



ELSEVIER

Journal of Chromatography A, 861 (1999) B383–B566

JOURNAL OF
CHROMATOGRAPHY A

www.elsevier.com/locate/chroma

Bibliography Section

Liquid Column Chromatography

1. REVIEWS AND BOOKS

- 3273 Anderson, D.J.: High performance liquid chromatography in clinical analysis. *Anal. Chem.*, 71 (1999) 314R-327R - a review with 379 refs.
- 3274 Dietz, M.L., Horwitz, E.Ph. and Bond, A.H.: Extraction chromatography: progress and opportunities. *ACS Symp. Ser.*, 716 (1999) 234-250; *C.A.*, 130 (1999) 201220 - a review with 79 refs.
- 3275 Filer, C.N.: Isotopic fractionation of organic compounds in chromatography. *J. Labelled Compd. Radiopharm.*, 42 (1999) 169-197; *C.A.*, 130 (1999) 231591 - a review with 307 refs.
- 3276 Laubscher, J.-C.: (Methods and application practice of high performance liquid chromatography (HPLC)). *Schweiz. Lab.-Z.*, 56 (1999) 68-71; *C.A.*, 130 (1999) 305785 - a review without refs.
- 3277 Lores, M., Cabaleiro, O. and Cela, R.: Post-column photochemical derivatization in high-performance liquid chromatography. *TrAC*, 18 (1999) 392-400.
- 3278 Owens, P.K., Karlsson, L., Lutz, E.S.M. and Andersson, L.I.: Molecular imprinting for bio- and pharmaceutical analysis. *TrAC*, 18 (1999) 146-154.
- 3279 Ryan, D., Robards, K., Prenzler, P. and Antolovich, M.: Application of mass spectrometry to plant phenols. *TrAC*, 18 (1999) 362-372.
- 3280 Smyth, W.F.: The use of electrospray mass spectrometry in the detection and determination of molecules of biological significance. *TrAC*, 18 (1999) 335-346.

See also 3281, 3282, 3306, 3336, 3346, 3353, 3370, 3398, 3399, 3404, 3405, 3421, 3426, 3437, 3440, 3441, 3442, 3451, 3460, 3466, 3553, 3617, 3636, 3657, 3700, 3783, 3785, 3844, 3850, 3961, 4124, 4130, 4166, 4184, 4286, 4300, 4308, 4334, 4337, 4340, 4371, 4389, 4397, 4412, 4456.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 3281 Barwick, V.J.: Sources of uncertainty in gas chromatography and high-performance liquid chromatography. *J. Chromatogr. A*, 849 (1999) 13-33 - a review with 75 refs.

- 3282 Bridge, P.: Numerical analysis of molecular variability: a comparison of hierarchic and non-hierarchic methods. In: Bridge, P., Couteaudier, Y. and Clarkson, J. (Editors), *Mol. Var. Fungal Pathog., [Workshop]*, Meeting Date 1997, CAB International, Wallingford, 1998, pp. 291-308; *C.A.*, 130 (1999) 277333 - a review with 31 refs.
- 3283 Brozek, C.M.: Chromatography. *J. Chem. Educ.*, 76 (1999) 83; *C.A.*, 130 (1999) 222720.
- 3284 Carda-Broch, S., Torres-Lapasió, J.R. and García-Alvarez-Coque, M.C.: Evaluation of several global resolution functions for liquid chromatography. *Anal. Chim. Acta*, 396 (1999) 61-74.
- 3285 Curtright, R., Emry, R. and Markwell, J.: Student understanding of chromatography: a hands-on approach. *J. Chem. Educ.*, 76 (1999) 249-252; *C.A.*, 130 (1999) 266938.
- 3286 Dolan, J.W.: How much is too much? *LC-GC Int.*, 12 (1999) 406-409.
- 3287 Dolan, J.W.: LC troubleshooting on-line with chromatography forum. *LC-GC Int.*, 12 (1999) 338-342.
- 3288 Egeberg, P.K.: An iterative method for solving inverse problems arising from dispersion in high pressure size exclusion chromatography. *Anal. Chim. Acta*, 392 (1999) 183-189.
- 3289 Felitsyn, N. and Cantwell, F.F.: Effect of stationary-phase sorption of organic modifier from a water-rich mobile phase on solute retention by an ODS bonded phase. *Anal. Chem.*, 71 (1999) 1862-1869.
- 3290 Fleming, C.M., Kowalski, B.R., Apfel, A. and Hancock, W.S.: Windowed mass selection method: a new data processing algorithm for liquid chromatography-mass spectrometry data. *J. Chromatogr. A*, 849 (1999) 71-85.
- 3291 Forgács, E. and Cserhádi, T.: Relationship between retention characteristics and physicochemical parameters of solutes on a porous graphitized carbon column studied by caconical correlation analysis. *Anal. Lett.*, 32 (1999) 1867-1878.
- 3292 Giroux, R.: ACS Award in chromatography. *Chem. Eng. News*, 77 (1999) 25-26; *C.A.*, 130 (1999) 281418.
- 3293 Haswell, S.J. and Howarth, N.: Perturbation of a solid phase separation process by a non-thermal microwave effect. *Anal. Chim. Acta*, 387 (1999) 113-120.
- 3294 Henrion, R. and Andersson, C.A.: A new criterion for simple-structure transformations of core arrays in N-way principal components analysis. *Chemom. Intell. Lab. Syst.*, 47 (1999) 189-204; *C.A.*, 130 (1999) 290782.
- 3295 Li, J.: A computational study on the effect of random noise on the precision and accuracy of the integration of chromatographic peaks. *Anal. Chim. Acta*, 388 (1999) 187-199.

- 3296 Lu, M., Zou, H., Liang, X. and Lu, P.: (Selectivity tuning in multi-binary eluents for reversed-phase liquid chromatography). *Sepeu*, 17 (1999) 5-9; *C.A.*, 130 (1999) 231626.
- 3297 Mayr, G. and Welsch, T.: Influence of viscous heat dissipation on efficiency in high-speed high-performance liquid chromatography. *J. Chromatogr. A*, 845 (1999) 155-163.
- 3298 Natarajan, V. and Cramer, S.M.: Modeling shock layers in ion-exchange displacement chromatography. *AIChE J.*, 45 (1999) 27-37; *C.A.*, 130 (1999) 193778.
- 3299 Neue, U.D., Alden, B.A. and Walter, T.H.: Universal procedure for the assessment of the reproducibility and the classification of silica-based reversed-phase packings. II. Classification of reversed-phase packings. *J. Chromatogr. A*, 849 (1999) 101-116.
- 3300 Neue, U.D., Serowik, E., Iraneta, P., Alden, B.A. and Walter, T.H.: Universal procedure for the assessment of the reproducibility and the classification of silica-based reversed-phase packings. I. Assessment of the reproducibility of reversed-phase packings. *J. Chromatogr. A*, 849 (1999) 87-100.
- 3301 Ostergren, K.C.E. and Tragardh, Ch.: Modelling and analysis of axial flow through and compression of a non-rigid chromatographic bed. *Chem. Eng. J. (Lausanne)*, 72 (1999) 153-161; *C.A.*, 130 (1999) 283980.
- 3302 Palamarev, C.E., Meyer, V.R. and Palamareva, M.D.: New approach to the computer-assisted selection of mobile phases for high-performance liquid chromatography on the basis of the Snyder theory. *J. Chromatogr. A*, 848 (1999) 1-8.
- 3303 Sándi, Á. and Szepeszy, L.: Evaluation and modulation of selectivity in reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 845 (1999) 113-131.
- 3304 Schriemer, D.C., Bundle, D.R., Li, L. and Hindsgaul, O.: Micro-scale frontal affinity chromatography with mass spectrometric detection: a new method for the screening of compound libraries. *Angew. Chem., Int. Ed.*, 37 (1999) 3383-3387; *C.A.*, 130 (1999) 261388.
- 3305 Vial, J. and Jardy, A.: Experimental comparison of the different approaches to estimate LOD and LOQ of an HPLC method. *Anal. Chem.*, 71 (1999) 2672-2677.
- 3306 Yamamoto, F.: (Fundamental and application of liquid chromatography: Introduction). *Bunseki*, (1999) 28-35; *C.A.*, 130 (1999) 231588 - a review without refs.
- 3307 Yamasaki, H., Sakane, K. and Nakamura, K.: (Effect of operating conditions on measurement accuracy in size exclusion chromatography (SEC)). *Toso Kenkyu Hokoku*, 42 (1998) 81-89; *C.A.*, 130 (1999) 267939.
- 3308 Yang, J. and Chen, Y.-F.: A novel quality criteria for optimization of chromatographic multicomponent separations. *J. Chin. Chem. Soc. (Taipei)*, 46 (1999) 105-114; *C.A.*, 130 (1999) 287356.
- 3309 Yang, Y.J. and Lee, M.L.: Theoretical optimization of packed capillary column liquid chromatography using nonporous particles. *J. Microcolumn Sep.*, 11 (1999) 131-140; *C.A.*, 130 (1999) 214069.
- 3310 Yoshida, M. and Akane, A.: Subzero-temperature liquid-liquid extraction of benzodiazepines for high-performance liquid chromatography. *Anal. Chem.*, 71 (1999) 1928-1921.
- 3311 Zhao, J. and Carr, P.W.: An approach to the concept of resolution optimization through changes in the effective chromatographic selectivity. *Anal. Chem.*, 71 (1999) 2623-2632.
- 3312 Zissis, K.D., Dunkerley, S. and Breton, R.G.: Chemometric techniques for exploring complex chromatograms: applications of diode array detection high performance liquid chromatography, electrospray ionisation mass spectrometry to chlorophyll α allomers. *Analyst (Cambridge)*, 124 (1999) 971-979.

For additional information see *C.A.*:

130 (1999) 224743, 227632, 236490, 248874.

See also 3325, 3338, 3352, 3353, 3392, 3411, 3470, 3625, 4171, 4175, 4179.

2b. Thermodynamics and theoretical relationships

3313 Cavazzini, A., Remelli, M., Dondi, F. and Felinger, A.: Stochastic theory of multiple-site linear adsorption chromatography. *Anal. Chem.*, 71 (1999) 3453-3462.

3314 Farkas, T., Zhong, G. and Guiochon, G.: Validity of Darcy's law at low flow-rates in liquid chromatography. *J. Chromatogr. A*, 849 (1999) 35-43.

3315 Hage, D.S., Thomas, D.H., Chowdhuri, A.R. and Clarke, W.: Development of a theoretical model for chromatographic based competitive binding immunoassays with simultaneous injection of sample and label. *Anal. Chem.*, 71 (1999) 2965-2975.

3316 Kaliszán, R.: Chromatography and capillary electrophoresis in modelling the basic processes of drug action. *TrAC*, 18 (1999) 400-410.

3317 Kavanagh, P.E.: Optimising reversed phase separations with the aid of a spreadsheet. *Chromatographia*, 50 (1999) 65-69.

3318 Kempe, H., Axelsson, A., Nilsson, B. and Zacchi, G.: Simulation of chromatographic processes applied to separation of proteins. *J. Chromatogr. A*, 846 (1999) 1-12.

3319 Lee, C.S. and Cheong, W.J.: Thermodynamic properties for the solute transfer from the mobile to the stationary phase in reversed phase liquid chromatography obtained by squalane-impregnated C_{18} bonded phase. *J. Chromatogr. A*, 848 (1999) 9-20.

3320 Li, J. and Robison, T.: Application of linear solvation energy relationships to guide selection of polar modifiers in normal-phase liquid chromatographic separations. *Anal. Chim. Acta*, 395 (1999) 85-99.

3321 Marqués, I., Fonrodona, G., Buti, S. and Barbosa, J.: Solvent effects on mobile phases used in liquid chromatography: factor analysis applied to protonation equilibria and solvatochromic parameters. *TrAC*, 18 (1999) 472-479.

3322 Park, J.H., Ryu, Y.K., Lim, H.J., Lee, H.S., Park, J.K., Lee, Y.K., Jang, M.D., Suh, J.K. and Carr, P.W.: Effect of triethylamine in the mobile phase on the retention properties of conventional polymeric and horizontally polymerized octadecylsilica in HPLC. *Chromatographia*, 49 (1999) 635-642.

3323 Pisarev, O.A., Kruchina-Bogdanov, I.V., Glazova, N.V. and Bychenkova, O.V.: (Kinetic control over adsorption in liquid low-pressure chromatography). *Dokl. Akad. Nauk*, 362 (1998) 365-367; *C.A.*, 130 (1999) 206846.

3324 Prudkovskii, A.G. and Dolgonosov, A.M.: The theory of ion chromatography: a versatile approach for the description of peak parameters. *J. Anal. Chem.*, 54 (1999) 104-108; *C.A.*, 130 (1999) 272439.

- 3325 Wang, A., Tan, L.C. and Carr, P.W.: Global linear solvation energy relationships for retention prediction in reversed-phase liquid chromatography. *J. Chromatogr. A*, 848 (1999) 21-37.
- 3326 Yang, G., Zhang, H., Hu, Z. and Sun, H.: A theoretical approach to ion exchange displacement chromatography. *Polym. Adv. Technol.*, 10 (1999) 74-77; C.A., 130 (1999) 228262.
- 3327 Zhang, W., Xu, G., Li, R. and Zhang, Y.: (Basic model and its peculiarity of relaxation theory in chromatography). *Sepu*, 17 (1999) 1-4; C.A., 130 (1999) 242727.
- 3328 Zhang, X. and Zhu, H.: Application of the number-theoretic method to the study on chromatographic retention. *Chemom. Intell. Lab. Syst.*, 45 (1999) 241-247; C.A., 130 (1999) 231609.
- 3329 Zhao, R.H., Yue, B.F., Ni, J.Y., Zhou, H.F. and Zhang, Y.K.: Application of an artificial neural network in chromatography-retention behavior prediction and pattern recognition. *Chemom. Intell. Lab. Syst.*, 45 (1999) 163-170; C.A., 130 (1999) 231608.

See also 3289, 3293, 3308, 3309, 3330, 3379, 3392, 3411, 3458, 3464, 3619, 3681, 4049, 4171, 4381, 4442.

2c. Relationship between structure and chromatographic behaviour

- 3330 Al-Haj, M.A., Kaliszán, R. and Nasal, A.: Test analytes for studies of the molecular mechanism of chromatographic separations by quantitative structure-retention relationships. *Anal. Chem.*, 71 (1999) 2976-2985.
- 3331 Dross, K., Rekker, R.F., de Vries, G. and Mannhold, R.: The lipophilic behavior of organic compounds. Part 3. The search for interconnections between reversed-phase chromatographic data and log P_{oct} values. *Quant. Struct.-Act. Relat.*, 17 (1998) 549-557; C.A., 130 (1999) 201415.

See also 3284, 3291, 3322, 3325, 3451.

2d. Measurement of physico-chemical and related values

- 3332 Barbosa, J., Barrón, D. and Butí, S.: Chromatographic behaviour of ionizable compounds in liquid chromatography. Part 1. pH Scale, pK_a and pH₅ values for standard buffers in tetrahydrofuran-water. *Anal. Chim. Acta*, 389 (1999) 31-42.
- 3333 Barbosa, J., Bergés, R., Sanz-Nebot, V. and Toro, I.: Chromatographic behavior of ionizable compounds in liquid chromatography. Part 2. Standardization of potentiometric sensors and effect of pH and ionic strength on the retention of analytes using acetonitrile-water mobile phases. *Anal. Chim. Acta*, 389 (1999) 43-52.

See also 3578, 3592, 3834, 4187.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

- 3334 Guo, W.: (Study on resolving chromatographic overlapping peaks with artificial neural network). *Hangzhou Daxue Xuebao, Ziran Kexueban*, 25 (1998) 62-66; C.A., 130 (1999) 275978.

- 3335 Hawryl, M.A., Soczewinski, E. and Dzido, T.H.: Two-dimensional liquid chromatography in a coupled micro-HPLC-thin-layer chromatography apparatus. *Chem. Anal. (Warsaw)*, 44 (1999) 15-21; C.A., 130 (1999) 275968.
- 3336 Jensen, D.: (Application of eluent generators in the modern ion chromatography). *LaborPraxis*, 23 (1999) 56-62; C.A., 130 (1999) 305655 - a review with 10 refs.
- 3337 Kephart, T.S., Dasgupta, P.K. and Alexander, J.N., IV: An affordable high-performance pumping system for gradient capillary liquid chromatography. *J. Microcolumn Sep.*, 11 (1999) 299-304; C.A., 130 (1999) 275967.
- 3338 Liu, Y. and Jensen, D.: (Online production of high-purity acids and bases for the IC). *LaborPraxis*, 23 (1999) 60-67; C.A., 130 (1999) 275815.
- 3339 Uematsu, G.-i. and Satoh, T.: (Development of high temperature gel permeation chromatograph HLC-8121GPC/HT). *Toso Kenkyu Hokoku*, 42 (1998) 3-16; C.A., 130 (1999) 252880.
- 3340 Wu, L., Almirall, J.R. and Furton, K.G.: An improved interface for coupling solid-phase microextraction (SPME) to high performance liquid chromatography (HPLC) applied to the analysis of explosives. *J. High Resolut. Chromatogr.*, 22 (1999) 279-282.

For additional information see C.A.:

130 (1999) 179610, 204407, 211162, 217320, 224920, 231651.

See also 3343, 3380, 3418, 3420, 3432, 4132.

3b. Detectors and detection reagents

- 3341 Dong, Y.-S. and Cheng, Y.-Y.: (Studies on adaptive filtering of analytical instrument signal based on wavelet theory). *Gaodeng Xuexiao Huaxue Xuebao*, 20 (1999) 378-382; C.A., 130 (1999) 290674.
- 3342 Enami, T. and Nagae, N.: UV absorption detection with a packed flow cell in microcolumn liquid chromatography. *Am. Lab. (Shelton)*, 30 (1998) 29-32; C.A., 130 (1999) 217277.
- 3343 Gale, B.K., Caldwell, K.D. and Frazier, A.B.: Electrical conductivity particle detector for use in biological and chemical microanalysis systems. *Proc. SPIE-Int. Soc. Opt. Eng.*, 3515 (1998) 230-241; C.A., 130 (1999) 305659.
- 3344 Link, J.M. and Synovec, R.E.: Whole-column radioactivity detection: simultaneous separation and enhanced detectability. *Anal. Chem.*, 71 (1999) 2700-2707.
- 3345 Schindler, R. and Lendl, B.: FTIR spectroscopy as detection principle in aqueous flow analysis. *Anal. Commun.*, 36 (1999) 123-126; C.A., 130 (1999) 290671.
- 3346 Shao, X. and Cai, W.: Wavelet analysis in analytical chemistry. *Rev. Anal. Chem.*, 17 (1998) 235-285; C.A., 130 (1999) 245877 - a review with 55 refs.
- 3347 Shao, X., Cai, W. and Pan, Z.: Wavelet transform and its applications in high performance liquid chromatography (HPLC) analysis. *Chemom. Intell. Lab. Syst.*, 45 (1999) 249-256. C.A., 130 (1999) 217273.
- 3348 Staes, E., Vangeneugden, D., Nagels, L.J., Vanderzande, D. and Gelan, J.: Properties of a low band gap conducting polymer electrode used for amperometric detection in liquid chromatography. *Electroanalysis*, 11 (1999) 65-69; C.A., 130 (1999) 276002.

