., Mathews, A.J., Revilla-Sharp, P. et al.: Acute and long-term stability studies of deoxy hemoglobin and characterization of ascorbate-induced modifications. *J. Pharm. Sci.*, 88 (1999) 79-88.
- 916 Lepeshova, G.I. and Usanov, S.A.: Comparative structural and immunochemical characterization of recombinant and natural cytochrome P450<sub>SCC</sub> (CYPXIAI). *Biokhimiya (Moscow)*, 63 (1998) 265-276.
- 917 Paleari, R., Paglietti, E., Mosca, A., Mortarino, M., Maccioni, L., Satta, S., Cao, A. and Galanello, R.: Posttranslational deamidation of proteins: the case of hemoglobin J Sardegna [ $\alpha$ 50(CD8)His $\rightarrow$ Asn $\rightarrow$ Asp]. *Clin. Chem. (Washington)*, 45 (1999) 21-28.
- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 918 Ginger, M.R., Piotte, C.P., Otter, D.E. and Grigor, M.R.: Identification, characterisation and cDNA cloning of two caseins from the common brushtail possum (*Trichosurus vulpecula*). *Biochim. Biophys. Acta*, 1427 (1999) 92-104.
- 919 Jennings, B.R., Spearman, C.W.N., Kirsch, R.E. and Shephard, E.G.: A novel high molecular weight fibrinogenase from the venom of *Bitis arietans*. *Biochim. Biophys. Acta*, 1427 (1999) 82-91.
- 920 Kuwata, H., Yip, T.-T., Tomita, M. and Hutchens, T.W.: Direct evidence of the generation in human stomach of an antimicrobial peptide domain (lactoferricin) from ingested lactoferrin. *Biochim. Biophys. Acta*, 1429 (1998) 129-141.
- 921 Oshikawa, K. and Terada, S.: Ussuristatin 2, a novel KGD-bearing disintegrin from *Agristostrodon ussuriensis* venom. *J. Biochem. (Tokyo)*, 125 (1999) 31-35.
- 922 Qian, Y.-c., Fan, C.-y., Gong, Y. and Yang, S.-l.: cDNA sequence analysis and expression of four long neurotoxin homologues from *Naja naja atra*. *Biochim. Biophys. Acta*, 1443 (1998) 233-238.
- 923 Siigur, E., Samel, M., Tõnismägi, K., Subbi, J., Reintamm, T. and Siigur, J.: Isolation, properties and N-terminal amino acid sequence of a factor V activator from *Vipera lebetina* (Levantine viper) snake venom. *Biochim. Biophys. Acta*, 1429 (1998) 239-248.
- 924 Soares, A.M., Anzalone Pedrosa, L.H., Fontes, M.R.M., da Silva, R.J. and Giglio, J.R.: Polyacrylamide gel electrophoresis as a tool for the taxonomic identification of snakes from the Elapidae and Viperidae families. *J. Venomous Anim. Toxins*, 4 (1998) 137-142; C.A., 130 (1999) 35237.
- 925 Tapia, J.A., Camello, C., Jensen, R.T. and García, L.J.: EGF stimulates tyrosine phosphorylation of focal adhesion kinase (p125<sup>FAK</sup>) and paxillin in rat pancreatic acini by a phospholipase C-independent process that depends on phosphatidylinositol 3-kinase, the small GTP-binding protein, p21<sup>ras</sup>, and the integrity of the actin cytoskeleton. *Biochim. Biophys. Acta*, 1448 (1999) 486-499.
- 926 Tietz, P., de Groen, P.C., Anderson, N.L., Sims, C., Esquer-Blasco, R., Meheus, L., Raymackers, J., Dauwe, M. and LaRusso, N.F.: Cholangiocyte-specific rat liver proteins identified by establishment of a two-dimensional gel protein database. *Electrophoresis (Weinheim)*, 19 (1998) 3207-3212.
- See also 708, 790, 818, 905, 907, 971, 1064, 1229, 1356.
- 19j. *Proteins of brain, cerebrospinal fluid and eye*
- 927 Boggs, J.M., Rangaraj, G. and Koshy, K.M.: Analysis of the membrane-interacting domains of myelin basic protein by hydrophobic photolabeling. *Biochim. Biophys. Acta*, 1417 (1999) 254-266.
- 928 Chau, M., Radeke, M.J., de Inés, C., Barasoain, I., Kohlstaedt, L.A. and Feinstein, S.C.: The microtubule-associated protein tau cross-links to two distinct sites on each  $\alpha$  and  $\beta$  tubulin monomer via separate domains. *Biochemistry*, 37 (1998) 17692-17703.
- 929 Davidsson, P., Westman, A., Puchades, M., Nilsson, C.L. and Blennow, K.: Characterization of proteins from human cerebrospinal fluid by a combination of preparative two-dimensional liquid-phase electrophoresis and matrix-assisted laser desorption/ionization time-of-flight mass spectrometry. *Anal. Chem.*, 71 (1999) 642-647.
- 930 Jungblut, P.R., Otto, A., Favor, J., Lowe, M., Muller, E.-C., Kastner, M., Sperling, K. and Klose, J.: Identification of mouse crystallins in 2D protein patterns by sequencing and mass spectrometry. Application to cataract mutants. *FEBS Lett.*, 435 (1998) 131-137; C.A., 130 (1999) 2355.
- 931 Lee, K.-W., Simpson, G. and Ortwerth, B.: A systematic approach to evaluate the modification of lens proteins by glycation-induced crosslinking. *Biochim. Biophys. Acta*, 1453 (1999) 141-151.
- 932 Nishio, Y., Minami, A., Kato, H., Kaneda, K. and Nishihira, J.: Identification of macrophage migration inhibitory factor (MIF) in rat peripheral nerves: its possible involvement in nerve regeneration. *Biochim. Biophys. Acta*, 1453 (1999) 74-82.
- 933 Ogden, A.T., Nunes, I., Ko, K., Wu, S., Hines, C.S., Wang, A., Hegde, R.S. and Lang, R.A.: GRIFIN, a novel lens-specific protein related to the galectin family. *J. Biol. Chem.*, 273 (1998) 28889-28896.

For additional information see C.A.:  
130 (1999) 37307.

See also 761.

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

- 934 Bernard-Gallon, D., de Oliveira, F., Favy, D., Hizel, C., Maurizis, J.-C., Rio, P. and Bignon, Y.-J.: Electrophoresis of BRCA1 onco-suppressor. *Oncol. Rep.*, 5 (1998) 995-997; C.A., 129 (1998) 200025f.
- 935 Gilles, C., Bassuk, J.A., Pulyaeva, H., Sage, E.H., Foidart, J.-M. and Thompson, E.W.: SPARC/osteonectin induces matrix metalloproteinase 2 activation in human breast cancer cell lines. *Cancer Res.*, 58 (1998) 5529-5536.
- 936 Grauer, L.S., Lawler, K.D., Marignac, J.L., Kumar, A., Goel, A.S. and Wolpert, R.L.: Identification, purification, and subcellular localization of prostate-specific membrane antigen PSM protein in the LNCaP prostatic carcinoma cell line. *Cancer Res.*, 58 (1998) 4787-4789.
- 937 Hanash, S.M.: Protein markers for lung cancer as identified by the computerized analysis of 2-D gels and application. *PCT Int. Appl.* WO 98 35,985 (Cl. C07K14/00), 20 Aug. 1998, US Appl. 38,819, 12 Feb. 1997; 51 p.; C.A., 129 (1998) 200171a.
- 938 Hochstrasser, D.F., Reymond, M.A. and Peinado, M.A.: Diagnosis of epithelial cell abnormalities and cancer using protein electrophoresis. *PCT Int. Appl.* WO 98 43,091 (Cl. G01N33/574), 1 Oct. 1998, GB Appl. 97/5,949, 21 Mar. 1997; 32 pp.; C.A., 129 (1998) 272689y.
- 939 Keesee, S.K., Marchese, J., Meneses, A., Potz, D., Garcia-Cuellar, C., Szaro, R.P., Solorza, G., Osornio-Vargas, A., Mohar, A., de la Garza, J.G. and Wu, Y.-J.: Human cervical cancer-associated nuclear matrix proteins. *Exp. Cell Res.*, 244 (1998) 14-25; C.A., 130 (1999) 36574.
- 940 Kumari, S.R., Mendoza-Alvarez, H. and Alvarez-Gonzalez, R.: Functional interactions of p53 with poly(AFP-ribose) polymerase (PARP) during apoptosis following DNA damage: covalent poly(ADP-ribosylation) of p53 by exogenous PARP and noncovalent binding of p53 to the Mr 85,000 proteolytic fragment. *Cancer Res.*, 58 (1998) 5075-5078.
- 941 Li, H., Zhao, L., Yang, Z., Funder, J.W. and Liu, J.: Telomerase is controlled by protein kinase C $\alpha$  in human breast cancer cells. *J. Biol. Chem.*, 273 (1998) 33436-33442.
- 942 Mannello, F., Malatesta, M., Luchetti, F., Papa, S., Battistelli, S. and Gazzanelli, G.: Immunoreactivity, ultrastructural localization, and transcript expression of prostate-specific antigen in human euroblastoma cell lines. *Clin. Chem. (Washington)*, 45 (1999) 78-84.
- 943 Matsuda, H.: (Characterization of phenolic glycolipid-I (PGL-I) like antigen in renal cell carcinoma). *Nippon Hinyokika Gakkai Zasshi*, 89 (1998) 683-692; C.A., 130 (1999) 23437.
- 944 Schwarz, M.J., Muller, N., Korschenhausen, D., Kirsch, K.H., Penning, R., Ackenheil, M., Johnson, J.P. and Hampel, H.: Melanoma-associated adhesion molecule MUC 18/MCAM(CD 146) and transcriptional regulator Mader in normal human CNS. *NeuroImmunoModulation*, 5 (1998) 270-276; C.A., 130 (1999) 2361.
- 945 Shoji, Y., Aoyagi, Y., Kawakami, T., Isemura, S. and Isemura, M.: Cell adhesion activity for murine carcinoma cells of a wheat germ 55-kDa protein with binding affinity for animal extracellular matrix proteins. *Biochim. Biophys. Acta*, 1426 (1999) 498-504.

- 946 Spencer, V.A., Coutts, A.S., Samuel, S.K., Murphy, L.C. and Davie, J.R.: Estrogen regulates the association of intermediate filament proteins with nuclear DNA in human breast cancer cells. *J. Biol. Chem.*, 273 (1998) 29093-29097.
- 947 Wirth, P.J., Luo, L.-d., Hoang, T. and Benjamin, T.: Two-dimensional polyacrylamide gel electrophoresis of cancer-associated proteins. *Recent Results Cancer Res.*, 143 (1997) 145-160; C.A., 129 (1998) 287469a.
- 948 Xu, C.-S., Jin, A.-L., Xia, M., Li, Y.-Z. and Xiang, H.: (Modification and degradation of the C6 rat glioma cellular HSP68 *in vivo* and *in vitro*). *Shengwu Huaxue Yu Shengwu Wuli Xuebao*, 30 (1998) 179-184; C.A., 130 (1999) 12685.
- See also 818, 1336.
- 19l. Specific binding and receptor proteins
- 949 Anderson, J., Bartley, C.R., Lerch, R.A., Gray, W.G.N., Friesen, P.D. and Gorski, J.: Estrogen receptor  $\alpha$  requires no accessory factors for high-affinity binding to a consensus response element. *Biochemistry*, 37 (1998) 17287-17298.
- 950 Barracough, R.: Calcium-binding protein S100A4 in health and disease. *Biochim. Biophys. Acta*, 1448 (1998) 190-199.
- 951 Blaukat, A., Herzer, K., Schroeder, C., Bachmann, M., Nash, N. and Müller-Esterl, W.: Overexpression and functional characterization of kinin receptors reveal subtype-specific phosphorylation. *Biochemistry*, 38 (1999) 1300-1309.
- 952 Chakravortty, D. and Kumar K.S.N.: Interaction of lipopolysaccharide with human small intestinal lamina propria fibroblasts favors neutrophil migration and peripheral blood mononuclear cell adhesion by the production of proinflammatory mediators and adhesion molecules. *Biochim. Biophys. Acta*, 1453 (1999) 261-272.
- 953 Dong, L.-W., Yang, J., Tong, L.-J., Tang, C. and Liu, M.-S.: Transcriptional regulation of  $\alpha_1$ -adrenoceptor gene in the rat liver during different phases of sepsis. *Biochim. Biophys. Acta*, 207-215.
- 954 Ernsberger, P., Ishizuka, T., Liu, S., Farrell, C.J., Bedol, D., Koletsky, R.J. and Friedman, J.E.: Mechanisms of antihyperglycemic effects of moxonidine in the obese spontaneously hypertensive Koletsky rat (SHROB). *J. Pharmacol. Exp. Ther.*, 288 (1999) 139-147.
- 955 Foucaud, L., Grillasca, J., Niot, I., Domingo, N., Lafont, H., Planells, R. and Besnard, P.: Output of liver fatty acid-binding protein (L-FABP) in bile. *Biochim. Biophys. Acta*, 1436 (1999) 593-599.
- 956 Grover-McKay, M., Walsh, S.A. and Thompson, S.A.: Glucose transporter 3 (GLUT3) protein is present in human myocardium. *Biochim. Biophys. Acta*, 1416 (1999) 145-154.
- 957 Hamamoto, R., Yamada, K., Kamihira, M. and Iijima, S.: Differentiation and proliferation of primary rat hepatocytes cultured as spheroids. *J. Biochem. (Tokyo)*, 124 (1998) 972-979.
- 958 Ivanenkov, V.V., Felici, F. and Menon, A.G.: Uptake and intracellular fate of phage display vectors in mammalian cells. *Biochim. Biophys. Acta*, 1448 (1999) 450-462.
- 959 Kako, K., Wakamatsu, H., Hamada, T., Banasik, M., Ohata, K., Niki-Kuroiwa, T., Suzuki, S., Takeuchi, J.-I. and Ishida, N.: Examination of DNA-binding activity of neuronal transcription factors by electrophoretic mobility shift assay. *Brain Res. Protoc.*, 2 (1998) 243-249; C.A., 129 (1998) 257204t.

- 960 Kawabe, Y., Suzuki, T., Hayashi, M., Hamakubo, T., Sato, R. and Kodama, T.: The physiological role of sterol regulatory element-binding protein-2 in cultured human cells. *Biochim. Biophys. Acta*, 1436 (1999) 307-318.
- 961 Kim, D.-H., Inagaki, Y., Suzuki, T., Ioka, R.X., Yoshioka, S.Z., Magoori, K., Kang, M.-J., Cho, Y., Nakano, Z., Liu, Q., Fujino, T., Suzuki, H., Sasano, H. and Yamamoto, T.T.: A new low density lipoprotein receptor related protein, LRP5, is expressed in hepatocytes and adrenal cortex, and recognizes apolipoprotein E. *J. Biochem. (Tokyo)*, 124 (1998) 1072-1076.
- 962 Kim, J.-W. and Ahn, Y.-H.: CCAAT/enhancer binding protein regulates the promoter activity of the rat GLUT2 glucose transporter gene in liver cells. *Biochem. J.*, 336 (1998) 83-90.
- 963 Maki, M., Yamaguchi, K., Kitaura, Y., Satoh, H. and Hitomi, K.: Calcium-induced exposure of a hydrophobic surface of mouse ALG-2, which is a member of the penta-EF-hand protein family. *J. Biochem. (Tokyo)*, 124 (1998) 1170-1177.
- 964 Menke, A., Geerling, I., Giehl, K., Vogelmann, R., Reinshagen, M. and Adler, G.: Transforming growth factor- $\beta$ -induced upregulation of transforming growth factor- $\beta$  receptor expression in pancreatic regeneration. *Biochim. Biophys. Acta*, 1449 (1999) 178-185.
- 965 Movitz, C., Sjölin, C. and Dahlgren, C.: Cleavage of annexin I in human neutrophils is mediated by a membrane-localized metalloprotease. *Biochim. Biophys. Acta*, 1416 (1999) 101-108.
- 966 Mushahid K.M., Muzammil, S., Kumar, Y. and Tayyab, S.: Visualization of serum albumin on electrophoretic gels using the specific ligand bilirubin. *J. Biochem. Biophys. Methods*, 37 (1998) 47-95; C.A., 130 (1999) 78320.
- 967 Neilsen, J.L., Abildtrup, A., Christensen, J., Watson, P., Cox, A., and McLeod, C.W.: Laser ablation inductively coupled plasma-mass spectrometry in combination with gel electrophoresis: a new strategy for speciation of metal binding serum proteins. *Spectrochim. Acta, Part B*, 53B (1998) 339-345; C.A., 129 (1998) 158834s.
- 968 Raap, D.K., Evans, S., Garcia, F., Li, Q., Muma, N.A., Wolf, W.A., Battaglia, G. and van de Kar, L.D.: Daily injections of fluoxetine induce dose-dependent desensitization of hypothalamic 5-HT<sub>1A</sub> receptors: reductions in neuroendocrine responses to 8-OH-DPAT and in levels of G<sub>z</sub> and G<sub>i</sub> proteins. *J. Pharmacol. Exp. Ther.*, 288 (1999) 98-106.
- 969 Reaven, E., Lua, Y., Nomoto, A., Temel, R., Williams, D.L., van der Westhuyzen, D.R. and Azhar, S.: The selective pathway and a high-density lipoprotein receptor (SR-BI) in ovarian granulosa cells of the mouse. *Biochim. Biophys. Acta*, 1436 (1999) 565-576.
- 970 Rhodes, D. and Fairall, L.: Analysis of sequence-specific DNA-binding proteins. In: Creighton, T.E. (Editor), *Protein Funct.* (2nd Ed.), IRL Press, Oxford, 1997, pp. 215-244; C.A., 129 (1998) 257089j - a review with 41 refs.
- 971 Sorrentino, S., D'Alessandro, A.M., Maras, B., di Cicco, L., D'Andrea, G., de Prisco, R., Bossa, F., Libonati, M. and Oratore, A.: Purification of a 76-kDa iron-binding protein from human seminal plasma by affinity chromatography specific for ribonuclease: structural and functional identity with milk lactoferrin. *Biochim. Biophys. Acta*, 1430 (1999) 103-110.
- 972 Stambolsky, D.V., Kuzmenko, Y.S., Philippova, M.P., Bochkov, V.N., Bespalova, Z.D., Azmuko, A.A., Kashirina, N.M., Vlasik, T.N., Tkachuk, V.A. and Resink, T.J.: Identification of 130 kDa cell surface LDL-binding protein from smooth muscle cells as a partially processed T-cadherin precursor. *Biochim. Biophys. Acta*, 1416 (1999) 155-160.
- 973 Taguchi, E., Muramatsu, H., Fan, Q.-W., Kurosawa, N., Sobue, G. and Muramatsu, T.: Zep: a novel zinc finger protein containing a large proline-rich domain. *J. Biochem. (Tokyo)*, 124 (1998) 1220-1228.
- 974 Van Ginkel, P.R., Gee, R.L., Walker, T.M., Hu, D.-N., Heizmann, C.W. and Polans, A.S.: The identification and differential expression of calcium-binding proteins associated with ocular melanoma. *Biochim. Biophys. Acta*, 1448 (1998) 290-297.
- 975 Vaziri, N.D., Liang, K. and Barton, C.H.: Effect of increased afterload on cardiac lipoprotein lipase and VLDL receptor expression. *Biochim. Biophys. Acta*, 1436 (1999) 577-584.
- 976 Vogt, A., Rice, R.L., Settimeni, C.E., Yokokawa, F., Yokokawa, S., Wipf, P. and Lazo, J.S.: Disruption of insulin-like growth factor-1 signaling and down-regulation of Cdc2 by SC- $\alpha\alpha\delta\delta$ 9, a novel small molecule antisignaling agent identified in a targeted array library. *J. Pharmacol. Exp. Ther.*, 287 (1998) 806-813.
- 977 Xie, Y., Lashuel, H.A., Miroy, G.J., Dikler, S. and Kelly, J.W.: Recombinant human retinol-binding protein refolding, native disulfide formation, and characterization. *Protein Expression Purif.*, 14 (1998) 31-37; C.A., 130 (1999) 35312.
- 978 Yoshikawa, F., Iwasaki, H., Michikawa, T., Furuichi, T. and Mikoshiba, K.: Trypsinized cerebellar inositol 1,4,5-trisphosphate receptor. Structural and functional coupling of cleaved ligand binding and channel domains. *J. Biol. Chem.*, 274 (1999) 316-327.
- 979 Yung, L.Y., Joshi, S.A., Chan, R.Y.K., Chan, J.S.C., Pei, G. and Wong, Y.H.: G $\alpha$ L1 (G $\alpha$ 14) couples the opioid receptor-like<sub>1</sub> receptor to stimulation of phospholipase C. *J. Pharmacol. Exp. Ther.*, 288 (1999) 232-238.
- For additional information see C.A.:  
130 (1999) 12095.
- See also 709, 835, 925, 980, 1103, 1244.
- 19m. Urinary proteins*
- 980 Utsumi, K., Itoh, K., Kase, R., Shimimoto, M., Yamamoto, N., Katagiri, Y., Tanoue, K., Kotani, M., Ozawa, T., Oguchi, T. and Sakuraba, H.: Urinary excretion of the vitronectin receptor (integrin  $\alpha\beta$ 3) in patients with Fabry disease. *Clin. Chim. Acta*, 279 (1999) 55-68.
- 19n. Other proteins (incl. proteinous inhibitors of enzymic activity)*
- 981 Benzie, J.A.H. and Williams, S.T.: Phylogenetic relationships among giant clam species (Mollusca: Tridacnidae) determined by protein electrophoresis. *Mar. Biol. (Berlin)*, 132 (1998) 123-133; C.A., 130 (1999) 35895.
- 982 Dosio, F., Arpicco, S., Canevari, S., Figini, M. and Gastaldi, D.: Single-step purification of immunotoxins containing a high ionic charge ribosome inactivating protein clavine by carboxymethyl high-performance membrane chromatography. *J. Chromatogr. A*, 830 (1999) 329-335.

- 983 Duportets, L., Dufour, M.-C., Couillaud, F. and Gadenne, C.: Biosynthetic activity of corpora allata, growth of sex accessory glands and mating in the male moth *Agrotis ipsilon* (Hufnagel). *J. Exp. Biol.*, 201 (1998) 2425-2432; C.A., 130 (1999) 12520.
- 984 Gassel, M., Siebers, A., Epstein, W. and Altendorf, K.: Assembly of the Kdp complex, the multi-subunit K<sup>+</sup>-transport ATPase of *Escherichia coli*. *Biochim. Biophys. Acta*, 1415 (1998) 77-84.
- 985 Hiraga, K., Seeram, S.S., Tate, S.-i., Tanaka, N., Kainosh, M. and Oda, K.: Mutational analysis of the reactive site loop of Streptomyces metalloproteinase inhibitor, SMPI. *J. Biochem. (Tokyo)*, 125 (1999) 202-209.
- 986 Jensen, C., Andersen, S.O. and Roepstorff, P.: Primary structure of two major cuticular proteins from the migratory locust, *Locusta migratoria*, and their identification in polyacrylamide gels by mass spectrometry. *Biochim. Biophys. Acta*, 1429 (1998) 151-162.
- 987 Kawamura, K., Hayata, D., Fujiwara, S. and Yubisui, T.: Serine protease inhibitors expressed in the process of budding of tunicates as revealed by EST analysis. *J. Biochem. (Tokyo)*, 124 (1998) 1004-1012.
- 988 Lee, R.S.F., Wheeler, T.T. and Peterson, A.J.: Large-format, two-dimensional polyacrylamide gel electrophoresis of ovine perimplantation uterine luminal fluid proteins: identification of aldose reductase, cytoplasmic actin, and transferrin as conceptus-synthesized proteins. *Biol. Reprod.*, 59 (1998) 743-752; C.A., 130 (1999) 1940.
- 989 Lindahl, M., Ståhlbom, B., Svartz, J. and Tagesson, C.: Protein patterns of human nasal and bronchoalveolar lavage fluids analyzed with two-dimensional gel electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3222-3229.
- 990 Prevot, G.I., Laurent-Winter, C., Feldmann, A.M., Rohrhan, F. and Bourguin, C.: Two-dimensional gel analysis of midgut proteins of *Anopheles stephensi* lines with different susceptibility to *Plasmodium falciparum* infection. *Insect. Mol. Biol.*, 7 (1998) 375-383; C.A., 129 (1998) 257224z.
- 991 Shimazaki, Y. and Manabe, T.: Separation of chicken egg proteins using two-dimensional electrophoresis in the absence of denaturing agents. *Seibutsu Butsuri Kagaku*, 42 (1998) 155-159; C.A., 129 (1998) 272540t.
- 992 Von Wolff, M., Beier-Hellwig, K., Sterzik, K. and Beier, H.M.: (Electrophoretic analysis of human uterine diagnosis of endometrial function). *Geburtshilfe Frauenheilkd.*, 58 (1998) 297-304; C.A., 129 (1998) 287468z.
- 993 Zhang, J., Zhang, L., Zhao, S. and Lee, E.Y.C.: Identification and characterization of the human HCG V gene product as a novel inhibitor of protein phosphatase-1. *Biochemistry*, 37 (1998) 16728-16734.
- 994 Zhou, H., Meng, H., Chen, Z. and Cao, C.: (Electrophoretic analysis of protein composition in gingival crevicular fluid). *Zhonghua Kouqiang Yixue Zazhi*, 33 (1998) 109-112; C.A., 130 (1999) 1930.
- 995 Zhu, B., Pu, Q., Chen, S., Chen, N., Zhang, J., Lu, Z. and Yu, Q.: (Cloning and sequencing and expression of human bone morphogenetic protein 3 (BMP-3)). *Disi Junyi Daxue Xuebao*, 19 (1998) 249-251; C.A., 130 (1999) 21099.
20. ENZYMES AND ENZYME ACTIVITY ESTIMATION
- 996 Freitag, R.: Utilization of enzyme-substrate interactions in analytical chemistry. *J. Chromatogr. B*, 722 (1999) 279-301 - a review with 96 refs.
- 20a. Oxidoreductases
- 997 Furster, C.: Hepatic and extrahepatic dehydrogenation/isomerization of 5-cholestene-3 $\beta$ ,7 $\alpha$ -diol: localization of 3 $\beta$ -hydroxy- $\Delta^5$ -C<sub>27</sub>-steroid dehydrogenase in pig tissues and subcellular fractions. *Biochim. Biophys. Acta*, 1436 (1999) 343-353.
- 998 Gomi, K. and Horiuchi, T.: Purification and characterization of a new enzyme, N-alkylglycine oxidase from *Cladosporium* sp. G-10. *Biochim. Biophys. Acta*, 1429 (1999) 439-445.
- 999 Imamura, Y., Migita, T., Otagiri, M., Choshi, T. and Hibino, S.: Purification and catalytic properties of a tetrameric carbonyl reductase from rabbit heart. *J. Biochem. (Tokyo)*, 125 (1999) 41-47.
- 1000 Juránek, I., Suzuki, H. and Yamamoto, S.: Affinities of various mammalian arachidonate lipoxygenases and cyclooxygenases for molecular oxygen as substrate. *Biochim. Biophys. Acta*, 1436 (1999) 509-518.
- 1001 Katsume, N., Sunaga, K., Aishita, H., Chuang, D.-M. and Ishitani, R.: ONO-1603, a potential antidiementia drug, delays age-induced apoptosis and suppresses overexpression of glyceraldehyde-3-phosphate dehydrogenase in cultured central nervous system neurons. *J. Pharmacol. Exp. Ther.*, 288 (1999) 6-13.
- 1002 Kliebenstein, D.J., Monde, R.-A. and Last, R.L.: Superoxide dismutase in *Arabidopsis*: an eclectic enzyme family with disparate regulation and protein localization. *Plant Physiol.*, 118 (1998) 637-650; C.A., 130 (1999) 22863.
- 1003 Matsuura, K., Shiraishi, H., Hara, A., Sato, K., Deyashiki, Y., Ninomiya, M. and Sakai, S.: Identification of a principal mRNA species for human 3 $\alpha$ -hydroxysteroid dehydrogenase isoform (AKR1C3) that exhibits high prostaglandin D<sub>2</sub> 11-ketoreductase activity. *J. Biochem. (Tokyo)*, 124 (1998) 940-946.
- 1004 Morii, S., Fujii, C., Miyoshi, T., Iwami, M. and Itagaki, E.: 3-Ketosteroid- $\Delta^1$ -dehydrogenase of *Rhodococcus rhodochrous*: sequencing of the genomic DNA and hyperexpression, purification, and characterization of the recombinant enzyme. *J. Biochem. (Tokyo)*, 124 (1998) 1026-1032.
- 1005 Niemi, J., Wang, Y., Airas, K., Ylihonko, K., Hakala, J. and Mäntsälä, P.: Characterization of aklavinone-11-hydroxylase from *Streptomyces purpurascens*. *Biochim. Biophys. Acta*, 1430 (1999) 57-64.
- 1006 Nishio, M., Watanabe, Y. and Hidaka, H.: HMN-1180, a small molecule inhibitor of neuronal nitric oxide synthase. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1063-1067.
- 1007 Nozue, M., Souris, M., Arakawa, D. and Kojima, M.: Purification and characterization of two isoforms of chlorogenic acid oxidase from sweet potato cells in suspension culture. *J. Plant. Physiol.*, 153 (1998) 552-557; C.A., 130 (1999) 34873.
- 1008 Okuda, H., Ogura, K., Kato, A., Takubo, H. and Watabe, T.: A possible mechanism of eighteen patient deaths caused by interactions of sorivudine, a new antiviral drug, with oral 5-fluorouracil prodrugs. *J. Pharmacol. Exp. Ther.*, 287 (1998) 791-799.

For additional information see C.A.:  
130 (1999) 37341.

See also 834, 839, 1309.