- 3349 Trones, R., Andersen, T. and Greibrokk, T.: Improved modification of a laser light-scattering detector for use in packed capillary high temperature liquid chromatography. *J. High Resolut. Chromatogr.*, 22 (1999) 283-286.
- 3350 Vander Heyden, Y., Jimidar, M., Hund, E., Niemeijer, N., Peeters, R., Smeyers-Verbeke, J., Massart, D.L. and Hoogmartens, J.: Determination of system suitability limits with a robustness test. *J. Chromatogr. A*, 845 (1999) 145-154.
- 3351 Vial, J. and Jardy, A.: Study of the linear range in HPLC analyses with UV detection: Methodology and experimental application to the influence of the analyte UV spectrum. *J. High Resolut. Chromatogr.*, 22 (1999) 217-221.
- 3352 Vladkyin, G.B. and Yashin, A.Ya.: Improvement of precision in ion chromatography with electrochemical detection. *J. Anal. Chem.*, 54 (1999) 210-213; *C.A.*, 130 (1999) 302171.
- 3353 Yamaguchi, M. and Nohta, H.: (Fundamental and application of liquid chromatography: detection method). *Bunseki*, No. 3 (1999) 204-212; *C.A.*, 130 (1999) 305780 - a review with 18 refs.
- 3354 Yu, H.: Study of conductivity detection equation for unsuppressed anion-exchange chromatography. *Chromatographia*, 50 (1999) 223-228.
- For additional information see *C.A.*:
130 (1999) 245860, 287478.
- See also 3277, 3459, 3491, 3607, 3627, 3645, 3647, 3660, 3682, 3683, 3687, 3691, 3696, 3701, 3713, 3725, 3756, 3786, 3799, 3801, 4027, 4052, 4070, 4076, 4078, 4127, 4139, 4159, 4167, 4293, 4355, 4410, 4423, 4437, 4444, 4445.
- 3c. *Sorbents and columns, packing procedures*
- 3355 Andersson, H.S., Karlsson, J.G., Piletsky, S.A., Koch-Schmidt, A.-C., Mosbach, K. and Nicholls, I.A.: Study of the nature of recognition in molecularly imprinted polymers. II. Influence of monomer-template ratio and sample load on retention and selectivity. *J. Chromatogr. A*, 848 (1999) 39-49.
- 3356 Antipenko, E.M. and Kuznetsov, P.V.: Affinity-type polymer adsorbents in the study of physiologically active substances. XII. Separation and analysis of phenolic compounds in *Rhodiola rosea* L. extracts on adsorbents with phenolic ligands. *Khim.-Farm. Zh.*, 32 (1998) 48-51; *C.A.*, 130 (1999) 287120.
- 3357 Araki, T., Kashiwamoto, Y., Tsunoi, S. and Tanaka, M.: Preparation and enantiomer separation behavior of selectively methylated γ -cyclodextrin-bonded stationary phases for high-performance liquid chromatography. *J. Chromatogr. A*, 845 (1999) 455-462.
- 3358 Armisén, P., Mateo, C., Cortés, E., Barredo, J.L., Salto, F., Diez, B., Rodés, L., García, J.L., Fernández-Lafuente, R. and Guisán, J.M.: Selective adsorption of poly-His tagged glutaryl acylase on tailor-made metal chelate supports. *J. Chromatogr. A*, 848 (1999) 61-70.
- 3359 Bolck, A., Smilde, A.K. and Bruins, Ch.H.P.: Monitoring aged reversed-phase high performance liquid chromatography columns. *Chemom. Intell. Lab. Syst.*, 46 (1999) 1-12; *C.A.*, 130 (1999) 231604.
- 3360 Bucheli, T.D., Müller, S.R., Reichmuth, P., Haderlein, S.B. and Schwarzenbach, R.P.: Spherical clay conglomerates: a novel stationary phase for solid-phase extraction and "reversed-phase" liquid chromatography. *Anal. Chem.*, 71 (1999) 2171-2178.
- 3361 Buszewski, B., Jezierska, M., Welniak, M. and Kaliszan, R.: Cholesteryl-silica stationary phase for liquid chromatography. Comparative study of retention behavior and selectivity. *J. Chromatogr. A*, 845 (1999) 433-445.
- 3362 Chubarova, E.V., Gazdina, N.V. and Domosevich, N.G.: (New method for chromatographic flow porosimetry as a proof of the real permeability of sorbent pores). *Dokl. Akad. Nauk*, 364 (1999) 350-352; *C.A.*, 130 (1999) 302173.
- 3363 Costa Melo, L.F. and Jardim, I.C.S.F.: Development of C_8 stationary phases immobilized by γ radiation on zirconized silica for high-performance liquid chromatographic applications. *J. Chromatogr. A*, 845 (1999) 423-431.
- 3364 Engelhardt, H. and Lobert, T.: Chromatographic determination of metallic impurities in reversed-phase HPLC columns. *Anal. Chem.*, 71 (1999) 1885-1892.
- 3365 Ensing, K. and de Boer, T.: Tailor-made materials for tailor-made applications: application of molecular imprints in chemical analysis. *TrAC*, 18 (1999) 138-145.
- 3366 Fujii, Y., Ishikawa, M. and Ito, M.: (Preparation of separation or reaction column for liquid chromatograph). *Jpn. Kokai Tokkyo Koho JP 11044681 A2* 16 Feb 1999 Heisei, 5 pp.; *C.A.*, 130 (1999) 191191.
- 3367 Ghannadi-Marageh, M., Husain, S.W., Khanchi, A.R. and Ahmady, S.J.: Separation of ions on columns of cerium(IV) silicate, a new ion exchanger. *Sep. Sci. Technol.*, 34 (1999) 219-229; *C.A.*, 130 (1999) 245761.
- 3368 Haginaka, J., Takehira, H., Hosoya, K. and Tanaka, N.: Uniform-sized molecularly imprinted polymer for (S)-naproxen selectively modified with hydrophilic external layer. *J. Chromatogr. A*, 849 (1999) 331-339.
- 3369 Hosoya, K., Iwakoshi, Y., Yoshizako, K., Kimata, K., Tanaka, N., Takehira, H. and Haginaka, J.: An unexpected molecular imprinting effect for a polyaromatic hydrocarbon, anthracene, using uniform size ethylene dimethacrylate particles. *J. High Resolut. Chromatogr.*, 22 (1999) 256-260.
- 3370 Hu, H., Yao, S. and Zhu, Z.: (Expanded bed adsorption chromatography and its application in bioseparation). *Huaxue Gongcheng*, 27 (1999) 37-41; *C.A.*, 130 (1999) 298487 - a review with 33 refs.
- 3371 Irvin, J.: (Enhanced service life of chromatography columns). *LaborPraxis*, 23 (1999) 56-57; *C.A.*, 130 (1999) 204438.
- 3372 Jardim, I.C.S.F., Collins, K.E. and Anazawa, T.A.: Radiation immobilization of poly(methyloctylsiloxane) on silica for use in HPLC: a uniform layer model. *J. Chromatogr. A*, 849 (1999) 299-307.
- 3373 Joshi, V.P., Kulkarni, M.G. and Mashelkar, R.A.: Molecularly imprinted adsorbents for positional isomer separation. *J. Chromatogr. A*, 849 (1999) 319-330.
- 3374 Kamiusuki, T., Monde, T., Yano, K., Yoko, T. and Konakahara, T.: Preparation of branched-polyfluoroalkylsilane-coated silica gel columns and their HPLC separation characteristics. *Chromatographia*, 49 (1999) 649-656.
- 3375 Kopylov, R.V., Nesterenko, P.N., Serdan, A.A. and Tyulenina, I.P.: (Synthesis and study of characteristics of new heterosurface sorbents). *Vestn. Mosk. Univ., Ser. 2: Khim.*, 39 (1998) 280-284; *C.A.*, 130 (1999) 206843.

- 3376 Ladaviere, C., Delair, T., Domard, A., Pichot, C. and Mandrand, B.: Covalent immobilization of biological molecules to maleic anhydride and methyl vinyl ether copolymers - a physico-chemical approach. *J. Appl. Polym. Sci.*, 71 (1999) 927-936; *C.A.*, 130 (1999) 206944.
- 3377 Lanza, F. and Sellergren, B.: Methods for synthesis and screening of large groups of molecularly imprinted polymers. *Anal. Chem.*, 71 (1999) 2092-2096.
- 3378 Lu, H. and Rutan, S.: Solvatochromic studies of solvation effects in reversed-phase liquid chromatography with addition of 1-propanol. *Anal. Chim. Acta*, 388 (1999) 345-352.
- 3379 Ma, M. and Cantwell, F.F.: Chain unfolding in an ODS-bonded phase caused by the sorbed tetra-*n*-butylammonium ion. *Anal. Chem.*, 71 (1999) 1879-1884.
- 3380 Majors, R.E.: New chromatography columns and accessories at the 1999 Pittsburgh conference, Part 1. *LC-GC Int.*, 12 (1999) 344-357.
- 3381 Mazza, C.B. and Cramer, S.M.: Evaluation of lot-to-lot consistency in ion exchange chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1733-1758.
- 3382 McCalley, D.V.: Comparison of the performance of conventional C₁₈ phases with others of alternative functionality for the analysis of basic compounds by reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 844 (1999) 23-38.
- 3383 Mifune, M., Onoda, M., Takatsuki, T., Kanai, T., Iwado, A., Motohashi, N., Haginaka, J. and Saito, Y.: Aminopropyl-silica gel modified with nickel(II)-phthalocyanine for separation of π -electron rich compounds by high performance liquid chromatography. *Chem. Pharm. Bull.*, 47 (1999) 346-350.
- 3384 Molander, P., Trones, R., Haugland, K. and Greibrokk, T.: Aspects and application of non-aqueous high temperature packed capillary liquid chromatography. *Analyst (Cambridge)*, 124 (1999) 1137-1141.
- 3385 Naikwadi, K.P. and Wadgaonkar, P.P.: Liquid-crystal stationary phases for chromatography. U.S. US 5900145 A 4 May 1999, 13 pp.; *C.A.*, 130 (1999) 298818.
- 3386 O'Gara, J.E., Walsh, D.P., Alden, B.A., Casellini, P. and Walter, T.H.: Systematic study of chromatographic behaviour vs. alkyl chain length for HPLC bonded phases containing an embedded carbamate group. *Anal. Chem.*, 71 (1999) 2992-2997.
- 3387 Ohmacht, R., Boros, B., Kiss, I. and Jelinek, L.: Quick and sensitive HPLC separations on non-porous reversed-phase packings. *Chromatographia*, 50 (1999) 75-81.
- 3388 Pandit, B. and Chudasama, U.: Synthesis and characterization of a new phase of titanium tungstate. *Indian J. Chem., Sect. A: Inorg., Bio-inorg., Phys., Rheor Anal. Chem.*, 37A (1998) 931-934; *C.A.*, 130 (1999) 204167.
- 3389 Pichon, V., Bouzige, M., Miege, C. and Hennion, M.-C.: Immunosorbents: natural molecular recognition materials for sample preparation of complex environmental matrices. *TrAC*, 18 (1999) 219-235.
- 3390 Podgornik, A., Barut, M., Jancar, J. and Strancar, A.: Isocratic separations on thin glycidyl methacrylate-ethylenedimethacrylate monoliths. *J. Chromatogr. A*, 848 (1999) 51-60.
- 3391 Poppe, H., Kraak, J.C. and Petersen, B.A.: Role of silica in highly efficient liquid chromatography. *GI Lab. J.*, 2 (1998) 261-263; *C.A.*, 130 (1999) 204452.
- 3392 Reta, M., Carr, P.W., Sadek, P.C. and Rutan, S.C.: Comparative study of hydrocarbon, fluorocarbon and aromatic bonded RP-HPLC stationary phases by linear solvation energy relationships. *Anal. Chem.*, 71 (1999) 3484-3496.
- 3393 Rozig, G.: A choice between pragmatism and progress in HPLC column technology. *LC-GC Int.*, 12 (1999) 404-405.
- 3394 Rüdell, U. and Meyerhoff, M.E.: Redox-modulated solute retention on iron-protoporphyrin-silica stationary phases. *Anal. Chim. Acta*, 392 (1999) 191-200.
- 3395 Saito, K., Iwata, K. and Suzuki, H.: (Development and application of new polymeric down sized column). *Chromatography*, 19 (1998) 352-353; *C.A.*, 130 (1999) 245888.
- 3396 Sardar, M. and Gupta, M.N.: Alginate beads as an affinity material for alpha amylases. *Bioseparation*, 7 (1998) 159-165; *C.A.*, 130 (1999) 293122.
- 3397 Silva, R.B. and Collins, C.H.: Chromatographic evaluation of radiation-immobilized poly(methyloctylsiloxane) on titanium-grafted silica. *J. Chromatogr. A*, 845 (1999) 417-422.
- 3398 Suzuki, T.M., Kanesato, M. and Yokoyama, T.: Chelating polymer resins as the selective stationary phase in the chromatographic separation of rare earth metal ions. *Recent Res. Dev. Pure Appl. Chem.*, 2 (1998) 101-111; *C.A.*, 130 (1999) 305627 - a review with 35 refs.
- 3399 Takeuchi, T. and Haginaka, J.: Separation and sensing based on molecular recognition using molecularly imprinted polymers. *J. Chromatogr. B*, 728 (1999) 1-20 - a review with 145 refs.
- 3400 Takeuchi, T., Safti, Miwa, T., Hashimoto, Y. and Moriyama, H.: Ion chromatography using anion-exchangers modified with dextran sulfate. *Chromatographia*, 50 (1999) 70-74.
- 3401 Xiao, X.-Z., Feng, Y.-Q., Da, S.-Z. and Zhang, Y.: Preparation and evaluation of *p*-tert-butyl-calix[4]arene-bonded silica stationary phases for high performance liquid chromatography. *Chromatographia*, 49 (1999) 643-648.
- For additional information see *C.A.*:
130 (1999) 198463, 198645, 204479, 217323, 224065, 236494, 254460, 268938, 269222, 283832.
- See also 3291, 3299, 3300, 3319, 3322, 3433, 3436, 3450, 3453, 3454, 3455, 3456, 3467, 3550, 3689, 3796, 3803, 4037, 4061, 4123, 4200, 4358, 4395, 4402, 4422, 4442, 4454.
- 3d. *Quantitative analysis*
- 3402 Magee, J.A. and Herd, A.C.: Internal standard calculations in chromatography. *J. Chem. Educ.*, 76 (1999) 252-253; *C.A.*, 130 (1999) 266939.
- See also 4175.
- 3e. *Preparative scale chromatography*
- 3403 Gu, T. and Zheng, Y.: A study of the scale-up of reversed-phase liquid chromatography. *Sep. Purif. Technol.*, 15 (1999) 41-58; *C.A.*, 130 (1999) 192009.
- 3404 Mazzotti, M. and Morbidelli, M.: Separation of fine chemicals by continuous SMB chromatography. In: Meunier, F. (Editor), *Fundam. Adsorpt., [Conf.]*, 6th, Elsevier, Paris, 1998, pp. 377-382; *C.A.*, 130 (1999) 301538 - a review with 47 refs.

3405 Nicoud, R.M.: Simulated Moving Bed (SMB): Some possible applications for biotechnology. In: Subramanian, G. (Editor), *Biosepr. Bioprocess.*, Vol. 1, Wiley-VCH Verlag, Weinheim, 1998, pp. 3-39; C.A., 130 (1999) 236487 - a review with 56 refs.

For additional information see C.A.:

130 (1999) 184352, 198433, 236486, 236491, 283694, 283836, 298502.

See also 3301, 3409, 3457, 3460, 3469, 3728, 3811, 3839, 3852, 3853, 3871.

3f. Programmed temperature, pressure, vapors, gradients

3406 Jandera, P.: Simultaneous optimisation of gradient time, gradient shape and initial composition of the mobile phase in the high-performance liquid chromatography of homologous and oligomeric series. *J. Chromatogr. A*, 845 (1999) 133-144.

3407 Pawlowski, T.M. and Poole, C.F.: Solvation characteristics of pressurized hot water and its use in chromatography. *Anal. Commun.*, 36 (1999) 71-75; C.A., 130 (1999) 275979.

See also 3296, 4165.

4. SPECIAL TECHNIQUES

4a. Automation

3408 Zweigenbaum, J., Heinig, K., Steinborner, S., Wachs, T. and Henion, J.: High-throughput bioanalytical LC/MS/MS determination of benzodiazepines in human urine: 1000 samples per 12 hours. *Anal. Chem.*, 71 (1999) 2294-2300.

See also 3410, 3662, 3695, 4274, 4458.

4b. Computerization and modelling

3409 Li, Z., Gu, Y. and Gu, T.: Mathematical modeling and scale-up of size-exclusion chromatography. *Biochem. Eng. J.*, 2 (1998) 145-155; C.A., 130 (1999) 234136.

3410 McDowall, R.D.: Chromatography data systems II. specifying, evaluating and selecting a system. *LC-GC Int.*, 12 (1999) 422-431.

3411 Shao, X., Yu, F., Kou, H., Cai, W. and Pan, Z.: A wavelet-based genetic algorithm for compression and de-noising of chromatograms. *Anal. Lett.*, 32 (1999) 1899-1915.

3412 Slusher, J.T. and Mountain, R.D.: A molecular dynamics study of a reversed-phase liquid chromatography model. *J. Phys. Chem. B*, 103 (1999) 1354-1362; C.A., 130 (1999) 228227.

For additional information see C.A.:

130 (1999) 249067.

See also 3287, 3291, 3298, 3301, 3302, 3313, 3315, 3317, 3318, 3625, 3670, 4171, 4179, 4197.

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

3413 Abian, J.: The coupling of gas and liquid chromatography with mass spectrometry. *J. Mass Spectrom.*, 34 (1999) 157-168; C.A., 130 (1999) 290808.

3414 Abian, J., Oosterkamp, A.J. and Gelpi, E.: Comparison of conventional, narrow-bore and capillary liquid chromatography/mass spectrometry for electrospray ionization mass spectrometry: practical considerations. *J. Mass Spectrom.*, 34 (1999) 244-254; C.A., 130 (1999) 305784 - a review with 86 refs.

3415 Bienvenu, Ph.G., Brochard, E.A. and Excoffier, E.A.: Determination of long-lived beta emitters in nuclear waste by inductively coupled plasma-mass spectrometry. *ASTM Spec. Tech. Publ.*, STP 1344 (1998) 51-63; C.A., 130 (1999) 290758.

3416 Bourne, S.: Enhancement of chromatographic detail using infrared spectra from chromatography/infrared spectrometer systems. *Vib. Spectrosc.*, 19 (1999) 47-52; C.A., 130 (1999) 305800.

3417 Bringmann, G., Messer, K., Wohlfarth, M., Kraus, J., Dumbuya, K. and Rückert, M.: HPLC-CD on-line coupling in combination with HPLC-NMR and HPLC-MS/MS for the determination of the full absolute stereostructure of new metabolites in plant extracts. *Anal. Chem.*, 71 (1999) 2678-2686.

3418 Cohen, S. and Murphy, B.J.: A capillary-scale liquid chromatography system that improves the practical sensitivity of HPLC-MS(MS) analysis. *Am. Lab. (Shelton)*, 31 (1999) 28-32; C.A., 130 (1999) 272085.

3419 Cohen, S. and Murphy, B.J.: A capillary-scale liquid chromatography system that improves the practical sensitivity of HPLC-MS(MS) analysis. *Int. Lab.*, 29, No. 3 (1999) 8-16.

3420 Games, D.E., Craze, A.S. and Hutton, K.A.: Development of CE-MS and capillary LC-MS interfaces for atmospheric pressure chemical ionization. *Adv. Mass Spectrom.*, 14 (1998) D012740/1-D012740/9; C.A., 130 (1999) 200998.

3421 Gfrörer, P., Schewitz, J., Pusecker, K. and Bayer, E.: On-line coupling of capillary separation techniques with ¹H NMR. *Anal. Chem.*, 71 (1999) 315A-321A - a review with 29 refs.

3422 Hirabayashi, Y., Hirabayashi, A., Yasuaki, T., Sakairi, M. and Koizumi, H.: Sonic spray ionization for liquid chromatography/mass spectrometry. *Adv. Mass Spectrom.*, 14 (1998) B081750/1-B081750/11; C.A., 130 (1999) 248859.

3423 Huber, C.G. and Premstaller, A.: Evaluation of volatile eluents and electrolytes for high-performance liquid chromatography-electrospray ionization mass spectrometry and capillary electrophoresis-electrospray ionization mass spectrometry of proteins. I. Liquid chromatography. *J. Chromatogr. A*, 849 (1999) 161-173.

3424 Hulthe, G., Petersson, M.A. and Fogelqvist, E.: Coupling of open tubular liquid chromatography to electrospray mass spectrometry with a nanospray interface. *Anal. Chem.*, 71 (1999) 2915-2921.

3425 Jemal, M. and Hawthorne, D.J.: Effect of high performance liquid chromatography mobile phase (methanol versus acetonitrile) on the positive and negative ion electrospray response of a compound that contains both an unsaturated lactone and a methyl sulfone group. *Rapid Commun. Mass Spectrom.*, 13 (1999) 61-66; C.A., 130 (1999) 231820.

- 3426 Komatsu, K. and Fukuhara, T.: (Progress and application of LC/NMR experiment). *Bunseki*, No. 3 (1999) 231-237; *C.A.*, 130 (1999) 278728 - a review with 59 refs.
- 3427 Lecchi, P. and Abramson, F.P.: Size exclusion chromatography - chemical reaction interface mass spectrometry: "A perfect match". *Anal. Chem.*, 71 (1999) 2951-2955.
- 3428 Lee, M.J., Monte, S., Sanderson, J. and Haskins, N.J.: A preliminary study using fast gradient liquid chromatography coupled to a quadrupole orthogonal time-of-flight mass spectrometer. *Rapid Commun. Mass Spectrom.*, 13 (1999) 216-221; *C.A.*, 130 (1999) 201014.
- 3429 Ludlow, M., Loudon, D., Taylor, A.H.S., Wright, B. and Wilson, I.D.: Size exclusion chromatography with UV detection coupled to online ¹H-NMR and online collection via a dedicated interface for subsequent off-line FT-IR. *Anal. Chem.*, 36 (1999) 85-87; *C.A.*, 130 (1999) 261223.
- 3430 Mistry, N., Roberts, A.D., Tranter, G.E., Francis, P., Barylski, I., Ismail, I.M., Nicholson, J.K. and Lindon, J.C.: Directly coupled chiral HPLC-NMR and HPLC-CD spectroscopy as complementary methods for structural and enantiomeric isomer identification: application to atracurium besylate. *Anal. Chem.*, 71 (1999) 2838-2843.
- 3431 Mottaleb, M.A.: Coupling of high-performance liquid chromatography to Fourier transform infrared spectrometry using a heated gas flow modified thermospray. *Anal. Sci.*, 15 (1999) 57-62; *C.A.*, 130 (1999) 249088.
- 3432 Nixdorf, A.: (Innovative interfaces for liquid chromatography/mass spectrometer coupling). *LaborPraxis*, 23 (1999) 16-18; *C.A.*, 130 (1999) 231597.
- 3433 Nyström, A., Strandberg, A., Aspegren, A., Behr, S. and Karlsson, A.: Use of immobilized amyloglucosidase as chiral selector in chromatography. Immobilization and performance in liquid chromatography. *Chromatographia*, 50 (1999) 209-214.
- 3434 Remelli, M., Bovi, C. and Pulidori, F.: Host-guest complexation in chiral chromatography: a study on the retention, selectivity and efficiency of a HPLC column containing a chiral crown ether. *Ann. Chim. (Rome)*, 89 (1999) 107-118; *C.A.*, 130 (1999) 245893.
- 3435 Shen, H., Manne, R., Xu, Q., Chen, D. and Liang, Y.: Local resolution of hyphenated chromatographic data. *Chemom. Intell. Lab. Syst.*, 45 (1999) 323-238; *C.A.*, 130 (1999) 191063.
- 3436 Strandberg, A., Nyström, A., Behr, S. and Karlsson, A.: Use of immobilized amyloglucosidase as chiral selector in chromatography. Control of enantioselective retention and resolution in liquid chromatography. *Chromatographia*, 50 (1999) 215-222.
- 3437 Tsalev, D.L.: Hyphenated vapor generation atomic absorption spectrometric techniques. *J. Anal. At. Spectrom.*, 14 (1999) 147-162; *C.A.*, 130 (1999) 191010 - a review with 256 refs.

For additional information see *C.A.*:

130 (1999) 217263, 264217, 275935, 275942, 290826, 293594, 305776.

See also 3280, 3290, 3304, 3357, 3395, 3408, 3444, 3452, 3473, 3474, 3485, 3486, 3487, 3494, 3500, 3506, 3512, 3514, 3518, 3521, 3526, 3528, 3533, 3567, 3590, 3601, 3604, 3612, 3615, 3630, 3632, 3635, 3636, 3637, 3643, 3650, 3657, 3673, 3678, 3680, 3702, 3706, 3712, 3726, 3735, 3738, 3739, 3745, 3760, 3762, 3766, 3770, 3772, 3783, 3792, 3802, 3823, 3863, 3882, 3888, 3895, 3901, 3986, 4044, 4051, 4053, 4065, 4066, 4069, 4088, 4101, 4106, 4115, 4124, 4129, 4131, 4134, 4135, 4143, 4149, 4165, 4172, 4176, 4177, 4178, 4190, 4222, 4225, 4228, 4232, 4247, 4252, 4254, 4256, 4264, 4274, 4278, 4279, 4280, 4288, 4289, 4290, 4295, 4296, 4297, 4300, 4301, 4303, 4308, 4309, 4311, 4332, 4335, 4339, 4348, 4351, 4354, 4356, 4357, 4367, 4383, 4388, 4393, 4398, 4399, 4402, 4407, 4418, 4420, 4425, 4432, 4433, 4441, 4451, 4459, 4460.

4d. Affinity chromatography (advances)

- 3438 Bayerl, T., Decher, G. and Braunschweig, T.: (Formation of reversibly imprinted lipid layer structures for affinity chromatography stationary phases by binding the template molecule above the phase transition temperature of the lipid layer and removing it after solidification). Ger. Offen. DE 19823432 A 1 11 Mar 1999, 14 pp.; *C.A.*, 130 (1999) 206977.
- 3439 Gan, H., Shang, Z. and Wang, J.: (Recent advances in affinity membrane chromatography). *Fenxi Huaxue*, 27 (1999) 111-116; *C.A.*, 130 (1999) 278714 - a review with 42 refs.
- 3440 Hage, D.S.: Affinity chromatography: a review of clinical applications. *Clin. Chem. (Washington)*, 45 (1999) 593-615 - a review with 243 refs.
- 3441 Muller, E. and Klein, E.: Membranes modified for biochromatography. In: Subramanian, G. (Editor), *Biosep. Bioprocess.*, Vol. 1, Wiley-VCH Verlag, Weinheim, 1998, pp. 305-326; *C.A.*, 130 (1999) 248825 - a review with 51 refs.
- 3442 Wheatley, J.B. and Schmidt, D.E., Jr.: Salt-induced immobilization of affinity ligands onto epoxide-activated supports. *J. Chromatogr. A*, 849 (1999) 1-12 - a review with 26 refs.
- 3443 Yu, Y., Bai, S., Sun, Y. and He, N.: (Membrane-based affinity chromatography). *Lizi Jiaohuan Yu Xifu*, 14 (1998) 466-473; *C.A.*, 130 (1999) 282910.

For additional information see *C.A.*:

130 (1999) 181459, 234098.

See also 3315, 3358, 3394, 3596, 3726, 3741, 3759, 3789, 3801, 3820, 3829, 3835, 3836, 3839, 3867, 3886, 3891, 3892, 3917, 3945, 3957, 3974, 3976, 3978, 3979, 4128, 4169, 4391.

4f. Trace analysis and pre-separation techniques

- 3444 Andersson, T., Hyötyläinen, T. and Riekkola, M.-L.: On-line coupled liquid chromatography - gas chromatography in the analysis of process samples. *J. High Resolut. Chromatogr.*, 22 (1999) 261-264.

- 3445 Boos, K.-S. and Grimm, C.-H.: High-performance liquid chromatography integrated solid-phase extraction in bioanalysis using restricted access precolumn packings. *TrAC*, 18 (1999) 175-180.
- 3446 Jönsson, J.A. and Mathiasson, L.: Liquid membrane extraction in analytical sample preparation. II. Applications. *TrAC*, 18 (1999) 325-334.
- 3447 Majors, R.E.: New chromatography columns and accessories at the 1999 Pittsburgh Conference, Part II. *LC-GC Int.*, 12 (1999) 411-420.
- 3448 Prosen, H. and Zupancic-Kralj, L.: Solid-phase microextraction. *TrAC*, 18 (1999) 272-282.
- 3449 Torto, N., Gorton, L., Laurell, T. and Marko-Varga, G.: Technical issues of *in vitro* microdialysis sampling in bioprocess monitoring. *TrAC*, 18 (1999) 252-260.
- See also 3476, 3499, 3630, 4173, 4351, 4405.
- 4g. *Enantiomers, separation*
- 3450 Allenmark, S.: A note concerning chromatography on mixed chiral stationary phases. *Enantiomer*, 4 (1999) 67-69; *C.A.*, 130 (1999) 290841.
- 3451 Ao, R.-Y. and Wang, H.-F.: (The quantitative structure-enantioselective retention relationships and the application in the chiral recognition mechanism in the chromatography). *Youji Huaxue*, 19 (1999) 135-140; *C.A.*, 130 (1999) 290809 - a review with 31 refs.
- 3452 Blanch, G.P., Ruiz del Castillo, M.L. and Herraiz, 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.
- 3453 Bonato, P.S., Lanchote, V.L., Bortocan, R., Jabor, V.A.P., Paias, F.O., Ricci-Junior, E. and Carvalho, R.: Chiral stationary phases based on cellulose and amylose tris-3,5-dimethylphenylcarbamate derivatives for the resolution of selected chiral drugs and metabolites. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1813-1827.
- 3454 Félix, G. and Descorps, V.: Stereochemical resolution of racemates, in HPLC, using a chiral stationary phase upon immobilized α -chymotrypsin. II. Enzyme chiral separations. *Chromatographia*, 49 (1999) 606-614.
- 3455 Félix, G. and Descorps, V.: Stereochemical resolution of racemates, in HPLC, using a chiral stationary phase upon immobilized α -chymotrypsin. I. Structural chiral separations. *Chromatographia*, 49 (1999) 595-605.
- 3456 Hou, J.G., Wang, Y.L., Li, C.X., Han, X.Q., Gao, J.Z. and Kang, J.W.: Reversed-phase separations on cellulose tris(3,5-dimethylphenyl-carbamate) chiral stationary phase. *Chromatographia*, 50 (1999) 89-95.
- 3457 Miller, L., Orihuela, C., Fronek, R., Honda, D. and Dapremont, O.: Chromatographic resolution of the enantiomers of a pharmaceutical intermediate from the milligram to the kilogram scale. *J. Chromatogr. A*, 849 (1999) 309-317.
- 3458 Miyabe, K. and Guiochon, G.: Kinetic study of the mass transfer of S-Tröger's base in the system cellulose triacetate and ethanol. *J. Chromatogr. A*, 849 (1999) 445-465.
- 3459 Nakazawa, H., Yamada, T., Watanabe, T., Yamamoto, A., Matsunaga, A. and Nishimura, M.: Measurement of enantiomeric purity by ratio chromatograms with a photometric detector using quartz plates as a multiple retarder. *Anal. Chim. Acta*, 396 (1999) 125-130.
- 3460 Nicoud, R.-M.: The separation of optical isomers by simulated moving bed chromatography (Part I.) *Pharm. Technol. Eur.*, 11 (1999) 36-44; *C.A.*, 130 (1999) 227808 - a review with refs.
- 3461 Sun, Q. and Olesik, S.V.: Chiral separations performed by enhanced-fluidity liquid chromatography on a macrocyclic antibiotic chiral stationary phase. *Anal. Chem.*, 71 (1999) 2139-2145.
- 3462 Wu, Y., Wang, Y., Yang, A. and Li, T.: Screening of mixture combinatorial libraries for chiral selectors: a reciprocal chromatographic approach using enantiomeric libraries. *Anal. Chem.*, 71 (1999) 1688-1691.
- For additional information see *C.A.*:
130 (1999) 283833, 286941.
- See also 3278, 3430, 3483, 3623, 3626, 3672, 3689, 3708, 3718, 3733, 3734, 4054, 4061, 4063, 4073, 4121, 4126, 4174, 4195, 4197, 4200, 4211, 4212, 4215, 4216, 4223, 4231, 4243, 4269, 4284, 4289.
- 4h. *Other special techniques*
- 3463 Athanasopoulou, A., Gavril, D., Koliadima, A. and Karaiskakis, G.: Study of hydroxyapatite aggregation in the presence of potassium phosphate by centrifugal sedimentation field-flow fractionation. *J. Chromatogr. A*, 845 (1999) 293-302.
- 3464 Chmelik, J.: Different elution modes and field programming in gravitational field-flow fractionation. I. A theoretical approach. *J. Chromatogr. A*, 845 (1999) 285-291.
- 3465 Contado, C., Riello, F., Blo, G. and Dondi, F.: Continuous split flow-thin cell fractionation of starch particles. *J. Chromatogr. A*, 845 (1999) 303-316.
- 3466 Ito, Y. and Oka, H.: (Countercurrent chromatography. Principle and application for food analysis). *Shokuhin Eiseigaku Zasshi*, 40 (1999) J15-J27; *C.A.*, 130 (1999) 222273 - a review with 29 refs.
- 3467 Kohne, A.P. and Welsch, T.: Coupling of a microbore column with a column packed with non-porous particles for fast comprehensive two-dimensional high-performance liquid chromatography. *J. Chromatogr. A*, 845 (1999) 463-469.
- 3468 Krause, E., Dathe, M., Wieprecht, T. and Bienert, M.: Noncovalent immobilized artificial membrane chromatography, an improved method for describing peptide-lipid bilayer interactions. *J. Chromatogr. A*, 849 (1999) 125-133.
- 3469 Nishizawa, H., Tahara, K., Miyamori, S., Motegi, Y., Shoji, T. and Abe, Y.: True moving bed chromatography: solid-liquid multi-stage countercurrent extraction. *J. Chromatogr. A*, 849 (1999) 61-69.
- 3470 Podgornik, A., Barut, M., Jancar, J., Strancar, A. and Tennikova, T.: High-performance membrane chromatography of small molecules. *Anal. Chem.*, 71 (1999) 2986-2991.
- 3471 Vissers, J.P.C., van Soest, R.E.J., Chervet, J.-P. and Cramers, C.A.: Two-dimensional capillary liquid chromatography based on microfractionation. *J. Microcolumn Sep.*, 11 (1999) 277-286; *C.A.*, 130 (1999) 275991.

For additional information see C.A.:

130 (1999) 236488, 236492, 236493, 283834.

See also 3274, 3304, 3337, 3439, 3461, 3472, 3508, 3623, 3798, 3827, 3970, 4034, 4036, 4160, 4169, 4361, 4375, 4394, 4412, 4445, 4457.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

See 3628.

5a. Aliphatic hydrocarbons

3472 Carbognani, L. and Orea, M.: Studies on large crude oil alkanes. I. High temperature liquid chromatography. *Pet. Sci. Technol.*, 17 (1999) 165-187; C.A., 130 (1999) 239664.

See also 4344, 4372.

5b. Cyclic hydrocarbons, fullerenes

3473 Andreoli, R., Manini, P., Bergamaschi, E., Mutti, A., Franchini, I. and Niessen, W.M.A.: Determination of naphthalene metabolites in human urine by liquid chromatography-mass spectrometry with electrospray ionization. *J. Chromatogr. A*, 847 (1999) 9-17.

3474 Blomberg, J., de Groot, P.C., Brandt, H.C.A., van der Does, J.J.B. and Schoenmakers, P.J.: Development of an on-line coupling of liquid-liquid extraction, normal-phase liquid chromatography and high-resolution gas chromatography producing an analytical marker for the prediction of mutagenicity and carcinogenicity of bitumen and bitumen fumes. *J. Chromatogr. A*, 849 (1999) 483-494.

3475 Boger, D.L., Goldberg, J. and Andersson, C.-M.: Solution phase combinatorial synthesis of biaryl libraries employing heterogeneous conditions for catalysis and isolation with size exclusion chromatography for purification. *J. Org. Chem.*, 64 (1999) 2422-2427; C.A., 130 (1999) 296483.

3476 Bouzige, M., Legeay, P., Pichon, V. and Hennion, M.-C.: Selective on-line immunoextraction coupled to liquid chromatography for the trace determination of benzidine, congeners and related azo dyes in surface water and industrial effluents. *J. Chromatogr. A*, 846 (1999) 317-329.

3477 Johnson, C. and Greenberg, A.: Extraction and high-performance liquid chromatographic separation of selected pyrene and benzo[a]pyrene sulfates and glucuronides: preliminary application to the analysis of smokers' urine. *J. Chromatogr. B*, 728 (1999) 209-216.

3478 Natalini, B., Capodiferro, V., Mattoli, L., Marinozzi, M., Costantino, G. and Pellicciari, R.: Chromatographic separation and evaluation of the lipophilicity by reversed-phase high-performance liquid chromatography of fullerene-C₆₀ derivatives. *J. Chromatogr. A*, 847 (1999) 339-343.

3479 Ohta, H., Saito, Y. and Jinno, K.: Separation of fullerenes with monomeric C-30 stationary phase by high performance liquid chromatography. *Chromatography*, 19 (1998) 304-305; C.A., 130 (1999) 245760.

3480 Rodríguez Delgado, M.A., Corbella Tena, R. and García Montelongo, F.J.: Determination of polycyclic hydrocarbons in limpet samples. *Chromatographia*, 50 (1999) 235-238.

3481 Sebor, G., Blazek, J. and Nemer, M.F.: Optimization of the preparative separation of petroleum maltenes by liquid adsorption chromatography. *J. Chromatogr. A*, 847 (1999) 323-330.

3482 Uvarova, M.I., Brykina, G.D. and Shpigun, O.A.: Phthalocyanine derivatives as mobile-phase modifiers for the indirect detection of fullerenes in high-performance liquid chromatography. *J. Anal. Chem.*, 54 (1999) 224-226; C.A., 130 (1999) 275857.

3483 Xia, L., Zhou, S., Tang, M., Lin, L. and Deng, M.: (Enantiomeric resolution of *trans*-1,2-disubstituted cyclopropane by high performance liquid chromatography). *Sepu*, 17 (1999) 43-45; C.A., 130 (1999) 245900.

See also 3369, 3374, 3383, 3401, 3517, 4338, 4344, 4411.

5c. Halogen derivatives

3484 Collins, C.H. and Morgano, M.A.: Quantitative determination of several simple perhalogenated compounds by high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 395-399.

See also 3374, 3476, 4126.

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

See 3481, 4411.

6. ALCOHOLS

3485 Debrauwer, L., Alary, J., Fernandez, Y. and Bories, G.: Detection of a mercapturic acid conjugate at physiological levels in urine by LC-ESI-MS/MS/MS. *Adv. Mass Spectrom.*, 14 (1998) C044010/1-C044010/14; C.A., 130 (1999) 249054.

3486 Dobson, G., Itabashi, Y., Christie, W.W. and Robertson, G.W.: Liquid chromatography with particle-beam electron-impact mass spectrometry of diacylglycerol nicotines. *Chem. Phys. Lipids*, 97 (1998) 27-39; C.A., 130 (1999) 264348.

3487 Holcapek, M., Virelizier, H., Chamot-Rooke, J., Jandera, P. and Moulin, C.: Trace determination of glycols by HPLC with UV and electrospray ionization mass spectrometric detections. *Anal. Chem.*, 71 (1999) 2288-2293.

3488 Pellegrino, S., Bruno, F.S. and Petrarulo, M.: Liquid chromatographic determination of ethyl alcohol in body fluids. *J. Chromatogr. B*, 729 (1999) 103-110.

3489 You, J., Sun, X., Lao, W., Ou, Q. and Jiang, D.: Derivatization of alcohols using acridone-9-N-acetyl-benzene-disulfonate as a condensation agent and its application for the determination of volatile alcohols in human plasma by liquid chromatography with fluorescence detection. *Anal. Chim. Acta*, 391 (1999) 43-55.

3490 You, J.M., Sun, X.J., Cao, W.J. and Ou, Q.Y.: Determination of alcohols using condensation agent carboxyle-9-acetyl-benzene-disulfonate by high performance liquid chromatography with pre-column fluorescence derivatization. *Chromatographia*, 49 (1999) 657-665.

See also 3320, 3555, 4123, 4355.

7. PHENOLS

- 3491 Carando, S., Teissedre, P.L., Waffo-Tégou, P., Cabanis, J.C., Defieux, G. and Mérillon, J.M.: High-performance liquid chromatography coupled with fluorescence detection for the determination of *trans*-astringin in wine. *J. Chromatogr. A*, 849 (1999) 617-620.
- 3492 Ding, M., Yang, H. and Xiao, S.: Rapid, direct determination of polyphenols in tea by reversed-phase column liquid chromatography. *J. Chromatogr. A*, 849 (1999) 637-640.
- 3493 Goldberg, D.M., Tsang, E., Levesque, M. and Soleas, G.J.: Method-dependent bias in the quantitation of *cis*- and *trans*-resveratrol glucosides by high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1843-1855.
- 3494 Horie, M., Yoshida, T., Ishii, R., Kobayashi, S. and Nakazawa, H.: (Determination of bisphenol A migrating from polycarbonate container by liquid chromatography-mass spectrometry). *Chromatography*, 19 (1998) 350-351; *C.A.*, 130 (1999) 268168.
- 3495 Lobbes, J.M., Fitznar, H.P. and Kattner, G.: High-performance liquid chromatography of lignin-derived phenols in environmental samples with diode-array detection. *Anal. Chem.*, 71 (1999) 3008-3012.
- 3496 Luan, L. and Zen, S.: (Identification of corrected retention indexes of ten phenols in reversed-phase high performance liquid chromatography). *Sepu*, 17 (1999) 213-214; *C.A.*, 130 (1999) 305808.
- 3497 Murakami, K., Kakemoto, M., Arakawa, Sh. and Maruta, E.: (Determination of phenols in river water by high performance liquid chromatography). *Kenkyu Kiyo - Tokyo Kasei Daigaku*, 2: *Shizen Kagaku*, 39 (1999) 127-131; *C.A.*, 130 (1999) 286625.
- 3498 Palma, M. and Taylor, L.T.: Extraction of polyphenolic compounds from grape seeds with near critical carbon dioxide. *J. Chromatogr. A*, 849 (1999) 117-124.
- 3499 Palma, M. and Taylor, L.T.: Statistical design for optimization of extraction of polyphenols from an inert matrix using carbon dioxide-based fluids. *Anal. Chim. Acta*, 391 (1999) 321-329.
- 3500 Pérez-Magariño, S., Revilla, I., González-SanJosé, M.L. and Beltrán, S.: Various applications of liquid chromatography-mass spectrometry to the analysis of phenolic compounds. *J. Chromatogr. A*, 847 (1999) 75-81.
- 3501 Sheu, S.-J. and Tan, Y.-W.: Determination of phenolic compounds in *Artemisia capillaris*. *J. High Resolut. Chromatogr.*, 22 (1999) 222-224.
- 3502 Sjöholm, E., Gustafsson, K. and Colmsjö, A.: Size exclusion chromatography of lignins using lithium chloride/N,N-dimethylacetamide as mobile phase. I. Dissolved and residual birch kraft lignins. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1663-1658.
- 3503 Tabira, Y., Nakai, M., Asai, D., Yakabe, Y., Tahara, Y., Shenyozu, T., Noguchi, M., Takatsuki, M. and Shimohigashi, Y.: Structural requirements of *para*-alkylphenols to bind to estrogen receptor. *Eur. J. Biochem.*, 262 (1999) 240-245.

- 3504 Waterhouse, A.L., Price, S.F. and McCord, J.D.: Reversed-phase high-performance liquid chromatography methods for analysis of wine polyphenols. *Methods Enzymol.*, 299 (1999) 113-121; *C.A.*, 130 (1999) 195886.

For additional information see *C.A.*:

130 (1999) 191201, 213135, 231660.

- See also 3279, 3293, 3320, 3356, 3467, 3516, 3519, 4123, 4335, 4343, 4360, 4369.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 3505 Carando, S., Teissedre, P.L. and Cabanis, J.C.: HPLC coupled with fluorescence detection for the determination of procyanidins in white wines. *Chromatographia*, 50 (1999) 253-254.
- 3506 Chen, Ch.-W., Chang, Y.-W. and Hwang, L.S.: Rapid analysis of the aflavins by high performance liquid chromatography/atmospheric pressure chemical ionization-mass spectrometry. *Yaowu Shipin Fenxi*, 6 (1998) 713-718; *C.A.*, 130 (1999) 287121.
- 3507 Liu, Z., Zhao, S., Wang, R. and Yang, G.: (Determination of the flavonoids from *Ginkgo biloba* L. extract by supercritical fluid chromatography). *Fenxi Huaxue*, 27 (1999) 214-216; *C.A.*, 130 (1999) 293438.
- 3508 Pei, Y.-H., Li, X. and Lee, D.: Separation of three major isoflavonoids from the root of *Pueraria lobata* by high speed centrifugal partition chromatography. *Stud. Plant Sci.*, 6 (1999) 311-313; *C.A.*, 130 (1999) 200986.
- 3509 Steele, C.L., Jijzen, M., Qutob, D. and Dixon, R.A.: Molecular characterization of the enzyme catalyzing the aryl migration reaction of isoflavonoid biosynthesis in soybean. *Arch. Biochem. Biophys.*, 367 (1999) 146-150.