- 1009 Peksuslu, A. and Sekin, S.: Identification of some Turkish tobacco varieties using gel electrophoresis techniques. *Biotechnol. Biotechnol. Equip.*, (1998) 34-38; C.A., 130 (1999) 22395.
- 1010 Prior, A., Uhrig, J.F., Heins, L., Wiesmann, A., Lillig, C.H., Stoltze, C., Soll, J. and Schwenn, J.D.: Structural and kinetic properties of adenylyl sulfate reductase from *Catharanthus roseus* cell cultures. *Biochim. Biophys. Acta*, 1430 (1999) 25-38.
- 1011 Rhie, G.-e., Hwang, C.-S., Brady, M.J., Kim, S.-T., Kim, Y.-R., Huh, W.-K., Baek, Y.-U., Lee, B.-H., Lee, J.-S. and Kang, S.-O.: Manganese-containing superoxide dismutase and its gene from *Candida albicans*. *Biochim. Biophys. Acta*, 1426 (1999) 409-419.
- 1012 Sakamoto, H., Kitahara, J. and Nakagawa, Y.: Effect of intracellular glutathione on the production of prostaglandin D<sub>2</sub> in RBL-2H3 cells oxidized by tert.-butyl hydroperoxide. *J. Biochem. (Tokyo)*, 125 (1999) 90-95.
- 1013 Seong, C., Kim, Y.-A., Chung, H.J., Park, D., Yim, J., Baek, K., Park, Y.S., Han, K. and Yoon, J.: Isolation and characterization of the *Drosophila melanogaster* cDNA encoding the sepiapterin reductase. *Biochim. Biophys. Acta*, 1443 (1998) 239-244.
- 1014 Taylor, B.S., Alarcon, L.H. and Billiar, T.R.: (Inducible nitric oxide synthase in the liver: regulation and functions). *Biokhimiya (Moscow)*, 63 (1998) 905-923.
- 1015 Tsukita, S., Koyanagi, S., Nagata, K., Koizuka, H., Akashi, H., Shimoyama, T., Tamura, T. and Sone, N.: Characterization of a cb-type cytochrome c oxidase from *Helicobacter pylori*. *J. Biochem. (Tokyo)*, 125 (1999) 194-201.
- 1016 Xia, Z., Li, Y., Chen, S., Shen, Q., Li, C., Shen, H. and Yu, S.: Purification and identification of heme oxygenase isoforms from spleen tissue of rat and the expression of heme oxygenase-1 cDNA in COS-1 cells. *Chin. Med. J. (Beijing)*, 111 (1998) 842-846; C.A., 130 (1999) 22024.
- 1017 Yamano, S. and Maruyama, T.: An azide-insensitive superoxide dismutase from a hyperthermophilic archaeon, *Sulfolobus solfataricus*. *J. Biochem. (Tokyo)*, 125 (1999) 186-193.
- See also 723, 793, 988, 1139.
- 20b. *Transferases (excl. E.C. 2.7.-.)*
- 1018 Bell, W., Sun, W., Hohmann, S., Wera, S., Reinders, A., de Virgilio, C., Wiemken, A. and Thevelein, J.M.: Composition and functional analysis of the *Saccharomyces cerevisiae* trehalose synthase complex. *J. Biol. Chem.*, 273 (1998) 33311-33319.
- 1019 Fuchikami, Y., Yoshimura, T., Gutierrez, A., Soda, K. and Esaki, N.: Construction and properties of a fragmentary D-amino acid aminotransferase. *J. Biochem. (Tokyo)*, 124 (1998) 905-910.
- 1020 Ha, C.-R. and Iuchi, I.: Enzyme responsible for egg envelope (chorion) hardening in fish: purification and partial characterization of two transglutaminases associated with their substrate, unfertilized egg chorion, of the rainbow trout, *Oncorhynchus mykiss*. *J. Biochem. (Tokyo)*, 124 (1998) 917-926.
- 1021 Humana, H. and Shinozawa, T.: Effects of C-terminal deletion on the activity and thermostability of orotate phosphoribosyltransferase from *Thermus thermophilus*. *J. Biochem. (Tokyo)*, 125 (1999) 1090-114.
- 1022 Liu, M., Cao, D., Russell, R., Handschumacher, R.E. and Pizzorno, G.: Expression, characterization, and detection of human uridine phosphorylase and identification of variant uridine phosphorolytic activity in selected human tumors. *Cancer Res.*, 58 (1998) 5418-5424.
- 1023 Moisyadi, S., Neupane, K.R. and Stiles, J.I.: Cloning and characterization of a cDNA encoding xanthosine-N7-methyltransferase from coffee (*Coffea arabica*). *Acta Hortic.*, 461 (International Symposium on Biotechnology of Tropical and Subtropical Species, 1997, Pt. 2) (1998) 367-377; C.A., 130 (1999) 22143.
- 1024 Molchan, O.K., Dmitrieva, N.A., Romanova, D.V., Errais Lopes, L., Debalov, V.G. and Mironov, A.S.: (Isolation and primary characterization of the uridine phosphorylase from *Salmonella typhimurium*). *Biokhimiya (Moscow)*, 63 (1998) 235-239.
- 1025 Munro, E.M., Climie, S., Vandenberg, E. and Storms, R.K.: Functional assessment of surface loops: deletion of eukaryote-specific peptide inserts in thymidylate synthase of *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta*, 1430 (1999) 1-13.
- 1026 Takeuchi, N., Ueda, T. and Watanabe, K.: Expression and characterization of bovine mitochondrial methionyl-tRNA transformylase. *J. Biochem. (Tokyo)*, 124 (1998) 1069-1071.
- 20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.)*
- 1027 Garver, W.S., Hossain, G.S., Winscott, M.M. and Heidenreich, R.A.: The Npc1 mutation causes an altered expression of caveolin-1, annexin II and protein kinases and phosphorylation of caveolin-1 and annexin II in murine livers. *Biochim. Biophys. Acta*, 1453 (1999) 193-206.
- 1028 Kanemitsu, F. and Kira, S.: Characterization of isoforms of human mitochondrial creatine kinase by isoelectric focusing. *J. Chromatogr. B*, 721 (1999) 171-177.
- 1029 Kurioka, K., Nakagawa, K., Denda, K., Miyazawa, K. and Kitamura, N.: Molecular cloning and characterization of a novel protein serine/threonine kinase highly expressed in mouse embryo. *Biochim. Biophys. Acta*, 1443 (1998) 275-284.
- 1030 Mancini, A., del Rosso, F., Roberti, R., Orvietani, P., Coletti, L. and Binaglia, L.: Purification of ethanolaminephosphotransferase from bovine liver microsomes. *Biochim. Biophys. Acta*, 1437 (1999) 80-92.
- 1031 Nozaki, T., Arase, T., Shigeta, Y., Asai, T., Leustek, T. and Takeuchi, T.: Cloning and bacterial expression of adenosine-5'-triphosphate sulfurylase from the enteric protozoan parasite *Entamoeba histolytica*. *Biochim. Biophys. Acta*, 1429 (1998) 284-291.
- 1032 Orlov, N.Ya. and Kimura, N.: (Interaction of nucleoside diphosphate kinase with membranes of the bleached bovine retinal rod outer segments. Effect of pH, salts, and guanine nucleotides). *Biokhimiya (Moscow)*, 63 (1998) 208-217.
- 1033 Pérez, M. and Avila, J.: The expression of casein kinase 2α' and phosphatase 2A activity. *Biochim. Biophys. Acta*, 1449 (1999) 150-156.
- 1034 Rinaldi-Carmona, M., le Duigou, A., Oustric, D., Barth, F., Vouaboula, M., Carayon, P., Casellas, P. and le Fur, G.: Modulation of CB1 cannabinoid receptor functions after a long-term exposure to agonist or inverse agonist in the Chinese hamster ovary cell expression system. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1038-1047.

1035 Ryzhova, T.A., Andreichuk, Yu.V. and Domkin, V.D.: (Adenylo-succinate-synthetase of the yeast *Saccharomyces cerevisiae*: isolation, purification, and properties). *Biokhimiya (Moscow)*, 63 (1998) 773-780.

1036 Wada, T., Yamazaki, T., Kuramitsu, S. and Kyogoku, Y.: Cloning of the RNA polymerase  $\alpha$  subunit gene from *Thermus thermophilus* H88 and characterization of the protein. *J. Biochem. (Tokyo)*, 125 (1999) 143-150.

1037 Yoshida, K.-i., Mizukami, Y.-i. and Kitakaze, M.: Nitric oxide mediates protein kinase C isoform translocation in rat heart during postischemic reperfusion. *Biochim. Biophys. Acta*, 1453 (1999) 230-238.

See also 788, 792, 976.

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

1038 Altintas, M.M., Özer, N. and Ülgen, K.Ö.: Purification of TaqI endonuclease from *Thermus aquaticus*. *J. Chromatogr. A*, 828 (1998) 373-381.

1039 Jiang, C.-M., Hou, W.-C. and Chang, W.-H.: (A rapid method for pectinesterase activity staining). *Shipin Kexue (Taipei)*, 25 (1998) 46-58; C.A., 130 (1999) 1575.

1040 Jimenez, M., Pedraza, T., Galar, M.M. and Eugui, J.: (Quantitative determination of alkaline phosphatase enzymes separated by agarose gel electrophoresis after treatment with neuraminidase. Reference values). *Tec. Lab.*, 20 (1998) 17-21; C.A., 129 (1998) 213282n.

1041 Jin, P., Sun, J. and Chitnis, P.R.: Structural features and assembly of the soluble overexpressed PsAD subunit of photosystem I. *Biochim. Biophys. Acta*, 1410 (1999) 7-18.

1042 Kim, Y., Kim, J.-E., Lee, S.D., Lee, T.G., Kim, J.H., Park, J.B., Han, J.M., Jang, S.K., Suh, P.-G. and Ryu, S.H.: Phospholipase D1 is located and activated by protein kinase C $\alpha$  in the plasma membrane in 3Y1 fibroblast cell. *Biochim. Biophys. Acta*, 1436 (1999) 319-330.

1043 Ruvolo-Takasusuki, M.C.C., del Lama, M.A. and Soares, A.E.E.: Esterase-2 polymorphism in *Apis mellifera*. *J. Apis. Res.*, 37 (1998) 17-22; C.A., 130 (1999) 23007.

1044 Toyoda, T., Sugimoto, H. and Yamashita, S.: Sequence, expression in *Escherichia coli*, and characterization of lysophospholipase II. *Biochim. Biophys. Acta*, 1437 (1999) 182-193.

1045 Vergnes, H., Grozdean, J., Denier, C., Bourrouillou, G. and Calvas, P.: Expression of a liver-bone-intestinal hybrid of alkaline phosphatase in neutrophils of Down's syndrome patients. *Clin. Chim. Acta*, 279 (1999) 167-173.

1046 Wang, A., Yang, H.-C., Friedman, P., Johnson, C.A. and Dennis, E.A.: A specific human lysophospholipase: cDNA cloning, tissue distribution and kinetic characterization. *Biochim. Biophys. Acta*, 1437 (1999) 157-169.

See also 723, 975, 1009.

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

1047 Gonzalez-Stawinski, G.V., Parker, W., Holzknecht, Z.E., Huber, N.S. and Platt, J.L.: Partial sequence of human platelet heparitinase and evidence of its ability to polymerize. *Biochim. Biophys. Acta*, 1429 (1999) 431-438.

1048 Kammouni, W., Naïmi, D., Renaud, W., Bianco, N., Figarella, C. and Merten, M.D.: High lysosomal activities in cystic fibrosis tracheal gland cells corrected by adenovirus-mediated CFTR gene transfer. *Biochim. Biophys. Acta*, 1453 (1999) 14-22.

1049 Park, G.-G., Kim, W.-D., Park, Y.-S., Gang, J.-B. and Kobayashi, H.: (Purification and properties of sunflower seed  $\alpha$ -galactosidase by affinity chromatography). *Sanop Misaengmul Hak-hoechi*, 26 (1998) 316-322; C.A., 130 (1999) 22013.

1050 Riou, C., Salmon, J.-M., Vallier, M.-J., Gunata, Z. and Barre, P.: Purification, characterization, and substrate specificity of a novel highly glucose-tolerant  $\beta$ -glucosidase from *Aspergillus oryzae*. *Appl. Environ. Microbiol.*, 64 (1998) 3607-3614; C.A., 130 (1999) 11844.

1051 Strahl-Bolsinger, S., Gentzsch, M. and Tanner, W.: Protein O-mannosylation. *Biochim. Biophys. Acta*, 1426 (1999) 297-307 - a review.

1052 Tian, X. and Wang, X.: (Purification and properties of alkaline cellulase from alkalophilic *Bacillus* N6-27). *Weishengwu Xue-bao*, 38 (1998) 310-312; C.A., 130 (1999) 11839.

See also 861.

*20f. Other hydrolases*

1053 Antonenkov, V.D., van Veldhoven, P.P., Waelkens, E. and Manhaerts, G.P.: Comparison of the stability and substrate specificity of purified peroxisomal 3-oxoacyl-CoA thiolases A and B from rat liver. *Biochim. Biophys. Acta*, 1437 (1999) 136-141.

1054 Cailler, F., Howell, S. and Crine, P.: Role of the glycosyl-phosphatidylinositol anchor in the intracellular transport of a transmembrane protein in Madin-Darby canine kidney cells. *Biochim. Biophys. Acta*, 1415 (1998) 1-9.

1055 Demirov, D., Sarafian, V., Kremensky, I. and Ganev, V.: Evidence for protein splicing in the endoplasmic reticulum-Golgi intermediate compartment. *Biochim. Biophys. Acta*, 1448 (1999) 507-511.

1056 Fujino, T., Tada, T., Beppu, M. and Kikugawa, K.: Purification and characterization of a serine protease in erythrocyte cytosol that is adherent to oxidized membranes and preferentially degrades proteins modified by oxidation and glycation. *J. Biochem. (Tokyo)*, 124 (1998) 1077-1085.

1057 Hiroaki, Y., Mitsuoka, K., Cheng, Y., Hiroaki, H. and Fujiyoshi, Y.: Influence of various nucleotides on the *in situ* crystallization of  $\text{Ca}^{2+}$ -ATPase. *Biochim. Biophys. Acta*, 1415 (1999) 361-368.

1058 Jiang, X., Zhang, M., Ding, Y., Yao, J., Chen, H., Zhu, D. and Muramatsu, M.: *Escherichia coli prlC* gene encodes a trypsin-like proteinase regulating the cell cycle. *J. Biochem. (Tokyo)*, 124 (1998) 980-985.

1059 Komatsu, N., Oda, T. and Muramatsu, T.: Involvement of both caspase-like proteases and serine proteases in apoptotic cell death induced by ricin, modeccin, diphtheria toxin, and *Pseudomonas* toxin. *J. Biochem. (Tokyo)*, 124 (1998) 1038-1044.

1060 Koussevitzky, S., Ne'eman, E., Sommer, A., Steffens, J.C. and Harel, E.: Purification and properties of a novel chloroplast stromal peptidase. Processing of polyphenol oxidase and other imported precursors. *J. Biol. Chem.*, 273 (1998) 27064-27069.

- 1061 Masumoto, H., Yoshizawa, T., Sorimachi, H., Nishino, T., Ishiura, S. and Suzuki, K.: Overexpression, purification, and characterization of human m-calpain and its active site mutant, m-C105S-calpain, using a baculovirus expression system. *J. Biochem. (Tokyo)*, 124 (1998) 957-961.
- 1062 Otsuka, Y., Homma, N., Shiga, K., Ushiki, J., Ikeuchi, Y. and Suzuki, A.: Purification and properties of rabbit muscle proteasome, and its effect on myofibrillar structure. *Meat Sci.*, 49 (1998) 365-378; C.A., 130 (1999) 22008.
- 1063 Takao, K., Takai, S., Shiota, N., Song, K., Nishimura, K., Ishihara, T. and Miyazaki, M.: Lack of effect of carbohydrate depletion on some properties of human mast cell chymase. *Biochim. Biophys. Acta*, 1427 (1999) 74-81.
- 1064 Terada, S., Hori, J., Fujimura, S. and Kimoto, E.: Purification and amino acid sequence of brevilysin L6, a non-hemorrhagic metalloprotease from *Agiistrodon halys brevicaudus* venom. *J. Biochem. (Tokyo)*, 125 (1999) 64-69.
- 1065 Tomaschova, J., Buchinger, W., Hampel, W. and Zemanovic, J.: Purification and characterization of extracellular proteinase produced by *Brevibacterium linens* ATCC 9172. *Food Chem.*, 63 (1998) 499-503; C.A., 130 (1999) 24320.
- 1066 Uchikoba, T., Yonezawa, H., Shimada, M. and Kaneda, M.: Melanin G, a cysteine protease from green fruits of the bead tree, *Melia azedarach*: a protease affected by specific amino acids at P<sub>3</sub> position. *Biochim. Biophys. Acta*, 1430 (1999) 84-94.
- 1067 Van den Steen, P., Rudd, P.M., Proost, P., Martens, E., Paemen, L., Küster, B., van Damme, J., Dwek, R.A. and Opdenakker, G.: Oligosaccharides of recombinant mouse gelatinase B variants. *Biochim. Biophys. Acta*, 1425 (1998) 587-598.
- 1068 Verret, C., Poussard, S., Touyariot, K., Donger, C., Savart, M., Cottin, P. and Ducastaing, A.: Degradation of protein kinase Ma by  $\mu$ -calpain in a  $\mu$ -calpain-protein kinase Ca complex. *Biochim. Biophys. Acta*, 1430 (1999) 141-148.
- 1069 Watanabe, K., Ishidoh, K., Ueno, T., Sato, N. and Kominami, E.: Suppression of lysosomal proteolysis at three different steps in regenerating rat liver. *J. Biochem. (Tokyo)*, 124 (1998) 947-956.
- 1070 Zylinska, L., Gromadzinska, E. and Lachowicz, L.: Short-time effects of neuroactive steroids on rat cortical Ca<sup>2+</sup>-ATPase activity. *Biochim. Biophys. Acta*, 1437 (1999) 257-264.
- See also 789, 874, 919, 984, 985.
- 20g. Lyases**
- 1071 Itoh, A. and Vick, B.A.: The purification and characterization of fatty acid hydroperoxide lyase in sunflower. *Biochim. Biophys. Acta*, 1436 (1999) 531-540.
- 1072 Warriow, A.G.S. and Hawkesford, M.J.: Separation, subcellular location and influence of sulfur nutrition on isoforms of cysteine synthase in spinach. *J. Exp. Bot.*, 49 (1998) 1625-1636; C.A., 130 (1999) 22855.
- 20h. Isomerases**
- 1073 Fujita, T., Suzuki, K., Tada, T., Yoshihara, Y., Hamaoka, R., Uchida, K., Matuo, Y., Sasaki, T., Hanafusa, T. and Taniguchi, N.: Human erythrocyte bisphosphoglycerate mutase: inactivation by glycation *in vivo* and *in vitro*. *J. Biochem. (Tokyo)*, 124 (1998) 1237-1244.
- 20i. Ligases**
- 1074 Boyer, A.S. and Hallick, R.B.: Purification and characterization of a soluble DNA-dependent chloroplast RNA polymerase from *Pisum sativum*. *Plant Sci. (Shannon)*, 137 (1998) 13-32; C.A., 130 (1999) 1585.
- 1075 De Vet, E.C.J.M. and van den Bosch, H.: Characterization of recombinant guinea pig alkyl-dihydroxyacetonephosphate synthase expressed in *Escherichia coli*. Kinetics, chemical modification and mutagenesis. *Biochim. Biophys. Acta*, 1436 (1999) 299-306.
- See also 906.
- 20j. Complex mixtures and incompletely identified enzymes**
- 1076 Beveridge, I.: Allozyme electrophoresis-difficulties encountered in studies on helminths. *Int. J. Parasitol.*, 28 (1998) 973-979; C.A., 129 (1998) 241580b.
- 1077 Christova, K., Sholeva, Z., Chipeva, V., Najdenova, M. and Todorova, D.: Differentiation of Streptomyces strains by multilocus enzyme electrophoresis. *Biotechnol. Biotechnol. Equip.*, (1997) 47-52; C.A., 129 (1998) 227851.
- 1078 Kalil, F., Antonio, N., Lama, M.A.D. and Mestriner, M.A.: Improvement of electrophoresis technique for isoenzymic analysis of rubber tree (*Hevea* sp.) clones. *Acta Amazonica*, 28 (1998) 31-39; C.A., 129 (1998) 257225a.
- 1079 Ruefenacht, U.B., Schneider-Yin, X., Schaefer, B.W., Taketani, S., Deybach, J.-C.P. and Minder, E.I.: Rapid molecular diagnosis of erythropoietic protoporphyrina among Swiss patients. *Clin. Chem. Lab. Med.*, 36 (1998) 763-765; C.A., 130 (1999) 11090.
- 21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS**
- 21a. Purines, pyrimidines, nucleosides, nucleotides**
- 1080 Beason, K.B., Acuff, C.G., Steinhelper, M.E. and Elton, T.S.: An A/T-rich *cis*-element is essential for rat angiotensin II type 1A receptor transcription in vascular smooth muscle cells. *Biochim. Biophys. Acta*, 1444 (1999) 25-34.
- 1081 DeLuisio, L.A., Raible, A.M. and Nelson, J.S.: Analysis of an oligonucleotide N3'→P5' phosphoramidate/phosphorothioate chimera with capillary gel electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2935-2938.
- 1082 Suen, I.-S., Rhodes, J.N., Christy, M., McEwen, B., Gray, D.M. and Mitas, M.: Structural properties of Friedreich's ataxia d(GAA) repeats. *Biochim. Biophys. Acta*, 1444 (1999) 14-24.

- 1083 Wu, M., Xia, S., Yang, Y. and Han, L.: (Chemical modification of oligonucleotides by porphyrins and their purification). *Tongji Yike Daxue Xuebao*, 27 (1998) 177-180; C.A., 130 (1999) 13980.

See also 1346.

*21b. Nucleic acids, RNA*

- 1084 Adamski, F.M., Timms, K.M. and Shieh, B.-H.: A unique isoform of phospholipase C $\beta$ 4 highly expressed in the cerebellum and eye. *Biochim. Biophys. Acta*, 1444 (1999) 55-60.
- 1085 Akiyama, H., Hiraki, Y., Shigeno, C., Ito, H., Kawai, J., Konishi, J., Shimizu, Y. and Nakamura, T.: Cloning of a novel gene specifically expressed in clonal mouse chondroprogenitor-like EC cells, ATDC5. *Biochim. Biophys. Acta*, 1444 (1999) 291-294.
- 1086 Angermayr, K., Parson, W., Stöffler, G. and Haas, H.: Expression of aTC - encoding a novel member of the ATP binding cassette transporter family in *Aspergillus nidulans* - is sensitive to cycloheximide. *Biochim. Biophys. Acta*, 1453 (1999) 304-310.
- 1087 Bengrine, A., Giuliani, N., Appia-Ayme, C., Jedlicki, E., Holmes, D.S., Chippaux, M. and Bonnefoy, V.: Sequence and expression of the rusticyanin structural gene from *Thiobacillus ferrooxidans* ATCC33020 strain. *Biochim. Biophys. Acta*, 1443 (1998) 99-112.
- 1088 Burbelo, P.D., Finegold, A.A., Kozak, C.A., Yamada, Y. and Takami, H.: Cloning, genomic organization and chromosomal assignment of the mouse p190-B gene. *Biochim. Biophys. Acta*, 1443 (1998) 203-210.
- 1089 Casamayor, E.O., Calderon-Paz, J.I., Mas, J. and Pedros-Alio, C.: Identification of phototrophic sulfur bacteria through the analysis of lmRNA band patterns. *Arch. Microbiol.*, 170 (1998) 269-278; C.A., 130 (1999) 12334.
- 1090 Delye, C. and Corio-Costet, M.-F.: Rapid isolation of both double-stranded RNA and PCR-suitable DNA from the obligate biotrophic phytopathogenic fungus *Uncinula necator* using a commercially available reagent. *J. Virol. Methods*, 74 (1998) 149-153. C.A., 130 (1999) 21080.
- 1091 Demontis, S., Terao, M., Brivio, M., Zanotta, S., Bruschi, M. and Garattini, E.: Isolation and characterization of the gene coding for human cytidine deaminase. *Biochim. Biophys. Acta*, 1443 (1998) 323-333.
- 1092 Fernández-González, B., Martínez-Férez, I.M. and Vioque, A.: Characterization of two carotenoid gene promoters in the cyanobacterium *Synechocystis* sp. PCC 6803. *Biochim. Biophys. Acta*, 1443 (1998) 343-351.
- 1093 Fitscher, B.A., Riedel, H.-D., Young, K.C. and Stremmel, W.: Tissue distribution and cDNA cloning of a human fatty acid transport protein (hsFATP4). *Biochim. Biophys. Acta*, 1443 (1998) 381-385.
- 1094 Gao, M., Li, G., Geng, J. and Zhang, X.: Isolation of living pollen mother cells (PMCs) in *Brassica* species and extraction of mRNA from PMCs. *J. Jpn. Soc. Hortic. Sci.*, 67 (1998) 1153-1156; C.A., 130 (1999) 12410.
- 1095 Greenwood, S.J. and Gray, M.W.: Processing of precursor rRNA in *Euglena gracilis*: identification of intermediates in the pathway to a highly fragmented large subunit rRNA. *Biochim. Biophys. Acta*, 1443 (1998) 128-138.
- 1096 Guillonneau, F., Drechou, A., Poüs, C., Chevalier, S., Lardeux, B., Cassio, D. and Durand, G.: Hepatocyte differentiation of WIF-B cells includes a high capacity of interleukin-6-mediated induction of  $\alpha_1$ -acid glycoprotein and  $\alpha_2$ -macroglobulin. *Biochim. Biophys. Acta*, 1448 (1999) 403-408.
- 1097 Guo, G. and Wang, H.: (Regulative effect of nuclear factor kappaB on the expression of intercellular adhesion molecular-1 in human mesangial cells). *Zhonghua Yixue Zazhi*, 78 (1998) 290-292; C.A., 130 (1999) 36176.
- 1098 Han, S.H., Yea, S.S., Jeon, Y.J., Yang, K.-H. and Kaminshi, N.E.: Transforming growth factor-beta 1 (TGF- $\beta$ 1) promotes IL-2 mRNA expression through the up-regulation of NF- $\kappa$ B, AP-1 and NF-AT in EL4 cells. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1105-1112.
- 1099 Handel-Fernandez, M.E. and Vincek, V.: Sequence analysis and expression of a mouse homolog of human I $\kappa$ BL gene. *Biochim. Biophys. Acta*, 1444 (1999) 306-310.
- 1100 Hashimoto, M., Shinohara, Y., Majima, E., Hatanaka, T., Yamazaki, N. and Terada, H.: Expression of the bovine heart mitochondrial ADP/ATP carrier in yeast mitochondria: significantly enhanced expression by replacement of the N-terminal region of the bovine carrier by the corresponding regions of the yeast carriers. *Biochim. Biophys. Acta*, 1409 (1999) 113-124.
- 1101 He, J.-x. and Liang, H.-g.: (Preparation of high quality plant RNA with low concentration of guanidinium thiocyanate). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 25 (1998) 379-381; C.A., 130 (1999) 22443.
- 1102 Hinton, S.M.: Electrophoresis system for the purification, concentration and size fractionation of nucleic acids. U.S. US 5,817,225 (Cl. 204-645; GO1N27/26), 6 Oct. 1998, US Appl. 698,618, 16 Aug. 1996; 5 pp.; C.A., 129 (1998) 272673p.
- 1103 Hooker, C.W. and Brindley, P.J.: Cloning of a cDNA encoding SjirV1, a *Schistosoma japonicum* calcium-binding protein similar to calnexin, and expression of the recombinant protein in *Escherichia coli*. *Biochim. Biophys. Acta*, 1429 (1999) 331-341.
- 1104 Inoue, A., Hayakawa, T., Otsuka, E., Kamiya, A., Suzuki, Y., Hirose, S. and Hagiwara, H.: Correlation between induction of expression of biglycan and mineralization by C-type natriuretic peptide in osteoblastic cells. *J. Biochem. (Tokyo)*, 125 (1999) 103-108.
- 1105 Jiang, R., Norton, C.R., Copeland, N.G., Gilbert, D.J., Jenkins, N.A. and Gridley, T.: Genomic organization, expression and chromosomal localization of the mouse Slug (Slugh) gene. *Biochim. Biophys. Acta*, 1443 (1998) 251-254.
- 1106 Kumagai, H., Kawamura, Y., Yanagisawa, K. and Komano, H.: Identification of a human cDNA encoding a novel protein structurally related to the yeast membrane-associated metalloprotease, Ste24P. *Biochim. Biophys. Acta*, 1426 (1999) 468-474.
- 1107 Lamers, A.E., Heiney, J.P. and Ram, J.L.: Cloning and sequence analysis of two cDNAs encoding cyclin A and cyclin B in the zebra mussel *Dreissena polymorpha*. *Biochim. Biophys. Acta*, 1448 (1999) 519-524.
- 1108 Leprince, A.-S., Jouannic, S., Hamal, A., Kreis, M. and Henry, Y.: Molecular characterisation of plant cDNAs BnMAP4K $\alpha$ 1 and BnMAP4K $\alpha$ 2 belonging to the GCK/SPS1 subfamily of MAP kinase kinase kinase kinase. *Biochim. Biophys. Acta*, 1444 (1999) 1-13.

- 1109 Lin, L., Peters, L.L., Ciciotte, S.L. and Chishti, A.H.: cDNA sequence and chromosomal localization of mouse *Dlgh3* gene adjacent to the *BRCA1* tumor suppressor locus. *Biochim. Biophys. Acta*, 1443 (1998) 211-216.
- 1110 Linder, B., Jones, L.K., Chaplin, T., Mohd-Sarip, A., Heinlein, U.A.O., Young, B.D. and Saha, V.: Expression pattern and cellular distribution of the murine homologue of AF10. *Biochim. Biophys. Acta*, 1443 (1998) 285-296.
- 1111 Ma, J.-x., Xu, L., Othersen, D.K., Redmond, T.M. and Crouch, R.K.: Cloning and localization of RPE65 mRNA in salamander cone photoreceptor cells. *Biochim. Biophys. Acta*, 1443 (1998) 255-261.
- 1112 Mantzouridis, T.D. and Fragoulis, E.G.: Two different cDNAs code for L-DOPA decarboxylase in the white prepuparium and eclosion developmental stages of the insect *Ceratitis capitata*. *Biochim. Biophys. Acta*, 1443 (1998) 267-273.
- 1113 Masaki, T., Yoshimatsu, H., Chiba, S., Hidaka, S., Tajima, D., Kakuma, T., Kurokawa, M. and Sakata, T.: Tumor necrosis factor- $\alpha$  regulates *in vivo* expression of the rat UCP family differentially. *Biochim. Biophys. Acta*, 1436 (1999) 585-592.
- 1114 Metón, I., Caseras, A., Mediavilla, D., Fernández, F. and Baanante, I.V.: Molecular cloning of a cDNA encoding 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase from liver of *Sparus aurata*: nutritional regulation of enzyme expression. *Biochim. Biophys. Acta*, 1444 (1999) 153-165.
- 1115 Miyazawa, K., Mori, A. and Okudaira, H.: Regulation of interleukin-1 $\beta$ -induced interleukin-6 gene expression in human fibroblast-like synoviocytes by glucocorticoids. *J. Biochem. (Tokyo)*, 124 (1998) 1130-1137.
- 1116 Nishimura, T., Utsunomiya, Y., Hoshikawa, M., Ohuchi, H. and Itoh, N.: Structure and expression of a novel human FGF, FGF-19, expressed in the fetal brain. *Biochim. Biophys. Acta*, 1444 (1999) 148-151.
- 1117 Ochi, C., Norisada, N., Moriguchi, M., Stalc, A., Urleb, U. and Muraoka, S.: Interleukin-10 inducing activity of LK423, a phthalimido-desmurrayldipeptide compound. *Arzneim.-Forsch.*, 49 (1999) 72-79.
- 1118 Oguro, T., Hayashi, M., Nakajo, S., Numazawa, S. and Yoshida, T.: The expression of heme oxygenase-1 gene responded to oxidative stress produced by phorone, a glutathione depleter, in the rat liver: the relevance to activation of c-jun N-terminal kinase. *J. Pharmacol. Exp. Ther.*, 287 (1998) 773-778.
- 1119 Ohkura, N., Hosono, T., Maruyama, K., Tsukada, T. and Yamaguchi, K.: An isoform of Nurr1 functions as a negative inhibitor of the NGFI-B family signaling. *Biochim. Biophys. Acta*, 1444 (1999) 69-79.
- 1120 Orfeo, T. and Bateman, E.: Transcription by RNA polymerase II during Acanthamoeba differentiation. *Biochim. Biophys. Acta*, 1443 (1998) 297-304.
- 1121 Osinskaya, M.A., Yusupov, T.Yu. and Ibragimov, A.P.: (Mitochondrial mRNA of cotton and product of its translation). *Dokl. Akad. Nauk Resp. Uzb.*, (1997) 38-40; *C.A.*, 130 (1999) 2178.
- 1122 Pepe, G.J., Davies, W.A., Dong, K.-W., Luo, H. and Albrecht, E.D.: Cloning of the 11 $\beta$ -hydroxysteroid dehydrogenase (11 $\beta$ -HSD)-2 gene in the baboon: effects of estradiol on promoter activity of 11 $\beta$ -HSD-1 and -2 in placental JEG-3 cells. *Biochim. Biophys. Acta*, 1444 (1999) 101-110.
- 1123 Record, E., Moukha, S. and Asther, M.: Characterization and expression of the cDNA encoding a new kind of phospholipid transfer protein, the phosphatidylglycerol/phosphatidylinositol transfer protein from *Aspergillus oryzae*: evidence of a putative membrane targeted phospholipid transfer protein in fungi. *Biochim. Biophys. Acta*, 1444 (1999) 276-282.
- 1124 Rescan, P.-Y.: Identification of a fibroblast growth factor 6 (FGF6) gene in a non-mammalian vertebrate: continuous expression of FGF6 accompanies muscle fiber hyperplasia. *Biochim. Biophys. Acta*, 1443 (1998) 305-314.
- 1125 Ritzenthaler, J. and Roman, J.: Differential effects of protein kinase C inhibitors on fibronectin-induced interleukin-1 $\beta$  gene transcription, protein synthesis and secretion in human monocytic cells. *Immunology*, 95 (1998) 264-271; *C.A.*, 130 (1999) 37129.
- 1126 Rudra-Ganguly, N., Ghosh, A.K. and Roy-Burman, P.: Retrovirus receptor PI-1 of the *Felis catus*. *Biochim. Biophys. Acta*, 1443 (1998) 407-413.
- 1127 Russell, M.W., Kemp, P., Wang, L., Brody, L.C. and Izumo, S.: Molecular cloning of the human HAND2 gene. *Biochim. Biophys. Acta*, 1443 (1998) 393-399.
- 1128 Sato, Y. and Takahashi, H.: Molecular cloning and expression of murine homologue of semaphorin K1 gene. *Biochim. Biophys. Acta*, 1443 (1998) 419-422.
- 1129 Schmitz, A. and Riesner, D.: Correlation between bending of the VM region and pathogenicity of different potato spindle tuber viroid strains. *RNA*, 4 (1998) 1295-1303; *C.A.*, 130 (1999) 2066.
- 1130 Singh, N. and Rastogi, A.K.: Kinetoplast DNA minicircles of *Leishmania donovani* express a protein product. *Biochim. Biophys. Acta*, 1444 (1999) 263-268.
- 1131 Soto, T., Fernández, J., Dominguez, A., Vicente-Soler, J., Candas, J. and Gacto, M.: Analysis of the ntp1+ gene, encoding neutral trehalase in the fission yeast *Schizosaccharomyces pombe*. *Biochim. Biophys. Acta*, 1443 (1998) 225-229.
- 1132 Suzuki, H., Takahashi, K., Yasumoto, K.-i., Amae, S., Yoshizawa, M., Fuse, N. and Shibahara, S.: Role of neurofibromin in modulation of expression of the tyrosinase-related protein 2 gene. *J. Biochem. (Tokyo)*, 124 (1998) 992-998.
- 1133 Tanguay, R.L., Abnet, C.C., Heideman, W. and Peterson, R.E.: Cloning and characterization of the zebrafish (*Danio rerio*) aryl hydrocarbon receptor. *Biochim. Biophys. Acta*, 1444 (1999) 35-48.
- 1134 Terent'ev, A.A., Kostyuk, G.V. and Boikov, P.Ya.: (Dynamics of association-dissociation of the c-myc gene with the nuclear matrix during its activation-inactivation). *Biokhimiya (Moscow)*, 63 (1998) 631-635.
- 1135 Teshima, Y., Saikawa, T., Yonemochi, H., Hidaka, S., Yoshimatsu, H. and Sakata, T.: Alteration of heart uncoupling protein-2 mRNA regulated by sympathetic nerve and triiodothyronine during postnatal period in rats. *Biochim. Biophys. Acta*, 1448 (1999) 409-415.
- 1136 Van Cruchten, I., Cinato, E., Fox, M., King, E.R., Newton, J.S., Riechmann, V. and Sablitzky, F.: Structure, chromosomal localisation and expression of the murine dominant negative helix-loop-helix Id4 gene. *Biochim. Biophys. Acta*, 1443 (1998) 5564.