8b. Aflatoxins and other mycotoxins

- 3510 De Oliveira Santos Cazenave, S. and Midio, A. Flavio: A simplified method for the determination of zearalenone in corn-flour. *Alimentaria*, 298 (1998) 27-29; *C.A.*, 130 (1999) 222283.
- 3511 Degelmann, P., Becker, M., Derderich, M. and Humpf, H.-U.: Determination of ochratoxin A in beer by high performance liquid chromatography. *Chromatographia*, 49 (1999) 543-546.
- 3512 Durix, A., Jaussaud, P., Garcia, P., Bonnaire, Y. and Bony, S.: Analysis of ergovaline in milk using high-performance liquid chromatography with fluorimetric detection. *J. Chromatogr. B*, 729 (1999) 255-263.
- 3513 Groves, F.D., Zhang, L., Chang, Y.-S., Ross, P.F., Casper, H., Norred, W.P., You, W.-C. and Fraumeni, J.F., Jr.: Fusarium mycotoxins in corn and corn products in a high-risk area for gastric cancer in Shandong province, China. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 657-662.
- 3514 Sewram, V., Nieuwoudt, T.W., Marasas, W.F.O., Shephard, G.S. and Riteni, A.: Determination of the mycotoxin moniliformin in cultures of *Fusarium subglutinans* and in naturally contaminated maize by high-performance liquid chromatography-atmospheric pressure chemical ionization mass spectrometry. *J. Chromatogr. A*, 848 (1999) 185-191.

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

- 3515 Cao, G. and Prior, R.L.: Anthocyanins are detected in human plasma after oral administration of an elderberry extract. *Clin. Chem. (Washington)*, 45 (1999) 574-576.
- 3516 Cheyner, V., Souquet, J.-M., le Roux, E., Guyot, S. and Rigaud, J.: Size separation of condensed tannins by normal-phase high-performance liquid chromatography. *Methods Enzymol.*, 299 (1999) 178-184; C.A., 130 (1999) 236597.
- 3517 Cortez, D.A.G., Marston, A. and Hostettmann, K.: Separation of xanthenes and a biphenyl from *Kielmeyera coriacea* by centrifugal partition chromatography. *Chromatographia*, 50 (1999) 7-10.
- 3518 Hammerstone, J.F., Lazarus, Sh.A., Mitchell, A.E., Rucker, R. and Schmitz, H.H.: Identification of procyanidins in cocoa (*Theobroma cacao*) and chocolate using high-performance liquid chromatography/mass spectrometry. *J. Agric. Food Chem.*, 47 (1999) 490-496.
- 3519 Hollman, P.C.H., Venema, D.P., Khokhar, S. and Arts, I.C.W.: Determination of tea catechins by reversed-phase high performance liquid chromatography. *Methods Enzymol.*, 299 (1999) 202-206; C.A., 130 (1999) 208927.
- 3520 Ishii, R., Saito, K., Horie, M., Shibano, T., Kitanaka, S. and Amano, F.: Inhibitory effects of hydrolyzable tannins from *Melastoma dodecanedrum* Lour. on nitric acid production by a murine macrophage-like cell line, RAW264.7, activated by lipopolysaccharide and interferon- γ . *Biol. Pharm. Bull.*, 22 (1999) 647-653.
- 3521 Revilla, I., Pérez-Magariño, S., González-SanJosé, M.L. and Beltrán, S.: Identification of anthocyanin derivatives in grape skin extracts and red wines by liquid chromatography with diode array and mass spectrometric detection. *J. Chromatogr. A*, 847 (1999) 83-90.

See also 3320, 3525, 4335.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 3522 Adrian-Romero, M., Blunden, G., Carpenter, B.G. and Tyihak, J.: HPLC quantification of formaldehyde, as formaldehydethone, in plants and plant-like organisms. *Chromatographia*, 50 (1999) 173-180.
- 3523 Chang, Z., Shen, X., Guo, D., Lu, K., Wang, S. and Zheng, J.: (Anthraquinone production in hairy root cultures of *Rhizoma wittrochii* Lundstr.) *Beijing Yike Daxue Xuebao*, 30 (1998) 413-415; C.A., 130 (1999) 195798.
- 3524 Deisinger, P.J. and English, J.C.: Bioavailability and metabolism of hydroquinone after intratracheal instillation in male rats. *Drug Metab. Disp.*, 27 (1999) 442-448.
- 3525 Gökmen, V. and Acar, J.: Simultaneous determination of 5-hydroxymethylfurfural and patulin in apple juice by reversed-phase liquid chromatography. *J. Chromatogr. A*, 847 (1999) 69-74.
- 3526 Grosjean, E., Green, P.G. and Grosjean, D.: Liquid chromatography analysis of carbonyl (2,4-dinitrophenyl)hydrazones with detection by diode array ultraviolet spectroscopy and by atmospheric pressure negative chemical ionization mass spectrometry. *Anal. Chem.*, 71 (1999) 1851-1861.

- 3527 Iwamoto, A., Sasaki, S. and Akiyama, K.-i.: (Analytical method of automotive exhaust carbonyls by high performance liquid chromatography). *Kankyo Kagaku*, 8 (1998) 847-855; C.A., 130 (1999) 186249.
- 3528 Koeber, R., Bayona, J.M. and Niessner, R.: Determination of benzo[a]pyrene diones in air particulate matter with liquid chromatography mass spectrometry. *Environ. Sci. Technol.*, 33 (1999) 1552-1558; C.A., 130 (1999) 300718.
- 3529 Kruk, J. and Strzalka, K.: Identification of plastoquinone-C in spinach and maple leaves by reverse-phase high-performance liquid chromatography. *Phytochemistry*, 49 (1998) 2267-2271; C.A., 130 (1999) 194338.
- 3530 Liu, Y.-M., Jinno, H., Kurihara, M., Miyata, N. and Toyooka, T.: Determination of 4-hydroxy-2-nonenal in primary rat hepatocyte cultures by liquid chromatography with laser induced fluorescence detection. *Biomed. Chromatogr.*, 13 (1999) 75-80; C.A., 130 (1999) 263238.
- 3531 Nascimento, R.F., Cerroni, J.L., Cardoso, D.R., Lima Neto, B.S. and Franco, D.W.: (Comparison of official and chromatographic analysis methods for the determination of aldehydes and carboxylic acids in alcoholic beverages). *Cienc. Tecnol. Aliment.*, 18 (1998) 350-355; C.A., 130 (1999) 251387.
- 3532 Pelet, S., Yoo, J.W. and Mouloungui, Z.: Analysis of cyclic organic carbonates with chromatographic techniques 1. Ethylene carbonate and glycerol carbonate. *J. High Resolut. Chromatogr.*, 22 (1999) 276-278.
- 3533 Sakuragawa, A., Yoneno, T., Inoue, K. and Okutani, T.: Trace analysis of carbonyl compounds by liquid chromatography-mass spectrometry after collection as 2,4-dinitrophenylhydrazine derivatives. *J. Chromatogr. A*, 844 (1999) 403-408.
- 3534 Tranfo, G., Plebani, C., Salerno, A., Panebianco, A.S. and Marcelloni, A.M.: High-performance liquid chromatographic determination of *n*-methylformamide, a biological index for occupational exposure to dimethylformamide. *J. Chromatogr. A*, 847 (1999) 19-24.
- 3535 Tsaknis, J., Lalas, S. and Evmorfopoulos, E.: Determination of malondialdehyde in traditional fish products by HPLC. *Analyst (Cambridge)*, 124 (1999) 843-845.

See also 3373, 3628, 3629, 3634.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 3536 Baccard, N., Hoizey, G., Frances, C., Lamiable, D., Trenque, T. and Millart, H.: Simultaneous determination of inulin *p*-aminohippuric acid (PAH) in human plasma and urine by high performance liquid chromatography. *Analyst (Cambridge)*, 124 (1999) 833-836.
- 3537 Biller, M., Bolmstedt, A., Hemming, A. and Olofsson, S.: Simplified procedure for fractionation and structural characterization of complex mixtures of N-linked glycans, released from HIV-1 gp120 and other highly glycosylated viral proteins. *J. Virol. Methods*, 76 (1998) 87-100; C.A., 130 (1999) 278892.

- 3538 Casterline, J.L., Jr., Oles, C.J. and Ku, Y.: Measurement of sugars and starches in foods by a modification of the AOAC total dietary fiber method. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 759-765.
- 3539 Cataldi, T.R.I., Campa, C. and Casella, I.G.: Study of sugar acids separation by high-performance anion-exchange chromatography-pulsed amperometric detection using alkaline eluents spiked with Ba²⁺, Sr²⁺, or Ca²⁺ as acetate or nitrate salts. *J. Chromatogr. A*, 848 (1999) 71-81.
- 3540 Corradini, C., Cavazza, A., Canali, G. and Nicoletti, I.: Improved method for the analysis of alditols in confectionery products by capillary zone electrophoresis (CZE) comparison with high-performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD). *Ital. J. Food Sci.*, 10 (1998) 195-206; *C.A.*, 130 (1999) 195883.
- 3541 Dittmer, F. and von Figura, K.: Phosphorylation of arylsulphatase A occurs through multiple interactions with UDP-N-acetylglucosamine-1-phosphotransferase proximal and distal to its retrieval site by the KDEL receptor. *Biochem. J.*, 340 (1999) 729-736.
- 3542 Elvebak, L.E., II, McNally, P. and Gray, G.R.: Authentic standards for the reductive-cleavage method: the positional isomers of partially methylated and acetylated or benzoylated 1,5-anhydro-L-arabinitol. *Carbohydr. Res.*, 313 (1998) 181-187; *C.A.*, 130 (1999) 282266.
- 3543 Fujiwara, T., Sakakura, H., Ito, H. and Honjo, T.: (Studies on analysis of sugars in fruits. II. Simplified sample preparation for analysis of sugar concentration in squeezed fruit juice by high performance liquid chromatography). *Nippon Shokuhin Kagaku Kogaku Kaishi*, 46 (1999) 81-88; *C.A.*, 130 (1999) 195910.
- 3544 Gan, B.: (Analysis of the composition in fructooligosaccharide by high performance liquid chromatography). *Sepu*, 17 (1999) 87-89; *C.A.*, 130 (1999) 295689.
- 3545 Jolly, L., Ferrari, P., Blanot, D., van Heijenoort, J., Fassy, F. and Mengin-Lecreux, D.: Reaction mechanism of phosphoglucosamine mutase from *Escherichia coli*. *Eur. J. Biochem.*, 262 (1999) 202-210.
- 3546 Kageyama, N., Natsuka, S. and Hase, S.: Molecular cloning and characterization of two zebrafish $\alpha(1,3)$ fucosyltransferase genes developmentally regulated in embryogenesis. *J. Biochem. (Tokyo)*, 125 (1999) 838-845.
- 3547 Kanazawa, K., Ashida, K., Itoh, M., Nagai, H., Sasaki, H. and Fukuda, M.: Establishment of a method for mapping of N-linked oligosaccharides and its use to analyze industrially produced recombinant erythropoietin. *Biol. Pharm. Bull.*, 22 (1999) 339-346.
- 3548 Koshiishi, I., Horikoshi, E., Mitani, H. and Imanari, T.: Quantitative alterations of hyaluronan and dermatan sulfate in the hairless mouse dorsal skin exposed to chronic UV irradiation. *Biochim. Biophys. Acta*, 1428 (1999) 327-333.
- 3549 Makatsori, E., Aletras, A., Karamanos, N.K. and Tsegmidis, T.: Analysis of N-acetyl and N-glycolylneuraminic acid in rat serum and tissues with Walker 256 carcinoma by high-performance liquid chromatography. *Biomed. Chromatogr.*, 13 (1999) 57-60; *C.A.*, 130 (1999) 293436.
- 3550 Masuda, T., Nishimura, Y., Tonegawa, M., Kitahara, K., Arai, S., Yamashita, J. and Takai, N.: High-performance liquid chromatographic separation of carbohydrates on stationary phases prepared from polystyrene-based resin and tertiary amines. Effect of chemical structure of anion-exchange sorbents. *J. Chromatogr. A*, 845 (1999) 401-408.
- 3551 McGuire, J.M., Stewart, Y.M. and Smith, K.D.: The effect of pH on the high pH anion-exchange chromatography elution of monosaccharides. *Chromatographia*, 49 (1999) 699-702.
- 3552 Merry, C.L.R., Lyon, M., Deakin, J.A., Hopwood, J.J. and Gallagher, J.T.: Highly sensitive sequencing of the sulfated domains of heparan sulfate. *J. Biol. Chem.*, 274 (1999) 18455-18462.
- 3553 Molnár-Perl, I.: Simultaneous quantitation of acids and sugars by chromatography: gas or high-performance liquid chromatography? *J. Chromatogr. A*, 845 (1999) 181-195 - a review with 44 refs.
- 3554 Nadanaka, S., Kitagawa, H., Goto, F., Tamura, J.-i., Neumann, K.W., Ogata, T. and Sugahara, K.: Involvement of the core protein in the first β -N-acetylgalactosamine transfer to the glycosaminoglycan-protein linkage-region tetrasaccharide and in the subsequent polymerization: the critical determining step for chondroitin sulphate biosynthesis. *Biochem. J.*, 340 (1999) 385-391.
- 3555 Naidu, B.P.: Separation of sugars, polyols, proline analogs, and betaines in stressed plant extracts by high performance liquid chromatography and quantification by ultra violet detection. *Aust. J. Plant Physiol.*, 25 (1998) 793-800; *C.A.*, 130 (1999) 264203.
- 3556 Olczak, M. and Olczak, T.: Oligosaccharides released by hydrazinolysis from Tamm-Horsfall protein of various human donors contain similar high-mannose glycans. *Clin. Chim. Acta*, 282 (1999) 35-44.
- 3557 Pauly, M. and York, W.S.: Isolation of complex carbohydrates by reversed-phase chromatography with evaporative light scattering detection. *Am. Biotechnol. Lab.*, 16 (1998) 14-17; *C.A.*, 130 (1999) 193772.
- 3558 Rahman, M.A., Mian, A.J., Nahar, N. and Mosihuzzaman, M.: Analysis of water-soluble polysaccharides of different parts of ripe jack-fruit (*Artocarpus heterophyllus*). *Dhaka Univ. J. Sci.*, 46 (1998) 247-252; *C.A.*, 130 (1999) 181632.
- 3559 Saksena, R., Deepak, D., Khare, A., Sahai, R., Tripathi, L.M. and Srivastava, V.M.L.: A novel pentasaccharide from immunostimulant oligosaccharide fraction of buffalo milk. *Biochim. Biophys. Acta*, 1428 (1999) 433-445.
- 3560 Ujita, M., McAuliffe, J., Hindsgaul, O., Sasaki, K., Fukuda, M.N. and Fukuda, M.: Poly-N-acetyllactosamine synthesis in branched N-glycans is controlled by complementary branch specificity of i-extension enzyme and β 1,4-galactosyltransferase I. *J. Biol. Chem.*, 274 (1999) 16717-16726.
- 3561 Zhang, M., Ni, W. and Huang, Z.: (Determination of lactic acid in intestinal liquid of rat by high performance liquid chromatography). *Yaowu Fenxi Zazhi*, 19 (1999) 33-35; *C.A.*, 130 (1999) 293441.

For additional information see C.A.:

130 (1999) 198005, 236561, 295635, 295829.

See also 3564, 3568, 3580, 3939.

- 10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*
- 3562 Byers, S., Razaklis, T., Brumfield, L.K., Ranieri, E. and Hopwood, J.J.: Glycosaminoglycan accumulation and excretion in the mucopolysaccharidoses: characterization and basis of a diagnostic test for MPS. *Mol. Genet. Metab.*, 65 (1998) 282-290; C.A., 130 (1999) 264368.
- 3563 Carrard, G. and Linder, M.: Widely different off rates of two closely related cellulose-binding domains from *Trichoderma reesei*. *Eur. J. Biochem.*, 262 (1999) 637-643.
- 3564 Cavalcante, M.C.M., Mourão, P.A.S. and Pavao, M.S.G.: Isolation and characterization of a highly sulfated heparan sulfate from ascidian test cells. *Biochim. Biophys. Acta*, 1428 (1999) 77-87.
- 3565 Dietrich, C.P., Paiva, J.F., Castro, R.A.B., Chavante, S.F., Jeske, W., Fareed, J., Gorin, P.A.J., Mendes, A. and Nader, H.B.: Structural features and anticoagulant activities of a novel natural low molecular weight heparin from the shrimp *Penaeus brasiliensis*. *Biochim. Biophys. Acta*, 1428 (1999) 273-283.
- 3566 Eriksen, G.V., Carlstedt, I., Mörgelin, N., Ulbjerg, N. and Malmström, A.: Isolation and characterization of proteoglycan from human follicular fluid. *Biochem. J.*, 340 (1999) 613-620.
- 3567 Ishimizu, T., Mitsukami, Y., Shinkawa, T., Natsuka, S., Hase, S., Miyagi, M., Sakiyama, F. and Norioka, S.: Presence of asparagine-linked N-acetylglucosamine and chitobiose in *Pyrus pyrifolia* S-RNases associated with gametophytic self-incompatibility. *Eur. J. Biochem.*, 263 (1999) 624-634.
- 3568 Iwase, H., Ohkawa, S., Ishii-Karakasa, I., Hiki, Y., Kokubo, T., Sano, T., Tanaka, A., Toma, K., Kobayashi, Y. and Hotta, K.: Study of the relationship between sticky human serum IgA1 and its O-glycan glycoform. *Biochem. Biophys. Res. Commun.*, 261 (1999) 472-477.
- 3569 Karlsson, A. and Singh, S.K.: Acid hydrolysis of sulfated polysaccharides. Desulfation and the effect on molecular mass. *Carbohydr. Polym.*, 38 (1999) 7-15; C.A., 130 (1999) 257398.
- 3570 Knuckles, B.E. and Chiu, M.-C.M.: β -Glucanase activity and molecular weight of β -glucans in barley after various treatments. *Cereal Chem.*, 76 (1999) 92-95.
- 3571 Kotani, N., Asano, M., Iwamura, Y. and Takasaki, S.: Impaired galactosylation of core 2-O-glycans in erythrocytes of β 1,4-galactosyltransferase knockout mice. *Biochem. Biophys. Res. Commun.*, 260 (1999) 94-98.
- 3572 Mitsuiki, M., Mizuno, A. and Motoki, M.: Determination of molecular weight of afars and effect of the molecular weight on the glass transition. *J. Agric. Food Chem.*, 47 (1999) 473-478; C.A., 130 (1999) 236616.
- 3573 Parisi, L. and von Hunolstein, C.: Determination of the molecular size distribution of *Haemophilus influenzae* type b-tetanus toxoid conjugate vaccines by size-exclusion chromatography. *J. Chromatogr. A*, 847 (1999) 209-211.
- 3574 Pereira, M.S., Mulloy, B. and Mourao, P.A.S.: Structure and anticoagulant activity of sulfated fucans. Comparison between the regular, repetitive and linear fucans from echinoderms with the more heterogeneous and branched polymers from brown algae. *J. Biol. Chem.*, 274 (1999) 7656-7667.
- 3575 Revers, L., Bill, R.M., Wilson, I.B.H., Watt, G.M. and Flitsch, S.L.: Development of recombinant, immobilised β -1,4-mannosyltransferase for use as an efficient tool in the chemoenzymatic synthesis of N-linked oligosaccharides. *Biochim. Biophys. Acta*, 1428 (1999) 88-98.
- 3576 Rousselle, M.-A. and Howley, Ph.S.: Use of molecular weight measurements to assess the effects of cellulase treatment on cotton fabrics. *Colourage Annu.*, (1998) 153-158; C.A., 130 (1999) 197837.
- 3577 Suda, Y., Mori, K., Bird, K., Marques, D., Ormsby, J., Tanaka, S., Koshida, S., Nakamura, M., Kusumoto, S. and Sobel, M.: A novel crosslinking reagent and its application for the detection and isolation of heparin-binding protein(s) on the platelet surface. *J. Biochem. (Tokyo)*, 125 (1999) 1011-1015.
- 3578 Tsaih, M.L. and Chen, R.H.: Molecular weight determination of 83% degree of deacetylation chitosan with non-gaussian and wide-range distribution by high-performance size-exclusion chromatography and capillary viscometry. *J. Appl. Polym. Sci.*, 71 (1999) 1905-1913; C.A., 130 (1999) 210995.
- 3579 Usui, S., Matsunaga, T., Ukai, S., Kiho, T. and Hirano, K.: Growth suppressing factor for endothelial cells exhibits tumor regressing activity. *Biol. Pharm. Bull.*, 22 (1999) 353-359.
- 3580 West, L.A., Roughley, P., Nelson, F.R.T. and Plaas, A.H.K.: Sulphation heterogeneity in the trisaccharide (GalNAc β 1,4GlcA β 1,3GalNAcS) isolated from the non-reducing terminal of human aggrecan chondroitin sulphate. *Biochem. J.*, 342 (1999) 223-229.
- 3581 Ying, G., Meng, Y. and You, W.: (Isolation and purification of hyaluronic acid by ion-exchange chromatography). *Zhongguo Shenghua Yaowu Zazhi*, 19 (1998) 240-242; C.A., 130 (1999) 278754.
- 3582 You, S., Fiedorowicz, M. and Lim, S.-T.: Molecular characterization of wheat amylopectins by multiangle laser light scattering analysis. *Cereal Chem.*, 76 (1999) 116-121; C.A., 130 (1999) 251381.
- For additional information see C.A.:
130 (1999) 179066, 195750, 213611, 291588.
- See also 3465, 3538, 3554, 3557, 3595.
- 10c. *Glycoproteins and their constituents*
- 3583 Babál, P., Pindak, F.F., Russell, L.C. and Gardner, W.A., Jr.: Sialic acid-specific lectin from *Trichomonas foetus*. *Biochim. Biophys. Acta*, 1428 (1999) 106-116.
- 3584 Brighton, T.A., Dai, Y.-P., Hogg, P.J. and Chesterman, C.N.: Microheterogeneity of beta-2 glycoprotein I: implications for binding to anionic phospholipids. *Biochem. J.*, 340 (1999) 59-67.
- 3585 Chai, W., Yuen, C.-T., Kogelberg, H., Carruthers, R.A., Margolis, R.U., Feizi, T. and Lawson, A.M.: High prevalence of 2-mono- and 2,6-di-substituted Manol-terminating sequences among O-glycans released from brain glycopeptides by reductive alkaline hydrolysis. *Eur. J. Biochem.*, 263 (1999) 879-888.
- 3586 Craig, A.G., Norberg, T., Griffin, D., Hoeger, C., Akhtar, M., Schmidt, K., Low, W., Dykert, J., Richelson, E., Navarro, V., Mazella, J., Watkins, M. et al.: Contulakin-G, an O-glycosylated invertebrate neurotensin. *J. Biol. Chem.*, 274 (1999) 13752-13759.
- 3587 De Faire, J.: Antimicrobial compositions containing active proteins. PCT Int. Appl. WO 9909835 A1 Mar 1999, 14 pp.; C.A., 130 (1999) 213631.