- 1137 Wang, H., Gao, X., Fukumoto, S., Tademoto, S., Sato, K. and Hirai, K.: Post-isolation inducible nitric oxide synthase gene expression due to collagenase buffer perfusion and characterization of the gene regulation in primary cultured murine hepatocytes. *J. Biochem. (Tokyo)*, 124 (1998) 892-899.
- 1138 Wang, W.-S., Seki, M., Yamaoka, T., Seki, T., Tada, S., Katada, T., Fujimoto, H. and Enomoto, T.: Cloning of two isoforms of mouse DNA helicase Q1/RecQL cDNA;  $\alpha$  form is expressed ubiquitously and  $\beta$  form specifically in the testis. *Biochim. Biophys. Acta*, 1443 (1998) 198-202.
- 1139 Wilanowski, T.M., Hayward, D.C. and Gibson, J.B.: Nucleotide sequence and expression of the sn-glycerol-3-phosphate dehydrogenase gene in *Locusta migratoria*. *Biochim. Biophys. Acta*, 1443 (1998) 414-418.
- 1140 Wolfrum, C., Buhmann, C., Rolf, B., Börchers, T. and Spener, F.: Variation of liver-type fatty acid binding protein content in the human hepatoma cell line HepG2 by peroxisome proliferators and antisense RNA affects the rate of fatty acid uptake. *Biochim. Biophys. Acta*, 1437 (1999) 194-201.
- 1141 Zhang, S.W., Fu, X.Y., Cao, S.L., Shen, Z.H. and Gu, J.X.: Down-regulation of  $\beta$ 1,4-galactosyltransferase gene expression by cell-cycle suppressor gene p16. *Biochim. Biophys. Acta*, 1444 (1999) 49-54.
- 1142 Zhu, M. and Paddock, G.V.: Expression of the hepatocyte growth factor-like protein gene in human hepatocellular carcinoma and interleukin-6-induced increased expression in hepatoma cells. *Biochim. Biophys. Acta*, 1449 (1999) 63-72.
- 1143 Zoetendal, E.G., Akkermans, A.D.L. and de Vos, W.M.: Temperature gradient gel electrophoresis analysis of 16S rRNA from human fecal samples reveals stable and host-specific communities of active bacteria. *Appl. Environ. Microbiol.*, 64 (1998) 3854-3859; C.A., 130 (1999) 33583.
- See also 708, 815, 839, 914, 932, 953, 964, 1001, 1003, 1013, 1014, 1029, 1044, 1069, 1158, 1168, 1186, 1199, 1206, 1245, 1312, 1313, 1315, 1322, 1324, 1329, 1344, 1357.
- 21c. *Nucleic acids, DNA*
- 1144 Allen, P.D. and Newland, A.C.: Electrophoretic DNA analysis for the detection of apoptosis. *Mol. Biotechnol.*, 9 (1998) 227-251; C.A., 129 (1998) 312981w.
- 1145 Ando, S., Putnam, D., Pack, D.W. and Langer, R.: PLGA microspheres containing plasmid DNA: preservation of supercoiled DNA via cryopreparation and carbohydrate stabilization. *J. Pharm. Sci.*, 88 (1999) 126-130.
- 1146 Arion, D., Kaushik, N., McCormick, S., Borkow, G. and Parniak, M.A.: Phenotypic mechanism of HIV-1 resistance to 3'-azido-3'-deoxythymidine (AZT): increased polymerization processivity and enhanced sensitivity to pyrophosphate of the mutant viral reverse transcriptase. *Biochemistry*, 37 (1998) 15908-15917.
- 1147 Asakawa, J.: (High resolutional two-dimension electrophoresis of DNA by using a vertical giant gel system). *Seibutsu Butsuri Kagaku*, 42 (1998) 145-154; C.A., 129 (1998) 272437q.
- 1148 Boyd, B.M., Prausnitz, J.M. and Blanch, H.W.: High-frequency alternating-crossed-field gel electrophoresis with neutral or slightly charged interpenetrating networks to improve DNA separation. *Electrophoresis (Weinheim)*, 19 (1998) 3137-3148.
- 1149 Busch, U. and Nitschko, H.: Methods for the differentiation of microorganisms. *J. Chromatogr. B*, 722 (1999) 263-278 - a review with 134 refs.
- 1150 Caccio, S., Camilli, R., La Rosa, G. and Pozio, E.: Establishing the *Cryptosporidium parvum* karyotype by NotI and SfiI restriction analysis and Southern hybridization. *Gene*, 219 (1998) 73-79; C.A., 130 (1999) 33812.
- 1151 Cheng, Y., Ren, B. and Chen, M.: (Tracing outbreak of methicillin resistant *Staphylococcus aureus* in intensive care units). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 164-166; C.A., 130 (1999) 23543.
- 1152 Coast, G.J. and Boeke, J.D.: Targeting of human retrotransposon integration is directed by the specificity of the L1 endonuclease for regions of unusual DNA structure. *Biochemistry*, 37 (1998) 18081-18093.
- 1153 Cremonesi, L., Carrera, P., Cardillo, E., Fumagalli, A., Lucchiari, S., Ferrari, M., Righetti, S.C., Righetti, P.G. and Gelfi, C.: Optimized detection of DNA point mutations by double gradient denaturing gradient gel electrophoresis. *Clin. Chem. Lab. Med.*, 36 (1998) 959-961.
- 1154 Dhandha, R.K., van Orsouw, N.J., Sigalas, I., Eng, C. and Vijg, J.: Critical factors in the performance and cost of two-dimensional gene scanning: RB1 as a model. *BioTechniques*, 25 (1998) 664-675; C.A., 130 (1999) 33596.
- 1155 Fairbrother, K.S., Hopwood, A.J., Lockley, A.K. and Bardsley, R.G.: Meat speciation by restriction fragment length polymorphism analysis using an  $\alpha$ -actin cDNA probe. *Meat Sci.*, 50 (1998) 105-114; C.A., 130 (1999) 24299.
- 1156 Foreman, P., Winfield, J.A. and Hahn, P.J.: Chromosome breakpoints near CpG islands in double minutes. *Gene*, 218 (1998) 121-128; C.A., 130 (1999) 11259.
- 1157 Fukue, H. and Okamura, A.: (Apparatus for recovering nucleic acids and proteins from electrophoretic gel bands). *Jpn. Kokai Tokkyo Koho JP 10 273,498 [98 273,498]* (Cl. C07H21/00), 13 Oct. 1998, Appl. 97/94,551, 28 Mar. 1997; 4 pp.; C.A., 129 (1998) 272675r.
- 1158 Fuller, C.W.: Electrophoresis buffers for fractionation of nucleic acids that minimize distortion associated with borate complex formation with 1,2-diols. *U.S. US 5,830,642* (Cl. 435-6; C12Q1/68), 3 Nov. 1998, US Appl. 862,734, 3 Apr. 1992; 17 pp.; C.A., 129 (1998) 326947b.
- 1159 Gay, R.D., Dawson, S.J., Murphy, W.J., Russell, S.W. and Latchman, D.S.: Activation of the iNOS gene promoter by Brn-3 POU family transcription factors is dependent upon the octamer motif in the promoter. *Biochim. Biophys. Acta*, 1443 (1998) 315-322.
- 1160 Georgakilas, A.G., Sakellou, L., Sideris, E.G., Margaritis, L.H. and Sophianopoulou, V.: Effects of gamma rays on the stability and size of DNA. *Radiat. Res.*, 150 (1998) 488-491; C.A., 130 (1999) 12012.
- 1161 Gerken, T., Kurtz, J., Sauer, K.P. and Lubjuhn, T.: DNA preparation and efficient microsatellite analysis from insect hemolymph. *Electrophoresis (Weinheim)*, 19 (1998) 3069-3070.
- 1162 Giardina, C., Boulares, H. and Inan, M.S.: NSAIDs and butyrate sensitize a human colorectal cancer cell line to TNF- $\alpha$  and Fas ligation: the role of reactive oxygen species. *Biochim. Biophys. Acta*, 1448 (1999) 425-438.

- 1163 Gorski, J.: Monitoring an immune response by analysis of amplified immunoglobulin or T-cell-receptor nucleic acid. *U.S. US 5837447 A*, 17 Nov. 1998, 26 pp.; *C.A.*, 130 (1999) 24093.
- 1164 Harada, T., Soma, N., Ishikawa, R. and Niizeki, M.: (Topological resolution of rice plastid DNA by pulsed-field gel electrophoresis). *Hirosaki Daigaku Nogakubu Gakujutsu Hokoku*, 61 (1998) 25-32; *C.A.*, 129 (1998) 226254e.
- 1165 He, Z.-W., Chen, N.-Y., Bao, B. and Zhao, M.-L.: (Study on the apoptosis in CNE-2Z cells induced by inhibitors of protein kinase C). *Zhongguo Bingli Shengli Zazhi*, 14 (1998) 22-26; *C.A.*, 130 (1999) 23754.
- 1166 Hietpas, P.B., Bullard, K.M. and Ewing, A.G.: Characterization of electrophoretic sample transfer from a capillary to an ultrathin slab gel. *J. Microcolumn Sep.*, 10 (1998) 519-527; *C.A.*, 130 (1999) 22407.
- 1167 Iida, T., Park, K.-S., Suthienkul, O., Kozawa, J., Yamaichi, Y., Yamamoto, K. and Honda, T.: Close proximity of the tdh, trh and ure genes on the chromosome of *Vibrio parahaemolyticus*. *Microbiology (Reading)*, 144 (1998) 2517-2523; *C.A.*, 130 (1999) 1049.
- 1168 Karahanian, E., Corsini, G., Lobos, S. and Vicuña, R.: Structure and expression of a laccase gene from the ligninolytic basidiomycete *Ceriporiopsis subvermispora*. *Biochim. Biophys. Acta*, 1443 (1998) 65-74.
- 1169 Kuznetsov, S.B., Larkin, D.M., Kaftanovskaya, E.M., Ivanova, E.V., Astakhova, N.M., Cheryaukene, O.V. and Zhdanova, N.S.: Chromosomal localization and synteny analysis of some genes in swine, cattle, and sheep (Artiodactyla). *Russ. J. Genet.*, 34 (1998) 1009-1013; *C.A.*, 130 (1999) 21228.
- 1170 Kwok, Y. and Hurley, L.H.: Topoisomerase II site-directed alkylation of DNA by psorospermin and its effect on topoisomerase II-mediated DNA cleavage. *J. Biol. Chem.*, 273 (1998) 33020-33026.
- 1171 Lai, Y., Zhao, H., Chen, R., Chen, L., Zhang, M., Guo, M. and Zhang, L.: (Analysis of genetic polymorphism of the complement factor B allotypes in Luoyang Han nationality population). *Zhongguo Mianyixue Zazhi*, 14 (1998) 217-219; *C.A.*, 130 (1999) 23900.
- 1172 Li, X., Qin, Y., Lin, H., Nockjoshua, M., Li, Y. and Li, Z.: (Baculovirus p35 gene delays apoptosis in insect cells). *Wuhan Daxue Xuebao, Ziran Kexueban*, 44 (1998) 501-505; *C.A.*, 130 (1999) 23013.
- 1173 Maule, J.: Pulsed-field gel electrophoresis. *Mol. Biotechnol.*, 9 (1998) 107-126; *C.A.*, 129 (1998) 227566v - a review with 87 refs.
- 1174 Maulik, N., Yoshida, T., Engelman, R.M., Deaton, D., Flack, J.E., III, Rousou, J.A. and Das, D.K.: Ischemic preconditioning attenuates apoptotic cell death associated with ischemia/reperfusion. *Mol. Cell. Biochem.*, 186 (1998) 139-145; *C.A.*, 130 (1999) 23587.
- 1175 Meireles, C.M., Czelusniak, J., Sampaio, I., Schneider, H., Ferrari, S.F., Coimbra-Filho, A.F., Pissinatti, A., Muniz, J.A.P.C., Ferreira, H.S. and Schneider, M.P.C.: Electrophoretic polymorphisms and their taxonomic implications in Callitrichini (primates, Platyrrhini). *Biochem. Genet.*, 36 (1998) 229-244; *C.A.*, 130 (1999) 21198.
- 1176 Meng, Z.-q. and Zhang, L.-z.: (Studies on DNA damage in human blood lymphocytes using the single cell microgel electrophoresis technique). *Yichuan Xuebao*, 25 (1998) 294-300; *C.A.*, 130 (1999) 1212.
- 1177 Miyamae, Y., Yamamoto, M., Sasaki, Y.F., Kobayashi, H., Igarashi-Soga, M., Shimoi, K. and Hayashi, M.: Evaluation of a tissue homogenization technique that isolates nuclei from the *in vivo* single cell gel electrophoresis (comet) assay: a collaborative study by five laboratories. *Mutat. Res.*, 418 (1998) 131-140; *C.A.*, 130 (1999) 34319.
- 1178 Mizushima, N. and Kohsaka, H. and Miyasaka, N.: Ceramide, a mediator of interleukin 1, tumor necrosis factor  $\alpha$ , as well as Fas receptor signaling, induces apoptosis of rheumatoid arthritis synovial cells. *Ann. Rheum. Dis.*, 57 (1998) 495-499; *C.A.*, 130 (1999) 37252.
- 1179 O'Keefe, D.S., Su, S.L., Bacich, D.J., Horiguchi, Y., Luo, Y., Powell, C.T., Zandvliet, D., Russell, P.J., Molloy, P.L., Nowak, N.J., Shows, T.B., Mullins, C., Vonder Haar, R.A., Fair, W.R. and Heston, W.D.W.: Mapping, genomic organization and promoter analysis of the human prostate-specific membrane antigen gene. *Biochim. Biophys. Acta*, d1443 (1998) 113-127.
- 1180 Oetting, W.S., Armstrong, C.M., Ronan, S.M., Young, T.L., Sellers, T.A. and King, R.A.: Multiplexed short tandem repeat polymorphisms of the Weber 8A set of markers using tailed primers and infrared fluorescence detection. *Electrophoresis (Weinheim)*, 19 (1998) 3079-3083.
- 1181 Olanelles, L., Maranon, C., Requena, J.M. and Lopez, M.C.: Phage recovery by electroporation of naked DNA into host cells avoids the use of packaging extracts. *Anal. Biochem.*, 267 (1999) 234-235.
- 1182 Osborne, J., Hu, C., Hawley, C., Underwood, L.J., O'Brien, T.J. and Baker, V.V.: Expression of HOXD10 gene in normal endometrium and endometrial adenocarcinoma. *J. Soc. Gynecol. Invest.*, 5 (1998) 277-280; *C.A.*, 130 (1999) 36512.
- 1183 Oto, J., Islam, Z., Takaishi, Y. and Sakato, N.: (Biological activity of the triterpene celastrol. Analysis from the viewpoint of the apoptosis induction). *Kagawa Daigaku Nogakubu Gakujutsu Hokoku*, 50 (1998) 79-87; *C.A.*, 130 (1999) 32781.
- 1184 Pan, J.-X., Zhu, Z.-Y., Li, H.-L., Wang, S.-W. and Li, S.-N.: (Apoptosis in hematopoietic cells induced by splenic lymphocytes of mice with aplastic anemia mediated immunologically). *Zhongguo Bingli Shengli Zazhi*, 13 (1997) 465-469; *C.A.*, 130 (1999) 23999.
- 1185 Pan, Z.K.: Anaphylatoxins C5a and C3a induce nuclear factor  $\kappa$ B activation in human peripheral blood monocytes. *Biochim. Biophys. Acta*, 1443 (1998) 90-98.
- 1186 Reddy, P.M., Kouchi, H. and Ladha, J.K.: Isolation, analysis and expression of homologues of the soybean early nodulin gene GmENOD93 (GmN93) from rice. *Biochim. Biophys. Acta*, 1443 (1998) 386-392.
- 1187 Ren, X., Gao, H., Wang, S. and Wang, D.: (A study on apoptotic cell death during chemotherapy of patients with acute leukemia). *Zhongguo Zhongliu Zazhi*, 20 (1998) 191-192; *C.A.*, 130 (1999) 20277.
- 1188 Ridinger, K., Ilg, E.C., Niggli, F.K., Heizmann, C.W. and Schäfer, B.W.: Clustered organization of S100 genes in human and mouse. *Biochim. Biophys. Acta*, 1448 (1998) 254-263.
- 1189 Riss, J. and Laskov, R.: Expression of novel alternatively spliced isoforms of the oct-1 transcription factor. *Biochim. Biophys. Acta*, 1444 (1999) 295-298.

- 1190 Roberts, P.D., Hodge, N.C., Bouzar, H., Jones, J.B., Stall, R.E., Berger, R.D. and Chase, A.R.: Relatedness of strains of *Xanthomonas fragariae* by restriction fragment length polymorphism, DNA-DNA reassociation, and fatty acid analyses. *Appl. Environ. Microbiol.*, 64 (1998) 3961-3965; C.A., 130 (1999) 2063.
- 1191 Rojas, E., Lopez, M.C. and Valverde, M.: Single cell gel electrophoresis assay: methodology and applications. *J. Chromatogr. B*, 722 (1999) 225-254 - a review with 301 refs.
- 1192 Schilli, M.B., Paus, R. and Menrad, A.: Reduction of intrafollicular apoptosis in chemotherapy-induced alopecia by topical calcitriol-analogs. *J. Invest. Dermatol.*, 111 (1998) 598-604; C.A., 130 (1999) 10379.
- 1193 Sengupta, P.K. and Smith, B.D.: Methylation in the initiation region of the first exon suppresses collagen pro- $\alpha$ 2(I) gene transcription. *Biochim. Biophys. Acta*, 1443 (1998) 75-89.
- 1194 Shen, B., Zou, L., Vhu, J., Li, D., Wu, C. and Han, X.: (Distribution of three STR loci in Chinese Jingpo ethnic group in Yunnan province). *Zhonghua Yixue Yichuanxue Zazhi*, 15 (1998) 89-91; C.A., 130 (1999) 33692.
- 1195 Shi, B. and Han, R.: (Isoharringtonine induces apoptosis in human leukemia HL-60 cell). *Haoxue Xuebao*, 33 (1998) 407-412; C.A., 130 (1999) 20274.
- 1196 Suter, M. and Richter, C.: Fragmented mitochondrial DNA is the predominant carrier of oxidized DNA bases. *Biochemistry*, 38 (1999) 459-464.
- 1197 Tang, G.-Q., Tanaka, N. and Kunugi, S.: *In vitro* increases in plasmid DNA supercoiling by hydrostatic pressure. *Biochim. Biophys. Acta*, 1443 (1998) 364-368.
- 1198 Terent'ev, A.A., Kostyuk, G.V. and Boikov, P.Ya.: (Changes in structural organization of the nucleosome fiber during protooncogene activation). *Biokhimiya (Moscow)*, 63 (1998) 183-189.
- 1199 Trézéguet, V., Zeman, I., David, C., Lauquin, G.J.-M. and Kolarov, J.: Expression of the ADP/ATP carrier encoding genes in aerobic yeasts; phenotype of an ADP/ATP carrier deletion mutant of *Schizosaccharomyces pombe*. *Biochim. Biophys. Acta*, 1410 (1999) 229-236.
- 1200 Utsuno, K., Kojima, K., Maeda, Y. and Tsuboi, M.: The average unwinding angle of DNA duplex produced by the binding of chromomycin A3. *Chem. Pharm. Bull.*, 46 (1998) 1667-1671.
- 1201 Van Orsouw, N.J., Zhang, X., Wei, J.Y., Johns, D.R. and Vijg, J.: Mutational scanning of mitochondrial DNA by two-dimensional electrophoresis. *Genomics*, 52 (1998) 27-36; C.A., 130 (1999) 906.
- 1202 Vega, A., Barros, F., Bellas, S. and Carracedo, A.: Minisatellite variant repeat (MVR) analysis of the HRAS1 minisatellite locus. *Electrophoresis (Weinheim)*, 19 (1998) 3084-3089.
- 1203 Winter, D.B., Gearhart, P.J. and Bohr, V.A.: Homogeneous rate of degradation of nuclear DNA during apoptosis. *Nucleic Acids Res.*, 26 (1998) 4422-4425. C.A., 130 (1999) 34586.
- 1204 Yamauchi, Y. and Okada, M.: (Pulsed field gel electrophoresis). *BME*, 12 (1998) 30-37; C.A., 129 (1998) 184686q - a review with 18 refs.
- 1205 Yogalingam, G., Crawley, A., Hopwood, J.J. and Anson, D.S.: Evaluation of fibroblast-mediated gene therapy in a feline model of mucopolysaccharidosis type VI. *Biochim. Biophys. Acta*, 1453 (1999) 284-296.
- 1206 Zakaria, Z., Radu, S., Sheikh-Omar, A.R., Mutalib, A.R., Joseph, P.G. and Rusul, G.: Molecular analysis of *Dichelobacter nodosus* isolated from footrot in sheep in Malaysia. *Vet. Microbiol.*, 62 (1998) 243-250; C.A., 130 (1999) 35546.
- 1207 Zapparoli, G., Torriani, S. and Dellaglio, F.: Differentiation of *Lactobacillus sanfranciscensis* strains by randomly amplified polymorphic DNA and pulsed-field gel electrophoresis. *FEMS Microbiol. Lett.*, 166 (1998) 325-332; C.A., 130 (1999) 875.
- 1208 Zhang, Q. and Zhou, H.: (Enterococcus spp resistance and typing by pulsed-field gel electrophoresis). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 73-75; C.A., 130 (1999) 1928.
- 1209 Zheng, Q., Yu, L., Zhang, M., Hu, P., Mao, N., Xu, Y. and Zhao, S.: (Chromosome assignment of a novel microsatellite polymorphic marker (D14S1435) by fluorescence in situ hybridization). *Zhonghua Yixue Yichuanxue Zazhi*, 15 (1998) 161-163; C.A., 130 (1999) 33705.
- For additional information see C.A.:  
130 (1999) 11288, 21338.
- See also 724, 738, 740, 784, 959, 970, 1013, 1044, 1102, 1103, 1108, 1119, 1125, 1138, 1251, 1276, 1283, 1289, 1319, 1329, 1352, 1357, 1363.
- 21d. Structural studies on RNA and RNA mapping
- 1210 Dhulipala, P.D.K. and Kotlikoff, M.I.: Cloning and characterization of the promoters of the maxiK channel  $\alpha$  and  $\beta$  subunits. *Biochim. Biophys. Acta*, 1444 (1999) 254-262.
- 1211 Kormanec, J., Novakova, R., Homerova, D. and Sevcikova, B.: The *Streptomyces aureofaciens* homologue of the sporulation gene whiH is dependent on rpoZ-encoded  $\delta$  factor. *Biochim. Biophys. Acta*, 1444 (1999) 80-84.
- 1212 Kutsuwada, K., Satoh, J.-i., Ohki, G., Muto, S., Imai, M., Arakawa, M. and Suzuki, M.: Cloning and characterization of 5'-flanking region of mouse non-selective cation channel 1. *Biochim. Biophys. Acta*, 1444 (1999) 92-100.
- 1213 Mittra, B., Sadhukhan, P.K. and Majumder, H.K.: A novel endonuclease from kinetoplastid hemoflagellated protozoan parasite Leishmania. *J. Biochem. (Tokyo)*, 124 (1998) 1198-1205.
- 1214 Richardson, N., Navaratnam, N. and Scott, J.: Secondary structure for the apolipoprotein B mRNA editing site. AU-binding proteins interact with a stem loop. *J. Biol. Chem.*, 273 (1998) 31707-31717.
- 1215 Sakaguchi, Y., Kishi, F., Murakami, A., Suminami, Y. and Kato, H.: Structural analysis of human SCC antigen 2 promoter. *Biochim. Biophys. Acta*, 1444 (1999) 111-116.
- 1216 Schroder, A.R.W., Baumstark, T. and Riesner, D.: Chemical mapping of co-existing RNA structures. *Nucleic Acids Res.*, 26 (1998) 3449-3450; C.A., 129 (1998) 212195z.
- 1217 Stothard, J.R., Frame, I.A., Carrasco, H.J. and Miles, M.A.: On the molecular taxonomy of *Trypanosoma cruzi* using riboprinting. *Parasitology*, 117 (1998) 243-247; C.A., 130 (1999) 35551.
- For additional information see C.A.:  
130 (1999) 11279.
- See also 1092, 1111, 1122, 1199.

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

- 1218 Alzhanov, D.T., Alzhanova, D.V., Zheleznyaya, L.A. and Matvienko, N.I.: (Thermophilic strain *Bacillus species* AA contains several site-specific endonucleases). *Biokhimiya (Moscow)*, 63 (1998) 636-645.
- 1219 Alzhanova, D.V., Alzhanov, D.T., Zheleznyaya, L.A. and Matvienko, N.I.: (Purification and characterization of the site-specific endonuclease BSP 123 I from the thermophilic *Bacillus species* strain 123). *Biokhimiya (Moscow)*, 63 (1998) 247-251.
- 1220 Ardu, J.A., Gillman, I.G. and Manderville, R.A.: On the role of copper and iron in DNA cleavage by ochratoxin A. Structure-activity relationships in metal binding and copper-mediated DNA cleavage. *Can. J. Chem.*, 76 (1998) 907-918; C.A., 130 (1999) 34337.
- 1221 Baffa, R., Veronese, M.L., Santoro, R., Mandes, B., Palazzo, J.P., Rugge, M., Santoro, E., Croce, C.M. and Huebner, K.: Loss of FHIT expression in gastric carcinoma. *Cancer Res.*, 58 (1998) 4708-4714.
- 1222 Belyavskii, M., Belyavskaya, E., Levy, G.A. and Leibowitz, J.L.: Coronavirus MHV-3-induced apoptosis in macrophages. *Virology*, 250 (1998) 41-49; C.A., 130 (1999) 36627.
- 1223 Bhanoori, M. and Venkateswarlu, G.: The alkaline single cell gel electrophoresis: a new test for assessing DNA single strand breaks in *Neurospora crassa*. *Mutat. Res.*, 405 (1998) 29-34; C.A., 129 (1998) 271601b.
- 1224 Bhat, S.P.: DNA sequencing apparatus and method for a small format gel with a magnified readout. U.S. US 5,800,993 (Cl. 435-6; C12Q1/68) 1 Sep. 1998, US Appl. 282,610, 29 Jul. 1994; 9 p.; C.A., 129 (1998) 198861e.
- 1225 Bogdanov, K.B., Chikhlovin, A.B., Zaritskii, A.Yu. and Afanas'ev, B.V.: (*In vitro* induction of primary DNA double-strand breaks in leukemic and normal blood cells by UV-irradiation). *Vopr. Onkol.*, 42 (1996) 67-70; C.A., 130 (1999) 12030.
- 1226 Borys, E. and Kusmirek, J.T.: Endogenous and exogenous DNA lesions recognized by N-alkylpurine-DNA glycosylases. *Acta Biochim. Pol.*, 45 (1998) 579-586; C.A., 130 (1999) 22060.
- 1227 Chen, Y., Jiang, B., Chen, Y., Ding, X., Liu, X., Chen, C., Guo, X. and Yin, G.: Formation of plasmid DNA strand breaks induced by low-energy ion beam: indication of nuclear stopping effects. *Radiat. Environ. Biophys.*, 37 (1998) 101-106; C.A., 130 (1999) 1792.
- 1228 Chopra, A.K., Ribardo, D.A., Wood, T.G., Prusak, D.J., Xu, X.-J. and Peterson, J.W.: Molecular characterization of cDNA for phospholipase A<sub>2</sub>-activating protein. *Biochim. Biophys. Acta*, 1444 (1999) 125-130.
- 1229 Chrenek, P., Zitny, J., Haladova, D., Vasicek, D., Bauerova, M., Michalickova, E., Michalikova, A., Kubek, A. and Bulla, J.: Determination kappa-casein and beta-lactoglobulin genotype of cows by DNA and protein analyses. *J. Farm. Anim. Sci.*, 29 (1996) 9-14; C.A., 129 (1998) 201037y.
- 1230 Cole, K.D.: Preparative separation of plasmid and bacterial artificial chromosome DNA by density gradient electrophoresis in the presence of linear polymers. *Electrophoresis (Weinheim)*, 19 (1998) 3062-3068.
- 1231 Cortez, N., Carrillo, N., Pasternak, C., Balzer, A. and Klug, G.: Molecular cloning and expression analysis of the *Rhodobacter capsulatus sodB* gene, encoding an iron superoxide dismutase. *J. Bacteriol.*, 180 (1998) 5413-5420; C.A., 130 (1999) 33650.
- 1232 Cremonesi, L., Carrera, P., Fumagalli, A., Lucchiari, S., Cardillo, E., Ferrari, M., Righetti, S.C., Zunino, F., Righetti, P.G. and Gelfi, C.: Validation of double gradient denaturing gradient gel electrophoresis through multigenic retrospective analysis. *Clin. Chem. (Washington)*, 45 (1999) 35-40.
- 1233 DiPietrantonio, A.M., Hsieh, T.-C., Olson, S.C. and Wu, J.M.: Regulation of G1/S transition and induction of apoptosis in HL-60 leukemia cells by fenretinide (4HPR). *Int. J. Cancer*, 78 (1998) 53-61; C.A., 130 (1999) 213.
- 1234 Dmitriev, A., Suvorov, A. and Totolian, A.: Physical and genetic chromosomal maps of *Streptococcus agalactiae*, serotypes II and III; rRNA operon organization. *FEMS Microbiol. Lett.*, 167 (1998) 33-39; C.A., 130 (1999) 21165.
- 1235 Fan, H., Li, S., Gu, W., Li, Y., Ma, H., Luo, J., Wang, W. and Lu, X.: (Association between angiotensin II type I receptor gene and human essential hypertension). *Zhonghua Yixue Yichuanxue Zazhi*, 15 (1998) 101-103; C.A., 130 (1999) 36673.
- 1236 Fiehn, C., Wettschureck, N. and Krauthoff, A.: PCR method for quantitative determination of transgenes in transformed cells. Ger. Offen. DE 19718705 A1, 5 Nov. 1998, 12 pp.; C.A., 130 (1999) 1161.
- 1237 Gaillard, M.-C., Mahadeva, R. and Lomas, D.A.: Identification of DNA polymorphisms associated with the V type alpha<sub>1</sub>-antitrypsin gene. *Biochim. Biophys. Acta*, 1444 (1999) 166-170.
- 1238 Gholizadeh, Y., Varnerot, A., Maslo, C., Salauze, B., Babaoui, H., Vincent, V. and Bure-Rossier, A.: *Mycobacterium celatum* infection in two HIV-infected patients treated prophylactically with rifabutin. *Eur. J. Clin. Microbiol. Infect. Dis.*, 17 (1998) 278-281; C.A., 130 (1999) 36591.
- 1239 Gorczyca, W., Melamed, M.R. and Darzynkiewicz, Z.: Analysis of apoptosis by flow cytometry. *Methods Mol. Biol. (Totowa)*, 91 (Flow Cytometry Protocols) (1998) 217-238; C.A., 129 (1998) 158648j.
- 1240 Harris, D.J., Arnold, E.N. and Thomas, R.H.: Rapid speciation, morphological evolution, and adaptation to extreme environments in South African sand lizards (*Meroles*) as revealed by mitochondrial gene sequences. *Mol. Phylogenet. Evol.*, 10 (1998) 37-48; C.A., 130 (1999) 35885.
- 1241 Hashimoto, S., Xu, M., Masuda, Y., Aiuchi, T., Nakajo, S., Cao, J., Miyakoshi, M., Ida, Y. and Nakaya, K.: beta-Hydroxyisovalerylshikonin inhibits the cell growth of various cancer cell lines and induces apoptosis in leukemia HL-60 cells through a mechanism different from those of Fas and etoposide. *J. Biochem. (Tokyo)*, 125 (1999) 17-23.
- 1242 Huang, H., Shu, S.C., Shih, J.H., Kuo, C.J. and Chiu, I.D.: Antimony trichloride induces DNA damage and apoptosis in mammalian cells. *Toxicology*, 129 (1998) 113-123; C.A., 130 (1999) 1271.
- 1243 Hughes, S.J., Glover, T.W., Zhu, X.-X., Kuick, R., Thoraval, D., Orringer, M.B., Beer, D.G. and Hanash, S.: A novel amplicon at 8p22-23 results in overexpression of cathepsin B in esophageal adenocarcinoma. *Proc. Natl. Acad. Sci. U.S.A.*, 95 (1998) 12410-12415; C.A., 130 (1999) 36583.
- 1244 Igloi, G.L.: Variability in the stability of DNA-peptide nucleic acid (PNA) single-base mismatched duplexes: real-time by hybridization during affinity electrophoresis in PNA-containing gel. *Proc. Natl. Acad. Sci. U.S.A.*, 95 (1998) 8562-8567; C.A., 129 (1998) 198573n.

- 1245 Iwao, K. and Tsukamoto, I.: Quercetin inhibited DNA synthesis and induced apoptosis associated with increase in c-fos mRNA level and the upregulation of p21<sup>WAF1/CIP1</sup> mRNA and protein expression during liver regeneration after partial hepatectomy. *Biochim. Biophys. Acta*, 1427 (1999) 112-120.
- 1246 Jing, H., Zhang, S., Xiao, C. and Wu, H.: (Studies of the polymorphism of CTG trinucleotide repeats of myotonic dystrophy gene in Qiang ethnic group in China). *Yichuan*, 20 (1998) 7-11; *C.A.*, 130 (1999) 36832.
- 1247 Kawasaki, N., Satonaka, M., Imagawa, M., Naito, H. and Kawasaki, T.: Functional characterization of the bovine conglutinin promoter: presence of a novel element for transcriptional regulation of a C-type mammalian lectin containing a collagen-like domain. *J. Biochem. (Tokyo)*, 124 (1998) 1188-1197.
- 1248 Kenney, M., Ray, S. and Boles, T.C.: Mutation typing using electrophoresis and gel immobilized Acrydite probes. *BioTechniques*, 25 (1998) 516-521; *C.A.*, 129 (1998) 311367p.
- 1249 Kiba, Y. and Baba, Y.: Electrophoretic behavior and conformational dynamics of triplet repeat DNA. *Nucleic Acids Symp. Ser.*, 39 (1998) 129-130; *C.A.*, 129 (1998) 287476a.
- 1250 Kitazawa, S., Kitazawa, R., Tamada, H. and Maeda, S.: Promoter structure of human sonic hedgehog gene. *Biochim. Biophys. Acta*, 1443 (1998) 358-363.
- 1251 Kraxenberger, F., Weber, K.J., Friedl, A.A., Eckard-Schupp, F., Flentje, M., Quicken, P. and Kellerer, A.M.: DNA double-strand breaks in mammalian cells exposed to gamma-rays and very heavy ions. Fragment-size distributions determined by pulsed-field gel electrophoresis. *Radiat. Environ. Biophys.*, 37 (1998) 107-115; *C.A.*, 130 (1999) 1793.
- 1252 Lauricella, M., Giuliano, M., Emanuele, S., Vento, R. and Tesoriere, G.: Apoptotic effects of different drugs on cultured retinoblastoma Y79 cells. *Tumor Biol.*, 19 (1998) 356-363; *C.A.*, 130 (1999) 10362.
- 1253 Li, M.-T., Su, X.-W., Sun, J., Qiu, P.-X., Wu, Y.-P. and Yan, G.-M.: (Protection of Bcl-2 protein against cyclopiazonic acid-induced apoptosis in Chinese hamster ovary cells). *Zhongguo Yaolixue Yu Dulixue Zazhi*, 12 (1998) 184-187; *C.A.*, 130 (1999) 10591.
- 1254 Mailman, M.D., Muscarella, P., Schirmer, W.J., Ellison, E.C., O'Dorisio, T.M. and Prior, T.W.: Identification of MENI mutations in sporadic enteropancreatic neuroendocrine tumors by analysis of paraffin-embedded tissue. *Clin. Chem. (Washington)*, 45 (1999) 29-34.
- 1255 Marchese, A., Ramirez, M., Schito, G.C. and Tomasz, A.: Molecular epidemiology of penicillin-resistant *Streptococcus pneumoniae* isolates recovered in Italy from 1993-1996. *J. Clin. Microbiol.*, 36 (1998) 2944-2949; *C.A.*, 130 (1999) 22757.
- 1256 Martin-Parras, L., Lucas, I., Martinez-Robles, M.L., Hernandez, P., Krimer, D.B., Hyrien, O. and Schwartzman, J.B.: Topological complexity of different populations of pBR322 as visualized by two-dimensional agarose gel electrophoresis. *Nucleic Acids Res.*, 26 (1998) 3424-3432; *C.A.*, 129 (1998) 213099h.
- 1257 McEvoy, C.R.E., Seshadri, R. and Firgaira, F.A.: Carge DNA fragment sizing using native acrylamide gels on an automated DNA sequencer and GENESCAN software. *BioTechniques*, 25 (1998) 464-470; *C.A.*, 129 (1998) 311364k.
- 1258 Meissner, C. and von Wurmb, N.: Sensitive detection of the 4977-bp deletion in human mitochondrial DNA of young individuals. *BioTechniques*, 25 (1998) 652-654; *C.A.*, 130 (1999) 33594.
- 1259 Minami, R., Kitazawa, R., Maeda, S. and Kitazawa, S.: Analysis of 5'-flanking region of human Smad4 (DPC4) gene. *Biochim. Biophys. Acta*, 1443 (1998) 182-185.
- 1260 Mitchelmore, C.L., Birmelin, C., Livingstone, D.R. and Chipman, J.K.: Detection of DNA strand breaks in isolated mussel (*Mytilus edulis* L.) digestive gland cells using the "Comet" assay. *Ecotoxicol. Environ. Saf.*, 41 (1998) 51-58; *C.A.*, 130 (1999) 21613.
- 1261 Mitsunaga, S.-I., Fukui, K., Ohyama, H. and Yamaguchi, J.: Detection of proteins binding to the promoter region DNA using a nonradioactive gel-retardation assay. *Biosci., Biotechnol., Biochem.*, 62 (1998) 1812-1814; *C.A.*, 130 (1999) 21097.
- 1262 Mohanty, U., Searls, T. and McLaughlin, L.W.: Anomalous migration of short sequences of nucleic acids in polyacrylamide gels: prediction and experiment. *J. Am. Chem. Soc.*, 120 (1998) 8275-8276; *C.A.*, 129 (1998) 276211j.
- 1263 Netzker, R., Fabian, D., Weigert, C. and Brand, K.A.: Functional studies by site-directed mutagenesis on the role of Sp1 in the expression of the pyruvate kinase M and aldolase A genes. *Biochim. Biophys. Acta*, 1444 (1999) 231-240.
- 1264 On, S.L.W.: *In vitro* genotypic variation of *Campylobacter coli* documented by pulsed-field gel electrophoretic DNA profiling: implications for epidemiological studies. *FEMS Microbiol. Lett.*, 165 (1998) 341-346; *C.A.*, 129 (1998) 257462a.
- 1265 Reader, S., Moutardier, V. and Denizeau, F.: Tributyltin triggers apoptosis in trout hepatocytes: the role of Ca<sup>2+</sup>, protein kinase C and proteases. *Biochim. Biophys. Acta*, 1448 (1999) 473-485.
- 1266 Sakakibara, Y., Kasamo, K., Kobayashi, H., Kusakabe, I. and Kawasaki, S.: Identification of the gene structure and promoter region of H<sup>+</sup>-translocating inorganic pyrophosphatase in rice (*Oryza sativa* L.). *Biochim. Biophys. Acta*, 1444 (1999) 117-124.
- 1267 Santegode, C.M., Ferdelman, T.G., Muyzer, G. and de Beer, D.: Structural and functional dynamics of sulfate-reducing populations in bacterial biofilms. *Appl. Environ. Microbiol.*, 64 (1998) 3731-3739; *C.A.*, 130 (1999) 2140.
- 1268 Szoke, M., Sasvari-Szekely, M. and Guttman, A.: Ultra-thin-layer agarose gel electrophoresis. I. Effect of the gel concentration and temperature on the separation of DNA fragments. *J. Chromatogr. A*, 830 (1999) 465-471.
- 1269 Takeshita, H., Yasuda, T., Nakajima, T., Hosomi, O., Nakashima, Y., Tsutsumi, S. and Kishi, K.: Detection of the two short tandem repeat loci (HumTPO and HumLPL) in Japanese populations using discontinuous polyacrylamide gel electrophoresis. *Nippon Hoigaku Zasshi*, 52 (1998) 139-143; *C.A.*, 129 (1998) 271144e.
- 1270 Takeuchi, S. and Takahashi, S.: A possible involvement of melanocortin 3 receptor in the regulation of adrenal gland function in the chicken. *Biochim. Biophys. Acta*, 1448 (1999) 512-518.
- 1271 Tchernitchko, D., Lamoril, J., Puy, H., Robreau, A.M., Bogard, C., Rosipal, R., Gouya, L., Deybach, J.C. and Nordmann, Y.: Evaluation of mutation screening by heteroduplex analysis in acute intermittent porphyria: comparison with denaturing gradient gel electrophoresis. *Clin. Chim. Acta*, 279 (1999) 133-143.
- 1272 Tow, L.A. and Coyne, V.E.: Cloning and characterisation of a novel *ompB* operon from *Vibrio cholerae* 569B. *Biochim. Biophys. Acta*, 1444 (1999) 269-275.

- 1273 Tsuda, S., Kosaka, Y., Matsusaka, N. and Sasaki, Yu.F.: Detection of pyrimethamine-induced DNA damage in mouse embryo and maternal organs by the modified alkaline single cell gel electrophoresis assay. *Mutat. Res.*, 415 (1998) 69-77; C.A., 129 (1998) 183872k.
- 1274 Vasiljeva, L.Yu., Zheleznyaya, L.A. and Matvienko, N.I.: (Site-specific endonuclease SscI I from the *Staphylococcus* sp. strain L1). *Biochimija (Moscow)*, 63 (1998) 252-258.
- 1275 Wendl, M.C., Dear, S., Hodgson, D. and Hillier, L.D.: Automated sequence preprocessing in a large-scale sequencing environment. *Genome Res.*, 8 (1998) 975-984; C.A., 130 (1999) 21088.
- 1276 Woynarowski, J.M., Chapman, W.G., Napier, C. and Herzog, M.C.S.: Induction of AT-specific DNA-interstrand crosslinks by bizelesin in genomic and simian virus 40 DNA. *Biochim. Biophys. Acta*, 1444 (1999) 201-217.
- 1277 Wu, S.-L., Hsiang, C.-Y., Ho, T.-Y. and Chang, T.-J.: Identification, expression, and characterization of the pseudorabies virus DNA-binding protein gene and gene product. *Virus Res.*, 56 (1998) 1-9; C.A., 130 (1999) 33655.
- 1278 Wu, W., Kong, X., Li, Y., Yang, R., Qu, C., Li, L. and Zhang, L.: (Study on determination of  $^{60}\text{Co}$  g ray induced mice thymocyte programmed cell death and DNA fragmentation). *Zhonghua Fangshe Yixue Yu Fanghu Zazhi*, 18 (1998) 169-170; C.A., 130 (1999) 1803.
- 1279 Yaneva, J. and Zlatanova, J.: The electrophoretic separation of curved cisplatin-modified DNA fragments on polyacrylamide gels in dependent on the voltage gradient. *Z. Naturforsch., C: Biosci.*, 53 (1998) 921-923; C.A., 129 (1998) 31033n.
- 1280 Zeng, H., Zhao, X., Ma, Y., Zhao, R., Yang, M., Zhang, Y., Liu, F. and Gao, T.: (Retinoic acid induction of Fas protein expression in HL-60 cells). *Zhonghua Xueyexue Zazhi*, 19 (1998) 237-240; C.A., 130 (1999) 23257.
- 1281 Zhang, H., Liu, C., Liu, J. and Wang, H.: (Vitamin D receptor genotyping by polymerase chain reaction-restriction fragment length polymorphism). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 145-147; C.A., 130 (1999) 21050.
- 1282 Zhang, L. and Chi, C.: (Studies on DNA damage induced by ionizing radiation in human blood lymphocytes using the single cell microgel electrophoresis technique). *Fushe Yanjiu Yu Fushe Gongyi Xuebao*, 16 (1998) 106-109; C.A., 129 (1998) 158512k.
- 1283 Zhang, W. and Bensadoun, A.: Identification of a silencing element in the chicken lipoprotein lipase gene promoter: characterization of the silencer-binding protein and delineation of its target nucleotide sequence. *Biochim. Biophys. Acta*, 1436 (1999) 390-404.
- 1284 Zou, L.-p., Yang, Y., Chu, J.-y., Shen, B. and Li, D.-l.: (Distribution of CSF1PO, TPOX and TH01 loci in Han Chinese). *Yichuan Xuebao*, 25 (1998) 199-204; C.A., 130 (1999) 23226.
- For additional information see C.A.:  
130 (1999) 23444.
- See also 731, 917, 1082, 1087, 1154, 1155, 1175, 1179, 1182, 1183, 1199, 1210, 1306, 1308, 1331, 1340, 1353.
- 21f. Complex mixtures of nucleic acids, their fragments and PCR products
- 1285 Bhagwati, S., Shafiq, S.A. and Xu, W.: (CTG)<sub>n</sub> repeats markedly inhibit differentiation of the C2C12 myoblast cell line: implications for congenital myotonic dystrophy. *Biochim. Biophys. Acta*, 1453 (1999) 221-229.
- 1286 Bulat, S.A., Lubeck, M., Mironenko, N., Jensen, D.F. and Lubeck, P.S.: UP-PCR analysis and ITS1 ribotyping of strains of *Trichoderma* and *Gliocladium*. *Mycol. Res.*, 102 (1998) 933-943; C.A., 130 (1999) 33543.
- 1287 Cazals, V., Nabeyrat, E., Corroyer, S., de Keyzer, Y. and Clement, A.: Role for NF- $\kappa$ B in mediating the effects of hyperoxia on IGF-binding protein 2 promoter activity in lung alveolar epithelial cells. *Biochim. Biophys. Acta*, 1448 (1999) 349-362.
- 1288 Chen, J.J., Vasko, M.R., Wu, X., Staeva, T.P., Baez, M., Zgombick, J.M. and Nelson, D.L.: Multiple subtypes of serotonin receptors are expressed in rat sensory neurons in culture. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1119-1127.
- 1289 Chen, X., Harmon, M., Deng, Z., Centola, M., Sood, R., Taylor, K., Kastner, D.L. and Fischel-Ghodsian, N.: Identification and characterization of a zinc finger gene (ZNF213) from 16p13.3. *Biochim. Biophys. Acta*, 1444 (1999) 218-230.
- 1290 Dassi, C., Signorini, S., Gerthoux, P., Cazzaniga, M. and Brambilla, P.: Cytochrome P450 1B1 mRNA measured in blood mononuclear cells by quantitative reverse transcription-PCR. *Clin. Chem. (Washington)*, 44 (1998) 2416-2421.
- 1291 Deb, P., Klempen, T.A., O'Reilly, R.L. and Singh, S.M.: Search for retroviral related DNA polymorphisms using RAPD PCR in schizophrenia. *Biochim. Biophys. Acta*, 1453 (1999) 216-220.
- 1292 Denizot, Y., Besse, A., Raher, S., Nachat, R., Trimoreau, F., Praloran, V. and Godard, A.: Interleukin-4 (IL-4), but not IL-10, regulates the synthesis of IL-6, IL-8 and leukemia inhibitory factor by human bone marrow stromal cells. *Biochim. Biophys. Acta*, 1449 (1999) 83-92.
- 1293 Desruisseaux, C., Slater, G.W. and Kist, T.B.L.: Trapping electrophoresis and ratchets: a theoretical study for DNA-protein complexes. *Biophys. J.*, 75 (1998) 1228-1236; C.A., 129 (1998) 287096b.
- 1294 Dörner, A., Olesch, M., Giessen, S., Pauschinger, M. and Schultheiss, H.-P.: Transcription of the adenine nucleotide translocase isoforms in various types of tissues in the rat. *Biochim. Biophys. Acta*, 1417 (1999) 16-24.
- 1295 Fernandez-Rodriguez, A., Alonso, A., Albaran, C., Montesino, M., Iturralde, M.J., de Simon, L.F., Martin, P. and Sancho, M.: D1S80 typing in casework: a simple strategy to distinguish non-specific microbial PCR products from human alleles. *Int. Congr. Ser.*, 1167(Progress in Forensic Genetics 7) (1988) 18-20; C.A., 130 (1999) 34099.
- 1296 Fromm, M.F., Leake, B., Roden, D.M., Wilkinson, G.R. and Kim, R.B.: Human MRP3 transporter: identification of the 5'-flanking region, genomic organization and alternative splice variants. *Biochim. Biophys. Acta*, 1415 (1999) 369-374.
- 1297 Granger, S.W. and Fan, H.: *In vivo* footprinting of the enhancer sequences in the upstream long terminal repeat of Moloney murine leukemia virus: differential binding of nuclear factors in different cell types. *J. Virol.*, 72 (1998) 8961-8970; C.A., 130 (1999) 33892.

- 1298 Guttman, A., Barta, C., Szöke, M., Sasvári-Székely, M. and Kalász, H.: Real-time detection of allele-specific polymerase chain reaction products by automated ultra-thin-layer agarose gel electrophoresis. *J. Chromatogr. A*, 828 (1998) 481-487.
- 1299 Henke, L. and Henke, J.: Separation of PCR fragments by means of direct blotting electrophoresis. *Methods Mol. Biol. (Totowa, NJ: Forensic DNA Profiling Protocols)* (1998) 209-212; *C.A.*, 129 (1998) 157776n.
- 1300 Hu, A.-L.W., Hartley, J.L. and Jordan, H.J.: Repeat-containing nucleic acid ladders for use as size standards in gel electrophoresis. *PCT Int. Appl. WO 98 44,156 (Cl. C12Q1/68)*, 8 Oct. 1998, US Appl. 40,914, 27 Mar. 1997; 36 p.; *C.A.*, 129 (1998) 286724t.
- 1301 Jaeckel, S., Epplen, J.T., Kauth, M., Mitterski, B., Tschentscher, F. and Epplen, C.: Polymerase chain reaction - single strand conformation polymorphism or how to detect reliably and efficiently each sequence variation in many samples and many genes. *Electrophoresis (Weinheim)*, 19 (1998) 3055-3061 - a review with 68 refs.
- 1302 Kim, C.D., Kim, H.H. and Hong, K.W.: Inhibitory effect of rebamipide on the neutrophil adherence stimulated by conditioned media from *Helicobacter pylori*-infected gastric epithelial cells. *J. Pharmacol. Exp. Ther.*, 288 (1999) 133-138.
- 1303 Kinoshita, M., Nakamura, J., Kusaka, H., Hadama, T., Bago, K., Kitajima, M. and Baba, S.: Automated and simultaneous identification of microsatellite instability by fluorescence-based polymerase chain reaction (PCR) in four loci. *Clin. Chim. Acta*, 279 (1999) 15-23.
- 1304 Kuytmans, J., Berg, H., Steegh, P., Vandenbosch, F., Etienne, J. and van Belkum, A.: Outbreak of *Staphylococcus schleiferi* wound infections: strain characterization by randomly amplified polymorphic DNA analysis, PCR ribotyping conventional ribotyping and pulsed-field gel electrophoresis. *J. Clin. Microbiol.*, 36 (1998) 2214-2219; *C.A.*, 129 (1998) 257287x.
- 1305 Kuroki, H., Ueda, K., Nakamura, F., Sawada, T. and Nagai, K.: Crystallization and preliminary X-ray diffraction studies of a replication initiator protein (RepE54) of the mini-F plasmid complexed with iteron DNA. *J. Biochem. (Tokyo)*, 125 (1999) 24-26.
- 1306 Kubo, S., Nagasawa, R., Nishimura, H., Shigemoto, K. and Maruyama, N.: ATF-2-binding regulatory element is responsible for the Ly49A expression in murine T lymphoid line, EL-4. *Biochim. Biophys. Acta*, 1444 (1999) 191-200.
- 1307 Lallas, T.A. and Buller, R.E.: Optimization of PCR and electrophoresis condition enhances mutation analysis of the BRCA1 gene. *Mol. Genet. Metab.*, 64 (1998) 173-176; *C.A.*, 129 (1998) 286504w.
- 1308 Lam, L.T., Martin, M.G., Turk, E., Hirayama, B.A., Bossard, N.U., Steinmann, B. and Wright, E.M.: Missense mutations in SGLT1 cause glucose-galactose malabsorption by trafficking defects. *Biochim. Biophys. Acta*, 1453 (1999) 297-303.
- 1309 Lei, J., Jiang, A. and Pei, D.: Identification and characterization of a new splicing variant of vascular endothelial growth factor: VEGF183. *Biochim. Biophys. Acta*, 1443 (1998) 400-406.
- 1310 Li, S., Li, Y., Wu, Y., Luo, J., Wang, X., Ma, J. and Lu, X.: (Correlation between the polymorphism of angiotensinogen gene at position 174 and essential hypertension). *Yichuan*, 20 (1998) 18-20; *C.A.*, 130 (1999) 36603.
- 1311 Li, Y., Wu, J., Jin, Z., Hang, F. and Hou, Y.: (Genetic polymorphisms of FABP2 and F13A1 loci in Han population). *Zhonghua Yixue Yichuanxue Zaishi*, 15 (1998) 24-26; *C.A.*, 130 (1999) 23232.
- 1312 Liang, X., Fei, H., Xiao, Y., Liu, S. and Yang, A.: (Detection of minimal residual disease in acute lymphoblastic leukemia using PCR-molecule hybridization of RNA transcripts). *Zhonghua Yixue Yichuanxue Zaishi*, 15 (1998) 164-166; *C.A.*, 130 (1999) 33576.
- 1313 Liminga, M. and Oliw, E.: cDNA cloning of 15-lipoxygenase type 2 and 12-lipoxygenases of bovine corneal epithelium. *Biochim. Biophys. Acta*, 1437 (1999) 124-135.
- 1314 Lindstrom, E.S.: Bacterioplankton community composition in a boreal forest lake. *FEMS Microbiol. Ecol.*, 27 (1998) 163-174; *C.A.*, 130 (1999) 22760.
- 1315 Linhartova, I., Replitz, M., Draber, P., Nemec, M., Wiche, G. and Propst, F.: Conserved domains and lack of evidence for polyglutamine length polymorphism in the chicken homolog of the Machado-Joseph disease gene product ataxin-3. *Biochim. Biophys. Acta*, 1444 (1999) 299-305.
- 1316 Llewellyn, L., Sweeney, G.E., Ramsurn, V.P., Rogers, S.A. and Wigham, T.: Cloning and unusual expression profile of the aldolase B gene from Atlantic salmon. *Biochim. Biophys. Acta*, 1443 (1998) 375-380.
- 1317 Magness, S.T. and Brenner, D.A.: Targeted disruption of the mouse ferrochelatase gene producing an exon 10 deletion. *Biochim. Biophys. Acta*, 1453 (1999) 161-174.
- 1318 Maynard, J.H. and Upadhyaya, M.: High-throughput screening for the detection of unknown mutations: improved productivity using heteroduplex analysis. *BioTechniques*, 25 (1998) 648-651; *C.A.*, 130 (1999) 33593.
- 1319 Miggan, S.M. and Kinsella, B.T.: Expression and tissue distribution of the mRNAs encoding the human thromboxane A<sub>2</sub> receptor (TP)  $\alpha$  and  $\beta$  isoforms. *Biochim. Biophys. Acta*, 1425 (1998) 582-588.
- 1320 Muscillo, M. et al.: Enteric virus detection in Adriatic sea water by cell cultures, polymerase chain reaction and polyamide gel electrophoresis. *Water Res.*, 32 (1998) 1987; *C.A.*, 129 (1998) 126792k.
- 1321 Nagai, H., Ueda, Y., Tanaka, H., Hirano, Y., Nakamura, N., Inagaki, N., Takatsu, K. and Kawada, K.: Effect of overproduction of interleukin 5 on dinitrofluorobenzene-induced allergic cutaneous response in mice. *J. Pharmacol. Exp. Ther.*, 288 (1999) 45-50.
- 1322 Nishio, H., Suda, T., Sawada, K.-i., Miyamoto, T., Koike, T. and Yamaguchi, Y.: Molecular cloning of cDNA encoding human Rab3D whose expression is upregulated with myeloid differentiation. *Biochim. Biophys. Acta*, 1444 (1999) 283-290.
- 1323 Nourse, C.R., Mattei, M.-G., Gunning, P. and Byrne, J.A.: Cloning of a third member of the D52 gene family indicates alternative coding sequence usage in D52-like transcripts. *Biochim. Biophys. Acta*, 1443 (1998) 155-168.
- 1324 Ohkawa, T., Ueki, N., Taguchi, T., Shindo, Y., Adachi, M., Amuro, Y., Hada, T. and Higashino, K.: Stimulation of hyaluronan synthesis by tumor necrosis factor- $\alpha$  is mediated by the p50/p65 NF- $\kappa$ B complex in MRC-5 myofibroblasts. *Biochim. Biophys. Acta*, 1448 (1999) 416-424.

- 1325 Ojcius, D.M., Souque, P., Perfettini, J.-L. and Dauby-Varsat, A.: Apoptosis of epithelial cells and macrophages due to infection with the obligate intracellular pathogen *Chlamydia psittaci*. *J. Immunol.*, 161 (1998) 4220-4226; C.A., 130 (1999) 24038.
- 1326 Okano, K., Uematsu, C., Matsunaga, H. and Kambara, H.: Characteristics of selective polymerase chain reaction (PCR) using two-base anchored primers and improvement of its specificity. *Electrophoresis (Weinheim)*, 19 (1998) 3071-3078.
- 1327 Olianas, M.C., Ingianni, A., Maullu, C., Adem, A., Karlsson, E. and Onali, P.: Selectivity profile of muscarinic toxin 3 in functional assays of cloned and native receptors. *J. Pharmacol. Exp. Ther.*, 288 (1999) 164-170.
- 1328 Polt, R., Luckenbach, C. and Ritter, H.: The STR-marker FGA: allele frequency data (SW-Germany), automated typing with different fluorescence markers. *Int. Congr. Ser.*, 1167 (Progress in Forensic Genetics 7) (1998) 460-462; C.A., 130 (1999) 33708.
- 1329 Reinhardt, J., Veyhl, M., Wagner, K., Gambaryan, S., Dekel, C., Akhounova, A., Korn, T. and Koepsell, H.: Cloning and characterization of the transport modifier RS1 from rabbit which was previously assumed to be specific for Na<sup>+</sup>-D-glucose cotransport. *Biochim. Biophys. Acta*, 1417 (1999) 131-143.
- 1330 Samuel, C.S., Coghlan, J.P. and Bateman, J.F.: Effects of relaxin, pregnancy and parturition on collagen metabolism in the rat pubic symphysis. *J. Endocrinol.*, 159 (1998) 117-125; C.A., 130 (1999) 627.
- 1331 Sander, A., Ruess, M., Bereswill, S., Schuppner, M. and Steinbrueckner, B.: Comparison of different DNA fingerprinting techniques for molecular typing of *Bartonella henselae* isolates. *J. Clin. Microbiol.*, 36 (1998) 2973-2981; C.A., 130 (1999) 33560.
- 1332 Seki, N., Hattori, A., Hayashi, A., Kozuma, S., Ohira, M., Hori, T. and Saito, T.: Structure, expression profile and chromosomal location of an isolog of DNA-PKcs interacting protein (KIP) gene. *Biochim. Biophys. Acta*, 1444 (1999) 143-147.
- 1333 Shi, Q., Zhang, J., Pan, S., Shan, X., Zhang, X., Chen, Y., Yu, L. and Zhao, S.: (Parental origin of extra chromosome 21 in Down syndrome detected by using short tandem repeat DNA polymorphisms after PCR amplification). *Zhonghua Yixue Yichuanxue Zazhi*, 15 (1998) 206-209; C.A., 130 (1999) 33554.
- 1334 Shimogiri, T., Kono, M., Mannen, H., Mizutani, M. and Tsuji, S.: Chicken ornithine transcarbamylase gene, structure, regulation, and chromosomal assignment: repetitive sequence motif in intron 3 regulates this enzyme activity. *J. Biochem. (Tokyo)*, 124 (1998) 962-971.
- 1335 Toda, H. and Su, J.Y.: Mechanisms of isoflurane-increases submaximum Ca<sup>2+</sup>-activated force in rabbit skinned femoral arterial strips. *Anesthesiology*, 89 (1998) 731-740. C.A., 130 (1999) 32915.
- 1336 Tsuneoka, M. and Mekada, E.: N-myc transactivates RCC1 gene expression in rat fibroblast cells transformed by N-myc and v-ras. *J. Biochem. (Tokyo)*, 124 (1998) 1013-1019.
- 1337 Tu, Z.J. and Kiang, D.T.: Mapping and characterization of the basal promoter of the human connexin26 gene. *Biochim. Biophys. Acta*, 1443 (1998) 169-181.
- 1338 Valdivieso Amante, F., Bullido Gomez-Heras, M.J., Artiga Gonzalez, M.J., Recuero Vicente, M. and Sastre Merlin, I.: (Genetic and electrophoretic methods for detection of apoE promoter polymorphism and their use in diagnosis and treatment of Alzheimer's disease). *Span. ES* 211553 A1, 16 Jun. 1998, 21 pp.; C.A., 130 (1999) 1156.
- 1339 Van Looveren, M., Vandamme, P., Hauchecorne, M., Wijsdooch, M., Carion, F., Caughant, D.A. and Goossens, H.: Molecular epidemiology of recent Belgian isolates of *Neisseria meningitidis* serogroup B. *J. Clin. Microbiol.*, 36 (1998) 2828-2834; C.A., 130 (1999) 22698.
- 1340 Villani, G.R.D., Balzano, N., Vitale, D., Saviano, M., Pavone, V. and di Natale, P.: Maroteaux-Lamy syndrome: five novel mutations and their structural localization. *Biochim. Biophys. Acta*, 1453 (1999) 185-192.
- 1341 Wei, J. and Zhang, Z.: (Method of directly labeling PCR products and hybridization in microplate for typing human papillomaviruses). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 170-172; C.A., 130 (1999) 33532.
- 1342 Winn, L.M., Kim, P.M. and Wells, P.G.: Investigation of the tobacco-specific carcinogen 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone for *in vivo* and *in vitro* murine embryopathy and embryonic ras mutations. *J. Pharmacol. Exp. Ther.*, 287 (1998) 1128-1135.
- 1343 Xiao, S., Bao, A., Yang, M. and Zhang, J.: (Detection of mutation frequencies at codon 64 in b3-adrenergic receptor gene with PCR-RFLP in health individuals). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 82-84; C.A., 130 (1999) 11054.
- 1344 Yeh, L.-C.C. and Lee, J.C.: Yeast ribosomal proteins L4, L17, L20, and L25 exhibit different binding characteristics for the yeast 35S precursor rRNA. *Biochim. Biophys. Acta*, 1443 (1998) 139-148.
- 1345 Zhu, G. and Davis, T.N.: The fork head transcription factor Hcm1p participates in the regulation of SPC110, which encodes the calmodulin-binding protein in the yeast spindle pole body. *Biochim. Biophys. Acta*, 1448 (1998) 236-244.
- For additional information see C.A.:  
130 (1999) 1950.
- See also 709, 907, 942, 1001, 1085, 1087, 1133, 1143, 1149, 1162, 1168, 1180, 1185, 1189, 1210, 1217, 1229, 1230, 1232, 1236, 1247, 1268, 1281, 1354, 1355, 1368.
25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)
- 1346 Carlucci, F., Biagioli, B., Maccherini, M., Sani, G., Simeone, F., Bizzarri, F., Perrett, D., Marinello, E., Pagani, R. and Tabucchi, A.: Myocardial ischemic injury and purine metabolism in patients undergoing coronary artery bypass. *Clin. Biochem.*, 31 (1998) 235-239; C.A., 129 (1998) 213750p.
- See also 774, 779, 1366.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

## 26c. Coordination compounds

- 1347 Nesterenko, P., Levitin, I., Chernoglazova, N., Paskonova, E., Penner, N. and Tsikalova, M.: Electrophoretic study of cationic cobalt(III) complexes with ( $N_2O$ ) and ( $N_2O_2$ ) Schiff base ligands. *Inorg. Chim. Acta*, 280 (1998) 295-301; C.A., 129 (1998) 350356d.