- 3588 Goso, Y., Ishihara, K., Kurihara, M., Sugaya, T. and Hotta, K.: Rat gastric mucins recognized by monoclonal antibodies RGM21 and HIK1083: isolation of mucin species characteristic of the surface and glandular mucosa. *J. Biochem. (Tokyo)*, 126 (1999) 375-381.
- 3589 Hernández, P., Bacilio, M., Porras, F., Juárez, S., Debray, H., Zenteno, E. and Ortiz, B.: A comparative study on the purification of the *Amaranthus leucocarpus* syn. *hypocondriatus* lectin. *Prepar. Biochem. Biotechnol.*, 29 (1999) 219-234.
- 3590 Hund, H.-K., Breuer, J., Lingens, F., Hüttermann, J., Kappl, R. and Fetzner, S.: Flavonol 2,4-dioxygenase from *Aspergillus niger* DSM 821, a type 2 Cu^{II}-containing glycoprotein. *Eur. J. Biochem.*, 263 (1999) 871-878.
- 3591 Iwase, H., Tanaka, A., Hiki, Y., Kokubo, T., Sano, T., Ishii-Karakasa, I., Toma, K., Kobayashi, Y. and Hotta, K.: Mutual separation of hinge-glycopeptide isomers bearing five N-acetylgalactosamine residues from normal human serum immunoglobulin A1 by capillary electrophoresis. *J. Chromatogr. B*, 728 (1999) 175-183.
- 3592 Komatsu, S., Iwata, H. and Nabeshima, T.: Studies on the kinetics, metabolism and re-utilization after intra-articular administration of hyaluronan on rabbits. *Arzneim.-Forsch.*, 49 (1999) 427-433.
- 3593 Liu, H., McKenna, L.A. and Dean, M.F.: The macromolecular characteristics of cartilage proteoglycans do not change when synthesis is up-regulated by link protein peptide. *Biochim. Biophys. Acta*, 1428 (1999) 191-200.
- 3594 Malhotra, R., Ward, M., Sim, R.B. and Bird, M.I.: Identification of human complement Factor H as a ligand for L-selectin. *Biochem. J.*, 341 (1999) 61-69.
- 3595 Masaoka, H., Shibata, K. and Yamaguchi, H.: Topological and functional characterization of the N-glycans of soybean (Glycine max) agglutinin. *J. Biochem. (Tokyo)*, 126 (1999) 212-217.
- 3596 Morenkov, O.S., Smirnov, S.V. and Vrublevskaia, V.V.: Isolation of mutants of Aujeszky's disease virus with antigenically altered glycoprotein E by affinity chromatography using monoclonal antibodies. *J. Virol. Methods*, 77 (1999) 101-108; C.A., 130 (1999) 278840.
- 3597 Müller, S., Alving, K., Peter-Katalinic, J., Zachara, N., Gooley, A.A. and Hanisch, F.-G.: High density O-glycosylation on tandem repeat peptide from secretory MUC1 of T47D breast cancer cells. *J. Biol. Chem.*, 274 (1999) 18165-18172.
- 3598 Muto, S., Sakuma, K., Taniguchi, A. and Matsumoto, K.: Human mannose-binding lectin preferentially binds to human colon adenocarcinoma cell lines expressing high amount of Lewis A and Lewis B antigens. *Biol. Pharm. Bull.*, 22 (1999) 347-352.
- 3599 Nair, P.S. and Robinson, W.E.: Purification and characterization of a histidin-rich glycoprotein that binds cadmium from the blood plasma of the bivalve *Mytilus edulis*. *Arch. Biochem. Biophys.*, 366 (1999) 8-14.
- 3600 Perez, L., Estepa, A. and Coll, J.M.: Purification of the glycoprotein G from viral hemorrhagic septicemia virus, a fish rhabdovirus, by lectin affinity chromatography. *J. Virol. Methods*, 76 (1998) 1-8; C.A., 130 (1999) 264210.
- 3601 Stimson, E., Hope, J., Chong, A. and Burlingame, A.L.: Site-specific characterization of the N-linked glycans of murine prior protein by high-performance liquid chromatography/electrospray mass spectrometry and exoglycosidase digestions. *Biochemistry*, 38 (1999) 4885-4895.
- 3602 Veau, B., Guillot, J., Damez, M., Dusser, M., Kanska, G. and Botton, B.: Purification and characterization of an anti-(A+B) specific lectin from the mushroom *Hygrophorus hypothejus*. *Biochim. Biophys. Acta*, 1428 (1999) 39-44.
- 3603 Wright, L.M., van Damme, E.J.M., Barre, A., Allen, A.K., van Leuven, F., Reynolds, C.D., Rouge, P. and Peumans, W.J.: Isolation, characterization, molecular cloning and molecular modeling of two lectins of different specificities from bluebell (*Scilla campanulata*) bulbs. *Biochem. J.*, 340 (1999) 299-308.
- 3604 Zenker, A., Pfanzagl, B., Löffelhardt, W. and Allmaier, G.: Negative and positive ion matrix-assisted laser desorption/ionization mass spectrometry of peptidoglycan fragments after size fractionation and reversed-phase high-performance liquid chromatography. *J. Microbiol. Methods*, 32 (1998) 237-246; C.A., 130 (1999) 278914.

For additional information see C.A.:
130 (1999) 236754.

See also 3713, 3811, 3891.

11. ORGANIC ACIDS AND LIPIDS

11a. Organic acids and simple esters

- 3605 Beal, J.L., Jones, Ch.E., Taylor, P.J. and Tett, S.E.: Evaluation of an immunoassay (EMIT) for mycophenolic acid in plasma from renal transplant recipients compared with a high-performance liquid chromatography assay. *Ther. Drug Monit.*, 20 (1998) 685-690; C.A., 130 (1999) 217524.
- 3606 Blackburn, M.L., Podgorski, I. and Bull, A.W.: Specific protein targets of 13-oxooctadecadienoic acid (13-OXO) and export of the 13-OXO-glutathione conjugate in HT-29 cells. *Biochim. Biophys. Acta*, 1440 (1999) 225-234.
- 3607 Chen, S.-H., Chen, K.-C. and Lien, H.-M.: Determination of fatty acids in vegetable oil by reversed-phase liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 849 (1999) 357-369.
- 3608 Chiba, N., Imai, H. and Nakagawa, Y.: Determination of 5-hydroperoxyeicosatetraenoic acid produced in rat basophilic leukemia cell line RBL-2H3 by high-performance liquid chromatography with chemiluminescence detection. *J. Chromatogr. B*, 728 (1999) 35-40.
- 3609 Correa, R.A., Ferraz, V., Medvedovici, A., Sandra, P., Cerne, K. and David, F.: Positional and configurational separation of fatty acid isomers by micro reversed-phase liquid chromatography with an Ag⁺-containing mobile phase. *J. Chromatogr. A*, 848 (1999) 83-93.
- 3610 De la Fuente, M.A. and Juárez, M.: (Application of chromatographic techniques to the study of triglycerides and sterols of milk fat). *Food Sci. Technol. Int. (Frederick)*, 5 (1999) 103-119; C.A., 130 (1999) 295662.
- 3611 Ellnain-Wojtaszek, M. and Zgórk, G.: High-performance liquid chromatography and thin-layer chromatography of phenolic acids from *Ginkgo biloba* L. leaves collected within vegetative period. *J. Liq. Chromatogr. Relat. Technol.*, 11 (1999) 1457-1471.

- 3612 Fang, J. and Barcelona, M.J.: Determination of organic acids in ground water by liquid chromatography/atmospheric pressure chemical ionization/mass spectrometry. *Anal. Lett.*, 32 (1999) 1459-1473.
- 3613 Fedeli, E., Cortesi, N. and Rovellini, P.: (Triglyceride analysis by HPLC for the detection of addition of high oleic acid seed oils to olive oils). *Riv. Ital. Sostanze Grasse*, 75 (1998) 483-489; *C.A.*, 130 (1999) 281026.
- 3614 Feng, Y. and Ito, A.: (Meaning for measurement of metabolite of epichlorohydrin (2). Quantitative determination of β -chloro-lactic acid in organs of rats treated with epichlorohydrin and α -chlorohydrin). *Jpn. J. Forensic Toxicol.*, 16 (1998) 162-163; *C.A.*, 130 (1999) 206017.
- 3615 Frauendorf, H. and Herzsuh, R.: Application of high-performance liquid chromatography/electrospray mass spectrometry for identification of carboxylic acids containing several carboxyl groups from aqueous solutions. *Eur. Mass Spectrom.*, 4 (1998) 269-278. *C.A.*, 130 (1999) 217307.
- 3616 Héron, S. and Tchaplá, A.: Comparison of the responses of triacylglycerols with an evaporative visible light scattering detector used in conventional, micro and capillary liquid chromatography. *J. Chromatogr. A*, 848 (1999) 95-104.
- 3617 Jerzewska, M.: (Practical aspects of determination of fatty acid composition of oils and fats). *Tłuszczę Jadalne*, 33 (1998) 61-73; *C.A.*, 130 (1999) 181600 - a review with 12 refs.
- 3618 Jiang, H., Kruger, N., Lahiri, D.R., Wang, D., Vatlé, J.-M. and Balazy, M.: Nitrogen dioxide induces *cis-trans*-isomerization of arachidonic acid within cellular phospholipides. Detection of *trans*-arachidonic acids *in vivo*. *J. Biol. Chem.*, 274 (1999) 16235-16241.
- 3619 John, H. and Schlegel, W.: Thermodynamic and structural characterization of *cis-trans* isomerization of 12-(S)-hydroxy-(5Z,8E,10E)-heptadecatrienoic acid by high-performance liquid chromatography and gas chromatography-mass spectrometry. [Erratum to document cited in CA 130: 135455]. *Chem. Phys. Lipids*, 97 (1999) 195-196; *C.A.*, 130 (1999) 278132.
- 3620 Li, E.-C., Gao, Y.-Z., Gao, Y.-S. and Zhang, T.-M.: (Preparation of ethyl docosahexaenoate with high purity by argentation chromatography). *Zhongguo Yiyao Gongye Zazhi*, 29 (1998) 483-485; *C.A.*, 130 (1999) 264202.
- 3621 Li, H.-Q., Matsuda, I., Fujise, Y. and Ichiyama, A.: Short-chain acyl-CoA-dependent production of oxalate from oxaloacetate by *Burkholderia glumae*, a plant pathogen which causes grain rot and seedling rot of rice via the oxalate production. *J. Biochem. (Tokyo)*, 126 (1999) 243-253.
- 3622 Lopez-Avila, V., Liu, Y. and Charan, C.: Determination of haloacetic acids in water by ion chromatography - method development. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 689-704.
- 3623 Mori, H.: Simultaneous determination of D-lactic acid and L-lactic acid using a flow system with two enzyme reactors and an octadecylsilica column in one line. *Anal. Lett.*, 32 (1999) 1301-1312.
- 3624 Narayanan, L., Moghaddam, A.P., Taylor, A.G., Sudberry, G.L. and Fisher, J.W.: Sensitive high-performance liquid chromatography method for the simultaneous determination of low levels of dichloroacetic acid and its metabolites in blood and urine. *J. Chromatogr. B*, 729 (1999) 271-277.
- 3625 Peyrin, E., Perrin, F.-X. and Guillaume, Y.C.: Retention behavior modelization of monotropic and ditropic species in a hydroorganic acetonitrile/water mixture. *Anal. Chem.*, 71 (1999) 2708-2713.
- 3626 Pinot, F., Benveniste, I., Salaün, J.-P., Loreau, O., Noël, J.-P., Schreiber, L. and Durst, F.: Production *in vitro* by the cytochrome P450 CYP94A1 of major C₁₈ cutin monomers and potential messengers in plant-pathogen interactions: enantioselectivity studies. *Biochem. J.*, 342 (1999) 27-32.
- 3627 Sen, Ch.K., Roy, S., Khanna, S. and Packer, L.: Determination of oxidized and reduced lipoic acid using high-performance liquid chromatography and coulometric detection. *Methods Enzymol.*, 299 (1999) 239-246; *C.A.*, 130 (1999) 234126.
- 3628 Sergeev, G.M. and Blinova, M.S.: Ion chromatography of impurities in organic solvents. *J. Chromatogr. A*, 847 (1999) 345-349.
- 3629 Stimers, J.R., Dobretsov, M., Hastings, S.L., Jude, A.R. and Grant, D.F.: Effects of linoleic acid metabolites on electrical activity in adult rat ventricular myocytes. *Biochim. Biophys. Acta*, 1438 (1999) 359-368.
- 3630 Tsai, T.-H., Chen, Y.-F., Chen, I.-F. and Chen, C.-F.: Measurement of unbound caffeic acid in rat blood by on-line microdialysis coupled with liquid chromatography and its application to pharmacokinetic study. *J. Chromatogr. B*, 729 (1999) 119-125.
- 3631 Udisti, R., Becagli, S., Traversi, R., Vermigli, S. and Piccardi, G.: Preliminary evidence of a biomass-burning event from a 60 year-old fir core from Antarctica by ion chromatographic determination of carboxylic acids. *Ann. Glaciol.*, 27 (1998) 391-397; *C.A.*, 130 (1999) 284750.
- 3632 Ummus, R.E., Onuki, J., Dörnemann, D., Medeiros, M.H.G. and di Mascio, P.: Measurement of 4,5-dioxovaleric acid by high-performance liquid chromatography and fluorescence detection. *J. Chromatogr. B*, 729 (1999) 237-243.

For additional information see *C.A.*:
130 (1999) 191200, 276019.

See also 3354, 3501, 3531, 3553, 3677, 4364, 4435.

11b. Prostaglandins

- 3633 Bae, J., Peters-Golden, M. and Loch-Carusio, R.: Stimulation of pregnant rat uterine contraction by the polychlorinated biphenyl (PCB) mixture Aroclor 1242 may be mediated by arachidonic acid release through activation of phospholipase A₂ enzymes. *J. Pharmacol. Exp. Ther.*, 289 (1999) 1112-1120.
- 3634 Brame, C.J., Salomon, R.G., Morrow, J.D. and Roberts, II, L.J.: Identification of extremely reactive γ -ketoaldehydes (isolevuglandins) as products of the isoprostane pathway and characterization of their lysyl protein adducts. *J. Biol. Chem.*, 274 (1999) 13139-13146.
- 3635 Mizugaki, M., Hishinuma, T. and Suzuki, N.: Determination of leukotriene E₄ in human urine using liquid chromatography-tandem mass spectrometry. *J. Chromatogr. B*, 729 (1999) 279-285.

11c. *Lipids and their constituents*

- 3636 Borgeat, P., Picard, S., Dallaire, N., Pouliot, M. and Surette, M.E.: Quantitative studies of the lipid mediators of inflammation using liquid chromatography-electrospray mass spectrometry. In: Serhan, C.N. and Ward, P.A. (Editors), *Mol. Cell. Basis Inflammation*, Humana, Totowa, 1999, pp. 275-288; *C.A.*, 130 (1999) 278700 - a review with 51 refs.
- 3637 Déziel, E., Lépine, F., Dennie, D., Boismenu, D., Mamer, O.A. and Villemur, R.: Liquid chromatography/mass spectrometry analysis of mixtures of rhamnolipids produced by *Pseudomonas aeruginosa* strain 57RP grown on mannitol or naphthalene. *Biochim. Biophys. Acta*, 1440 (1999) 244-252.
- 3638 Dugas, T.R. and Church, D.F.: Purification and characterization of phospholipid for use in lipid oxidation studies. *Methods Enzymol.*, 300 (1999) 63-70; *C.A.*, 130 (1999) 220011.
- 3639 Ehlers, D., Kirchhoff, J., Gerard, D. and Quirin, K.-W.: High performance liquid chromatography analysis of nutmeg and mace oils produced by supercritical CO₂ extraction - comparison with steam-distilled oils - comparison of East Indian, West Indian and Papuan oils. *Int. J. Food Sci. Technol.*, 33 (1998) 215-223; *C.A.*, 130 (1999) 236633.
- 3640 Gomes, T. and Caponio, F.: Effort to improve the quantitative determination of oxidation and hydrolysis compound classes in edible vegetable oils. *J. Chromatogr. A*, 844 (1999) 77-86.
- 3641 Jones, D.R., González-García, A., Diez, E., Martínez, A., C., Carrera, A.C. and Mérida, I.: The identification of phosphatidylinositol 3,5-bisphosphate in T-lymphocytes and its regulation by interleukin-2. *J. Biol. Chem.*, 274 (1999) 18407-18413.
- 3642 Jones, D.R., Pettitt, T.R., Sanjuán, M.A., Mérida, I. and Wakelam, M.J.O.: Interleukin-2 causes an increase in saturated/monounsaturated phosphatidic acid derived from 1,2-diacylglycerol and 1-O-alkyl-2-acylglycerol. *J. Biol. Chem.*, 274 (1999) 16846-16852.
- 3643 Karlsson, A.A., Michelsen, P. and Odham, G.: Molecular species of sphingomyelin: determination by high-performance liquid chromatography/mass spectrometry with electrospray and high-performance liquid chromatography/tandem mass spectrometry with atmospheric pressure chemical ionization. *J. Mass Spectrom.*, 33 (1998) 1192-1198; *C.A.*, 130 (1999) 220133.
- 3644 Kawai, Y., Ogamo, A. and Nakagawa, Y.: Formation of the aldehydic choline glycerophospholipids in human red blood cell membrane peroxidized with an azo initiator. *J. Biochem. (Tokyo)*, 126 (1999) 115-120.
- 3645 Korytowski, W., Geiger, P.G. and Girotti, A.W.: Lipid hydroperoxide analysis by high-performance liquid chromatography with mercury cathode electrochemical detection. *Methods Enzymol.*, 300 (1999) 23-33; *C.A.*, 130 (1999) 220009.
- 3646 Lim, S.-Y., Park, W.-K. and Suzuki, H.: Analyses of glycolipids from fish, shellfish, and sea snake lipids by high-performance liquid chromatography. *J. Agric. Food Chem.*, 47 (1999) 960-963; *C.A.*, 130 (1999) 251374.
- 3647 Neff, W.E., List, G.R. and Byrdwell, W.C.: Quantitative composition of high palmitic and stearic acid soybean oil triacylglycerols by reversed phase high performance liquid chromatography: utilization of evaporative light scattering and flame ionization detectors. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1649-1662.
- 3648 Nomikos, T.N., Antonopoulou, S., Argyropoulos, D. and Demopoulos, C.A.: Determination of platelet-activating factor by HPLC with fluorescence detection. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1331-1341.
- 3649 Perona, J.S. and Ruiz-Gutiérrez, V.: Characterization of the triacylglycerol molecular species of fish oil by reversed-phase high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1699-1714.
- 3650 Vietzke, J.-P., Strassner, M. and Hintze, U.: Separation and identification of ceramides in the human stratum corneum by high-performance liquid chromatography coupled with electrospray ionization mass spectrometry and electrospray multiple-stage mass spectrometry profiling. *Chromatographia*, 50 (1999) 15-20.
- 3651 Yamamoto, H., Iida-Tanaka, N., Kasama, T., Ishizuka, I., Kushi, Y. and Handa, S.: Isolation and characterization of a novel Forsman active acidic glycosphingolipid with branched isoglobo-, ganglio-, and neolacto-series hybrid sugar chains. *J. Biochem. (Tokyo)*, 125 (1999) 923-930.

For additional information see *C.A.*:
130 (1999) 264161.

See also 3349, 3468, 3584, 3616, 3788, 4358.

11d. *Lipoproteins and their constituents*

- 3652 De Vries, H.E., Moor, A.C.E., Dubbelman, T.M.A.R., van Berkel, T.J.C. and Kuiper, J.: Oxidized low-density lipoprotein as a delivery system for photosensitizers: implications for photodynamic therapy of atherosclerosis. *J. Pharmacol. Exp. Ther.*, 289 (1999) 528-534.
- 3653 Kaplan, I.V., Hobbs, G.A. and Levinson, S.S.: Simpler technique for measuring oxidative susceptibility by heparin affinity column isolation of lipoproteins. *Clin. Chim. Acta*, 283 (1999) 89-103.
- 3654 Ravandi, A., Kuksis, A. and Shaikh, N.A.: Glycated phosphatidylethanolamine promotes macrophage uptake of low density lipoprotein and accumulation of cholesteryl esters and triacylglycerols. *J. Biol. Chem.*, 274 (1999) 16494-16500.
- 3655 Tleugabulova, D., Falcón, V. and Pentón, E.: Physico-chemical characterization of recombinant hepatitis B surface antigen by a multidimensional approach. *J. Chromatogr. A*, 845 (1999) 171-179.

See also 3788, 4006.

12. ORGANIC PEROXIDES

See 3645.

13. STEROIDS

13a. *General techniques*

- 3656 Forgács, E. and Cserhádi, T.: Interaction of some steroid drugs with β -cyclodextrin polymer. *J. Chromatogr. A*, 845 (1999) 447-453.