## 28. ANTIBIOTICS

- 1348 Kakeya, H., Morishita, M., Ikeno, A., Kobinata, K., Yano, T. and Osada, H.: Factumycin and its new derivative RK-1009 enhance threonine-phosphorylation of a 60-kDa protein in *Streptomyces griseus*. *J. Antibiot.*, 51 (1998) 963-966.

## 30. SYNTHETIC AND NATURAL DYES

## 30b. Chloroplast and other natural pigments

- 1349 Shirshova, L. and Osterberg, R.: Electrophoresis of podzol soil humic acids. *Environ. Int.*, 24 (1998) 625-628; C.A., 129 (1998) 202477d.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 1350 Folkersma, R., Diemen, A.J.G. and van Stein, H.N.: Electrophoretic properties of polystyrene spheres. *Langmuir*, 14 (1998) 5973-5976; C.A., 129 (1998) 290715h.  
 1351 Furukawa, M., Okazaki, T. and Shiiba, T.: Functionally graded polyurethane elastomers prepared by electrophoresis of monomer. *J. Nat. Rubber Res.*, 12 (1997) 237-246; C.A., 129 (1998) 190327q.

## 32. DRUG ANALYSIS

## 32a. Drug analysis, general techniques

See 1081.

## 32h. Toxicological and forensic applications

- 1352 Blasiak, J. and Trzeciak, A.: Single cell gel electrophoresis (comet assay) as a tool for environmental biomonitoring. An example of pesticides. *Pol. J. Environ. Stud.*, 7 (1998) 189-194; C.A., 129 (1998) 271616k.  
 1353 Decre, D., Gachot, B., Lucet, J.C., Arlet, G., Bergogne-Berezin, E. and Regnier, B.: Clinical and bacteriologic epidemiology of extended-spectrum  $\beta$ -lactamase-producing strains of *Klebsiella pneumoniae* in a medical intensive care unit. *Clin. Infect. Dis.*, 27 (1998) 834-844; C.A., 130 (1999) 92722.

See also 859, 924, 982, 1370.

## 32i. Plant extracts

See 1078.

## 33. CLINICO-CHEMICAL APPLICATIONS

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

- 1354 Hirose, M., Abe-Hashimoto, J., Tahara, H., Ide, T. and Yoshimura, T.: New method to measure telomerase activity by transcription-mediated amplification and hybridization protection assay. *Clin. Chem. (Washington)*, 44 (1998) 2446-2452.  
 1355 Killeen, A.A., Jiddou, R.R. and Sane, K.S.: Characterization of frequent polymorphisms in intron 2 of CYP21: application to analysis of segregation of CYP21 alleles. *Clin. Chem. (Washington)*, 44 (1998) 2410-2415.  
 1356 Morris, C., Willcox, M., Bolis, S., Walsh, B., Herbert, B., Molloy, M., Gooley, A.A. and Williams, K.L.: Diagnosis of disease using tears. *PCT Int. Appl. WO 98 35,229* (Cl. G01N33/48), 13 Aug. 1998, AU Appl. 97/5,009, 7 Feb. 1997; 15 p.; C.A., 129 (1998) 200170z.

See also 742, 762, 901, 980, 1045, 1254, 1271, 1290, 1303, 1353.

## 34. FOOD ANALYSIS

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

See 783, 795, 797.

## 35. ENVIRONMENTAL ANALYSIS

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

- 1357 Kilb, B., Kuhlmann, B., Eschweiler, B., Pruss, G., Ziemann, E. and Schoettler, U.: (Community structures of different ground-water habitats investigated using methods of molecular biology). *Acta Hydrochim. Hydrobiol.*, 26 (1998) 349-354; C.A., 130 (1999) 28898.

For additional information see C.A.:  
 130 (1999) 28826.

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

- 1358 Calace, N., Campanella, L., Palombo, R., Petronio, B.M. and Pupella, A.: Soil characteristics studies by electrophoresis in stabilized medium. *Sci. Total Environ.*, 219 (1998) 7-12; C.A., 129 (1998) 315610k.

## 36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

## 36a. Surfactants

- 1359 Hild, A., Seguaris, J.-M., Narres, H.D. and Schwuger, M.J.: Adsorption of anionic surfactant Na-dodecylsulphate (SDS) at the polyvinylpyrrolidone (PVC)-modified Na-montmorillonite surface. *Prog. Colloid Polymer Sci.*, 111 (1998) 174-178; C.A., 129 (1998) 265994r.
- 1360 Tanaka, Y., Kishimoto, Y., Otsuka, K. and Terabe, S.: Analysis of surfactants by capillary electrophoresis/mass spectrometry. *Bunseki Kagaku*, 47 (1998) 563-569; C.A., 129 (1998) 325540b.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- 1361 Bos, R., van der Mei, H.C. and Busscher, H.J.: Soft particle analysis of the electrophoretic mobility of a fibrillated and non-fibrillated oral streptococcal strain: *Streptococcus salivarius*. *Biophys. Chem.*, 74 (1998) 251-255; C.A., 129 (1998) 341600b.
- 1362 Giudici, P., Caggia, C., Pulvirenti, A., Zambonelli, C. and Rainieri, S.: Electrophoretic profile of hybrids between cryotolerant and non-cryotolerant *Saccharomyces* strains. *Lett., Appl. Microbiol.*, 27 (1998) 31-34; C.A., 129 (1998) 313274e.
- 1363 Izumiya, H., Masuda, T., Ahmed, R., Khakhria, R., Wada, A., Terajima, J., Itoh, K.-I., Johnson, W.M., Konuma, H., Shinagawa, K., Tamura, K. and Watanabe, H.: Combined use of bacteriophage typing and pulsed-field gel electrophoresis in the epidemiological analysis of Japanese isolates of enterohemorrhagic *Escherichia coli* O 157:H7. *Microbiol. Immunol.*, 42 (1998) 515-519; C.A., 129 (1998) 214037y.
- 1364 Lee, E., Chu, J.W. and Hsu, J.-P.: Electrophoretic mobility of a sphere in a spherical cavity. *J. Colloid Interface Sci.*, 205 (1998) 65-76; C.A., 129 (1998) 265981j.
- 1365 Mrozinski, P.M., Betts, R.P. and Coates, S.: Performance tested method certification of BAX™ for screening/Salmonella: a case study. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1147-1154.
- 1366 Roy, M.T., Gallardo, M. and Montserrat, E.J.: Influence of size on electrokinetic behavior of phosphatidylserine and phosphatidylethanolamine lipid vesicles. *J. Colloid Interface Sci.*, 206 (1998) 512-517; C.A., 129 (1998) 347536g.
- 1367 Semenov, S.N.: Inertial phoresis of particles in a nonuniform alternating electric field. *Colloid J.*, 60 (1998) 506-511; C.A., 129 (1998) 294340e.
- 1368 Serwer, P. and Griess, G.A.: Advances in the separation of bacteriophages and related particles. *J. Chromatogr. B*, 722 (1999) 179-190 - a review with 75 refs.
- 1369 Van der Mei, H.C., Meijer, S. and Busscher, H.J.: Electrophoretic mobilities of protein-coated hexadecane droplets at different pH. *J. Colloid Interface Sci.*, 205 (1998) 185-190; C.A., 129 (1998) 287094z.
- 1370 Zhang, G., Dai, X. and Zhou, D.: (Approach to cell membrane toxicity of materials by using electrophoresis ratio index). *Shanghai Huanjing Kexue*, 17 (1998) 42-44; C.A., 129 (1998) 271602c.
- 1371 Zinovieva, M., Fresneau, C. and Arrio, B.: Electrophoretic mobility variations of *Synechococcus* PCC 7942 plasmalemma vesicles with nitrogen source. *Bioelectrochem. Bioenerg.*, 46 (1998) 55-58; C.A., 129 (1998) 328110x.

See also 712, 729, 1062, 1239, 1264, 1320.

## 38. INORGANIC COMPOUNDS

## 38a. Cations

For additional information see C.A.:  
130 (1999) 16706.

## Capillary Electrophoresis and Electrokinetic Chromatography

### 1. REVIEWS AND BOOKS

- 519 Fernandes, C.F. and Flick, G.J., Jr.: Capillary electrophoresis for food analysis. *Dev. Food Sci.*, 39 (Instrumental Methods in Food and Beverage Analysis) (1998) 575-612; *C.A.*, 129 (1998) 160728d - a review with 3 refs.
- 520 Hochstrasser, D.F.: Proteome in perspective. *Clin. Chem. Lab. Med.*, 36 (1998) 825-836.
- 521 Jia, L., Chen, X., Wang, X., Xu, M. and Yang, P.: (Application of capillary electrophoresis in speciation analysis). *Sepu*, 16 (1998) 402-405; *C.A.*, 129 (1998) 350239t - a review with 47 refs.
- 522 Kok, S.J., Velthorst, N.H., Gooijer, C. and Brinkman, U.A.T.: Analyte identification in capillary electrophoretic separation techniques. *Electrophoresis (Weinheim)*, 19 (1998) 2753-2776 - a review with 319 refs.
- 523 Linhardt, R.J.: High-performance capillary electrophoresis. *J. Med. Chem.*, 41 (1998) 4425-4426; *C.A.*, 129 (1998) 312984z.
- 524 Otsuka, K. and Terabe, S.: Micellar electrokinetic chromatography. *Mol. Biotechnol.*, 9 (1998) 253-271; *C.A.*, 129 (1998) 312921b - a review with 94 refs.
- 525 Quirino, J.P. and Terabe, S.: Exceeding 5000-fold concentration of dilute analytes in micellar electrokinetic chromatography. *Science (Washington)*, 282 (1998) 465-468; *C.A.*, 129 (1998) 350345z - a review with 13 refs.
- 526 Vogt, C.: (Capillary electrophoresis). *Nachr. Chem., Tech. Lab.*, 46 (1998) 1077-1081; *C.A.*, 130 (1999) 10124 - a review with 33 refs.

See also 530, 531, 532, 561, 567, 571, 587, 591, 593, 602, 621, 638, 648, 653, 655, 657, 660, 684, 733, 759, 768, 776, 815, 835, 836, 837, 839, 843, 844, 846, 866, 874, 883, 903, 904, 908, 909, 911, 914, 915, 918, 919, 920, 921, 923, 931, 934, 948, 949, 954, 955, 956.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 527 Allen, D.J., Wall, W.E., Denson, K.D. and Smith, J.T.: Adjusting selectivity in micellar electrokinetic capillary chromatography with 1,2-hexanediol. *Electrophoresis (Weinheim)*, 20 (1999) 100-110.
- 528 Davis, J.M.: New assessments of dispersion in micellar electrokinetic chromatography. *J. Microcolumn Sep.*, 10 (1998) 479-489; *C.A.*, 129 (1998) 285385w.
- 529 Dohnal, V.: (Artificial neural networks for optimization in the capillary zone electrophoresis). *Chem. Listy*, 92 (1998) 669-672; *C.A.*, 129 (1998) 193797d.

See also 522, 546, 562, 584, 845.

#### 2b. Thermodynamics and theoretical relationships

- 544 Li, D., Fu, S. and Lucy, C.A.: Prediction of electrophoretic mobilities. 3. Effect of ionic strength in capillary zone electrophoresis. *Anal. Chem.*, 71 (1999) 687-699.

- 530 El Rassi, Z. and Giese, R.W. (Editors): *Selectivity and Optimization in Capillary Electrophoresis*. Elsevier, Oxford, 1997, 530 pp; *C.A.*, 130 (1999) 10161.
- 531 Esaka, Y.: (Hydrogen-bonding interaction-assisted capillary electrophoresis). *Bunseki Kagaku*, 47 (1998) 819-827; *C.A.*, 130 (1999) 20025 - a review with 14 refs.
- 532 Huang, X., Yang, X. and Wang, E.: (Recent development of sample injection techniques for capillary electrophoresis). *Fenxi Huaxue*, 26 (1998) 1275-1279; *C.A.*, 129 (1998) 339121c - a review with 20 refs.
- 533 Ladoux, B., Isambert, H., Leger, J.-F. and Viovy, J.-L.: New rectifying electrohydrodynamic instability at the boundary of charged gels in alternating electric fields. *Phys. Rev. Lett.*, 81 (1998) 3793-3796; *C.A.*, 130 (1999) 17601.
- 534 Lazar, I.M., Lee, E.D., Rockwood, A.L. and Lee, M.L.: General considerations for optimizing a capillary electrophoresis-electrospray ionization time-of-flight mass spectrometry system. *J. Chromatogr. A*, 829 (1998) 279-288.
- 535 Liang, H., Chen, D., Li, X. and Lin, B.: (Conformational parameters of solutes in capillary zone electrophoresis). *Xi'an Jiaotong Daxue Xuebao*, 32 (1998) 72-76; *C.A.*, 129 (1998) 350347b.
- 536 Likuski, R.K.: Mobility-based and normalized capillary electrophoresis. *PCT Int. Appl. WO 9854567 A1* 3 Dec.1998, 28 pp; *C.A.*, 130 (1999) 22511.
- 537 Liu, Q. and Sommer, S.S.: The SSCP phenomenon: addition of HEPES buffer dramatically effects electrophoretic mobility. *BioTechniques*, 25 (1998) 50-56; *C.A.*, 129 (1998) 184756n.
- 538 Mangelsdorf, C.S. and White, L.R.: The dynamic double layer. Part 2. Effects of Stern-layer conduction on the high-frequency electrokinetic transport properties. *J. Chem. Soc., Faraday Trans.*, 94 (1998) 2583-2593; *C.A.*, 129 (1998) 281557f.
- 539 McGuffin, V.L., Krouskop, P.E. and Wu, P.: Stochastic simulation of the partition mechanism under diffusion-limited conditions in chromatography and electrochromatography. *J. Chromatogr. A*, 828 (1998) 37-50.
- 540 Pokric, B., Allinson, N.M., Bergström, E.T. and Goodall, D.M.: Dynamic analysis of capillary electrophoresis data using real-time neural networks. *J. Chromatogr. A*, 833 (1999) 231-244.
- 541 Serenov, S.N.: Laser electrophoresis in surface electric double layer. *Anal. Commun.*, 35 (1998) 369-372; *C.A.*, 130 (1999) 32307.
- 542 Williams, K.R.: Capillary electrophoresis in the analytical and physical chemistry laboratories. *J. Chem. Educ.*, 75 (1998) 1079; *C.A.*, 129 (1998) 259894s.
- 543 Woodrow, B.N.: Thermodynamics of micelle/water partitioning in micellar electrokinetic chromatography. Avail. UMI, Order No. DA9827661, 1998, 180 pp.; *C.A.*, 129 (1998) 241971e.

- 545 Liang, H., Zhou, X. and Lin, B.: (Entropy equation for solute systems in capillary electrophoresis). *Xi'an Jiaotong Daxue Xuebao*, 32 (1998) 70-73; C.A., 129 (1998) 221807c.
- 546 Mikkers, F.E.P.: Concentration distributions in capillary zone electrophoresis: CZE in a spreadsheet. *Anal. Chem.*, 71 (1999) 522-532.
- 547 Starkweather, M.E., Muthukumar, M. and Hoagland, D.A.: Single chain entanglement: a Monte Carlo simulation of dilute solution capillary electrophoresis. *Macromolecules*, 31 (1998) 5495-5501; C.A., 129 (1998) 162082n.

See also 528.

2c. *Relationship between structure and electrophoretic behaviour*

- 548 McKillop, A.G., Smith, R.M., Rowe, R.C. and Wren, S.A.C.: Modeling and prediction of electrophoretic mobilities in capillary electrophoresis: separation of alkylpyridines. *Anal. Chem.*, 71 (1999) 497-503.

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

- 549 Glukhovskiy, P.V. and Vigh, G.: A simple method for the determination of isoelectric points of ampholytes with closely spaced pK<sub>a</sub> values using pressure-mediated capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3166-3170.
- 550 Li, J. and Waldron, K.C.: Estimation of the pH-independent binding constants of alanylphenylalanine and leucylphenylalanine stereoisomers with β-cyclodextrin in the presence of urea. *Electrophoresis (Weinheim)*, 20 (1999) 171-179.

See also 548, 687, 834, 853, 863.

### 3. GENERAL TECHNIQUES

3a. *Apparatus and accessories*

- 551 Arai, A.: Microchip electrophoresis apparatus for automatic analysis. *Eur. Pat. Appl. EP 863,400* (Cl. G01N27/447), 9 Sep. 1998, JP Appl. 97/65,397, 3 Mar. 1997; 13 pp.; C.A., 129 (1998) 213836w.
- 552 Ford, S.M., Kar, B., McWhorter, S., Davis, J., Soper, S.A., Klopf, M., Calderon, G. and Saile, V.: Microcapillary electrophoresis devices fabricated using polymeric substrates and x-ray lithography. *J. Microcolumn Sep.*, 10 (1998) 413-422; C.A., 129 (1998) 257121p.
- 553 Hayashizaki, Y. and Nakamura, N.: Electrophoresis apparatus containing capillary column. *Jpn. Kokai Tokkyo Koho* JP 10 253,590 [98 253,590] (Cl. G01N27/447), 25 Sep. 1998, Appl. 97/74,394, 10 Mar. 1997; 5 p.; C.A., 129 (1998) 313088x.
- 554 Hayashizaki, Y. and Nakamura, S.: Sample plate and multicapillary electrophoresis apparatus. *Eur. Pat. Appl. EP 864,860* (Cl. G01N27/447), 16 Sep. 1998, JP Appl. 97/74,396, 10 Mar. 1997; 12 pp.; C.A., 129 (1998) 242191n.
- 555 Janusa, M.A., Andermann, L.J., Kliebert, N.M. and Nannie, M.H.: Determination of chloride concentration using capillary zone electrophoresis: an instrumental analysis chemistry laboratory experiment. *J. Chem. Educ.*, 75 (1998) 1463-1465; C.A., 130 (1999) 37899.

- 556 Kappes, T. and Hauser, P.C.: Portable capillary electrophoresis instrument with potentiometric detection. *Anal. Commun.*, 35 (1998) 325-329; C.A., 129 (1998) 280636u.
- 557 Katayama, H., Ishihama, Y. and Asakawa, N.: Stable cationic capillary coating with successive multiple ionic polymer layers for capillary electrophoresis. *Anal. Chem.*, 70 (1998) 5272-5277.
- 558 Oh, C.S.: Microfluidic device for capillary electrophoresis utilizing sheets siliceous or glass material. *PCT Int. Appl. WO 98 39,645* (Cl. G01N27/447), 11 Sep. 1998, US Appl. 814,755, 7 Mar. 1997; 20 p.; C.A., 129 (1998) 227792r.
- 559 Zhang, Y. and Zhang, H.: An improved apparatus for online chemiluminescence detection with capillary electrophoresis and detection of metal-porphyrins. *Anal. Commun.*, 35 (1998) 293-296; C.A., 129 (1998) 297716t.

See also 570, 793, 794.

3b. *Detectors and detection procedures*

- 560 Altria, K.D.: Optimization of sensitivity in capillary electrophoresis. *LC-GC Int.*, 12 (1999) 24-29.
- 561 Doble, P. and Haddad, P.R.: Indirect photometric detection of anions in capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 189-212 - a review with 165 refs.
- 562 Doble, P. and Haddad, P.R.: Use of electrolytes containing multiple co-anions in the analysis of anions by capillary electrophoresis using indirect absorbance detection. *Anal. Chem.*, 71 (1999) 15-22.
- 563 Hardy, S., Jones, P., Riviello, J.M. and Avdalovic, N.: Construction and investigation of a post-capillary reactor for trace metal analysis by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 309-320.
- 564 Hashimoto, M., Tsukagoshi, K., Nakajima, R. and Kondo, K.: Compact detection cell using optical fiber for sensitization and simplification of capillary electrophoresis-chemiluminescence detection. *J. Chromatogr. A*, 832 (1999) 191-202.
- 565 Holand, L.A. and Lunte, S.M.: Postcolumn reaction detection with dual-electrode capillary electrophoresis/electrochemistry and electrogenerated bromine. *Anal. Chem.*, 71 (1999) 407-412.
- 566 Hooijsscher, E.W.J., Kientz, C.E. and Brinkman, U.A.T.: Capillary electrophoresis coupled on-line with nitrogen-selective thermionic detection using an eluent-jet interface. *J. High Resolut. Chromatogr.*, 21 (1998) 540-544.
- 567 Kappes, T. and Hauser, P.C.: Electrochemical detection methods in capillary electrophoresis and applications to inorganic species. *J. Chromatogr. A*, 834 (1999) 89-101 - a review with 55 refs.
- 568 Matysik, F.-M.: Potentialities of electrochemical detection in conjunction with non-aqueous capillary electrophoresis. *Electrochim. Acta*, 43 (1998) 3475-3482; C.A., 129 (1998) 285264f.
- 569 Matysik, F.M., Nyholm, L. and Markides, K.E.: Comparison of μm and mm sized disk electrodes for end-column electrochemical detection in capillary electrophoresis. *Fresenius J. Anal. Chem.*, 363 (1999) 231-235.

- 570 Odake, T., Kitamori, T. and Sawada, T.: Ultrasensitive on-column detection of capillary electrophoresis using laser-induced capillary vibration method. *Analisis*, 26 (1998) M41-M44; C.A., 129 (1998) 272432.
- 571 Polesello, S. and Valsecchi, S.M.: Electrochemical detection in the capillary electrophoresis analysis of inorganic compounds. *J. Chromatogr. A*, 834 (1999) 103-116 - a review with 54 refs.
- 572 Wallenborg, S.R., Nyholm, L. and Lunte, C.E.: End-column amperometric detection in capillary electrophoresis: influence of separation-related parameters on the observed half-wave potential for dopamine and catechol. *Anal. Chem.*, 71 (1999) 544-549.
- 573 Wei, H. and Li, S.F.Y.: Rugged gap reactor device for postcolumn fluorescence detection in capillary electrophoresis. *Anal. Chem.*, 70 (1998) 5097-5102.
- 574 Ying, Y. and Wu, C.: (UV-visible absorbance detection for capillary zone electrophoresis). *Chuangan Jishu Xuebao*, 11 (1998) 44-45; C.A., 129 (1998) 336141y.

See also 522, 540, 559, 622, 673, 683, 697, 703, 707, 708, 720, 768, 814, 832, 836, 837, 951.

### 3c. Stabilization media for electrophoresis

- 575 Chen, Y.: A new method for the preparation of polyacrylamide gradient gel-filled capillaries with low UV detection background. *Talanta*, 46 (1998) 727-734; C.A., 129 (1998) 225086q.
- 576 Cifuentes, A., Canalejas, P. and Diez-Masa, J.C.: Preparation of linear polyacrylamide-coated capillaries. Study of the polymerization process and its effect on capillary electrophoresis performance. *J. Chromatogr. A*, 830 (1999) 423-438.
- 577 Kolb, S. and Welsch, T.: (Use of polymeric dyes as separation media. New selectivities in electrokinetic chromatography). *CLB, Chem. Labor. Biotech.*, 49 (1998) 342-346; C.A., 129 (1998) 225101r.
- 578 Schneider, P.J. and Engelhardt, H.: (Polymer capillaries An alternative to capillary electrophoresis). *CLB, Chem. Labor. Biotech.*, 49 (1998) 347-350; C.A., 129 (1998) 224983t.
- 579 Tellman, K.T. and Palmer, C.P.: Polymers of sodium-N-undec-10-ene-1-oyl taurate and sodium-N-undec-10-ene-1-oyl aminoethyl-2-phosphonate as pseudostationary phases for electrokinetic chromatography. *Electrophoresis (Weinheim)*, 20 (1999) 152-161.
- 580 Wright, P.B. and Dorsey, J.G.: Silver(I)-mediated separation by nonaqueous capillary electrophoresis: Nonaqueous argentation electrophoresis. *J. High Resolut. Chromatogr.*, 21 (1998) 498-504.
- 581 Zhao, T., Hu, X.-B., Cheng, J.-K. and Lu, X.-R.: p-Sulfonic calix[4]arene as running buffer additive in electrokinetic chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3111-3124.

See also 604, 610, 619, 636, 637, 687, 790.

### 3d. Quantitative analysis

See 536.

### 3e. Preparative scale electrophoresis

- 582 Weber, G. and Bocek, P.: Interval isotachophoresis for purification and isolation of ionogenic species. *Electrophoresis (Weinheim)*, 19 (1998) 3090-3093.

See also 653, 678, 915.

### 3f. Programmed voltage and buffer gradients

- 583 Lister, A.S.: Evaluation of nonaqueous solvents as carrier phases in capillary electrophoresis and capillary electrochromatography. Avail. UMI, Order No. DA9827653, 1998, 147 pp.; C.A., 129 (1998) 224991u.
- 584 Soontornniyomkij, B., Chen, S., Minnoor, E.S. and Pietrzyk, D.J.: Application of an electroosmotic flow gradient in capillary zone electrophoresis separations. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2957-2976.

## 4. SPECIAL TECHNIQUES

### 4a. Automation

See 712.

### 4b. Computerization and modelling

- 585 Wang, H., Hu, H., Shang, S., Ding, T., Gu, J. and Fu, R.: (Dynamic scouting optimization for capillary micellar electrokinetic chromatography separation system using a controlled weighted centroid variable-size simplex algorithm). *Sepu*, 16 (1998) 293-296; C.A., 129 (1998) 197351b.

See also 513, 518, 521, 546, 548, 729

### 4c. Combination w./i other physicochemical techniques, (MS, IR etc.)

- 586 Bartle, K.D., Batchelder, D.N., Cooper, S., Myers, P., Robson, M.M. and Ruddick, A.: Prospects for Raman spectroscopic detection in microseparation. *LC-GC Int.*, 12 (1999) 105-107.
- 587 Bjornsdottir, I., Knudsen, C.B. and Hansen, S.H.: Hyphenated analytical techniques: HPLC-MS and capillary electrophoresis-mass spectrometry (CE-MS). *Dan. Kemi*, 79 (1998) 12-13; C.A., 130 (1999) 10118.
- 588 Guetens, G., de Boeck, G., van Cauwenbergh, K., de Brujin, E.A. and Tjaden, U.R.: Hyphenated analytical techniques in cancer research. *LC-GC Int.*, 12 (1999) 115-120.
- 589 Kuban, P., Pirmohammadi, R. and Karlberg, B.: Flow injection analysis-capillary electrophoresis system with hydrodynamic injection. *Anal. Chim. Acta*, 378 (1999) 55-62.
- 590 Lada, M.W.: Microdialysis coupled online to capillary electrophoresis: *in vivo* monitoring in the rat striatum. Avail. UMI, Order No. DA9824102, 1997, 196 pp.; C.A., 129 (1998) 272581g.
- 591 Michalke, B. and Schramel, P.: The coupling of capillary electrophoresis to ICP-MS. *Analisis*, 26 (1998) M51-M56; C.A., 130 (1999) 22329 - a review with 19 refs.

- 592 Moini, M. and Cao, P.: A sheathless interface for capillary electrophoresis/electrospray ionization-mass spectrometry using an in-capillary electrode. *PCT Int. Appl.* WO 98 35,226 (Cl. G01N27/447), 13 Aug. 1998, US Appl. 36,922, 6 Feb. 1997; 80 pp.; *C.A.*, 129 (1998) 169863b.
- 593 Otsuka, K. and Terabe, S.: Recent developments in MEKC-MS. *Analisis*, 26 (1998) M44-M47; *C.A.*, 129 (1998) 239252c - a review with 23 refs.
- 594 Tanaka, Y., Kishimoto, Y., Otsuka, K. and Terabe, S.: (Separation of enantiomers by capillary electrophoresis-mass spectrometry). *Chromatography*, 19, No. 2 (1998) 76-77; *C.A.*, 129 (1998) 339292j.
- 595 Taylor, K.A., Sharp, B.L., Lewis, J. and Crews, H.M.: Design and characterization of a microconcentric nebulizer interface for capillary electrophoresis-inductively coupled plasma mass spectrometry. *J. Anal. At. Spectrom.*, 13 (1998) 1095-1100; *C.A.*, 129 (1998) 339281e.
- 596 Terabe, S.: (Recent advances in CE-MS). *Chromatography*, 19 (1998) 58-59; *C.A.*, 129 (1998) 285355m.
- 597 Veraart, J.R., van Hekezen, J., Groot, M.C.E., Gooijer, C., Lingeman, H., Velthorst, N.H. and Brinkman, U.A.T.: On-line dialysis solid-phase extraction coupled to capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2944-2949.
- 598 Zhou, J., Heckert, D.M., Zuo, H., Lunte, C.E. and Lunte, S.M.: On-line coupling of *in vivo* microdialysis with capillary electrophoresis/electrochemistry. *Anal. Chim. Acta*, 379 (1999) 307-317.
- See also 521, 522, 534, 540, 607, 640, 665, 677, 678, 721, 729, 734, 746, 768, 785, 787, 809, 828, 836, 837, 848, 862, 864, 865, 869, 871, 874, 885, 895, 923, 933.
- 4d. Affinity electrophoresis**
- 599 Chiem, N.H. and Harrison, D.J.: Monoclonal antibody binding affinity determined by microchip-based capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3040-3044.
- 600 Zhao, D.S., Kwak, E.-S., Kawaoka, J., Esquivel, S. and Gomez, F.A.: The use of affinity capillary electrophoresis for determining binding constants of ligands to receptors. *Am. Lab. (Shelton)*, 30 (1998) 40-47; *C.A.*, 129 (1998) 213752r.
- See also 735, 743, 759, 853.
- 4e. Capillary electrochromatography**
- 601 Alicea-Maldonado, R. and Colón, L.A.: Capillary electrochromatography using a fluoropolymer as the chromatographic support material. *Electrophoresis (Weinheim)*, 20 (1999) 37-42.
- 602 Baeuml, F. and Welsch, T.: (Capillary electrochromatography. The HPLC with higher resolution). *CLB, Chem. Labor. Biotech.*, 49 (1998) 388-391; *C.A.*, 129 (1998) 310117v - a review with 3 refs.
- 603 Bao, Y.: (Influence of ionic strength on the separation behavior on ODS column in capillary electrochromatography). *Sepu*, 16 (1998) 454-455; *C.A.*, 130 (1999) 32478.
- 604 Bazzanella, A., Bächmann, K., Milbradt, R., Böhmer, V. and Vogt, W.: Discontinuous electrokinetic chromatography of parabens using different substituted resonances as pseudostationary phases. *Electrophoresis (Weinheim)*, 20 (1999) 92-99.
- 605 Behnke, B. and Metzger, J.W.: Tryptic digest mapping by gradient capillary electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 80-83.
- 606 Chirica, G. and Remcho, V.T.: Silicate entrapped columns - new columns designed for capillary electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 50-56.
- 607 Choudhary, G., Horváth, C. and Banks, J.F.: Capillary electrochromatography of biomolecules with on-line electrospray ionization and time-of-flight mass spectrometry. *J. Chromatogr. A*, 828 (1998) 469-480.
- 608 Dermaux, A., Lynen, F. and Sandra, P.: Chiral capillary electrochromatography on a vancomycin stationary phase. *J. High Resolut. Chromatogr.*, 21 (1998) 575-576.
- 609 Dermaux, A., Sandra, P. and Ferraz, V.: Analysis of free fatty acids and fatty acid phenacyl esters in vegetable oils and margarine by capillary electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 74-79.
- 610 Dulay, M.T., Kulkarni, R.P. and Zare, R.N.: Preparation and characterization of monolithic porous capillary columns loaded with chromatographic particles. *Anal. Chem.*, 70 (1998) 5103-5107.
- 611 Gfrörer, P., Schewitz, J., Pusecker, K., Tseng, L.-H., Albert, K. and Bayer, E.: Gradient elution capillary electrochromatography and hyphenation with nuclear magnetic resonance. *Electrophoresis (Weinheim)*, 20 (1999) 3-8.
- 612 Kitagawa, S., Watanabe, H. and Tsuda, T.: Voltage-induced variation of distribution coefficient in electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 9-17.
- 613 Li, J. and Fritz, J.S.: Nonaqueous media for separation of non-ionic organic compounds by capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 84-91.
- 614 Lister, A.S., Rimmer, C.A. and Dorsey, J.G.: Gradient elution electrochromatography with a flow-injection analysis interface. *J. Chromatogr. A*, 828 (1998) 105-112.
- 615 Liu, Z., Zou, H., Ni, J.Y. and Zhang, Y.: Open tubular capillary electrochromatography with adsorbed stationary phase. *Anal. Chim. Acta*, 378 (1999) 73-76.
- 616 Lu, J.-D., Fu, X.-Y. and Xu, X.-Z.: (Effects of microemulsion composition on microemulsion electrokinetic capillary chromatography). *Gaodeng Xuexiao Huaxue Xuebao*, 19 (1998) 1219-1222; *C.A.*, 129 (1998) 269724a.
- 617 Mayer, M., Rapp, E., Marck, C. and Bruin, G.J.M.: Fritless capillary electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 43-49.
- 618 Sawada, H. and Jinno, K.: Preparation of capillary columns coated with linear polymer containing hydrophobic and charged groups for capillary electrochromatography. *Electrophoresis (Weinheim)*, 20 (1999) 24-30.
- 619 Schure, M.R., Murphy, R.E., Klotz, W.L. and Lau, W.: High-performance capillary gel electrochromatography with replaceable media. *Anal. Chem.*, 70 (1998) 4985-4995.
- 620 Smith, N. and Evans, M.B.: Comparison of the electroosmotic flow profiles and selectivity of stationary phases used in capillary electrochromatography. *J. Chromatogr. A*, 832 (1999) 41-54.