- 3657 Mitamura, K. and Shimada, K.: (High-performance liquid chromatography/mass spectrometry of steroids (review)). *Bunseki Kagaku*, 48 (1999) 401-411; C.A., 130 (1999) 261180 - a review with 95 refs.
- 3658 Xu, Q., Gu, Z., Chen, X. and Liu, T.: (Hydrophobic separation of steroids and the effect of cyclodextrins). *Fenxi Huaxue*, 27 (1999) 193-197; C.A., 130 (1999) 231625.
- See also 3399.
- 13b. *Pregnane and androstane derivatives*
- 3659 Ferron, G.M., Pyszczynski, N.A. and Jusko, W.J.: Pharmacokinetic and pharmacodynamic interactions between prednisolone and sirolimus in adrenalectomized rats. *J. Pharmacokin. Biopharm.*, 27 (1999) 1-21.
- 13c. *Estrogens*
- 3660 Müllner, C. and Sontag, G.: Determination of some phytoestrogens in soybeans and their processed products with HPLC and coulometric electrode array detection. *Fresenius J. Anal. Chem.*, 364 (1999) 261-265.
- 3661 Van Puymbroeck, M., Kuilman, M.E.M., Maas, R.F.M., Witkamp, R.F., Leyssens, L., van Miert, A.S.J.P.A.M., Hendriks, L., Vanderzande, D., Adriaensens, P., Jacobs, M.-P. and Raus, J.: 17 α -Ethinyl-5 β -estrane-3 α ,17 β -diol, a biological marker for the abuse of norethandrolone and ethylestrenol in slaughter cattle. *J. Chromatogr. B*, 728 (1999) 217-232.
- 13d. *Sterols*
- 3662 Emara, S., Hussien, S.A. and Mohamed, F.A.: Determination of cholesterol in egg yolk by high performance liquid chromatography using an automated precolumn-switching procedure. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1235-1246.
- 3663 Handelman, G.J.: High-performance liquid chromatography analysis of cholesterol linoleate hydroperoxide in oxidized low density lipoproteins: calibration by conjugated diene internal standard. *Methods Enzymol.*, 300 (1999) 43-50; C.A., 130 (1999) 220010.
- 3664 Weber, A., Klages, U., Kennecke, M., Lang, C., Stahl, U. and Polakowski, T.: (Method for producing ergosterol and intermediates by recombinant yeast fermentation). PCT Int. Appl. WO 9916886 A1 8 Apr 1999, 45 pp.; C.A., 130 (1999) 280919.
- See also 3610.
- 13e. *Bile acids and alcohols*
- 3665 Choi, S.J., Jeong, C.K., Lee, H.M., Kim, K., Do, K.S. and Lee, H.S.: Simultaneous determination of ursodeoxycholic acid and its glycinconjugate in serum as phenacyl esters using multidimensional liquid chromatography. *Chromatographia*, 50 (1999) 96-100.
- 3666 Dongowski, G., Neubert, R.H.H. and Heinevetter, L.: Permeation of bile acids across artificial lipid membranes and Caco-2 monolayers. *Pharmazie*, 54 (1999) 517-520.
- 3667 Murao, N., Okuyama, H., Ikegawa, S. and Goto, J.: (Separatory determination of bile acid 24-glucuronides by LC/ESI-MS). *Chromatography*, 19 (1998) 276-277; C.A., 130 (1999) 293561.
14. STEROID GLYCOSIDES AND SAPONINS
- 3668 Arun, P., Ravikumar, A., Leelamma, S. and Kurup, P.A.: Identification and estimation of endogenous digoxin in biological fluids and tissues by TLC and HPLC. *Indian J. Biochem. Biophys.*, 35 (1998) 308-312; C.A., 130 (1999) 217539.
- See also 4035, 4318, 4319, 4323.
15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS
- 15a. *Terpenes*
- 3669 Brochini, C.B., Nunez, C.V., Moreira, I.C., Roque, N.F., Chaves, M.H. and Martins, D.: (Identification of components from volatile oils: spectroscopical analysis of sesquiterpenes mixtures). *Quim. Nova*, 22 (1999) 37-40; C.A., 130 (1999) 237711.
- 3670 Chatjigakis, A.K., Clarot, I., Cardot, P.J.P., Nowakowski, R. and Coleman, A.: Reversed phase chromatographic study of the inclusion selectivity of terpene derivatives with β -cyclodextrin in water/cosolvent mixtures. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1267-1284.
- 3671 Couto, A.S., Kimura, E.A., Peres, V.J., Uhrig, M. and Katzin, A.M.: Active isoprenoid pathway in the intra-erythrocytic stages of *Plasmodium falciparum*: presence of dolichols of 11 and 12 isoprene units. *Biochem. J.*, 341 (1999) 629-637.
- 3672 Fukuyama, Y., Yokoyama, R., Ohsaki, A., Takahashi, H. and Minami, H.: An example of the co-occurrence of enantiomeric labdane-type diterpenes in the leaves of *Mimosa hostilis*. *Chem. Pharm. Bull.*, 47 (1999) 454-455.
- 3673 Glasl, S., Kastner, U., Jurenitsch, J. and Kubelka, W.: Qualitative and quantitative determination of sesquiterpenoids in Achillea species by reversed-phase high-performance liquid chromatography, mass-spectrometry and thin-layer chromatography. *J. Chromatogr. B*, 729 (1999) 361-368.
- 3674 Hutapea, A.M., Toskulkaeo, C., Wilairat, P. and Buddhasukh, D.: High-performance liquid chromatographic separation and quantitation of stevioside and its metabolites. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1161-1170.
- 3675 Jung, Y. and Row, K.H.: Separation of perillyl alcohol from Korean orange peel by solvent extraction and chromatography. *Korean J. Chem. Eng.*, 15 (1998) 538-543; C.A., 130 (1999) 196768.
- 3676 Ketchum, R.E.B., Luong, J.V. and Gibson, D.M.: Efficient extraction of paclitaxel and related taxoids from leaf tissue of *Taxus* using a potable solvent system. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1715-1732.
- 3677 Luong, J.H.T., Rigby, T., Male, K.B. and Bouvette, P.: Derivatization of resin acids with a fluorescent label for cyclodextrin-modified electrophoretic separation. *J. Chromatogr. A*, 849 (1999) 255-266.

- 3678 Van den Berg, K.J., van der Horst, J., Boon, J.J., Shibayama, N. and de la Rie, E.R.: Mass spectrometry as a tool to study ageing processes of diterpenoid resins in works of art: GC- and LC-MS studies. *Adv. Mass Spectrom.*, 14 (1998) Chapter 23/563-Chapter 23/573; C.A., 130 (1999) 251829.

For additional information see C.A.:
130 (1999) 227710.

See also 4036, 4186, 4323, 4326.

15c. Bitter substances

- 3679 Anonymous: Determination of iso-alpha, alpha-, and beta-acids in hop and isomerized hop extracts by high-performance liquid chromatography. *J. Am. Soc. Brew. Chem.*, 56 (1998) 194-196; C.A., 130 (1999) 208948.

16. NITRO AND NITROSO COMPOUNDS

- 3680 Cassada, D.A., Monson, S.J., Snow, D.D. and Spalding, R.F.: Sensitive determination of RDX, nitroso-RDX metabolites, and other munitions in ground water by solid-phase extraction and isotope dilution liquid chromatography-atmospheric pressure chemical ionization mass spectrometry. *J. Chromatogr. A*, 844 (1999) 87-95.
- 3681 Crini, G., Morin, N. and Morcellet, M.: High-performance liquid chromatography of structural isomers with cyclodextrin-poly(vinylamine)-coated silica columns, Part III: Retention mechanism study of nitrophenol derivatives. *J. Chromatogr. Sci.*, 37 (1999) 121-125.
- 3682 De Beer, T., Besoo, P., Hoornweg, G.P., Velthorst, N.H., Brinkman, U.A.T. and Gooijer, C.: Sensitive absorption detection for micro-column liquid chromatography by ultraviolet forward-scattering degenerate four-wave mixing. *Anal. Chim. Acta*, 390 (1999) 55-64.
- 3683 Hayakawa, K., Kizu, R. and Ando, K.: (Study on atmospheric behavior and toxicity of carcinogenic nitroarenes by high-performance liquid chromatography using chemiluminescence detection). *Chromatography*, 19 (1998) 284-287; C.A., 130 (1999) 247950.
- 3684 Hilmi, A., Luong, J.H.T. and Nguyen, A.-L.: Determination of explosives in soil and ground water by liquid chromatography-amperometric detection. *J. Chromatogr. A*, 844 (1999) 97-110.
- 3685 Kaiser, M.: HPLC optimization of the separation of explosives and propellant components with an octadecyl phase by computer simulation. *Propellants, Explos., Pyrotech.*, 22 (1997) 321-325; C.A., 130 (1999) 198551.
- 3686 Lang, M.J. and Burns, S.E.: Improvement of EPA method 8330: complete separation using a two-phase approach. *J. Chromatogr. A*, 849 (1999) 381-388.

See also 3467, 3712, 3714, 3731, 3739, 4046, 4213, 4343, 4344, 4352.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 3687 Cobo, M. and Silva, M.: Continuous solid-phase extraction and dansylation of low-molecular-mass amines coupled on-line with liquid chromatography and peroxyoxalate chemiluminescence-based detection. *J. Chromatogr. A*, 848 (1999) 105-115.
- 3688 Lehotay, J., Halmo, F., Oktavec, D. and Lacuska, M.: (Determination of 2-naphthylamine in waste gas using HPLC with diode array (DAD) and electrochemical detectors (ED)). *Chem. Listy*, 93 (1999) 138-141; C.A., 130 (1999) 256314.
- 3689 Machida, Y., Nishi, H. and Nakamura, K.: Separation of the enantiomers of amino and amide compounds on novel chiral stationary phases derived from a crown ether. *Chromatographia*, 49 (1999) 621-627.
- 3690 Maddox, N.J. and Lin, S.: High-performance liquid chromatographic method for the separation of isomers of *cis* and *trans*-4-aminocyclohexylacetic acid and corresponding ethyl ester. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1367-1380.
- 3691 Rose, M.J., Lunte, S.M., Carlson, R.G. and Stobaugh, J.F.: Hydroquinone-based derivatization reagents for the quantitation of amine using electrochemical detection. *Anal. Chem.*, 71 (1999) 2221-2230.
- 3692 Sahasrabudhey, B., Jain, A. and Verma, K.K.: Determination of ammonia and aliphatic amines in environmental aqueous samples utilizing pre-column derivatization to their phenylthioureas and high performance liquid chromatography. *Analyst (Cambridge)*, 124 (1999) 1017-1021.
- 3693 Shi, X., Wang, Q. and Wu, W.: (Determination of benzidine in cotton cloth by high performance liquid chromatography). *Sepu*, 17 (1999) 75-76; C.A., 130 (1999) 283273.
- 3694 Zenser, T.V., Lakshmi, V.M., Hsu, F.F. and Davis, B.B.: Peroxygenase metabolism of N-acetylbenzidine by prostaglandin H synthase. Formation of an N-hydroxylamine. *J. Biol. Chem.*, 274 (1999) 14850-14856.

For additional information see C.A.:
130 (1999) 179592.

See also 3696, 3697, 3699, 3700.

17b. Catecholamines and their metabolites

- 3695 Dutton, J., Hodgkinson, A.J., Hutchinson, G. and Roberts, N.B.: Evaluation of a new method for the analysis of free catecholamines in plasma using automated sample trace enrichment with dialysis and HPLC. *Clin. Chem. (Washington)*, 45 (1999) 394-399.
- 3696 Hoekstra, J.C. and Johnson, D.C.: Waveform optimization for integrated square-wave detection of biogenic amines following their liquid chromatographic separation. *Anal. Chim. Acta*, 390 (1999) 45-54.
- 3697 Kanda, T. and Ohtsu, Y.: (Analysis of biogenic amines using semi-microcolumn liquid chromatography with column-switching system). *Chromatography*, 19 (1998) 332-335; C.A., 130 (1999) 278749.

- 3698 Linert, W., Bridge, M.H., Huber, M., Bjugstad, K.B., Grossman, S. and Arendash, G.W.: *In vitro* and *in vivo* studies investigating possible antioxidant actions of nicotine: relevance to Parkinson's and Alzheimer's diseases. *Biochim. Biophys. Acta*, 1454 (1999) 143-152.
- 3699 Sadain, S.K. and Koropchak, J.A.: Condensation nucleation light scattering detection for biogenic amines separated by ion-exchange chromatography. *J. Chromatogr. A*, 844 (1999) 111-118.
- 3700 Steinhart, H. and Biernoth, G.: (Analysis of biogenic amines). *Anal.-Taschenb.*, 17 (1998) 243-261; *C.A.*, 130 (1999) 234080 - a review with 53 refs.
- 3701 You, J., Lao, W., Ou, Q. and Sun, X.: Fluorescence properties of carbazole-N-(2-methyl)acetyl chloride and determination of amino compounds via high-performance liquid chromatography with pre-column fluorescence derivatization. *J. Chromatogr. A*, 848 (1999) 117-130.
- For additional information see *C.A.*:
130 (1999) 220166, 277325.
- See also 3937.
- 17c. *Urea and guanidine derivatives*
- See 3628.
- 17d. *Other amine derivatives and amides (excl. peptides)*
- 3702 Frolich, L., Dirr, A., Gotz, M.E., Gsell, W., Reichmann, H., Riederer, P. and Maurer, K.: Acetylcholine in human CSF: methodological considerations and levels in dementia of Alzheimer type. *J. Neural Transm.*, 105 (1998) 961-973; *C.A.*, 130 (1999) 218417.
- 3703 Ghanayem, B.I., Sanders, J.M., Chanas, B., Burka, L.T. and Gonzalez, F.J.: Role of cytochrome P-450 2E1 in methacrylonitrile metabolism and disposition. *J. Pharmacol. Exp. Ther.*, 289 (1999) 1054-1059. *C.A.*,
- 3704 Kempter, C., Büldt, A. and Karst, U.: Workplace monitoring of oximes using 2,4-dinitrophenylhydrazine-coated silica gel cartridges and liquid chromatography. *Anal. Chim. Acta*, 388 (1999) 181-186.
- 3705 Krämer, I. and Maas, B.: Compatibility of amsacrine (Amsidyl®) concentrate for infusion with polypropylene syringes. *Pharmazie*, 54 (1999) 538-541.
- 3706 Kudo, Sh., Mizooku, Y., Miyamoto, G., Odomi, M., Sogawa, Y. and Sugai, T.: High-performance liquid chromatography-electrospray tandem mass spectrometry for the measurement of 1-(3,4-dichlorobenzyl)-5-octylbiguanide in human serum. *Ther. Drug Monit.*, 20 (1998) 697-705; *C.A.*, 130 (1999) 217526.
- 3707 Thaler, A., Hottkowitz, T. and Eibl, H.: A sensitive method for the separation and quantitative determination of alkylphosphocholines by high-performance liquid chromatography. *Drugs Today*, 34 (1998) 153-158; *C.A.*, 130 (1999) 242397.
- 3708 Yamazaki, Sh., Tanimura, T. and Uchikura, K.: Direct enantiomeric separation of β -aminoalcohols with a tertiary amine moiety by ligand-exchange chromatography with chemiluminescence detection. *Chromatography*, 19 (1998) 201-205; *C.A.*, 130 (1999) 275976.

See also 3320, 3476, 3686, 3689.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 3709 Al-Dehaimi, A.W., Blumsohn, A. and Eastell, R.: Serum galactosyl hydroxylysine as a biochemical marker of bone resorption. *Clin. Chem. (Washington)*, 45 (1999) 676-681.
- 3710 Battaglia, A., Bertoluzza, A., Calbucci, F., Eusebi, V., Giorgianni, P., Ricci, R., Rosi, R. and Tugnoli, V.: High-performance liquid chromatographic analysis of physiological amino acids in human brain tumors by pre-column derivatization with phenylisothiocyanate. *J. Chromatogr. B*, 730 (1999) 81-93.
- 3711 Carducci, C., Birarelli, M., Nola, M. and Antonozzi, I.: Automated high-performance liquid chromatographic method for the determination of homocysteine in plasma samples. *J. Chromatogr. A*, 846 (1999) 93-100.
- 3712 Cheng, C.F. and Tsang, C.W.: Separation of N-nitrosoamino acids by C₁₈ reversed-phase ion-pair high-performance liquid chromatography and compatible detection by electrospray ionization mass spectrometry. *J. Chromatogr. A*, 849 (1999) 389-402.
- 3713 Clarke, A.P., Jandik, P., Rocklin, R.D., Liu, Y. and Avdalovic, N.: An integrated amperometry waveform for the direct, sensitive detection of amino acids and amino sugars following anion-exchange chromatography. *Anal. Chem.*, 71 (1999) 2774-2781.
- 3714 Crow, J.P.: Measurement and significance of free and protein-bound 3-nitrotyrosine, 3-chlorotyrosine, and free 3-nitro-4-hydroxyphenylacetic acid in biologic samples: a high-performance liquid chromatography method using electrochemical detection. *Methods Enzymol.*, 301 (1999) 151-160; *C.A.*, 130 (1999) 234123.
- 3715 Dalton, J.T., Meyer, M.C. and Golub, A.L.: Pharmacokinetics of aminolevulinic acid after oral and intravenous administration in dogs. *Drug Metab. Disp.*, 27 (1999) 432-435.
- 3716 Fujii, T., Kawabe, S., Horike, T., Taguchi, T. and Ogata, M.: Simultaneous determination of the urinary metabolites of toluene, xylene and styrene using high-performance capillary electrophoresis. Comparison with high-performance liquid chromatography. *J. Chromatogr. B*, 730 (1999) 41-47.
- 3717 Hayakawa, K., Hirano, M., Yoshikawa, K., Katsumata, N. and Tanaka, T.: Separation of phenylthiohydantoin-amino acids by temperature-controlled reversed-phase high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 73-82.
- 3718 Inoue, T., Hamase, K. and Zaitso, K.: (Sensitive determination of D-Leu in biological samples using column switching system). *Chromatography*, 19 (1998) 386-387; *C.A.*, 130 (1999) 278752.
- 3719 Kim, I.-W., Jang, M.D. and Park, J.H.: (Separation of free amino acids by reversed-phase liquid chromatography using strongly acidic mobile phases). *J. Korean Chem. Soc.*, 43 (1999) 119-121; *C.A.*, 130 (1999) 245891.
- 3720 Le Bricon, T., Stoitchkov, K., Letellier, S., Guibal, F., Spy, J., Garnier, J.-P. and Bousquet, B.: Simultaneous analysis of tyrosinase mRNA and markers of tyrosinase activity in the blood of patients with metastatic melanoma. *Clin. Chim. Acta*, 282 (1999) 101-113.

- 3721 Lewisch, S.A. and Levine, R.L.: Determination of 2-oxohistidine by amino acid analysis. *Methods Enzymol.*, 300 (1999) 120-124; *C.A.*, 130 (1999) 220096.
- 3722 Miyake, T. and Sammoto, H.: (Determination of thiol compounds in yeast cell by high-performance liquid chromatography). *Okayama-ken Kogyo Gijutsu Senta Hokoku*, 24 (1998) 50-52; *C.A.*, 130 (1999) 220008.
- 3723 Mohammed, N., Onodera, R. and Khan, R.I.: A new determination method of tryptophan and its related compounds by high-performance liquid chromatography and its application to rumen fluid. *Anim. Sci. Technol.*, 69 (1998) 1020-1028; *C.A.*, 130 (1999) 278744.
- 3724 Mühling, J., Fuchs, M., Dehne, M.G., Sablotzki, A., Menges, T., Weber, B. and Hempelmann, G.: Quantitative determination of free intracellular amino acids in single human polymorphonuclear leucocytes. Recent developments in sample preparation and high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 157-166.
- 3725 Notsumot, Sh., Higashiura, M., Usui, Y. and Kobayashi, K.: (A method for the determination of γ -carboxyglutamic acid in human bile by high-performance liquid chromatography with fluorometric detection). *Rinsho Kagaku*, 27 (1998) 239-244; *C.A.*, 130 (1999) 220016.
- 3726 Pähler, A., Völkel, W. and Dekant, W.: Quantitation of N^ε-(dichloroacetyl)-L-lysine in proteins after perchloroethene exposure by gas chromatography-mass spectrometry using chemical ionization and negative ion detection following immunoaffinity chromatography. *J. Chromatogr. A*, 847 (1999) 25-34.
- 3727 Rembischevski, P. and Gemal, A.L.: Separation of different ionic forms of L- α -methyl-dopa and other amino acids by reversed-phase ion-pair high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1343-1353.
- 3728 Saguyan, A.S., Atayan, K.I., Ovsepyan, G.Ts., Vardanyan, A.A. and Zurabyan, A.S.: (Low-waste technique for separation of L-proline from mixtures of amino acids). *Khim. Zh. Arm.*, 51 (1998) 87-97; *C.A.*, 130 (1999) 280869.
- 3729 Shen, Z.-J., Wang, Z.-G., Li, X.-P., Hu, C.-H. and Yang, S.-D.: (Determination of γ -aminobutyric acid in serum by reverse-phase high performance liquid chromatography). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 25 (1998) 543-547; *C.A.*, 130 (1999) 262245.
- 3730 Shigenaga, M.K.: Quantitation of protein-bound 3-nitrotyrosine by high-performance liquid chromatography with electrochemical detection. *Methods Enzymol.*, 301 (1999) 27-40; *C.A.*, 130 (1999) 220014.
- 3731 Tabrizi-Fard, M.A., Maurer, T.S. and Fung, H.-L.: *In vivo* disposition of 3-nitro-L-tyrosine in rats: implications on tracking systemic peroxynitrite exposure. *Drug Metab. Disp.*, 27 (1999) 429-431.
- 3732 Takac, S., Calik, G., Aytar, M. and Ozdamar, T.H.: Separation kinetics of L-phenylalanine by ion-exchange process. *Biochem. Eng. J.*, 2 (1998) 101-112; *C.A.*, 130 (1999) 251248.
- 3733 Tokoroki, N., Shibata, K., Yamada, T., Kera, Y. and Yamada, R.-h.: Determination of N-methyl-D-aspartate in tissues of bivalves by high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 41-47.
- 3734 Török, G., Péter, A., Gaucher, A., Wakselman, M., Mazaleyra, J.-P. and Armstrong, D.W.: High-performance liquid chromatographic separation of novel atropic α,α -disubstituted- β -amino acids, either on different β -cyclodextrin-bonded phases or as their 1-fluoro-2,4-dinitrophenyl-5-L-alanine amide derivatives. *J. Chromatogr. A*, 846 (1999) 83-91.
- 3735 Tuchman, M. and McCann, M.T.: Phenylalanine and tyrosine quantification by stable isotope dilution liquid chromatography-mass spectrometry from filter paper blood spots. *Clin. Chem. (Washington)*, 45 (1999) 571-573.
- 3736 Wilson, R.F., Kamel, A., Adnane, M. and Yu, X.: Determination of hydroxy-2-ethylenediaminetriacetic acid (HEEDTA) and Fe-HEEDTA in nutrient solutions by ion pair reversed-phase high-performance liquid chromatography. *Microchem. J.*, 60 (1998) 266-270; *C.A.*, 130 (1999) 251377.
- See also 3278, 3357, 3399, 3446, 3536, 3555, 3701, 3997, 4047, 4306.
- 18b. *Peptides, peptidic and proteinous hormones, growth factors*
- 3737 Arcelloni, C., Aiuti, A., Cipponi, A. and Paroni, R.: High-performance liquid chromatographic purification and capillary electrophoresis quantification of the chemokine stromal cell-derived factor-1. *J. Chromatogr. B*, 729 (1999) 369-374.
- 3738 Charton, E., Wierer, M., Spieser, J.M., van Dorsselaer, A. and Rautmann, G.: A somatropin counterfeit challenging the European Pharmacopoeia monograph. *Pharm. Pharmacol. Commun.*, 5 (1999) 61-66; *C.A.*, 130 (1999) 257430.
- 3739 Curcuruto, O., Rovatti, L., Patorino, A.M. and Hamdan, M.: Peptide nitration by peroxynitrite: characterization of the nitration sites by liquid chromatography/tandem mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 156-163; *C.A.*, 130 (1999) 293590.
- 3740 Dai, Y., Lil, L., Roser, D.C. and Long, S.R.: Detection and identification of low-mass peptides and proteins from solvent suspensions of *Escherichia coli* by high performance liquid chromatography fractionation and matrix-assisted laser desorption/ionization mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 73-78; *C.A.*, 130 (1999) 207220.
- 3741 De Lucena, S.L., Carabonell, R.G. and Santana, C.C.: Peptide affinity chromatography process for adsorption of fibrinogen. *Powder Technol.*, 101 (1999) 173-177; *C.A.*, 130 (1999) 278257.
- 3742 Flinn, J.P., Pallaghy, P.K., Lew, M.J., Murphy, R., Angus, J.A. and Norton, R.S.: Role of disulfide bridges in the folding, structure and biological activity of ω -conotoxin GVIA. *Biochim. Biophys. Acta*, 1434 (1999) 177-190.
- 3743 Floridi, A., Trizza, V., Paolotti, P. and Lucarelli, C.: Analytical strategy for the assessment of the protein glycation status in uremic patients by high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 65-71.
- 3744 Girard, M. and Mousseau, N.: Analysis of human growth hormone by hydrophobic interaction HPLC. Method development, validation, and comparative selectivity to reversed phase HPLC. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1103-1116.