- 621 Stevenson, R., Mistry, K. and Krull, I.S.: CEC '98: The state of the art. *Int. Lab.*, 28, No. 7(November) (1998) 11c-22c - a review with 64 refs.
- 622 Thomas, D.H., Rakestrav, D.J., Schoeniger, J.S., Lopez-Avila, V. and van Emon, J.: Selective trace enrichment by immunoaffinity capillary electrochromatography on-line with capillary zone electrophoresis - laser-induced fluorescence. *Electrophoresis (Weinheim)*, 20 (1999) 57-66.
- 623 Tsuda, T.: Capillary electrochromatography, electrically enhanced concentration, instrumentation of a chromatographic system for space station, and dynamic observation and analysis of human sweat. *Analisis*, 26 (1998) M48-M49; C.A., 129 (1998) 272613u.
- 624 Whang, C.-W. and Pawliszyn, J.: Solid phase microextraction coupled to capillary electrophoresis. *Anal. Commun.*, 35 (1998) 353-356; C.A., 130 (1999) 32474.
- 625 Xin, B. and Lee, M.L.: Design and evaluation of a new capillary electrochromatography system. *Electrophoresis (Weinheim)*, 20 (1999) 67-73.
- 626 Yang, C. and El Rassi, Z.: Capillary electrochromatography with segmented capillaries for controlling electroosmotic flow. *Electrophoresis (Weinheim)*, 20 (1999) 18-23.
- 627 Zhang, M. and El Rassi, Z.: Capillary electrochromatography with novel stationary phases: II. Studies of the retention behavior of nucleosides and bases on capillaries packed with octadecyl-sulfonated-silica microparticles. *Electrophoresis (Weinheim)*, 20 (1999) 31-36.
- See also 539, 583, 588, 663, 692, 710, 714, 719, 755, 812, 840, 847, 848.
- 4f. Capillary isotachophoresis and sample stacking*
- 628 Bednar, P., Stransky, Z., Sevcik, J. and Dostal, V.: Precise measurement of mobility from the length of isotachophoretic zones. *J. Chromatogr. A*, 831 (1999) 277-284.
- 629 Hofmann, O., Che, D., Cruickshank, K.A. and Müller, U.R.: Adaptation of capillary isoelectric focusing to microchannels on a glass chip. *Anal. Chem.*, 71 (1999) 678-686.
- 630 Park, S. and Lunte, C.E.: On-column sample concentration of high-ionic-strength samples in capillary electrophoresis. *J. Microcolumn Sep.*, 10 (1998) 511-517; C.A., 129 (1998) 285386x.
- 631 Stastna, M. and Slais, K.: Use of micellar partition in capillary isotachophoretic focusing. *J. Chromatogr. A*, 832 (1999) 265-271.
- See also 525, 582, 728, 855, 860, 903, 908, 912, 923, 931, 957.
- 4g. Enantiomers, separation*
- 632 Amini, A., Jäverfalk, E., Bastami, S. and Westerlund, D.: Simultaneous separation and enantioresolution of racemic local anesthetic drugs by capillary zone electrophoresis with Tween 20 and methyl- $\beta$ -cyclodextrin as selectors, employing a double plug technique. *Electrophoresis (Weinheim)*, 20 (1999) 204-211.
- 633 Amini, A., Merlini, N., Bastami, S. and Westerlund, D.: Determination of association constants between enantiomers of orciprenaline and methyl- $\beta$ -cyclodextrin as chiral selector by capillary zone electrophoresis using a partial filling technique. *Electrophoresis (Weinheim)*, 20 (1999) 180-188.
- 634 Cai, H. and Vigh, G.: Capillary electrophoretic separation of enantiomers using the single isomer heptakis-(2,3-dimethyl-6-sulfato)- $\beta$ -cyclodextrin as chiral resolving agent in methanol-water background electrolytes. *J. Chromatogr. A*, 827 (1998) 121-132.
- 635 Chang, L.W.: Cyclodextrin chiral selectors for enantioseparations in high performance liquid chromatography and capillary electrophoresis. Avail. UMI, Order No. DA9828104, 1998, 151 p.; C.A., 129 (1998) 239263g.
- 636 Chiari, M., Desperati, V., Manera, E. and Longhi, R.: Combinatorial synthesis of highly selective cyclohexapeptides for separation of amino acid enantiomers by capillary electrophoresis. *Anal. Chem.*, 70 (1998) 4967-4973.
- 637 Ding, W. and Fritz, J.S.: Carbamate chiral surfactants for capillary electrophoresis. *J. Chromatogr. A*, 831 (1999) 311-320.
- 638 Fillet, M., Hubert, P. and Crommen, J.: Method development strategies for the enantioseparation of drugs by capillary electrophoresis using cyclodextrins as chiral additives. *Electrophoresis (Weinheim)*, 19 (1998) 2834-2840 - a review with 37 refs.
- 639 Gal, J.: On the meaning and use of homochiral. *J. Chromatogr. A*, 829 (1998) 417-418.
- 640 Grainger, J., Smith, P., Smith, C., Otsuka, K., Lovingood, J. and Patterson, D.G., Jr.: Chiral separation of ortho-substituted poly-chlorinated biphenyl enantiomers and phenoxy herbicides by capillary electrophoresis with UV and MS detectors. *Organohalog Compd.*, 23(Analysis, Chlorinated Boranes, Chiral Contaminants, Polymer Additives and Monomers) (1998) 351-354; C.A., 130 (1999) 46881.
- 641 Izumoto, S.-i. and Nishi, H.: Enantiomer separation of drugs by capillary electrophoresis using mixtures of  $\beta$ -cyclodextrin sulfate and neutral cyclodextrins. *Electrophoresis (Weinheim)*, 20 (1999) 189-197.
- 642 Jin, L.J., Wang, Y., Xu, R., Go, M.L., Lee, H.K. and Li, S.F.Y.: Chiral resolution of atropine, homatropine and eight synthetic tropinyl and piperidinyl esters by capillary zone electrophoresis with cyclodextrin additives. *Electrophoresis (Weinheim)*, 20 (1999) 198-203.
- 643 Koppenhoefer, B., Epperlein, U., Jakob, A., Wuerthner, S., Xiaofeng, Z. and Bingcheng, L.: Separation of enantiomers of drugs by capillary electrophoresis, part 7: gamma-cyclodextrin as chiral solvating agent. *Chirality*, 10 (1998) 48-554; C.A., 129 (1998) 221244s.
- 644 Larsen, K.L., Endo, T., Ueda, H. and Zimmermann, W.: Inclusion complex formation constants of  $\alpha$ -,  $\delta$ -,  $\gamma$ -,  $\delta$ -,  $\epsilon$ -,  $\xi$ -,  $\eta$ - and  $\theta$ -cyclodextrins determined with capillary zone electrophoresis. *Carbohydr. Res.*, 309 (1998) 153-159; C.A., 129 (1998) 276149v.
- 645 McCurdy, C.R., Venkateswaran, T.G., Beach, J.W. and Stewart, J.T.: Chiral separation of lobeline analogs using high performance capillary electrophoresis and derivatized cyclodextrins as chiral additives. *Electrophoresis (Weinheim)*, 20 (1999) 212-218.

- 646 Rudaz, S., Veuthey, J.L., Desiderio, C. and Fanali, S.: Use of cyclodextrins in capillary electrophoresis: resolution of tramadol enantiomers. *Electrophoresis (Weinheim)*, 19 (1998) 2883-2889.
- 647 Tang, L., Silverman, C.F. and Blackwell, J.A.: Effect of additives on chiral selectivities by  $\beta$ -cyclodextrin in capillary electrophoresis based on the phenomenon of solvatochromism. *J. Chromatogr. A*, 829 (1998) 301-307.
- 648 Verleysen, K. and Sandra, P.: Separation of chiral compounds by capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2798-2833 - a review with 360 refs.
- 649 Wang, F.: Enhancement of selectivity and resolution in chiral separation by capillary electrophoresis in aqueous and nonaqueous media. Avail. UMI, Order No. DA9826036, 1998, 204 p.; C.A., 129 (1998) 325513v.
- 650 Wang, H., Gu, J., Dai, R., Fu, R., Hu, H. and Ding, T.: (Study on the chiral separation of anisodamine by high performance capillary electrophoresis). *Beijing Ligong Daxue Xuebao*, 18 (1998) 380-384; C.A., 130 (1999) 32462.
- 651 Wang, X., Lee, J.-T. and Armstrong, D.W.: Separation of enantiomers by capillary electrophoresis using pentosan polysulfate. *Electrophoresis (Weinheim)*, 20 (1999) 162-170.
- 652 Zhu, S., Niu, C. and Liu, Q.: (Separation and determination of Z,E isomers of toremifene by high performance capillary electrophoresis). *Yaowu Fenxi Zazhi*, 18 (1998) 250-252; C.A., 130 (1999) 7495.
- See also 594, 608, 666, 684, 725, 730, 839, 841, 854, 857, 867, 870, 874, 875.
- 4h. Two dimensional electrophoresis
- See 872.
- 4i. Other special techniques
- 653 Bauer, J.: Advances in cell separation: recent developments in counterflow centrifugal elutriation and continuous flow cell separation. *J. Chromatogr. B*, 722 (1999) 55-69 - a review with 218 refs.
- 654 Chen, W., Bai, J., Li, R. and Cao, C.: An apparatus with continuous flows of anolyte and catholyte for the experiments of moving chemical reaction boundary. *Wuli Huaxue Xuebao*, 14 (1998) 949-953; C.A., 130 (1999) 30595.
- 655 Craston, D. and Cowen, S.: The laboratory on a chip: a new approach to chemical analysis and beyond. *Sci. Prog. (Northwood)*, 81 (1998) 225-244; C.A., 130 (1999) 10122 - a review with 9 refs.
- 656 Manz, A. and Becker, H.: Parallel capillaries for high throughput in electrophoretic separations and electroosmotic drug discovery systems. *Transducer 97, Int. Conf. Solid-State Sens Actuators*, 2 (1997) 915-918; C.A., 129 (1998) 227585a.
- 657 Otsuka, K.: (Separation techniques using microchips). *Bunseki*, (1998) 522-528; C.A., 129 (1998) 225072g - a review with 40 refs.
- 658 Quirino, J.P. and Terabe, S.: Stacking of neutral analytes in micellar electrokinetic chromatography). *J. Capillary Electrophor.*, 4 (1997) 233-245; C.A., 129 (1998) 225073h.
- 659 Ramsey, J.M., Jacobson, C.S. and Foote, R.S.: Microfabricated devices for performing chemical and biochemical analysis. In: Ehrfeld, W. (Editor), *Microact. Technol. Proc. Int. Conf.*, 1st Meeting Date 1997, Springer, Berlin, 1998, pp. 204-218; C.A., 130 (1999) 20020.
- 660 Roh, G.W., Im, G.S. and Han, J.H.: (Lab.-on-chip:  $\mu$ TAS (micro-total chemical analysis system)). *Hwahak Sekyo*, 38 (1998) 34-42; C.A., 129 (1998) 350226m - a review without refs.
- 661 Van den Berg, A., van Akker, E., Oostenbroek, E., Tjekstra, W. and Barsony, I.: Technologies and microstructures for (bio)chemical microsystems. In: Ehrfeld, W. (Editor), *Microact. Technol. Proc. Int. Conf.*, 1st, Meeting Date 1997, Springer, Berlin, 1998, pp. 91-103; C.A., 130 (1999) 19940.
- See also 583, 597, 599, 613, 629, 687, 688, 733, 775, 780, 791, 794, 804, 837, 868, 869, 872, 885, 914, 915.
5. HYDROCARBONS AND HALOGEN DERIVATIVES
- 5b. Cyclic hydrocarbons, fullerenes
- 662 Akbay, C., Warner, I.M. and Shamsi, S.A.: Electrokinetic chromatography of twelve monomethylbenz[a]anthracene isomers using a polymerized anionic surfactant. *Electrophoresis (Weinheim)*, 20 (1999) 145-151.
- 663 Dadoo, R., Zare, R.N., Yan, C. and Anex, D.S.: Advances in capillary electrochromatography: rapid and high-efficiency separations of PAHs. *Anal. Chem.*, 70 (1998) 4787-4792.
- 664 Xu, X. and Hurtubise, R.J.: Influence of organic solvents in the capillary zone electrophoresis of polycyclic aromatic hydrocarbon metabolites. *J. Chromatogr. A*, 829 (1998) 289-299.
- See also 619, 698.
7. PHENOLS
- 665 Arce, L., Rios, A. and Valcérvel, M.: Determination of anti-carcinogenic polyphenols present in green tea using capillary electrophoresis coupled to a flow injection system. *J. Chromatogr. A*, 827 (1998) 113-120.
- 666 Zhang, Y., Ye, Y., Mao, L. and Ding, K.: (Capillary electrophoretic chiral separation of 1,1'-bi-2-naphthol using *n*-benzyl-cinchonine chloride as chiral selector). *Fenxi Huaxue*, 26 (1998) 1189-1191; C.A., 130 (1999) 20040.
- See also 581, 640.
8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN
- 8c. Other compounds with heterocyclic oxygen (incl. tannins)
- See 665.

## 9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 667 Asthana, A., Bose, D., Kushrestha, S., Pathak, S.P., Sangh, S.K. and Kok, W.T.: Determination of aldehydes in water samples by capillary electrophoresis after derivatization with hydrazino benzene sulphonic acids. *Chromatographia*, 48 (1998) 807-810.
- 668 Ji, S.-G., Chai, Y.-F., Wu, Y.-T., Yin, X.-P., Xiang, Z.-B., Liang, D.-S., Xu, Z.-M. and Li, X.: Separation and determination of anthraquinone derivatives in rhubarb and its preparations by micellar electrokinetic capillary chromatography. *Biomed. Chromatogr.*, 12 (1998) 335-337; C.A., 129 (1998) 347359b.
- 669 Watarai, H. and Takahashi, I.: Comparison of three different microemulsion systems as the run buffer for the capillary electrophoretic separation of ketone test solutes. *Anal. Commun.*, 35 (1998) 289-292; C.A., 129 (1998) 297697n.

## 10. CARBOHYDRATES

## 10a. Mono and oligosaccharides. Structural studies

- 670 Che, F.-Y., Liu, Z.-Y., Wang, K.-Y. and Xia, Q.-C.: (Analysis of monosaccharides derivatized with 2-aminoacridone by capillary electrophoresis). *Shengwu Huaxue Yu Shengwu Wuli Xuebao*, 30 (1998) 251-256; C.A., 129 (1998) 186307r.
- 671 Payan, E., Presle, N., Lapicque, F., Jouzeau, J.Y., Bordji, K., Oerther, S., Miralles, G., Mainard, D. and Netter, P.: Separation and quantification by ion-association capillary zone electrophoresis of unsaturated disaccharide units of chondroitin sulfates and oligosaccharides derived from hyaluronan. *Anal. Chem.*, 70 (1998) 4780-4786.
- 672 Ristolainen, M.: Characterization of totally chlorine-free effluents from Kraft pulp bleaching. II. Analysis of carbohydrate-derived constituents after acid hydrolysis by capillary zone electrophoresis. *J. Chromatogr. A*, 832 (1999) 203-209.
- 673 Suzuki, H. and Honda, S.: (Analysis of carbohydrates on a monoclonal antibody by capillary electrophoresis with PMP labeling). *Chromatography*, 19 (1998) 180-181; C.A., 130 (1999) 22393.
- 674 Ye, J., Zhao, X., Jin, W. and Fang, Y.: (Determination of sugar in honeys by high performance capillary electrophoresis). *Fenxi Ceshi Xuebao*, 17 (1998) 34-36; C.A., 130 (1999) 24193.

See also 537, 675, 676.

## 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 675 Kinoshita, M., Oda, Y. and Kakehi, K.: (Ultra-high resolution analysis of oligomers and polymers of N-acetylneurameric acid). *Chromatography*, 19 (1998) 182-183; C.A., 130 (1999) 22394.
- 676 Ruiz-Calero, V., Puignou, L. and Galcern, M.T.: Use of reversed polarity and a pressure gradient in the analysis of disaccharide composition of heparin by capillary electrophoresis. *J. Chromatogr. A*, 828 (1998) 497-508.

- 677 Zhou, X.-M., Liu, J.-W., Zhang, M.-E. and Chen, S.-J.: Determination of plasma heparin by micellar electrokinetic capillary electrophoresis. *Talanta*, 46 (1998) 757-760; C.A., 129 (1998) 200032f.

## 10c. Glycoproteins and their constituents

- 678 Choudhary, G., Chakel, J., Hancock, W., Torres-Duarte, A., McMahon, G. and Wainer, I.: Investigation of the potential of capillary electrophoresis with off-line matrix-assisted laser desorption/ionization time-of-flight mass spectrometry for clinical analysis: examination of a glycoprotein factor associated with cancer cachexia. *Anal. Chem.*, 71 (1999) 855-859.
- 679 Cifuentes, A., Moreno-Arribas, M.V., de Frutos, M. and Díez-Masa, J.C.: Capillary isoelectric focusing of erythropoietin glycoforms and its comparison with flat-bed isoelectric focusing and capillary zone electrophoresis. *J. Chromatogr. A*, 830 (1999) 453-463.
- 680 Haginaka, J., Matsunaga, H. and Tsukamoto, T.: Separation of enantiomers on a chiral stationary phase based on ovoglycoprotein. III. Effect of aggregation of ovoglycoprotein on chiral resolution. *J. Chromatogr. A*, 830 (1999) 81-89.
- 681 Kuroda, Y., Shibukawa, A. and Nakagawa, T.: (Plasma protein binding study using capillary electrophoresis: the effect of branching glycan of  $\alpha$ 1-acid glycoprotein and oxidation of lipoprotein upon drug - protein binding). *Chromatography*, 19 (1998) 78-79; C.A., 130 (1999) 22387.
- 682 Taga, A., Yasueda, S., Mochizuki, M., Itoh, H. and Honda, S.: Studies of carbohydrate-protein interaction by capillary electrophoresis. *Analisis*, 26 (1998) M35-M38; C.A., 129 (1998) 272536w.

See also 671.

## 11. ORGANIC ACIDS AND LIPIDS

## 11a. Organic acids and simple esters

- 683 Church, W.H. and Chiang, H.-T.: Characterization and quantification of organic anions with capillary zone electrophoresis using direct and indirect detection. *J. Capillary Electrophor.*, 4 (1997) 261-268; C.A., 130 (1999) 32507.
- 684 Craston, D.H. and Saeed, M.: Analysis of carboxylic and related acids in the environment by capillary electrophoretic techniques. *J. Chromatogr. A*, 827 (1998) 1-12 - a review with 61 refs.
- 685 Del Giovine, L. and Bocca, A.: (Citric acid in Mozzarella cheese: determination by capillary electrophoresis). *Sci. Tec. Latt.-Casearia*, 49 (1998) 139-147; C.A., 129 (1998) 342789g.
- 686 Jussila, M., Sundberg, S., Hopia, A., Mäkinen, M. and Riekkola, M.-L.: Separation of linoleic acid oxidation products by micellar electrokinetic capillary chromatography and nonaqueous capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 111-117.
- 687 Motellier, S. and Charles, Y.: Characterization of acid-base and complexation properties of cellulose degradation products using capillary electrophoresis. *Anal. Chim. Acta*, 375 (1998) 243-254.

- 688 Sarmini, K. and Kenndler, E.: Capillary zone electrophoresis in mixed aqueous-organic media: effect of organic solvents on actual ionic mobilities and acidity constants of substituted aromatic acids. IV. Acetonitrile. *J. Chromatogr. A.*, 833 (1999) 245-259.
- 689 Wan, H., Blomberg, L.G. and Hamberg, M.: Highly efficient separation of isomeric epoxy fatty acids by micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 20 (1999) 132-137.
- 690 Yoo, J.H. and Lee, K.-J.: Application of micellar electrokinetic capillary chromatography for the determination of benzoic acid and its esters in liquid formula medicines as preservatives. *J. Pharm. Biomed. Anal.*, 17 (1998) 1371-1379; *C.A.*, 129 (1998) 221257y.

See also 584, 604, 628, 692, 830, 910, 912, 929, 954.

#### 11b. Prostaglandins

- 691 Esaka, Y., Goto, M., Deyashiki, Y. and Kano, K.: (CZE separation of prostaglandins using poly(ethylene glycol) as a matrix agent). *Chromatography*, 19 (1998) 160-161; *C.A.*, 130 (1999) 22389.

#### 11c. Lipids and their constituents

- 692 Dermaux, A., Sandra, P., Ksir, M.-H. and Zarrouck, K.F.F.: Analysis of the triglycerides and the free and derivatized fatty acids in fish oil by capillary electrochromatography. *J. High Resolut. Chromatogr.*, 21 (1998) 545-458.
- 693 Haddadian, F., Shamsi, S.A., Schaeper, J.P. and Danielson, N.D.: Capillary electrophoresis of phospholipids with indirect photometric detection. *J. Chromatogr. Sci.*, 36 (1998) 395-400.
- 694 Kawakami, K., Nishihara, Y. and Hirano, K.: Compositional homogeneity of liposomal membranes investigated by capillary electrophoresis. *J. Colloid Interface Sci.*, 206 (1998) 177-180; *C.A.*, 130 (1999) 7469.

#### 11d. Lipoproteins and their constituents

See 916.

### 13. STEROIDS

#### 13b. Pregnane and androstane derivatives

- 695 Palmer, J., Atkinson, S., Yoshida, W.Y., Stalcup, A.M. and Landers, J.P.: Charged chelate - capillary electrophoresis of endogenous corticosteroids. *Electrophoresis (Weinheim)*, 19 (1998) 3045-3051.

#### 13c. Estrogens

- 696 Berzas, J.J., Rodriguez, J., Castaneda, G. and Pinilla, M.J.: Determination of ethinylestradiol and gestogene in oral contraceptives by micellar electrokinetic chromatography. *Chromatographia*, 49 (1999) 65-70.

### 16. NITRO AND NITROSO COMPOUNDS

- 697 Hilmi, A., Luong, J.H.T. and Nguyen, A.-L.: Development of electrokinetic capillary electrophoresis equipped with amperometric detection for analysis of explosive compounds. *Anal. Chem.*, 71 (1999) 873-878.

See also 631, 957.

### 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

#### 17a. Amines and polyamines

- 698 Kaneta, T., Saito, Y. and Imasaka, T.: Indirect detection of amino-substituted polycyclic aromatic hydrocarbons in cyclodextrin-modified micellar electrokinetic chromatography combined with diode laser-induced fluorometry. *J. Chromatogr. A*, 831 (1999) 285-292.
- 699 Oguri, S., Tsukamoto, A., Yura, A. and Miho, Y.: Development of a simple high-performance capillary electrophoretic method with on-line mode in capillary derivatization for the determination of spermidine. *Electrophoresis (Weinheim)*, 19 (1998) 2986-2990.

See also 702.

#### 17b. Catecholamines and their metabolites

- 700 Engelhardt, H. and Shakulashvili, N.: Separation of catecholamines using MECC with ultra violet detection for their qualitative and quantitative analyses. *Bull. Georgian Acad. Sci.*, 157 (1998) 73-76; *C.A.*, 130 (1999) 12068.
- 701 Hu, S., Pang, D., Wang, Z., Chen, J., Li, Z., Fan, Y. and Hu, H.: (Determination of catecholamines in the single sympathetic nerve cell of rat by capillary electrophoresis with amperometric detection). *Fenxi Huaxue*, 26 (1998) 752-756; *C.A.*, 129 (1998) 157041u.
- 702 Rodriguez, I., Lee, H.K. and Li, S.F.Y.: Microchannel electrokinetic separation of biogenic amines by micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 20 (1999) 118-126.
- 703 Shen, H., Weihua, H., Daiwen, P., Zongli, W. and Jieke, C.: Amperometric detection of histamine and amino acid neurotransmitters in capillary electrophoresis with copper microelectrodes. *Wuhan Univ. J. Nat. Sci.*, 3 (1998) 341-344; *C.A.*, 130 (1999) 32456.

See also 918.

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

- 704 Kubilius, D.T. and Bushway, R.J.: Determination of maleic hydrazide in potatoes and onions by capillary electrophoresis. *J. Agric. Food Chem.*, 46 (1998) 4224-4227.

- 705 Rudzinski, W., Yin, J., England, E. and Carlton, G.: Determination of hexamethylen diisocyanate-based isocyanates in spray-painting operation. Part 2. Comparison of HPLC with capillary-zone electrophoresis. *Analyst (Cambridge)*, 124 (1999) 119-123.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 706 Che, F.-Y., Shao, X.-X., Xu, L.G., Zeng, R. and Xia, Q.-C.: Non-radioactive determination of phosphoamino acids in peptides and proteins by capillary electrophoresis. In: Xu, X.-J., Ye, Y.-H. and Tam, J.P. (Editors), *Pept.: Biol. Chem., Proc. Chin. Pept. Symp., 4th 1996*, Kluwer, Dordrecht, 1998, pp. 242-244; C.A., 129 (1998) 227669f.
- 707 Coble, P.G. and Timperman, A.T.: Fluorescence detection of proteins and amino acids in capillary electrophoresis using a post-column sheath flow reactor. *J. Chromatogr. A*, 829 (1998) 309-315.
- 708 Feng, L. and Johnson, M.E.: Selective fluorescence derivatization and capillary electrophoretic separation of amidated amino acids. *J. Chromatogr. A*, 832 (1999) 211-224.
- 709 Kaneta, T., Komatsubara, T., Shiba, H. and Imasaka, T.: Separation and detection of cyanine-labeled amino acids by micellar electrokinetic chromatography combined with fluorescence detection using diode-based solid-state lasers. *Anal. Sci.*, 14 (1998) 1017-1019; C.A., 129 (1998) 339302n.
- 710 Lammerhofer, M. and Lindner, W.: High-efficiency chiral separations of N-derivatized amino acids by packed-capillary electrochromatography with a quinine-based chiral anion-exchange type stationary phase. *J. Chromatogr. A*, 829 (1998) 115-125.
- 711 Miura, M., Terashita, Y. and Tanaka, M.: (Chiral separation of several amino acid derivatives with selectively modified cyclodextrin derivatives). *Chromatography*, 19, No. 2 (1998) 74-75; C.A., 129 (1998) 339291h.
- 712 Pozdniakova, S., Ragauskas, R., Dikcins, A. and Padaraukas, A.: Determination of EDTA in used fixing solutions by capillary electrophoresis. *Fresenius J. Anal. Chem.*, 363 (1999) 124-125.
- 713 Royle, L., Bailey, R.G. and Ames, J.M.: Separation of Maillard reaction products from xylose-glycine and glucose-glycine model systems by capillary electrophoresis and comparison to reverse phase HPLC. *Food Chem.*, 62 (1998) 425-430; C.A., 129 (1998) 259505r.
- 714 Seifar, R.M., Kraak, J.C., Poppe, H. and Kok, W.T.: Application of capillary electrochromatography to the separation of phenylthiohydantoin-amino acids. *J. Chromatogr. A*, 832 (1999) 133-140.
- 715 Shen, Z. and Wu, L.: (Rapid high performance capillary electrophoretic method for determination of free amino acids in serum). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 151-154; C.A., 130 (1999) 22384.
- 716 Takizawa, K. and Nakamura, H.: Separation and determination of fluorescein isothiocyanate-labeled amino acids by capillary electrophoresis with laser-induced fluorescence detection. *Anal. Sci.*, 14 (1998) 925-928; C.A., 129 (1998) 339301m.
- 717 Tucci, S., Pinto, C., Goyo, J., Rada, P. and Hernandez, L.: Measurement of glutamine and glutamate by capillary electrophoresis and laser induced fluorescence detection in cerebrospinal fluid of meningitis sick children. *Clin. Biochem.*, 31 (1998) 143-150; C.A., 129 (1998) 186361d.
- 718 Wang, H., Gu, J., Fu, R., Hu, H. and Ding, T.: Capillary zone electrophoresis of native amino acids with indirect ultraviolet detection. *J. Beijing Inst. Technol.*, 7 (1998) 43-48; C.A., 129 (1998) 197339d.
- See also 584, 607, 631, 636, 703, 730.
- 18b. *Peptides, peptidic and proteinous hormones, growth factors*
- 719 Appfel, A., Yin, H., Hancock, W.S., McManigill, D., Frenz, J. and Wu, S.-L.: Effect of electric field on liquid chromatographic separation of peptide digests. Combining capillary separation techniques. *J. Chromatogr. A*, 832 (1999) 149-163.
- 720 Baars, M.J. and Patonay, G.: Ultrasensitive detection of closely related angiotensin I peptides using capillary electrophoresis with near-infrared laser-induced fluorescence detection. *Anal. Chem.*, 71 (1999) 667-671.
- 721 Cao, P. and Moini, M.: Analysis of peptides, proteins, protein digests, and whole human blood by capillary electrophoresis/electrospray ionization-mass spectrometry using an in-capillary electrode sheathless interface. *J. Am. Soc. Mass Spectrom.*, 9 (1998) 1081-1088; C.A., 130 (1999) 1982.
- 722 Hinch, J.M., Alberdi, F., Smith, S.C., Woodward, J.R. and Evans, K.: Discrimination of European and Australian *Globodera rostochiensis* and *G. pallida* pathotypes by high performance capillary electrophoresis. *Fundam. Appl. Nematol.*, 21 (1998) 123-128; C.A., 129 (1998) 213751q.
- 723 Kunkel, A., Gunter, S. and Watzig, H.: Capillary electrophoresis for the quantitation of insulin in pharmaceutical quality control: strategies to obtain maximum precision and comparison to HPLC. *Am. Lab. (Shelton)*, 30 (1998) 67C-89C; C.A., 129 (1998) 321273u.
- 724 Raggi, M.A., Mandrioli, R., Sabbioni, C., Mongiello, F., Marini, M. and Fanali, S.: High-performance capillary electrophoretic determination of glutathione in human lymphocytes. *J. Microcolumn Sep.*, 10 (1998) 503-509; C.A., 130 (1999) 22406.
- 725 Sabah, S. and Scriba, G.K.E.: pH-Dependent reversal of the chiral recognition of tripeptide enantiomers by carboxymethyl- $\beta$ -cyclodextrin. *J. Chromatogr. A*, 833 (1999) 261-266.
- 726 Shao, X., Shen, Y., O'Neill, K. and Lee, M.L.: Capillary electrophoresis using diol-bonded fused-silica capillaries. *J. Chromatogr. A*, 830 (1999) 415-422.
- 727 Thorsteinsdóttir, M., Ringbom, C., Westerlund, D., Andersson, G. and Kaufmann, P.: Multivariate evaluation of organic modifier effects on the separation performance of peptides in micellar electrokinetic chromatography. *J. Chromatogr. A*, 831 (1999) 293-309.
- 728 Waterval, J.C.M., la Porte, C.J.L., van 't Hof, R., Teeuwesen, J., Bult, A., Lingeman, H. and Underberg, W.J.M.: Development and validation of transient isotachophoretic capillary zone electrophoresis for determination of peptides. *Electrophoresis (Weinheim)*, 19 (1998) 3171-3177.
- See also 550, 564, 679, 731, 846, 918.

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

- 729 Escoubas, P., Whiteley, B.J., Kristensen, C.P., Culirier, M.-L., Corzo, G. and Nakajima, T.: Multidimensional peptide fingerprinting by high performance liquid chromatography, capillary zone electrophoresis and matrix-assisted laser desorption/ionization time-of-flight mass spectrometry for the identification of tarantula venom samples. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1075-1084; C.A., 129 (1998) 256088w.
- 730 Kurosu, Y., Murayama, K., Shindo, N., Shisa, Y., Satou, Y., Senda, M. and Ishioka, N.: Identification of chirality of phenylthiohydantoin-D-amino acid residue of [D-Ala<sup>2</sup>]-methionine enkephalin by capillary electrophoresis: suppression and control of racemization ratio in the Edman sequencing method. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3125-3137.

See also 605, 719, 721.

## 19. PROTEINS

19a. *General techniques*

- 731 Bjerregaard, C., Olsen, L.R., Sorensen, H. and Sorensen, S.: Analysis of low-molecular-weight proteins and peptides by micellar electrokinetic capillary chromatography. In: Gueguen, J. and Popineau, Y. (Editors), *Plant Proteins Eur. Crops*, Springer, Berlin, 1998, pp. 79-87; C.A., 129 (1998) 287420c.
- 732 Sedzik, J., Zhang, R. and Hjertén, S.: Ups and downs of protein crystallization: studies of protein crystals by high-performance capillary electrophoresis. *Biochim. Biophys. Acta*, 1426 (1999) 401-408.
- 733 Tulp, A., Verwoerd, D. and Neefjes, J.: Electromigration for separations of protein complexes. *J. Chromatogr. B*, 722 (1999) 141-151 - a review with 55 refs.
- 734 Yang, L.: Online coupling of capillary electrophoresis and liquid chromatography with electrospray ionization mass spectrometry for protein characterization. Avail. UMI, Order No. DA9826588, 1998, 109 p.; C.A., 129 (1998) 287017b.

See also 526, 576, 707, 721, 726, 846.

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

- 735 Phillips, T.M. and Dickens, B.F.: Analysis of recombinant cytokines in human body fluids by immunoaffinity capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2991-2996.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*

See 735.

19d. *Microbial and plant proteins*

- 736 Bean, S.R. and Lookhart, G.L.: Faster capillary electrophoresis separation of wheat proteins through modifications to buffer composition and sample handling. *Electrophoresis (Weinheim)*, 19 (1998) 3190-3198.

- 737 Laguera, C., Moreno-Arribas, V., Pueyo, E., Bartolome, B. and Polo, M.C.: Fractionation and partial characterization of protein fractions present at different stages of the production of sparkling wines. *Food Chem.*, 63 (1998) 465-471; C.A., 130 (1999) 3264.

- 738 Yan, Y., Liu, G., Prodanovic, S. and Zoric, D.: (Separation of gliadins and low-molecular-weight glutenin subunits in sheath endosperm by high-performance capillary electrophoresis). *Zhongguo Liangyou Xuebao*, 13 (1998) 1-5; C.A., 130 (1999) 24196.

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

- 739 Bossuyt, X., Mewis, A. and Blanckaert, N.: Interference of radio-opaque agents in clinical capillary zone electrophoresis. *Clin. Chem. (Washington)*, 45 (1999) 129-131.
- 740 Gysler, J., Schunack, W. and Jaehde, U.: Monitoring of chemotherapy-induced proteinuria using capillary zone electrophoresis. *J. Chromatogr. B*, 721 (1999) 207-216.
- 741 Jenkins, M.A.: Three methods of capillary electrophoresis compared with high-resolution agarose gel electrophoresis for serum protein electrophoresis. *J. Chromatogr. B*, 720 (1998) 49-58.
- 742 Keren, D.F.: Capillary zone electrophoresis in the evaluation of serum protein abnormalities. *Am. J. Clin. Pathol.*, 110 (1998) 248-252; C.A., 129 (1998) 272430g.

See also 599, 743, 748.

19f. *Structural and muscle proteins*

- 743 Dalluge, J.J. and Sander, L.C.: Precolumn affinity capillary electrophoresis for the identification of clinically relevant proteins in human serum: application to human cardiac troponin I. *Anal. Chem.*, 70 (1998) 5339-5343.

19h. *Chromoproteins and metalloproteins*

- 744 Bordin, G., Virtanen, V. and Rodriguez, A.R.: Characterization of the polymorphism of metallothionein by CZE with diode array detection. *Analisis*, 26 (1998) M61-M64; C.A., 130 (1999) 22402.
- 745 Ding, Y.S., Liu, L.L., Ma, Y.F. and Kun, B.C.: Determination of total iron binding capacity of serum by capillary electrophoresis. *Chromatographia*, 49 (1999) 71-74.
- 746 Knudsen, C.B., Bjornsdottir, I., Jons, O. and Hansen, S.H.: Detection of metallothionein isoforms from three different species using on-line capillary electrophoresis - mass spectrometry. *Anal. Biochem.*, 265 (1998) 167-175.
- 747 Lin, C., Gulbis, B., Delobbe, E., Cotton, F. and Vertongen, F.: Separation of human globin chains by micellar electrokinetic capillary chromatography. *J. Chromatogr. B*, 719 (1998) 47-54.
- 748 Saccomani, A., Gelfi, C., Wajcman, H. and Righetti, P.G.: Detection of neutral and charged mutations in  $\alpha$ - and  $\beta$ -human globin chains by capillary zone electrophoresis in isoelectric, acidic buffers. *J. Chromatogr. A*, 832 (1999) 225-238.
- 749 Tagliaro, F., Crivellente, F., Manetto, G., Puppi, I., Deyl, Z. and Marigo, M.: Optimized determination of carbohydrate-deficient transferrin isoforms in serum by capillary zone electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3033-3039.

- 750 Virtanen, V. and Bordin, G.: Characterization of mammalian metallothionein isoforms by capillary zone electrophoresis with diode array detection using tris-borate buffer. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 3087-3098.
- 751 Virtanen, V., Bordin, G. and Rodriguez, A.-R.: The influence of experimental conditions and of organic solvents as modifiers on the separation of metallothionein isoforms by capillary zone electrophoresis in a uncoated capillary column. *Chromatographia*, 48 (1998) 637-642.

See also 918.

- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 752 Cartoni, G.P., Cocciali, F., Jasionowska, R. and Marci, M.: Determination of cow milk in buffalo milk and Mozzarella cheese by capillary electrophoresis of whey protein fractions. *Ital. J. Food Sci.*, 10 (1998) 127-135; *C.A.*, 129 (1998) 342780x.
- 753 Hallberg, R.K. and Dubin, P.L.: Effect of pH on the binding of  $\beta$ -lactoglobulin to sodium polystyrenesulfonate. *J. Phys. Chem. B*, 102 (1998) 8629-8633; *C.A.*, 130 (1999) 1467.
- 754 Izco, J.M., Ordóñez, A.I., Torre, P. and Barcina, Y.: Validation of capillary electrophoresis in the analysis of ewe's milk casein. *J. Chromatogr. A*, 832 (1999) 239-246.
- 755 Vallejo-Cordoba, B.: Rapid separation and quantification of major caseins and whey proteins of bovine milk by capillary electrophoresis. *J. Capillary Electrophor.*, 4 (1997) 219-224; *C.A.*, 129 (1998) 259472c.

See also 520, 729, 896.

- 19i. *Specific binding and receptor proteins*

- 756 Foucaud, L., Grillasca, J., Niot, I., Domingo, N., Lafont, H., Planells, R. and Besnard, P.: Output of liver fatty acid-binding protein (L-FABP) in bile. *Biochim. Biophys. Acta*, 1436 (1999) 593-599.
- 757 Nelson, B.C., Malik, S., Seeley, S.K. and Uden, P.C.: Characterization of the transmembrane serine receptor by capillary zone electrophoresis. *Chromatographia*, 49 (1999) 28-34.

See also 802.

- 19m. *Urinary proteins*

- 758 Pähler, A., Blumberg, K., Herbst, J. and Dekant, W.: Quantitation of  $\alpha_2u$ -globulin in rat kidney cytosol by capillary electrophoresis. *Anal. Biochem.*, 267 (1999) 203-211.

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

See 680.

## 20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

- 759 Freitag, R.: Utilization of enzyme-substrate interactions in analytical chemistry. *J. Chromatogr. B*, 722 (1999) 279-301 - a review with 96 refs.

See also 919.

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

- 760 Viglio, S., Valentini, G., Zanaboni, G., Cetta, G., de Gregorio, A. and Iadarola, P.: Rapid detection of ornithine transcarbamylase activity by micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 20 (1999) 138-144.
- 761 Adams, T., Sevcik, J., Fairbanks, L.D. and Bartak, P.: Determination of purine enzyme activities in human erythrocytes by capillary electrophoresis. *Adv. Exp. Med. Biol.*, 431 (1998) 759-763; *C.A.*, 129 (1998) 312518a.
- 762 Fujima, J.M. and Danielson, N.D.: Determination of creatine kinase activity and phosphocreatine in off-line and on-line modes with capillary electrophoresis. *Anal. Chim. Acta*, 375 (1998) 233-241.
- 763 Svagera, Z., Adam, T., Bartak, P. and Sevcik, J.: (Determination of enzyme activities by capillary zone electrophoresis). *Chem. Listy*, 92 (1998) 673-675; *C.A.*, 129 (1998) 186318v.
21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. *Purines, pyrimidines, nucleosides, nucleotides*
- 764 Cahours, X., Morin, P. and Dreux, M.: Capillary electrophoretic study of the complexation of nucleotides with magnesium and calcium ions. *Chromatographia*, 48 (1998) 739-744.
- 765 Cellai, L., Onori, A.M., Desiderio, C. and Fanali, S.: Capillary electrophoretic analysis of synthetic short-chain oligoribonucleotides. *Electrophoresis (Weinheim)*, 19 (1998) 3160-3165.
- 766 Chiari, M., Damin, F., Melis, A. and Consonni, R.: Separation of oligonucleotides and DNA fragments by capillary electrophoresis in dynamically and permanently coated capillaries, using a copolymer of acrylamide and  $\beta$ -D-glucopyranoside as a new low viscosity matrix with high sieving capacity. *Electrophoresis (Weinheim)*, 19 (1998) 3154-3159.
- 767 DeDionisio, L.A., Raible, A.M. and Nelson, J.S.: Analysis of an oligonucleotide N3'→P5' phosphoramidate/phosphorothioate chimera with capillary gel electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2935-2938.
- 768 Geldart, S.E. and Brown, P.R.: Analysis of nucleotides by capillary electrophoresis. *J. Chromatogr. A*, 828 (1998) 317-336 - a review with 59 refs.
- 769 Zhao, R., Xu, G., Yue, B., Lieblich, H.M. and Zhang, Y.: Artificial neural network classification based on capillary electrophoresis of urinary nucleosides for the clinical diagnosis of tumors. *J. Chromatogr. A*, 828 (1998) 489-496.

See also 588, 627, 726, 762, 832, 883, 892.

## 21b. Nucleic acids, RNA

- 770 Saevels, J., Van Schepdael, A. and Hoogmartens, J.: Capillary electrophoresis of RNA nucleotides: catalytic activity of a hammerhead ribozyme. *Anal. Biochem.*, 266 (1999) 93-101.

See also 520.

## 21c. Nucleic acids, DNA

- 771 Arakawa, H. and Maeda, M.: (Analysis of single-strand DNA conformation polymorphisms by capillary electrophoresis). *Chromatography*, 19 (1998) 172-173; C.A., 130 (1999) 22390.
- 772 Chen, H.-S. and Chang, H.-T.: Capillary electrophoretic separation of 1 to 10 kbp sized dsDNA using poly(ethylene oxide) solutions in the presence of electroosmotic counterflow. *Electrophoresis (Weinheim)*, 19 (1998) 3149-3153.
- 773 Han, F., Xue, J. and Lin, B.: Mannitol influence on the separation of DNA fragments by capillary electrophoresis in entangled polymer solutions. *Talanta*, 46 (1998) 735-742; C.A., 129 (1998) 200031e.
- 774 Heller, C.: Finding a universal low viscosity polymer for DNA separation (II). *Electrophoresis (Weinheim)*, 19 (1998) 3114-3127.
- 775 Hietpas, P.B., Bullard, K.M. and Ewing, A.G.: Characterization of electrophoretic sample transfer from a capillary to an ultrathin slab gel. *J. Microcolumn Sep.*, 10 (1998) 519-527; C.A., 130 (1999) 22407.
- 776 Kheterpal, I. and Mathies, R.A.: Capillary array electrophoresis DNA sequencing. *Anal. Chem.*, 71 (1999) 31A-37A - a review with 46 refs.
- 777 Otim, O. and Singhal, R.P.: Prediction of selectivity for the separation of double-stranded DNA fragments in electrophoresis. *J. Capillary Electrophor.*, 4 (1997) 247-251; C.A., 129 (1998) 257223y.
- 778 Sanz, P., Prieto, V. and Andres, M.I.: Validation of FESFPS and F13AO1 typing using capillary electrophoresis. *Int. Congr. Ser.*, 1167(Progress in Forensic Genetics 7) (1988) 37-39; C.A., 130 (1999) 34101.
- 779 Sunada, W.M. and Blanch, H.W.: A theory for the electrophoretic separation of DNA in polymer solutions. *Electrophoresis (Weinheim)*, 19 (1998) 3128-3136.
- 780 Waters, L.C., Jacobson, S.C., Kroutchinina, N., Khandurina, J., Foote, R.S. and Ramsey, J.M.: Multiple sample PCR amplification and electrophoretic analysis on a microchip. *Anal. Chem.*, 70 (1998) 5172-5176.
- 781 Wu, C., Liu, T. and Chu, B.: A new separation medium for DNA capillary electrophoresis: self-assembly behavior of Pluronic polyol E<sub>99</sub>P<sub>99</sub>E<sub>99</sub> in 1X TBE buffer. *J. Non-Cryst. Solids*, 235-237 (1998) 605-611; C.A., 129 (1998) 327902v.
- 782 Xu, Q., Han, F., Fan, Y., Lin, B., Shen, Y. and Wu, G.: (Detection of picogram SRY gene in mixed sample by capillary electrophoresis). *Zhonghua Yixue Jianyan Zazhi*, 21 (1998) 92-95; C.A., 130 (1999) 1929.
- 783 Yashiro, N., Tabata, O. and Baba, Y.: (Novel microfabricated capillary array electrophoresis chip fabricated by LIGA process and electrophoretic behavior of single DNA molecule migrating in microchannel). *Chromatography*, 19 (1998) 176-177; C.A., 130 (1999) 22392.

See also 526, 588, 766, 802.

## 21d. Structural studies on RNA and RNA mapping

- 784 Arends, R.J., van der Gaag, R., Martens, G.J.M., Bonga, S.E. Wendelaar and Flik, G.: Differential expression of two pro-*opiomelanocortin* mRNAs during temperature stress in common carp (*Cyprinus carpio* L.). *J. Endocrinol.*, 139 (1998) 85-91; C.A., 130 (1999) 2335.
- 785 Schummer, B., Hauptfleisch, S., Siegmund, M., Schummer, M. and Lemmer, B.: Highly accurate quantification of mRNA expression by means of Titan one tube RT-PCR and capillary electrophoresis. *Biochemica*, (1998) 31-33; C.A., 129 (1998) 284473k.
- See also 765.
- 21e. Structural studies on DNA and DNA mapping
- 786 Butler, J.M.: The use of capillary electrophoresis in genotyping STR loci. *Methods Mol. Biol. (Totowa)*, 98(Forensic DNA Profiling Protocols) (1998) 279-289; C.A., 129 (1998) 157780j.
- 787 Fung, N.-K.E.: DNA sequencing with capillary electrophoresis and single cell analysis with mass spectrometry. Avail. UMI, Order No. DA9826530, 1998, 154 p.; C.A., 129 (1998) 255655s.
- 788 Kiba, Y. and Baba, Y.: (Capillary electrophoretic behavior for triplet repeat DNA fragments and their higher-order structures). *Chromatography*, 19 (1998) 174-175; C.A., 130 (1999) 22391.
- 789 Lee, J.J. and Lee, K.-J.: Analysis of double-stranded DNA fragments by capillary electrophoresis using entangle polymer solutions in uncoated fused silica capillary columns. *J. Biochem. Mol. Biol.*, 31 (1998) 384-390; C.A., 129 (1998) 226246d.
- 790 Lieberwirth, U., Arden-Jacob, J., Drexhage, K.H., Herten, D.P., Müller, R., Neumann, M., Schulz, A., Siebert, S., Sagner, G., Klingel, S. et al.: Multiplex dye DNA sequencing in capillary gel electrophoresis by diode laser-based time-resolved fluorescence detection. *Anal. Chem.*, 70 (1998) 4771-4779.
- 791 Liu, S., Shi, Y., Ja, W.W. and Mathies, R.A.: Optimization of high-speed DNA sequencing on microfabricated capillary electrophoresis channels. *Anal. Chem.*, 71 (1999) 566-573.
- 792 Nishimura, A., Tsuhako, M. and Baba, Y.: Analysis of variable number of tandem repeats of human genome D1S80 locus using capillary electrophoresis with laser-induced fluorescence detector. *Chem. Pharm. Bull.*, 46 (1998) 1639-1642.
- 793 Watanabe, S. and Imai, K.: (Capillary gel electrophoresis method and apparatus). *Jpn. Kokai Tokkyo Koho*, JP 10 197,480 [98 197,480] (Cl. G01N27/447), 31 Jul. 1998, Appl. 97/3,591, 13 Jan. 1997; 5 pp.; C.A., 129 (1998) 186409a.
- 794 Webster, J.R. and Matrangelo, C.H.: Large-volume integrated capillary electrophoresis stage fabricated using micromachining of plastics on silicon substrates. *Transducers 97, Int. Conf. Solid-State Sens. Actuators*, 1 (1997) 503-506; C.A., 129 (1998) 227583y.
- 795 Wenz, H.M., Ramachandra, S., O'Connell, C.D. and Atha, D.H.: Identification of known p53 point mutations by capillary electrophoresis using unique mobility profiles in a blinded study. *Mutat. Res.*, 382 (1998) 121-132; C.A., 129 (1998) 198564k.

See also 772, 773, 800, 898.

- 21f. *Complex mixtures of nucleic acids, their fragments and PCR products*
- 796 Bjorheim, J., Lystad, S., Lindblom, A., Kressner, U., Westring, S., Wahlberg, S., Lindmark, G., Gaudernack, G., Ekstrom, P., Roe, J., Thilly, W.G. and Borresen-Dale, A.-L.: Mutation analyses of KRAS exon 1 comparing three different techniques: temporal temperature gradient electrophoresis, constant denaturant capillary electrophoresis and allele specific polymerase chain reaction. *Mutat. Res.*, 403 (1998) 103-112; C.A., 129 (1998) 212174s.
- 797 Butler, J.M.: Rapid assessment of PCR product quality and quantity by capillary electrophoresis. *Methods Mol. Biol. (Towata)*, 98(Forensic DNA Profiling Protocols) (1998) 39-47; C.A., 129 (1998) 157772h.
- 798 Foulds, G.J. and Etzkorn, F.A.: A capillary electrophoresis mobility shift assay for protein-DNA binding affinities free in solution. *Nucleic Acids Res.*, 26 (1998) 4303-4305; C.A., 130 (1999) 22404.
- 799 Hamdan, I.I., Skellern, G.G. and Waigh, R.D.: Use of capillary electrophoresis in the study of ligand-DNA interactions. *Nucleic Acids Res.*, 26 (1998) 3053-3058; C.A., 129 (1998) 158706b.
- 800 Lee, H., Fung, D.C.Y., Yu, B. and Trent, R.J.: Capillary electrophoresis: new technology for DNA diagnostics. *Pathology*, 30 (1998) 304-308; C.A., 129 (1998) 340264h.
- 801 Polti, R., Luckenbach, C. and Ritter, H.: The STR-mariet FGA: allele frequency data (SW-Germany), automated typing with different fluorescence markers. *Int. Congr. Ser.*, 1167(Progress in Forensic Genetics 7) (1998) 460-462; C.A., 130 (1999) 33708.
- 802 Xue, B., Gabrielsen, O.S. and Myrset, A.H.: Capillary electrokinetic mobility shift assay (CEMSA) of a protein-DNA complex. *J. Capillary Electrophor.*, 4 (1997) 225-231; C.A., 129 (1998) 257222x.

See also 771, 782, 785, 901, 902.

## 22. ALKALOIDS

- 803 Cherkaoui, S., Mateus, L., Christen, P. and Veuthey, J.-L.: Nonaqueous capillary electrophoresis for the analysis of selected tropane alkaloids in a plant extract. *Chromatographia*, 49 (1999) 54-60.
- 804 Cherkaoui, S., Varesio, E., Christen, P. and Veuthey, J.-L.: Selectivity manipulation using nonaqueous capillary electrophoresis. Application to tropane alkaloids and amphetamine derivatives. *Electrophoresis (Weinheim)*, 19 (1998) 2900-2906.
- 805 Lin, M., Fan, G., Zhang, Z., An, D. and Hu, J.: (Systematic separation and quantitative analysis of tropane alkaloids in Belladonna preparation by high performance capillary electrophoresis). *Zhongcaoyao*, 29 (1998) 518-520; C.A., 129 (1998) 321270r.
- 806 Mateus, L., Cherkaoui, S., Christen, P. and Veuthey, J.-L.: Use of a Doehlert design in optimizing the analysis of selected tropane alkaloids by micellar electrokinetic capillary chromatography. *J. Chromatogr. A*, 829 (1998) 317-325.

807 Nakanishi, H. and Kitamura, K.: (Determination of Scopolia extract in crude drug preparations using capillary electrophoresis). *Iyakuhin Kenkyu*, 29 (1998) 719-724; C.A., 129 (1998) 293967c.

- 808 Plaut, O. and Staub, C.: Determination of atropine in biological fluids by micellar electrokinetic capillary chromatography in the presence of strychnine and tetracaine. *Electrophoresis (Weinheim)*, 19 (1998) 3003-3007.
- 809 Sturm, S. and Stuppner, H.: Analysis of isoquinoline alkaloids in medicinal plants by capillary electrophoresis - mass spectrometry. *Electrophoresis (Weinheim)*, 19 (1998) 3026-3032.

See also 598, 642, 888, 897.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

### 23a. *Porphyrins and other pyrroles*

See 559.

### 23b. *Bile pigments*

- 810 Liu, J., Zhou, X. and Zhang, M.: (Separation and assay of bilirubin subspecies with capillary micellar electrokinetic chromatography). *Sepu*, 16 (1998) 369-370; C.A., 129 (1998) 242069d.

### 23c. *Indole derivatives and plant hormones (gibberellins)*

- 811 Gao, H.: I. Capillary enzyme immunoassay with electrochemical detection for determining indole-3-acetic acid in tomato embryos. II. Capillary electrophoresis with dendrimers as buffer additives. Avail. *UMI*, Order No. DA9833685, 1988, 127 p.; C.A., 130 (1999) 22419.
- 812 Pesek, J.J. and Matyska, M.T.: The analysis of melatonin, tryptamine, and serotonin by HPCE and CEC. *J. Liq. Chromatogr. Relat. Technol.*, 21 (1998) 2923-2934.

### 23d. *Pyridine derivatives*

See 548, 906.

### 23e. *Other N-heterocyclic compounds*

See 540, 703, 713, 816, 906.

## 24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 813 Karcher, A., Melouk, H.A. and El Rassi, Z.: High performance liquid-phase separation of glycosides. III. Determination of total glucosinolates in cabbage and rapeseed by capillary electrophoresis via the enzymatically released glucose. *Anal. Biochem.*, 267 (1999) 92-99.
- 814 Zhong, M. and Lunte, S.M.: Tubular-wire dual electrode for detection of thiols and disulfides by capillary electrophoresis/electrochemistry. *Anal. Chem.*, 71 (1999) 251-255.

See also 562, 565.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

See 706, 762.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. *Organometallic compounds*

815 Liu, W. and Lee, H.K.: Chemical modification of analytes in speciation analysis by capillary electrophoresis, liquid chromatography and gas chromatography. *J. Chromatogr. A*, 834 (1999) 45-63 - a review with 123 refs.

26c. *Coordination compounds*

816 Chang, C.A., Chen, Y.-H., Chen, H.-Y. and Shieh, F.-K.: Capillary electrophoresis, potentiometric and laser excited luminescence studies of lanthanide(III) complexes of 1,7-dicarboxymethyl-1,4,7,10-tetraazacyclododecane (DO2A). *J. Chem. Soc., Dalton Trans.*, (1998) 3243-3248; C.A., 130 (1999) 7892.

817 Hlader, E.F., Macka, M. and Haddad, P.R.: Separation of dithiocarbamate metal complexes by micellar electrokinetic chromatography. *Analyst (Cambridge)*, 123 (1998) 2865-2870.

818 Mucha, P., Rekowski, P., Kosakowska, A. and Kupryszecki, G.: Separation of siderophores by capillary electrophoresis. *J. Chromatogr. A*, 830 (1999) 183-189.

See also 930, 931, 934.

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

819 Herrero-Martinez, J.M., Simo-Alfonso, E., Deltoro, V.I., Calatayud, A. and Ramis-Ramos, G.: Determination of L-ascorbic acid and total ascorbic acid in vascular and nonvascular plants by capillary zone electrophoresis. *Anal. Biochem.*, 265 (1998) 275-281.

820 Næss, Ø., Tilander, T., Pedersen-Bjergaard, S. and Rasmussen, K.E.: Analysis of vitamin formulations by electrokinetic chromatography utilizing tetradecylammonium ions as the pseudostationary phase. *Electrophoresis (Weinheim)*, 19 (1998) 2912-2917.

821 Olsson, J., Nordström, O., Nordström, A.-C. and Karlberg, B.: Determination of ascorbic acid in isolated pea plant cells by capillary electrophoresis and amperometric detection. *J. Chromatogr. A*, 826 (1998) 227-233.

28. ANTIBIOTICS

822 Li, Y.-M., Vanderghinste, D., Pecanac, D., van Schepdael, A., Roets, E. and Hoogmartens, J.: Analysis of cefadroxil by micellar electrokinetic capillary chromatography: development and validation. *Electrophoresis (Weinheim)*, 19 (1998) 2890-2894.

823 Li, Y.-M., Zhu, Y., Vanderghinste, D., van Schepdael, A., Roets, E. and Hoogmartens, J.: Micellar electrokinetic capillary chromatography for the separation of cefalexin and its related substances. *Electrophoresis (Weinheim)*, 20 (1999) 127-131.

824 Makino, K., Hirakawa, M., Goto, Y., Nakashima, K., Kataoka, Y. and Oishi, R.: Quality evaluation by capillary electrophoresis of amphotericin B injection after filtration through various membrane filters. *Electrophoresis (Weinheim)*, 19 (1998) 2930-2934.

825 Mrestani, Y., El-Mokdad, N., Rüttinger, H.H. and Neubert, R.: Characterization of partitioning behavior of cephalosporins using microemulsion and micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 19 (1998) 2895-2899.

826 Zhu, S., Niu, C. and Zhang, H.: (Separation of tetracycline antibiotics and detection of impurities in tetracycline by high performance capillary electrophoresis). *Yaowu Fenxi Zazhi*, 18 (1998) 248-250; C.A., 130 (1999) 7473.

See also 884.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. *General techniques*

827 Abrantes, S., Philo, M., Damant, A.P. and Castle, L.: Determination of extractable biocides in paper food packing material using micellar electrokinetic chromatography. *J. Microcolumn Sep.*, 10 (1998) 387-391; C.A., 129 (1998) 259471b.

See also 628.

29b. *Chlorinated insecticides*

828 Song, X. and Budde, W.L.: Determination of chlorinated acid herbicides and related compounds in water by capillary electrophoresis-electrospray negative ion mass spectrometry. *J. Chromatogr. A*, 829 (1998) 327-340.

29e. *Herbicides*

829 Lancas, F.M., Rissato, S.R. and Galhiane, M.S.: Off-line SFE-MEKC determination of diuron in sugar cane and orange samples. *J. High Resolut. Chromatogr.*, 21 (1998) 519-522.

See also 640, 828, 830.

29f. *Fungicides*

See 684.

29g. *Other types of pesticides and various agrochemicals*

830 Lubilius, D.T. and Bushway, R.J.: Determination of maleic acid hydrazide in pesticide formulations by capillary electrophoresis. *J. Assoc. Off. Anal. Chem.*, 81 (1998) 1109-1111.

## 30. SYNTHETIC AND NATURAL DYES

## 30a. Synthetic dyes

- 831 Berzas Nevado, J.J., Guiberteau Cabanillas, C. and Contento Salcedo, A.M.: Method development and validation for the simultaneous determination of dyes in foodstuffs by capillary zone electrophoresis. *Anal. Chim. Acta*, 378 (1999) 63-71.
- 832 Lan, Z.-H., Qian, X. and Giese, R.W.: Preparation of an IMI dye (imidazole functional group) containing a 4-(N,N-dimethylaminosulfonyl)-2,1,3-benzoxadiazole fluorophore for labeling of phosphomonoesters. *J. Chromatogr. A*, 831 (1999) 325-330.

See also 540.

## 30b. Chloroplast and other natural pigments

- 833 Watanabe, T., Yamamoto, A., Nagai, S. and Terabe, S.: Analysis of elderberry pigments in commercial food samples by micellar electrokinetic chromatography. *Anal. Sci.*, 14 (1998) 839-844; C.A., 129 (1998) 229817b/.

See also 684.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 834 Welch, C.F. and Hoagland, D.A.: Fractionation of polycations with capillary electrophoresis. *Polym. Prepr.*, 39 (1998) 771-772; C.A., 129 (1998) 261131j.

## 32. DRUG ANALYSIS

## 32a. Drug analysis, general techniques

- 835 Brunner, L.J. and DiPiro, J.T.: Capillary electrophoresis for therapeutic drug monitoring. *Electrophoresis (Weinheim)*, 19 (1998) 2848-2855 - a review with 37 refs.
- 836 Couderc, F., Caussé, E. and Bayle, C.: Drug analysis by capillary electrophoresis and laser-induced fluorescence. *Electrophoresis (Weinheim)*, 19 (1998) 2777-2790 - a review with 101 refs.
- 837 Denoroy, L., Bert, L., Parrot, S., Robert, F. and Renaud, B.: Assessment of pharmacodynamic and pharmacokinetic characteristics of drugs using microdialysis sampling and capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2841-2847 - a review with 43 refs.
- 838 Lin, M., Feng, M., Zhang, Z., An, D. and Fan, G.: (Research on the separation behavior of acidic drugs in capillary electrophoresis with reversed direction of electroosmotic flow). *Sepu*, 16 (1998) 383-385; C.A., 129 (1998) 29396m.
- 839 Mislanova, C. and Oravcova, J.: (Separation methods in the monitoring of chiral drugs using the direct injection of biological samples). *Chem. Listy*, 92 (1998) 711-721; C.A., 129 (1998) 339394u - a review with 134 refs.