- 3745 Hagiwara, T., Yasuno, T., Suzuki, S. and Saito, K.: Determination of aspartame and diketopiperazine in food by liquid chromatography/atmospheric pressure chemical ionization-mass spectrometry. *Shokuhin Eiseigaku Zasshi*, 40 (1999) 62-67; C.A., 130 (1999) 222299.
- 3746 Higashimoto, Y., Kodama, H., Jelokhani-Niaraki, M., Kato, F. and Kondo, M.: Structure-function relationship of model Aib-containing peptides as ion transfer intermembrane templates. *J. Biochem. (Tokyo)*, 125 (1999) 705-712.
- 3747 Hoover, D.M., Schalk-Hihi, C., Chou, C.-C., Menon, S., Wlodawer, A. and Zdanov, A.: Purification of receptor complexes of interleukin-10. Stoichiometry and the importance of deglycosylation in their crystallization. *Eur. J. Biochem.*, 262 (1999) 134-141.
- 3748 Hummert, C., Reichelt, M., Legrand, C., Graneli, E. and Luckas, B.: Rapid clean-up and effective sample preparation procedure for unambiguous determination of the cyclic peptides microcystin and nodularin. *Chromatographia*, 50 (1999) 173-180.
- 3749 Iguchi, S., Kawasaki, K., Okamoto, H., Umezawa, C. and Okada, Y.: Synthesis of some pseudo-peptide analogs of thiol proteinase inhibitors. *Chem. Pharm. Bull.*, 47 (1999) 423-427.
- 3750 Kaerner, A. and Rabenstein, D.L.: Stability and structure-forming properties of the two disulfide bonds of α -conotoxin GI. *Biochemistry*, 38 (1999) 5459-5470.
- 3751 Kramell, R., Porzel, A., Miersch, O., Schneider, G. and Wastermack, C.: Chromatographic resolution of peptide-like conjugates of jasmonic acid and of cucurbitic acid isomers. *J. Chromatogr. A*, 847 (1999) 103-107.
- 3752 Kristiansen, K.R., Deding, A.S., Jensen, D.F., Ardoe, Y. and Qvist, K.B.: Influence of salt content on ripening of semi-hard round-eyed cheese of Danbo-type. *Milchwissenschaft*, 54 (1999) 19-23; C.A., 130 (1999) 181731.
- 3753 Lawton, L.A., McElhiney, J. and Edwards, C.: Purification of closely eluting hydrophobic microcystins (peptide cyanotoxins) by normal-phase and reversed-phase flash chromatography. *J. Chromatogr. A*, 848 (1999) 515-522.
- 3754 Lee, H.S., Jeong, C.K., Lee, H.M., Choi, S.J., Do, K.S., Kim, K. and Kim, Y.H.: On-line trace enrichment for the simultaneous determination of microcystins in aqueous samples using high-performance liquid chromatography with diode-array detection. *J. Chromatogr. A*, 848 (1999) 179-184.
- 3755 Malik, Z., Amir, S., Pál, G., Buzás, Z., Várallyay, É., Antal, J., Szilágyi, Z., Vékey, K., Asbóth, B., Patthy, A. and Gráf, L.: Proteinase inhibitors from desert locust, *Schistocerca gregaria*: engineering of both P₁ and P_{1'} residues converts a potent chymotrypsin inhibitor to a potent trypsin inhibitor. *Biochim. Biophys. Acta*, 1434 (1999) 143-150.
- 3756 Manna, L., Valvo, L. and Betto, P.: Determination of oxidized and reduced glutathione in pharmaceuticals by reversed-phase high-performance liquid chromatography with dual electrochemical detection. *J. Chromatogr. A*, 846 (1999) 59-64.
- 3757 Matsui, T., Tamaya, K., Kawasaki, T. and Osajima, Y.: Determination of angiotensin metabolites in human plasma by fluorimetric high-performance liquid chromatography using a heart-cut column-switching technique. *J. Chromatogr. B*, 729 (1999) 89-95.
- 3758 Murray, A., Spencer, D.I.R., Missailidis, S., Denton, G. and Price, M.R.: Design of ligands for the purification of anti-MUC1 antibodies by peptide epitope affinity chromatography. *J. Pept. Res.*, 52 (1998) 375-383; C.A., 130 (1999) 181194.
- 3759 Nilsson, C., Westman, A. and Ekman, R.: Tachykinins in porcine cortex: A comparative study using MSIA or conventional methods. *Adv. Mass Spectrom.*, 14 (1998) C011780/1-C011780/10; C.A., 130 (1999) 249048.
- 3760 Niwa, M., Enomoto, K. and Yamashita, K.: Measurement of the novel decapeptide cetorexil in human plasma and urine by liquid chromatography-electrospray ionization mass spectrometry. *J. Chromatogr. B*, 729 (1999) 245-253.
- 3761 Ouimet, P.M. and Kapoor, M.: Nucleotide binding and hydrolysis properties of *Neurospora crassa* cytosolic molecular chaperones, Hsp70 and Hsp80, heat-inducible members of the eukaryotic stress-70 and stress-90 families. *Biochem. Cell Biol.*, 77 (1999) 89-99.
- 3762 Péter, A., Tóth, G., Tömböly, C., Laus, G. and Tourwè, D.: Liquid chromatographic study of the enzymatic degradation of endomorphins, with identification by electrospray ionization mass spectrometry. *J. Chromatogr. A*, 846 (1999) 39-48.
- 3763 Predel, R., Brandt, W., Kellner, R., Rapus, J., Nachman, R.J. and Gäde, G.: Post-translational modifications of the insect sulfakinins. Sulfation, pyroglutamate-formation and O-methylation of glutamic acid. *Eur. J. Biochem.*, 263 (1999) 552-560.
- 3764 Reichelt, M., Hummert, C. and Luckas, B.: Hydrolysis of microcystins and nodularin by microwave radiation. *Chromatographia*, 49 (1999) 671-677.
- 3765 Rose, M.J., Rose, J.M., Lunte, S.M., Audus, K.L., Carlson, R.G. and Stobaugh, J.F.: Determination of angiotensin II in blood-brain barrier permeability studies using microbore LC with *p*-nitrophenyl-2,5-dihydroxyphenylacetate bis-tetrahydropyranyl ether as a pre-separation electrochemical labeling reagent. *Anal. Chim. Acta*, 394 (1999) 299-308.
- 3766 Sanz-Nebot, V., Toro, I. and Barbosa, J.: Fractionation and characterization of a crude peptide mixture from the synthesis of eledoisin by liquid chromatography-electrospray ionization mass spectrometry. *J. Chromatogr. A*, 846 (1999) 25-38.
- 3767 Sayegh, A.I., Anderson, N.V., Harding, J.W., Cerpovicz, P., DeBowes, R.M., Ritter, R.C., Baker, G.J. and Reeck, G.: Purification of two equine pepsinogens by use of high-performance liquid chromatography. *Am. J. Vet. Res.*, 60 (1999) 114-118; C.A., 130 (1999) 278751.
- 3768 Shi, G., Lu, J., Xu, F., Sun, W., Jin, L., Yamamoto, K., Tao, S. and Jin, J.: Determination of glutathione *in vivo* by microdialysis using liquid chromatography with a cobalt hexacyanoferrate chemically modified electrode. *Anal. Chim. Acta*, 391 (1999) 307-313.
- 3769 Sommerer, N., Septier, Ch., Salles, Ch. and le Quere, J.-L.: A liquid chromatography purification method to isolate small peptides from goat cheese for their mass spectrometry analysis. *Sci. Aliments*, 18 (1998) 537-551; C.A., 130 (1999) 251361.
- 3770 Sparidans, R.W., Kettenes-van den Bosch, J.J., van Tellingen, O., Nuyen, B., Henrar, R.E.C., Jimeno, J.M., Faircloth, G., Floriano, P., Rinehart, K.L. and Beijnen, J.H.: Bioanalysis of apolidine, a new marine antitumoral depsipeptide, in plasma by high-performance liquid chromatography after derivatization with *trans*-4'-hydrazino-2-stilbazole. *J. Chromatogr. B*, 729 (1999) 43-53.
- 3771 Takahashi, S., Geenen, D., Nieves, E. and Iwazumi, T.: Collagenase degrades collagen *in vivo* in the ischemic heart. *Biochim. Biophys. Acta*, 1428 (1999) 251-259.
- 3772 Vähätalo, H., Auriola, S. and Lapinjoki, S.: High-performance liquid chromatography-mass spectrometry of an osteocalcin derivative. *J. Chromatogr. A*, 846 (1999) 49-57.

- 3773 Van den Hooven, H.W., Appelman, A.W.J., Zey, T., de Wit, P.J.G.M. and Vervoort, J.: Folding and conformational analysis of AVR9 peptide elicitors of the fungal tomato pathogen *Cladosporium fulvum*. *Eur. J. Biochem.*, 264 (1999) 9-18.
- 3774 Wagschal, K., Triplet, B. and Hodges, R.S.: De novo design of a model peptide sequence to examine the effects of single amino acid substitutions in the hydrophobic core on both stability and oligomerization state of coiled-coils. *J. Mol. Biol.*, 285 (1999) 785-803; *C.A.*, 130 (1999) 263715.
- 3775 Yoshida, T. and Okada, T.: (Prediction of peptide retention time in normal phase liquid chromatography). *Chromatography*, 19 (1998) 376-377; *C.A.*, 130 (1999) 231614.

For additional information see *C.A.*:
130 (1999) 208441, 292098.

See also 3290, 3387, 3449, 3468, 3791, 3858, 4057, 4069.

18c. Elucidation of structure of proteins and enzymes

- 3776 Amoresano, A., Brancaccio, A., Andolfo, A., Perduca, M., Monaco, H.L. and Marino, G.: The carbohydrates of the isoforms of three avian riboflavin-binding proteins. *Eur. J. Biochem.*, 263 (1999) 849-858.
- 3777 Brennan, S.O., Fellowes, A.P. and George, P.M.: Albumin Banks Peninsula: a new termination variant characterised by electrospray mass spectrometry. *Biochim. Biophys. Acta*, 1433 (1999) 321-326.
- 3778 Hartog, A.F. and Berden, J.A.: One of the non-exchangeable nucleotides of the mitochondrial F₁-ATPase is bound at a β -subunit: evidence for a non-rotatory two-site catalytic mechanism. *Biochim. Biophys. Acta*, 1412 (1999) 79-93.
- 3779 Hashimoto, M. and Hatanaka, Y.: Identification of photolabeled peptides for the acceptor substrate binding domain of β 1,4-galactosyltransferase. *Chem. Pharm. Bull.*, 47 (1999) 667-671.
- 3780 Hughes, G.J., Reason, A.J., Savoy, L.-A., Jaton, J.-C. and Frutiger-Hughes, S.: Carbohydrate moieties in human secretory component. *Biochim. Biophys. Acta*, 1434 (1999) 86-93.
- 3781 Kobayashi, H., Usami, T., Fujisawa, Y., Kano, T., Umeda, T. and Tsunaki, T.: (Comparison of peaks separated by HPLC and spots of 2D electrophoresis of *C. elegans* protein using MALDI-TOF mass spectrometry of tryptic peptides). *Chromatography*, 19 (1998) 346-347; *C.A.*, 130 (1999) 278883.
- 3782 Tanaka, K., Kajiyama, N., Ishikura, K., Waga, S., Kikuchi, A., Ohtomo, K., Takagi, T. and Mizuno, S.: Determination of the site of disulfide linkage between heavy and light chains of silk fibroin produced by *Bombyx mori*. *Biochim. Biophys. Acta*, 1432 (1999) 92-103.
- 3783 Vankova, H.: (Peptide maps). *Chem. Listy*, 93 (1999) 120-127; *C.A.*, 130 (1999) 179429 - a review with 69 refs.

See also 3843, 3866, 3876, 3879, 3883, 3913, 3966, 3968, 3992, 3999.

19. PROTEINS

19a. General techniques

- 3784 Bosma, J.C. and Wesselingh, J.A.: pH Dependence of ion-exchange equilibrium of proteins. *AIChE J.*, 44 (1998) 2399-2409; *C.A.*, 130 (1999) 278757.
- 3785 Dent, A.H. and Aslam, M.: The characterization of protein conjugates. In: Aslam, M. and Dent, A.H. (Editors), *Bioconjugation*, Macmillan Reference, London, 1998, pp. 665-734; *C.A.*, 130 (1999) 264153 - a review with 400 refs.
- 3786 Hall, D.R. and Winzor, D.J.: Reassessment of the calibration constant for the IAsys biosensor. *J. Chromatogr. A*, 844 (1999) 395-401.
- 3787 Hamaker, K., Rau, Sh.-L., Hendrickson, R., Liu, J., Ladisch, Ch.M. and Ladisch, M.R.: Rolled stationary phases: dimensionally structured textile adsorbents for rapid liquid chromatography of proteins. *Ind. Eng. Chem. Res.*, 38 (1999) 865-872; *C.A.*, 130 (1999) 264204.
- 3788 Hazen, S.L., Hsu, F.F., Gaut, J.P., Crowley, J.R. and Heinecke, J.W.: Modification of proteins and lipids by myeloperoxidase. *Methods Enzymol.*, 300 (1999) 88-105; *C.A.*, 130 (1999) 220095.
- 3789 Hennig, L. and Schafer, E.: Protein purification with C-terminal fusion of maltose binding protein. *Protein Expression Purif.*, 14 (1998) 367-370; *C.A.*, 130 (1999) 220138.
- 3790 Igonina, L.M., Korradini, D., Glazova, N.V., Elkin, G.E. and Kannaars, J.: (Effect of metal(II) ions on the order of protein elution in ion-exchange high-performance liquid chromatography). *Zh. Prikl. Khim. (S.-Peterburg)*, 71 (1998) 1094-1097; *C.A.*, 130 (1999) 264209.
- 3791 Issaeva, T., Kourganov, A. and Unger, K.: Super-high-speed liquid chromatography of proteins and peptides on non-porous Micra NPS-RP packings. *J. Chromatogr. A*, 846 (1999) 13-23.
- 3792 Kiyonami, R., Kubota, M., Maeda, Y., Ikezawa, H. and Land, A.: (Identification of proteins using an ion trap mass spectrometer-LCQ). *Nippon Iyo Masu Supekutoru Gakkai Keonshu*, 23 (1998) 105-108; *C.A.*, 130 (1999) 179552.
- 3793 Kundu, A., Vunnum, S. and Cramer, S.M.: Displacement chromatography of proteins using low molecular weight anionic displacers. *Adsorption*, 4 (1998) 373-381. *C.A.*, 130 (1999) 293433.
- 3794 McNay, J.L. and Fernandez, E.J.: How does a protein unfold on a reversed-phase liquid chromatography surface? *J. Chromatogr. A*, 849 (1999) 135-148.
- 3795 Purcell, A.W., Aguilar, M.-I. and Hearn, M.T.W.: Probing the binding behavior and conformational states of globular proteins in reversed-phase high-performance liquid chromatography. *Anal. Chem.*, 71 (1999) 2440-2451.
- 3796 Robinson, F.D., Gadgil, H. and Jarrett, H.W.: Comparative studies on chemically and enzymatically coupled DNA-Sepharose columns for purification of a lac repressor chimeric fusion protein. *J. Chromatogr. A*, 849 (1999) 403-412.
- 3797 Sane, S.U., Cramer, S.M. and Przybycien, T.M.: Protein structure perturbations on chromatographic surfaces. *J. Chromatogr. A*, 849 (1999) 149-159.

- 3798 Sasagawa, N., Saito, K., Sugita, K., Kunori, S.-i. and Sugo, T.: Ionic crosslinking of SO₃H-group-containing graft chains helps to capture lysozyme in a permeation mode. *J. Chromatogr. A*, 848 (1999) 161-168.
- 3799 Takeuchi, T. and Miwa, T.: (Indirect fluorometric detection of proteins in liquid chromatography). *Chromatography*, 19 (1998) 258-259; *C.A.*, 130 (1999) 278746.
- 3800 Vincentelli, J., Paul, C., Azarkan, M., Guermant, C., El Mousaoui, A. and Looze, Y.: Evaluation of the polyethylene glycol-KF-water system in the context of purifying PEG-protein adducts. *Int. J. Pharm.*, 176 (1999) 241-249; *C.A.*, 130 (1999) 286863.
- 3801 Wang, Q., Luo, G., Ou, J. and Yeung, W.S.B.: Noncompetitive immunoassays using protein G affinity capillary chromatography and capillary electrophoresis with laser-induced fluorescence detection. *J. Chromatogr. A*, 848 (1999) 139-148.
- 3802 Yates, J.R., III, Carmack, E., Hays, L., Link, A.J. and Eng, J.K.: Automated protein identification using microcolumn liquid chromatography-tandem mass spectrometry. *Methods Mol. Biol.*, 112 (1999) 553-569; *C.A.*, 130 (1999) 206904.
- 3803 Zhou, D., Zou, H., Ni, J., Wang, H., Yang, C. and Zhang, Y.: Membrane affinity chromatography for analysis and purification of biopolymers. *Chromatographia*, 50 (1999) 27-34.
- For additional information see *C.A.*:
130 (1999) 179591, 236489, 293612.
- See also 3318, 3381, 3387, 3423, 3449, 4028.
- 19b. *Proteins of cells, viruses and subcellular particles*
- 3804 Chen, Y., Wall, D. and Lubman, D.M.: Rapid identification and screening of proteins from whole cell lysates of human erythroleukemia cells in the liquid phase, using non-porous reversed phase high-performance liquid chromatography separations of proteins followed by multi-assisted laser desorption-ionization mass spectrometry analysis and sequence database searching. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1994-2003; *C.A.*, 130 (1999) 193932.
- 3805 Cheng, Z., Lin, Q.F., Jin, X.H., Wang, F., Bai, H.S., Chen, D.M., Fan, H.Q. and Du, J.: Quality control of 99mTc-DTPA-octreotide by reverse high performance liquid chromatography. *J. Radioanal. Nucl. Chem.*, 236 (1998) 97-101; *C.A.*, 130 (1999) 219883.
- 3806 Deubel, V.: (Preparation and application of recombinant envelope proteins for diagnosing the dengue virus using immunoassays). PCT Int. Appl. WO 9909414 A1 25 Feb 1999, 40 pp.; *C.A.*, 130 (1999) 193973.
- 3807 Diamantopoulos, G.S., Scheel, J., Kreis, T.E. and Rickard, J.E.: Purification and assay of CLIP-170. *Methods Enzymol.*, 298 (1998) 197-206; *C.A.*, 130 (1999) 206924.
- 3808 Field, Ch., Oegema, K., Zheng, Y., Mitchinson, T.J. and Walczak, C.E.: Purification of cytoskeletal proteins using peptide antibodies. *Methods Enzymol.*, 298 (1998) 525-541; *C.A.*, 130 (1999) 220108.
- 3809 Kumar, J., Toyoshima, I. and Sheetz, M.P.: Isolation and characterization of kinectin. *Methods Enzymol.*, 298 (1998) 185-197; *C.A.*, 130 (1999) 206923.
- 3810 Zheng, Y., Wong, M.L., Alberts, B. and Mitchison, T.: Purification and assay of γ tubulin ring complex. *Methods Enzymol.*, 298 (1998) 218-228; *C.A.*, 130 (1999) 206926.
- See also 3869, 3888.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*
- 3811 Balland, A., Mahan-Boyce, J.A., Krasts, D.A., Daniels, M., Wang, W. and Gombotz, W.R.: Characterization of the isoforms of PIXY321, a granulocyte-macrophage-colony stimulating factor-interleukin-3 fusion protein, separated by preparative isoelectric focusing on immobilized pH gradients. *J. Chromatogr. A*, 846 (1999) 143-156.
- 3812 Barnthouse, K.A., Trompeter, W., Jones, R., Inampudi, P., Rupp, R. and Cramer, S.M.: Cation-exchange displacement chromatography for the purification of recombinant protein therapeutics from variants. *J. Biotechnol.*, 66 (1998) 125-136; *C.A.*, 130 (1999) 208846.
- 3813 Park, J.-H., Choi, E.-A., Cho, E.-W., Hahm, K.-S. and Kim, K.L.: Maltose binding protein (MBP) fusion proteins with low or no affinity to amylose resins can be single-step purified using a novel anti-MBP monoclonal antibody. *Mol. Cells*, 8 (1998) 709-716; *C.A.*, 130 (1999) 234144.
- 3814 Rais-Beghdadi, C., Roggero, M.A., Fasel, N. and Reymond, Ch.D.: Purification of recombinant proteins by chemical removal of the affinity tag. *Appl. Biochem. Biotechnol.*, 74 (1998) 95-103; *C.A.*, 130 (1999) 179576.
- 3815 Zhang, Ch. and Glatz, Ch.E.: Process engineering strategy for recombinant protein recovery from canola by cation exchange chromatography. *Biotechnol. Prog.*, 15 (1999) 12-18; *C.A.*, 130 (1999) 179453.
- For additional information see *C.A.*:
130 (1999) 251215.
- See also 3655, 3796, 3833, 3838, 3839, 3850, 3868, 3869, 3917, 3922.
- 19d. *Microbial and plant proteins*
- 3816 Baniel, A., Bertrand, D., Lelion, A. and Gueguen, J.: Variability in protein composition of pea seed studied by FPLC and multidimensional analysis. *Crop Sci.*, 38 (1998) 1568-1575; *C.A.*, 130 (1999) 234138.
- 3817 Guerra, M., Gonzalez, M., Hung, B. and Martinez, R.: (Determination of proteins in Santiago de Cuba distillery slops). *Rev. Cubana Quim.*, 10 (1998) 18-22; *C.A.*, 130 (1999) 209052.
- 3818 Hefford, M.A., Dupont, C., MacCallum, J., Parker, M.H. and Beauregard, M.: Characterization of MB-1. A dimeric helical protein with a compact core. *Eur. J. Biochem.*, 262 (1999) 467-474.
- 3819 Hellebust, H., Bergseth, S. and Orning, L.: Expression of the second epidermal growth factor-like domain of human factor VII in *Escherichia coli*. *J. Biotechnol.*, 66 (1998) 203-210; *C.A.*, 130 (1999) 192477.