- 840 Reilly, J. and Saeed, M.: Capillary electrochromatography as an alternative separation technique to high-performance liquid chromatography and capillary zone electrophoresis for the determination of drug related impurities in Lilly compound LY300164. *J. Chromatogr. A*, 829 (1998) 175-186.
- 841 Shibukawa, A., Kuroda, Y. and Nakagawa, T.: High-performance capillary electrophoresis/frontal analysis for stereoselective drug-protein binding study. *Analisis*, 26 (1998) M39-M41; C.A., 129 (1998) 285481z.
- 842 Suzuki, N., Ishihama, Y., Kajima, T. and Asakawa, N.: Quantitation of counter ion of a water-insoluble drug by nonaqueous capillary electrophoresis with indirect UV detection. *J. Chromatogr. A*, 829 (1998) 411-415.
- 843 Taylor, R.B., Toasaksiri, S. and Reid, R.G.: A literature assessment of sample pretreatments and limits of detection for capillary electrophoresis of drugs in biological fluids and practical investigation with some antimalarials in plasma. *Electrophoresis (Weinheim)*, 19 (1998) 2791-2797 - a review with 116 refs.
- 844 Thormann, W. and Caslavská, J.: Capillary electrophoresis in drug analysis. *Electrophoresis (Weinheim)*, 19 (1998) 2691-2694 - a review with 50 refs.
- 845 Veraart, J.R., Gooijer, C., Lingeman, H., Velthorst, N.H. and Brinkman, U.A.T.: At-line solid-phase extraction for capillary electrophoresis: application to negatively charged solutes. *J. Chromatogr. B*, 719 (1998) 199-208.
- 846 Wätzig, H., Degenhardt, M. and Kunkel, A.: Strategies for capillary electrophoresis: method development and validation for pharmaceutical and biological applications. *Electrophoresis (Weinheim)*, 19 (1998) 2695-2752 - a review with 840 refs.

See also 522, 597, 608, 628, 633, 637, 638, 641, 643, 648, 656, 681, 690, 767, 885.

## 32b. Antirheumatics and antiinflammatory drugs

- 847 Meyring, M., Strickmann, D., Chankvetadze, B., Blaschke, G., Desiderio, C. and Fanali, S.: Investigation of the *in vitro* biotransformation of R-(+)-thalidomide by HPLC, nano-HPLC, CEC and HPLC-APCI-MS. *J. Chromatogr. B*, 723 (1999) 255-264.
- 848 Pusecker, K., Schewitz, J., Gfrorer, P., Tseng, L.-H., Albert, K., Bayer, E., Wilson, I.D., Pusecker, K., Bailey, N.J., Scarfe, G.B., Nicholson, J.K. and Lindon, J.C.: On-flow identification of metabolites of paracetamol from human urine by using directly coupled CZE-NMR and CEC-NMR spectroscopy. *Anal. Commun.*, 35 (1998) 213-215; C.A., 129 (1998) 156398d.
- 849 Raith, K., Althoff, E., Banse, J., Neidhardt, H. and Neubert, R.H.: Two examples of rapid and simple drug analysis in pharmaceutical formulations using capillary electrophoresis: naphazoline, dexamethasone and benzalkonium in nose drops and nystatin in an oily suspension. *Electrophoresis (Weinheim)*, 19 (1998) 2907-2911.
- 850 Zhang, Z., Jiang, H., Wu, Y. and Wu, R.: (Chiral resolution of ibuprofen by high performance capillary electrophoresis (HPLC)). *Zhongguo Yaoke Daxue Xuebao*, 29 (1998) 278-280; C.A., 129 (1998) 207285z.

See also 845.

32c. *Autonomic and cardiovascular drugs*

- 851 Bao, J.J., Parekh, N.J. and Shuja, A.: Separation and quantitation of azimilide and its putative metabolites by capillary electrophoresis. *J. Chromatogr. B*, 720 (1998) 129-140.
- 852 Chen, H. and Wang, J.: (Determination of 2 constituents in compound enalapril maleate tablets by capillary zone electrophoresis). *Yaowu Fenxi Zazhi*, 18 (1998) 245-247; C.A., 130 (1999) 7494.
- 853 Dongowski, G., Neubert, R.H.H., Plätzer, M., Schwarz, M.A., Schnorrenberger, B. and Anger, H.: Interaction between food components and drugs. Part 6: Influence of starch degradation products on propranolol transport. *Pharmazie*, 53 (1998) 871-875.
- 854 Gratz, S.R. and Stalcup, A.M.: Enantiomeric separations of terbutaline by CE with a sulfated  $\beta$ -cyclodextrin chiral selector: a quantitative binding study. *Anal. Chem.*, 70 (1998) 5166-5171.
- 855 Hercegová, A., Sadecka, J. and Polonsky, J.: Isotachophoretic determination of bisoprolol, clonidine, disopyramide, and tolazoline in human fluids. *Acta Pol. Pharm.*, 55 (1998) 167-171; C.A., 129 (1998) 339411x.
- 856 Kuwahara, Y. and Nishi, H.: (Fast drug analysis by capillary electrophoresis-content uniformity and assays for diltiazem tablets and trimetoquinol tablets). *Yakugaku Zasshi*, 118 (1998) 456-463; C.A., 129 (1998) 293980b.
- 857 Le Potier, I., Tamisier-Karolak, S.L., Morin, P., Megel, F. and Taverna, M.: Comparison of native, alkylated and charged cyclodextrins for the chiral separation of labetalol stereoisomers by capillary electrophoresis. *J. Chromatogr. A*, 829 (1998) 341-349.
- 858 Maguregui, M.I., Jiménez, R.M. and Alonso, R.M.: Simultaneous determination of the  $\beta$ -blocker atenolol and several complementary antihypertensive agents in pharmaceutical formulations and urine by capillary zone electrophoresis. *J. Chromatogr. Sci.*, 36 (1998) 516-522.
- 859 Rui, J., Zhou, Y., Ling, S., Xiang, B. and An, D.: Evaluation of enantioselective pharmacokinetics combined with pharmacodynamics of racemic verapamil administrated orally to patients. *Zhongguo Yaoke Daxue Xuebao*, 29 (1998) 292-297; C.A., 130 (1999) 20388.
- 860 Shihabi, Z.K.: Serum procainamide analysis based on acetonitrile stacking by capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3008-3011.

32d. *Central nervous system drugs*

- 861 Bohnenstengel, F., Kroemer, H.K. and Sperker, B.: *In vitro* cleavage of paracetamol glucuronide by human liver and kidney  $\beta$ -glucuronidase: determination of paracetamol by capillary electrophoresis. *J. Chromatogr. B*, 721 (1999) 295-299.
- 862 Choi, J., Kim, C. and Choi, M.J.: Comparison of capillary electrophoresis-based immunoassay with fluorescence polarization immunoassay for the immunodetermination of methamphetamine using various methamphetamine antibodies. *Electrophoresis (Weinheim)*, 19 (1998) 2950-2955.
- 863 Coufal, P., Stulík, K., Claessens, H.A., Hardy, M.J. and Webb, M.: Determination of the dissociation constants of ropinirole and some impurities and their quantification using capillary zone electrophoresis. *J. Chromatogr. B*, 720 (1998) 197-204.

- 864 Heitmeier, S. and Blaschke, G.: Direct assay of nonopioid analgesics and their metabolites in human urine by capillary electrophoresis and capillary electrophoresis-mass spectrometry. *J. Chromatogr. B*, 721 (1999) 109-125.
- 865 Heitmeier, S. and Blaschke, G.: Direct determination of paracetamol and its metabolites in urine and serum by capillary electrophoresis with ultraviolet and mass spectrometric detection. *J. Chromatogr. B*, 721 (1999) 93-108.
- 866 Kataoka, Y., Makino, K. and Oishi, R.: Capillary electrophoresis for therapeutic drug monitoring of antiepileptics. *Electrophoresis (Weinheim)*, 19 (1998) 2856-2860 - a review with 21 refs.
- 867 Lehtonen, P., Mälki-Laine, L. and Wikberg, T.: Separation of the glucuronides of entacapone and its (Z)-isomer in urine by micellar electrokinetic capillary chromatography. *J. Chromatogr. B*, 721 (1999) 127-134.
- 868 Li, X.-F., Liu, C.-S., Roos, P., Hansen, E.B., Jr., Cerniglia, C.E. and Dovichi, N.J.: Nonaqueous capillary electrophoretic separation and thermo-optical absorbance detection of five tricyclic antidepressants and metabolism of amitriptyline by *Cunninghamella elegans*. *Electrophoresis (Weinheim)*, 19 (1998) 3178-3182.
- 869 Liu, C.-S., Li, X.-F., Pinto, D., Hansen, E.B., Jr., Cerniglia, C.E. and Dovichi, N.J.: On-line nonaqueous capillary electrophoresis and electrospray mass spectrometry of tricyclic antidepressants and metabolic profiling of amitriptyline by *Cunninghamella elegans*. *Electrophoresis (Weinheim)*, 19 (1998) 3183-3189.
- 870 Lurie, I.S., Odeneal, N.G., II, McKibben, T.D. and Casale, J.F.: Effects of various anionic chiral selectors on the capillary electrophoresis separation of chiral phenethylamines and achiral neutral impurities present in illicit methamphetamine. *Electrophoresis (Weinheim)*, 19 (1998) 2918-2925.
- 871 Ramseier, A., Caslavská, J. and Thormann, W.: Screening for urinary amphetamine and analogs by capillary electrophoretic immunoassays and confirmation by capillary electrophoresis with on-column multiwavelength absorbance detection. *Electrophoresis (Weinheim)*, 19 (1998) 2956-2966.
- 872 Ramseier, A., von Heeren, F. and Thormann, W.: Analysis of fluorescein isothiocyanate derivatized amphetamine and analogs in human urine by capillary electrophoresis in chip-based and fused-silica capillary instrumentation. *Electrophoresis (Weinheim)*, 19 (1998) 2967-2975.
- 873 Schieferecke, M.A., McLaughlin, K.J., Faibushevich, A.A. and Lunte, C.E.: Determination of bupivacaine and three of its metabolites in rat urine by capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2997-3002.
- 874 Smyth, W.F. and McClean, S.: A critical evaluation of the application of capillary electrophoresis to the detection and determination of 1,4-benzodiazepine tranquilizers in formulations and body materials. *Electrophoresis (Weinheim)*, 19 (1998) 2870-2882 - a review with 50 refs.
- 875 Stewart, J.T. and Siluveru, M.: CE of racemic local anesthetics in serum and CE/MEKC study of a 5TH receptor agonist. *Methodol. Surv. Bioanal. Drugs*, 25 (1998) 78-81; C.A., 129 (1998) 310801p.
- 876 Vargas, M.G., Havel, J. and Patocka, J.: Determination of the anti-Alzheimer's disease drugs tacrine, 7-methoxytacrine, and its metabolites by capillary zone electrophoresis. *Am. Clin. Lab.*, 17 (1998) 22-23; C.A., 129 (1998) 197499f.

- 877 Wang, R., Lu, X., Wu, M. and Wang, E.: Separation of promethazine and thioridazine using capillary electrophoresis with end-column amperometric detection. *J. Chromatogr. B*, 721 (1999) 327-332.

See also 632, 646, 888, 897.

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

- 878 Dabas, P.C., Vescina, M.C. and Carducci, C.N.: Determination of suramin by micellar electrokinetic chromatography with direct serum injection. *J. Capillary Electrophor.*, 4 (1997) 253-256; *C.A.*, 129 (1998) 254292j.
- 879 Esteve-Romero, J., Escrig-Tena, I., Simo-Alfonso, E.F. and Ramis-Ramas, G.: Determination of thyreostatics in animal feed by micellar electrokinetic chromatography. *Analyst (Cambridge)*, 124 (1999) 125-128.
- 880 Nevado, J.J.B., Salcedo, A.M.C. and Penalvo, G.C.: Simultaneous determination of *cis*- and *trans*-reveratrol in wines by capillary-zone electrophoresis. *Analyst (Cambridge)*, 124 (1999) 61-66.
- 881 Szymanski, A. and Szczepaniak, W.: Retention mechanism of sulfonamides in ionic micellar liquid chromatography. *Chem. Anal. (Warsaw)*, 43 (1998) 617-635; *C.A.*, 129 (1998) 310149g.
- 882 You, T., Yang, X. and Wang, E.: Determination of sulfadiazine and sulfamethoxazole by capillary electrophoresis with end-column electrochemical detection. *Analyst (Cambridge)*, 123 (1998) 2357-2360.

See also 893.

32f. *Cytostatics*

- 883 Chen, S.-H. and Gallo, J.M.: Use of capillary electrophoresis methods to characterize the pharmacokinetics of antisense drugs. *Electrophoresis (Weinheim)*, 19 (1998) 2861-2869 - a review with 53 refs.
- 884 Hempel, G., Schulze-Westhoff, P., Flege, S., Laubrock, N. and Boos, J.: Therapeutic drug monitoring of doxorubicin in paediatric oncology using capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2939-2943.
- 885 Mader, R.M., Brunner, M., Rizovski, B., Mensik, C., Steger, G.G., Eichler, H.-G. and Müller, M.: Analysis of microdialysates from cancer patients by capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 2981-2985.
- 886 Mrestani, Y. and Neubert, R.: Separation of etoposide phosphate and methotrexate by capillary zone electrophoresis using UV detection with a high sensitivity cell. *Electrophoresis (Weinheim)*, 19 (1998) 3022-3025.
- 887 Wittrisch, H., Schröer, H.-P., Vogt, J. and Vogt, C.: Determination of titanocene, a new drug with anticancer potential, and its metabolism in solution by capillary electrophoresis. *Electrophoresis (Weinheim)*, 19 (1998) 3012-3017.

See also 652, 926.

32g. *Other drug categories*

- 888 Barnett, N.W., Hindson, B.J., Lewis, S.W. and Purcell, S.D.: Determination of codeine, 6-methoxycodeine and thebaine using capillary electrophoresis with tris(2,2'-bipyridyl)-ruthenium(II) chemiluminescence detection. *Anal. Commun.*, 35 (1998) 321-324; *C.A.*, 129 (1998) 339316v.
- 889 Cai, H. and Lim, C.K.: Comparison of HPLC, capillary electrophoresis and direct spectrofluorimetric methods for determination of temoporfin - polyethylene glycol conjugates in plasma. *Analyst (Cambridge)*, 123 (1998) 2243-2245.
- 890 Jankowsky, R., Friebe, M., Noll, B. and Johannsen, B.: Determination of dissociation constants of <sup>99m</sup>Technetium radiopharmaceuticals by capillary electrophoresis. *J. Chromatogr. A*, 833 (1999) 83-96.
- 891 Rada, P., Tucci, S., Pérez, J., Teneud, L., Chuecos, S. and Hernández, L.: *In vivo* monitoring of gabapentin in rats: a microdialysis study coupled to capillary electrophoresis and laser-induced fluorescence detection. *Electrophoresis (Weinheim)*, 19 (1998) 2976-2980.
- 892 Vargas, G., Revilla, A., Havel, J. and Holy, A.: Capillary electrophoresis separation of the new anti-AIDS agents 9-(2-phosphorylmethoxyethyl)adenine and 9-(2-phosphorylmethoxyethyl)-2,6-diaminopurine in mixtures with some monoribonucleotides or the most common deoxynucleotides. *Electrophoresis (Weinheim)*, 19 (1998) 2926-2929.
- 893 Wang, S.-P. and Chang, C.-L.: Determination of parabens in cosmetic products by supercritical fluid extraction and capillary zone electrophoresis. *Anal. Chim. Acta*, 377 (1998) 85-93.
- 894 Zou, D., Wu, X. and Nan, G.: (Determination of three component contents in clorprenaline tablet by capillary zone electrophoresis). *Zhongguo Yaoxue Zazhi Beijing*, 33 (1998) 360-362; *C.A.*, 129 (1998) 347362x.

See also 580, 632, 645, 696, 739, 843, 847, 849, 856, 873, 883.

32h. *Toxicological and forensic applications*

- 895 De Roy, G.L.J.: Chromatography in forensic casework - the importance of hyphenated techniques. *LC-GC Int.*, 12 (1999) 121-122.
- 896 Huang, J. and Liang, S.: (Capillary zone electrophoresis of the crude venom of the female spider *Selenocosmia huwena*). *Hunan Shifan Daxue Ziran Kexue Xuebao*, 21 (1998) 66-70; *C.A.*, 129 (1998) 212765k.
- 897 Krawczeniuk, A.S. and Bravenec, V.A.: Quantitative determination of cocaine in illicit powders by free zone electrophoresis. *J. Forensic Sci.*, 43 (1998) 738-743; *C.A.*, 129 (1998) 256092.
- 898 Luque, J.A., Crespillo, M., Ramirez, E., Fernandez, R.M. and Valverde, J.L.: Analysis of STRs by capillary electrophoresis. *Int. Congr. Ser.*, 1167(Progress in Forensic Genetics 7) (1998) 34-36. *C.A.*, 130 (1999) 34100.
- 899 Xu, X., de Bruyn, P.C.A.M., de Koeijer, J.A. and Logtenberg, H.: Low-molecular-mass anion screening for forensic environmental analyses by capillary zone electrophoresis with indirect UV detection. *J. Chromatogr. A*, 830 (1999) 439-451.
- 900 Zhang, J. and Zhou, T.: (Capillary electrophoresis determination of tetrodotoxin). *Yaowu Fenxi Zazhi*, 18 (1998) 231-233; *C.A.*, 130 (1999) 7492.

See also 598, 729, 749, 862, 870, 871.

*32i. Plant extracts*

See 645, 665, 807, 809.

**33. CLINICO-CHEMICAL APPLICATIONS**

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

- 901 Beckmann, A., Vogt, U., Huda, N., Zänker, K.S. and Brandt, B.H.: Direct-double-differential PCR for gene dosage quantification of c-myc. *Clin. Chem. (Washington)*, 45 (1999) 41-143.  
 902 Donohoe, G.G., Salomäki, A., Lehtimäki, T., Pulkki, K. and Kairisto, V.: Rapid identification of apolipoprotein E genotypes by multiplex amplification refractory mutation system PCR and capillary gel electrophoresis. *Clin. Chem. (Washington)*, 45 (1999) 143-146.

See also 590, 678, 715, 739, 742, 743.

**34. FOOD ANALYSIS**

*34a. General papers and reviews*

- 903 Blatny, P. and Kvasnicka, F.: Application of capillary isotachophoresis and capillary zone electrophoresis to the determination of inorganic ions in food and feed samples. *J. Chromatogr. A*, 834 (1999) 419-431 - a review with 65 refs.  
 904 Sádecká, J. and Polonský, J.: Determination of inorganic ions in food and beverages by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 401-417 - a review with 124 refs.  
 905 Wielgos, T., Turner, P. and Havel, K.: Validation of analytical capillary electrophoresis methods for use in a regulated environment. *J. Capillary Electrophor.*, 4 (1997) 273-278; C.A., 130 (1999) 17306.

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

- 906 Mardones, C., Arce, L., Rios, A. and Valcarcel, M.: Determination of heterocyclic aromatic amines in fried beefsteak, meat extract, and fish by capillary zone electrophoresis. *Chromatographia*, 48 (1998) 700-706.  
 907 Schober, T., Graeber, S. and Kuhn, M.: Rapid estimation of characteristic technological properties of spelt varieties by using fundamental rheological methods and capillary electrophoresis. *Dtsch. Lebensm.-Rundsch.*, 94 (1998) 297-302; C.A., 129 (1998) 160892c.

See also 737.

**35. ENVIRONMENTAL ANALYSIS**

*35a. General papers and reviews*

- 908 Onuska, F.I., Kaniansky, D., Onuska, K.D. and Lee, M.L.: Iso-tachophoresis: trials, tribulations, and trends in trace analysis of organic and inorganic pollutants. *J. Microcolumn Sep.*, 10 (1998) 567-579; C.A., 129 (1998) 320591j - a review with 71 refs.  
 909 Valsecchi, S.M. and Polesello, S.: Analysis of inorganic species in environmental samples by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 363-385 - a review with 140 refs.

See also 684, 899, 911.

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

- 910 Fiehn, O., Wegener, G. and Jekel, M.: Capillary electrophoretic analysis of organic anions in tannery wastewaters including high contents of chloride and sulphate. *Int. J. Environ. Anal. Chem.*, 69 (1998) 257-271; C.A., 129 (1998) 320797f.  
 911 Fukushi, K., Takeda, S., Chayama, K. and Wakida, S.-I.: Application of capillary electrophoresis to the analysis of inorganic ions in environmental samples. *J. Chromatogr. A*, 834 (1999) 349-362 - a review with 67 refs.  
 912 Martínez, D., Borrull, F. and Calull, M.: Comparative study of a solid-phase extraction system coupled to capillary electrophoresis in the determination of haloacetic compounds in tap water. *J. Chromatogr. A*, 827 (1998) 105-112.  
 913 Yang, Y., Liu, F., Kang, J. and Ou, Q.: Improved selectivity of anions with methanol as additive. Determination of Cl<sup>-</sup>, NO<sub>3</sub><sup>-</sup> and SO<sub>4</sub><sup>2-</sup> in river water by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 393-399.

See also 571, 667, 697, 828, 909, 924, 936, 939, 945, 957.

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

See 697, 924, 958.

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

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

See 672.

**37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES**

- 914 Canut, H., Bauer, J. and Weber, G.: Separation of plant membranes by electromigration techniques. *J. Chromatogr. B*, 722 (1999) 121-139 - a review with 88 refs.  
 915 Pasquali, C., Fialka, I. and Huber, L.A.: Subcellular fractionation, electromigration analysis and mapping of organelles. *J. Chromatogr. B*, 722 (1999) 89-102 - a review with 74 refs.

- 916 Radko, S.P. and Chrambach, A.: Capillary electrophoresis of subcellular-sized particles. *J. Chromatogr. B*, 722 (1999) 1-10.
- 917 Torimura, M., Ito, S., Kano, K., Ikeda, T., Esaka, Y. and Ueda, T.: Surface characterization and on-line activity measurements of microorganisms by capillary zone electrophoresis. *J. Chromatogr. B*, 721 (1999) 31-37.
- 918 Yeung, E.S.: Study of single cells by using capillary electrophoresis and native fluorescence detection. *J. Chromatogr. A*, 830 (1999) 243-262 - a review with 78 refs.

See also 653, 694, 922.

### 38. INORGANIC COMPOUNDS

- 919 Janos, P.: Role of chemical equilibria in the capillary electrophoresis of inorganic substances. *J. Chromatogr. A*, 834 (1999) 3-20 - a review with 121 refs.
- 920 Krivácsy, Z., Gelencsér, A., Hlavay, J., Kiss, G. and Sárvári, Z.: Electrokinetic injection in capillary electrophoresis and its application to the analysis of inorganic compounds. *J. Chromatogr. A*, 834 (1999) 21-44 - a review with 100 refs.
- 921 Okada, T.: Polyethers in inorganic capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 73-87 - a review with 57 refs.
- 922 Petersen, S.L. and Balloou, N.E.: Separation of micrometer-size oxide particles by capillary zone electrophoresis. *J. Chromatogr. A*, 834 (1999) 445-452.
- 923 Timerbaev, A.R. and Buchberger, W.: Prospects for detection and sensitivity enhancement of inorganic ions in capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 117-132 - a review with 110 refs.

See also 567, 571.

#### 38a. Cations

- 924 Casiot, C., Alonso, M.C.B., Boisson, J., Donard, D.F.X. and Potin-Gautier, M.: Simultaneous speciation of arsenic, selenium, antimony and tellurium species in waters and soil extracts by capillary electrophoresis and UV-detection. *Analyst (Cambridge)*, 123 (1998) 2887-2893.
- 925 Creson, T.K., Monaco, P.J., Rasch, E.M., Hagardorn, A.H. and Ferslew, K.E.: Capillary ion analysis of lithium concentrations in biological fluids and tissues of *Poecilia* (teleost). *Electrophoresis (Weinheim)*, 19 (1998) 3018-3021.
- 926 Hamacek, J. and Havel, J.: Determination of platinum(II,IV) and palladium(II) as thiocyanate complexes by capillary zone electrophoresis. Analysis of carboplatin and similar drugs. *J. Chromatogr. A*, 834 (1999) 321-327.
- 927 Hu, P., Luo, G., Wang, R. and Tang, C.: (Determination of inorganic selenium in KSC by electrophoretic capillary ion analysis). *Tsinghua Sci. Technol.*, 1 (1996) 425-428; *C.A.*, 129 (1998) 347378g.
- 928 Hu, Y., Veeramasuneni, S. and Miller, J.D.: Electrokinetic behavior of selected alkali and alkaline-earth fluoride salts in organic solvents. *Colloids Surf. A*, 141 (1998) 193-203; *C.A.*, 129 (1998) 29432d.
- 929 Kelly, R.G., Yuan, J., Weyant, C.M. and Lewis, K.S.: Applications of capillary electrophoresis in corrosion science and engineering. *J. Chromatogr. A*, 834 (1999) 433-444.

- 930 Liu, B.-F., Liu, L.-B. and Chen, J.-K.: (Separation of cobalt, nickel and copper by precolumn derivatization capillary electrophoresis in nonaqueous medium). *Gaodeng Xuexiao Huaxue Xuebao*, 19 (1998) 1232-1235; *C.A.*, 129 (1998) 239193j.
- 931 Liu, B.-F., Liu, L.-B. and Cheng, J.-K.: Analysis of inorganic cations as their complexes by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 277-308 - a review with 113 refs.
- 932 López, C.E., Castro, J.M., González, V., Pérez, J., Seco, H.M. and Fernández, J.M.: Determination of metal ions in algal solution samples by capillary electrophoresis. *J. Chromatogr. Sci.*, 36 (1998) 352-356.
- 933 Michalke, B. and Schramel, P.: Antimony speciation in environmental samples by interfacing capillary electrophoresis on-line to an inductively coupled plasma mass spectrometer. *J. Chromatogr. A*, 834 (1999) 341-348.
- 934 Pacakova, V., Coufal, P. and Stulík, K.: Capillary electrophoresis of inorganic cations. *J. Chromatogr. A*, 834 (1999) 257-275 - a review with 132 refs.
- 935 Padarauskas, A., Olsauskaite, V. and Paliulinyte, V.: New electrolyte system for the determination of ammonium, alkali and alkaline earth cations by capillary electrophoresis. *Anal. Chim. Acta*, 374 (1998) 159-165.
- 936 Padarauskas, A., Olsauskaite, V. and Paliulinyte, V.: Simultaneous determination of inorganic anions and cations in waters by capillary electrophoresis. *J. Chromatogr. A*, 829 (1998) 359-365.
- 937 Pozdnjakova, S. and Padarauskas, A.: Speciation of vanadium(V) and vanadium(IV) by capillary electrophoresis using pre-capillary complexation. *Chemija*, (1998) 240-244; *C.A.*, 130 (1999) 43012.
- 938 Prima-Putra, D. and Botton, B.: Organic and inorganic compounds of xylem exudates from five woody plants at the stage of bud breaking. *J. Plant Physiol.*, 153 (1998) 670-676; *C.A.*, 130 (1999) 35653.
- 939 Qiu, J. and Fu, X.: (Capillary electrophoresis analysis of  $K^+$ ,  $Na^+$ ,  $Ca^{2+}$ , and  $Mg^{2+}$  in drinking water). *Huaxue Fenxi*, 34 (1998) 342-343; *C.A.*, 130 (1999) 43008.
- 940 Sánchez, J.M., Salvadó, V. and Havel, J.: Speciation of iridium(IV) in hydrochloric acid medium by means of capillary zone electrophoresis and spectrophotometry. *J. Chromatogr. A*, 834 (1999) 329-340.
- 941 Scapolan, S., Ansoborlo, E., Moulin, C. and Madic, C.: Investigations by time-resolved laser-induced fluorescence and capillary electrophoresis of the uranyl-phosphate species: application to blood serum. *J. Alloys Compd.*, 271-273 (1998) 106-111; *C.A.*, 129 (1998) 119627g.
- 942 Xia, Z. and Svensmark, B.O.: (Labile speciation of cadmium by capillary electrophoresis). *Huaxue Yanjiu Yu Yingyong*, 10 (1998) 63-66; *C.A.*, 129 (1998) 321861j.
- 943 Yang, Y., Kang, J., Li, J. and Ou, Q.: (Effect of electrolyte composition on separation and determination of rare earth metals with capillary electrophoresis). *Sepu*, 16 (1998) 433-435; *C.A.*, 130 (1999) 32374.

For additional information see *C.A.*:  
130 (1999) 16706.

See also 521, 563, 567, 571, 591, 745, 815, 817, 903, 904, 909, 911, 944, 954.

**38b. Anions**

- 944 Aguilar, M., Farran, A. and Martí, V.: Determination of cyanides in electropolating solutions as  $\text{Ni}(\text{CN})_4^{2-}$  and analysis by capillary electrophoresis. *Fresenius J. Anal. Chem.*, 363 (1999) 121-123.
- 945 Deng, Y.: Determination of major inorganic anions in rainwater by capillary electrophoresis. *Water Res.*, 32 (1998) 2249-2256; C.A., 129 (1998) 165947j.
- 946 Fabre, H., Blanchin, M.D. and Bosc, N.: Capillary electrophoresis for the determination of bromide, chloride and sulfate as impurities in calcium acamprosate. *Anal. Chim. Acta*, 381 (1999) 29-37.
- 947 Fabry, L., Ehmann, T., Philke, S. and Kotz, L.: Re-dissolving VPD-TXRF-droplets of 300mm wafer for the determination of inorganic anions by capillary electrophoresis. *Proc.-Electrochem. Soc.*, 98-13 (1998) 373-378; C.A., 129 (1998) 269637z.
- 948 Harakuwe, A.H. and Haddad, P.R.: Control of separation selectivity in capillary zone electrophoresis of inorganic anions. *J. Chromatogr. A*, 834 (1999) 213-232 - a review with 189 refs.
- 949 Kamiansky, D., Masár, M., Marák, J. and Bodor, R.: Capillary electrophoresis of inorganic anions. *J. Chromatogr. A*, 834 (1999) 133-178 - a review with 293 refs.
- 950 Klockow-Beck, A., Nick, A., Geissheuer, S. and Schaufelberger, D.: Determination of the inorganic degradation products sulfate and sulfamate in the antiepileptic drug topiramate by capillary electrophoresis. *J. Chromatogr. B*, 720 (1998) 141-151.
- 951 Masár, M., Bodor, R. and Kamiansky, D.: Separations of inorganic anions based on their complexations with  $\alpha$ -cyclodextrin by capillary zone electrophoresis with contactless conductivity detection. *J. Chromatogr. A*, 834 (1999) 179-188.
- 952 Meissner, T., Eisenbeiss, F. and Jastorff, B.: Capillary zone electrophoresis and ion chromatography in the low  $\mu\text{g/l}$  range applied to the determination of anions in hydrogen peroxide. *J. Chromatogr. A*, 829 (1998) 351-357.

- 953 Nutku, M.S. and Erim, F.B.: The use of cationic polymer for the separation of inorganic anions by capillary electrophoresis. *J. High Resolut. Chromatogr.*, 21 (1998) 505-508.
- 954 Soga, T. and Ross, G.A.: Simultaneous determination of inorganic anions, organic acids and metal cations by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 65-71 - a review with 15 refs.
- 955 Stover, F.S.: Capillary electrophoresis of phosphorus oxo anions. *J. Chromatogr. A*, 834 (1999) 243-256 - a review with 104 refs.
- 956 Wang, T. and Li, S.F.Y.: Separation of inorganic phosphorus-containing anions by capillary electrophoresis. *J. Chromatogr. A*, 834 (1999) 233-241 - a review with 69 refs.
- 957 Yang, Y., Kang, J., Lu, H., Ou, Q. and Liu, F.: Determination of trace level anions in snow samples by capillary electrophoresis with sample stacking. *J. Chromatogr. A*, 834 (1999) 387-391.
- 958 Zbiral, J.: Determination of some inorganic anions in soil extract and atmospheric deposition using capillary electrophoresis. *Commun. Soil Sci. Plant. Anal.*, 29 (1998) 1585-1592; C.A., 129 (1998) 289594m.

See also 521, 555, 561, 562, 567, 571, 899, 903, 904, 909, 911, 912, 913, 929, 936, 938.

**38d. Volatile inorganic compounds**

See 935.

**39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS**

See 890.