- 3820 Kamogae, M., Miya, N., Pereira, J.L. and Hirooka, E.Y.: (Dye ligand Red A affinity chromatography versus ion exchange plus gel filtration column: comparison of the practicality in staphylococcal enterotoxin A purification). *Cienc. Tecnol. Aliment.*, 18 (1998) 165-168; *C.A.*, 130 (1999) 192826.
- 3821 Kelleher, J.F., Mullins, R.D. and Pollard, Th.D.: Purification and assay of the Arp2/3 complex from *Acanthamoeba castellanii*. *Methods Enzymol.*, 298 (1998) 42-51; *C.A.*, 130 (1999) 206919.
- 3822 Kitano, K., Niimura, Y., Nishiyama, Y. and Miki, K.: Stimulation of peroxidase activity by decamerization related to ionic strength: AhpC protein from *Amphibacillus xylanus*. *J. Biochem. (Tokyo)*, 126 (1999) 313-319.
- 3823 Krishnamurthy, Th., Davis, M.T., Stahl, D.C. and Lee, T.D.: Liquid chromatography/microspray mass spectrometry for bacterial investigations. *Rapid Commun. Mass Spectrom.*, 13 (1999) 39-49; *C.A.*, 130 (1999) 207219.
- 3824 Kudo, Y., Kumaga, T., Fukuchi, Y., Ebina, K. and Yokota, K.: Binding of Asp-hemolysin from *Aspergillus fumigatus* to oxidized low density protein. *Biol. Pharm. Bull.*, 22 (1999) 549-550.
- 3825 Nesterenko, M.V., Woods, K. and Upton, S.J.: Receptor/ligand interactions between *Cryptosporidium parvum* and the surface of the host cell. *Biochim. Biophys. Acta*, 1454 (1999) 165-173.
- 3826 Newsome, W.H. and Abbott, M.: An immunoaffinity column for the determination of peanut protein in chocolate. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 666-668.
- 3827 Rasooly, A. and Ito, Y.: Toroidal coil countercurrent chromatography separation and analysis of Staphylococcal enterotoxin A (SEA) in milk. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1285-1293.
- 3828 Roy, S.K., Hiyaama, T. and Nakamoto, H.: Purification and characterization of the 16-kDa heat-shock-responsive protein from the thermophilic cyanobacterium *Synechococcus vulcanus* which is an α -crystallin-related, small heat shock protein. *Eur. J. Biochem.*, 262 (1999) 406-416.
- 3829 Salzer, U., Kubicek, M. and Prohaska, R.: Isolation, molecular characterization, and tissue-specific expression of ECP-51 and ECP-54 (TIP49), two homologous, interacting erythroid cytosolic proteins. *Biochim. Biophys. Acta*, 1446 (1999) 365-370.
- 3830 Shiloach, J. and Kaufman, J.B.: The combined use of expanded-bed adsorption and gradient elution for capture and partial purification of mutant diphtheria toxin (CRM 9) from *Corynebacterium diphtheriae*. *Sep. Sci. Technol.*, 34 (1999) 29-40; *C.A.*, 130 (1999) 263234.
- 3831 Smallwood, M., Worrall, D., Byass, L., Elias, L., Ashford, D., Doucet, C.J., Holt, C., Telford, J., Lillford, P. and Bowles, D.J.: Isolation and characterization of a novel antifreeze protein from carrot (*Daucus carota*). *Biochem. J.*, 340 (1999) 385-391.
- 3832 Striebel, H.-M. and Kalousek, F.: Eukaryotic precursor proteins are processed by *Escherichia coli* outer membrane protein OmpP. *Eur. J. Biochem.*, 262 (1999) 832-839.
- 3833 Tchorzewski, M., Boguszeska, A., Abramczyk, D. and Grankowski, N.: Overexpression in *Escherichia coli*, purification, and characterization of recombinant 60S ribosomal acidic proteins from *Saccharomyces cerevisiae*. *Protein Expression Purif.*, 15 (1999) 40-47; *C.A.*, 130 (1999) 292194.
- 3834 Wang, M., Dai, J. and Gu, W.: (Determination of molecular weight distribution of oligopeptide in corn protein hydrolyzate by gel filtration chromatography). *Shipin Yu Fajiao Gongye*, 24 (1998) 25-27; *C.A.*, 130 (1999) 195878.

For additional information see *C.A.*:
130 (1999) 206978.

See also 3595, 3740, 3974.

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

- 3835 Caughey, D.J., Narhi, L.O., Kita, Y., Meng, S.-Y., Wen, D., Chen, W., Ratzkin, B.J., Fujimoto, J., Iwahara, T., Yamamoto, T. and Arakawa, T.: Fractionation of polyclonal antibodies to fragments of a neuroreceptor using three increasingly chaotropic solvents. *J. Chromatogr. B*, 728 (1999) 49-57.
- 3836 Chen, J., Liu, C., Lu, J. and Lin, J.: (Preparation and application of anti-NGF affinity chromatography column). *Jinan Daxue Xuebao, Ziran Kexue Yu Yixueban*, 19 (1998) 104-115; *C.A.*, 130 (1999) 234120.
- 3837 Deorkar, N., Vanderbeck, E., Mascoli, C.C. and Roy, S.K.: Separation of immunoglobulin G using a novel affinity-like high-throughput chromatographic medium. *Am. Biotechnol. Lab.*, 17 (1999) 24-28; *C.A.*, 130 (1999) 221782.
- 3838 Ejima, D., Watanabe, M., Sato, Y., Date, M., Yamada, N. and Takahara, Y.: High yield refolding and purification process for recombinant human interleukin-6 expressed in *Escherichia coli*. *Biotechnol. Bioeng.*, 62 (1999) 301-310; *C.A.*, 130 (1999) 179454.
- 3839 Fahrner, R.L. and Blank, G.S.: Real-time control of antibody loading during protein A affinity chromatography using an on-line assay. *J. Chromatogr. A*, 849 (1999) 191-196.
- 3840 Fernandez, A.Z., Tablante, A., Beguín, S., Hemker, H.C. and Apitz-Castro, R.: Draculin, the anticoagulant factor in vampire bat saliva, is a tight-binding, noncompetitive inhibitor of activated factor X. *Biochim. Biophys. Acta*, 1434 (1999) 135-142.
- 3841 Grodecka, B. and Bukowska, B.: (Method of purifying human G, A and M immunoglobulins). *Pol. PL 170067 B1 31 Oct 1996*, 4 pp.; *C.A.*, 130 (1999) 222105.
- 3842 Grover, P.K. and Ryall, R.L.: Inhibition of calcium oxalate crystal growth and aggregation by prothrombin and its fragments *in vitro*. Relationship between protein structure and inhibitory activity. *Eur. J. Biochem.*, 263 (1999) 50-56.
- 3843 Hämäläinen, M.M., Eskola, J.U., Hellman, J. and Pulkki, K.: Major interference from leukocytes in reverse transcription-PCR identified as neurotoxin ribonuclease from eosinophils: detection of residual chronic myelogenous leukemia from cell lysates by use of an eosinophil-depleted cell preparation. *Clin. Chem. (Washington)*, 45 (1999) 465-471.
- 3844 Hansson, U.-B. and Wingren, C.: Separation of antibodies by liquid-liquid aqueous partition and by liquid-liquid partition chromatography. *Sep. Purif. Methods*, 27 (1998) 169-211; *C.A.*, 130 (1999) 234096 - a review with 90 refs.
- 3845 Harley, S.L. and Powell, J.T.: Fibrinogen up-regulates the expression of monocyte chemoattractant protein 1 in human saphenous vein endothelial cells. *Biochem. J.*, 341 (1999) 739-744.

- 3846 Hoffer, L., Schwinn, H. and Josic, D.: Production of highly purified clotting factor IX by a combination of different chromatographic methods. *J. Chromatogr. A*, 844 (1999) 119-128.
- 3847 Kameh, H., Landolt-Marticorena, C., Charuk, J.H.M., Schachter, H. and Reithmeier, R.A.F.: Structural and functional consequences of an N-glycosylation mutation (HEMPAS) affecting human erythrocyte membrane glycoproteins. *Biochem. Cell Biol.*, 76 (1998) 823-835.
- 3848 Kristensen, P., Rasmussen, D.E. and Kristensen, B.I.: Properties of thiol-specific anti-oxidant protein or calpromotin in solution. *Biochem. Biophys. Res. Commun.*, 262 (1999) 127-131.
- 3849 Loginska, Z.V., Orishchenko, N.V., Vus, M.M., Magerovskii, Yu.V., Gaida, G.Z. and Gaida, A.V.: (Thrombin and antithrombin III chromatography on biospecific silochromes). *Ukr. Biokhim. Zh.*, 70 (1998) 63-68; *C.A.*, 130 (1999) 271902.
- 3850 Matejtschuk, P., Baker, R.M. and Chapman, G.E.: Purification and characterization of monoclonal antibodies. In: Subramanian, G. (Editor), *Biosep. Bioprocess.*, Vol. 2, Wiley-VCH Verlag, Weinheim, 1998, pp. 223-252; *C.A.*, 130 (1999) 236049 - a review with 147 refs.
- 3851 Ni, B., Zhou, J.-X. and Dong, Y.-L.: (Purification, identification, and antisera of multicatalytic proteinase from rat skeletal muscle). *Zhongguo Shengwu Huaxue Yu Fenzi Shengwu Xuebao*, 14 (1998) 736-741; *C.A.*, 130 (1999) 233866.
- 3852 Tanaka, K., Sawatani, E., Shigueoka, E.M., Campos, T.C.X.B., Nakao, H.C., Dias, G.A., Fujita, R.K. and Arashiro, F.: A chromatographic method for the production of a human immunoglobulin G solution for intravenous use. *Braz. J. Med. Biol. Res.*, 31 (1998) 1375-1381; *C.A.*, 130 (1999) 227611.
- 3853 Tanaka, K., Shigueoka, E.M., Sawatani, E., Dias, G.A., Arashiro, F., Campos, T.C.X.B. and Nakao, H.C.: Purification of human albumin by the combination of the method of Cohn with liquid chromatography. *Braz. J. Med. Biol. Res.*, 31 (1998) 1383-1388; *C.A.*, 130 (1999) 227612.
- 3854 Taylor, A.M. and Watts, A.: Spin-label studies of lipid-protein interactions with reconstituted band 3, the human erythrocyte chloride-bicarbonate exchanger. *Biochem. Cell Biol.*, 76 (1998) 815-822.
- 3855 Zhang, W.-M., Finne, P., Leinonen, J., Vesalainen, S., Nordling, S. and Stenman, U.-H.: Measurement of the complex between prostate-specific antigen and α_1 protease inhibitor in serum. *Clin. Chem. (Washington)*, 45 (1999) 814-821.
- For additional information see *C.A.*:
130 (1999) 179623, 249117, 266357.
- See also 3315, 3591, 3777, 4330, 4331, 4333.
- 19f. *Structural and muscle proteins*
- 3856 Chevet, E., Lemaitre, G., Cailleret, K., Dahan, S., Bergeron, J.J.M. and Katinka, M.D.: Identification and characterization of an intracellular protein complex that binds fibroblast growth factor-2 in bovine brain. *Biochem. J.*, 341 (1999) 713-723.
- 3857 Ciszak, L., Krawczenko, A., Polzar, B., Mannherz, H.G. and Malicka-Blaszkiewicz, M.: Carp liver actin: isolation, polymerization and interaction with deoxyribonuclease I (DNase I). *Biochim. Biophys. Acta*, 1451 (1999) 141-152.
- 3858 Farrugia, C.A., Farrugia, I.V. and Groves, M.J.: Comparison of the molecular weight distribution of gelatin fractions by size-exclusion chromatography and light scattering. *Pharm. Pharmacol. Commun.*, 4 (1998) 559-562; *C.A.*, 130 (1999) 286939.
- 3859 Fernandes, R.J. and Eyre, D.R.: The elastin-like protein matrix of lamprey branchial cartilage is cross-linked by lysyl pyridinoline. *Biochem. Biophys. Res. Commun.*, 261 (1999) 635-640.
- 3860 Harrison, C.A. and Tan, J.S.: Differential size-exclusion chromatography for the analysis of gelatin-polyelectrolyte complexes. *J. Polym. Sci., Part B: Polym. Phys.*, 37 (1999) 275-280; *C.A.*, 130 (1999) 223782.
- 3861 Luo, Y., Leszyk, J., Qian, Y., Gergely, J. and Tao, T.: Residues 48 and 82 at the N-terminal hydrophobic pocket of rabbit skeletal muscle troponin-C photo-cross-link to Met121 of troponin-I. *Biochemistry*, 38 (1999) 6678-6688.
- 3862 Schmidt, J.M., Zhang, J., Lee, H.-S., Stromer, M.H. and Robson, R.M.: Interaction of talin with actin: sensitive modulation of filament crosslinking activity. *Arch. Biochem. Biophys.*, 366 (1999) 139-150.
- 3863 Viner, R.I., Ferrington, D.A., Williams, T.D., Bigelow, D.J. and Schöneich, C.: Protein modification during biological aging: selective tyrosine nitration of the SERCA2a isoform of the sarcoplasmic reticulum Ca^{2+} -ATPase in skeletal muscle. *Biochem. J.*, 340 (1999) 657-669.
- See also 3782.
- 19g. *Protamines, histones and other nuclear proteins*
- 3864 Gohshi, T., Shimada, M., Kawahire, S., Imai, N., Ichimura, T., Omata, S. and Horigome, T.: Molecular cloning of mouse p47, a second group mammalian RuvB DNA helicase-like protein: homology with those from human and *Saccharomyces cerevisiae*. *J. Biochem. (Tokyo)*, 125 (1999) 939-946.
- 19h. *Chromoproteins and metalloproteins*
- 3865 Blakney, G.B., Higgins, T.N. and Holmes, D.J.: Comparison of hemoglobin A1C results by two different methods on patients with structural hemoglobin variants. *Clin. Biochem.*, 31 (1998) 619-626; *C.A.*, 130 (1999) 249080.
- 3866 Keller, H., Lieb, B., Altenhein, B., Gebauer, D., Richter, S., Stricker, S. and Markl, J.: Abalone (*Haliotis tuberculata*) hemocyanin type 1 (HtH1). Organization of the \approx 400 kDa subunit and amino acid sequence of its functional units *f*, *g* and *h*. *Eur. J. Biochem.*, 264 (1999) 27-38.
- 3867 Kuwada, M., Maki, J. and Hasumi, H.: A two-step purification of cytochrome P-450 from pig testis by cholesterol affinity column chromatography. *Biochem. Arch.*, 14 (1998) 307-317; *C.A.*, 130 (1999) 178970.
- 3868 Lepesheva, G.I., Strushkevich, N.V. and Usanov, S.A.: Conformational dynamics and molecular interaction reactions of recombinant cytochrome P450scc (CYP11A1) detected by fluorescence energy transfer. *Biochim. Biophys. Acta*, 1434 (1999) 31-43.
- 3869 Nakamura, M., Saeki, K. and Takahashi, Y.: Hyperproduction of recombinant ferredoxins in *Escherichia coli* by coexpression of the ORF1-ORF2-iscS-iscU-iscA-hscB-hscA-fox-ORF3 gene cluster. *J. Biochem. (Tokyo)*, 126 (1999) 10-18.

- 3870 Sayers, Z., Brouillon, P., Svergun, D.I., Zielenkiewicz, P. and Koch, M.H.J.: Biochemical and structural characterization of recombinant copper-metallothionein from *Saccharomyces cerevisiae*. *Eur. J. Biochem.*, 262 (1999) 858-865.
- 3871 Schwaneberg, U., Sprauer, A., Schmidt-Dannert, C. and Schmid, R.D.: P450 Monooxygenase in biotechnology. I. Single-step, large-scale purification method for cytochrome P450 BM-3 by anion-exchange chromatography. *J. Chromatogr. A*, 848 (1999) 149-159.
- See also 3599, 4331, 4333.
- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 3872 Lee, J.-W., Seu, J.-H., Rhee, I.-K., Jin, I., Kawamura, Y. and Park, W.: Purification and characterization of brevipain, a heterogenous two-chain fibrinolytic enzyme from the venom of Korean snake, *Agkistrodon blomhoffii brevicaudus*. *Biochem. Biophys. Res. Commun.*, 260 (1999) 665-670.
- 3873 Lieske, B., Faber, W. and Konrad, G.: Effect of pH on the size fractionation of bovine casein micelles by porous glass chromatography. *Milchwissenschaft*, 54 (1999) 9-13; *C.A.*, 130 (1999) 181649.
- 3874 Martin, G., Sorokine, O., Moniatte, M., Bolet, P., Hetru, C. and van Dorsselaer, A.: The structure of a glycosylated protein hormone responsible for sex determination of the isopod, *Armadillidium vulgare*. *Eur. J. Biochem.*, 262 (1999) 727-736.
- 3875 Prasad, N.B., Uma, B., Bhatt, S.K.G. and Gowda, V.T.: Comparative characterisation of Russell's viper (*Daboia/Vipera russelli*) venoms from different regions of the Indian peninsula. *Biochim. Biophys. Acta*, 1428 (1999) 121-136.
- 3876 Recio, I. and Visser, S.: Identification of two distinct antibacterial domains within the sequence of bovine α_{s2} -casein. *Biochim. Biophys. Acta*, 1428 (1999) 314-326.
- 3877 Serrano, S.M.T., Reichl, A.P., Mentele, R., Auerswald, E.A., Santoro, M.L., Sampaio, C.A.M., Camargo, A.C.M. and Assakura, M.T.: A novel phospholipase A2, BJ-PLA2, from the venom of the snake *Bothrops jararaca*: purification, primary structure analysis and its characterization as a platelet-aggregation-inhibiting factor. *Arch. Biochem. Biophys.*, 367 (1999) 26-32.
- 3878 Wang, F.C., Parcej, D.N. and Dolly, J.O.: α Subunit compositions of the Kv1.1-containing K⁺ channel subtypes fractionated from rat brain using dendrotoxins. *Eur. J. Biochem.*, 263 (1999) 230-237.
- For additional information see C.A.: 130 (1999) 266618, 281142.
- See also 3967.
- 19j. *Proteins of brain, cerebrospinal fluid and eye*
- 3879 Banerjee, A.: A monoclonal antibody to α -tubulin: purification of functionally active α -tubulin isoforms. *Biochemistry*, 38 (1999) 5438-5446.
- 3880 Koike, H., Seki, H., Kouchi, Z., Ito, M., Kinouchi, T., Tomioka, S., Sorimachi, H., Saido, T.C., Maruyama, K., Suzuki, K. and Ishiura, S.: Thimet oligopeptidase cleaves the full-length Alzheimer amyloid precursor protein at a β -secretase cleavage site in COS cells. *J. Biochem. (Tokyo)*, 126 (1999) 235-242.
- 3881 Ostrander, D.B., Ernst, E.G., Lavoie, T.B. and Gorman, J.A.: Polyproline binding is an essential function of human profilin in yeast. *Eur. J. Biochem.*, 262 (1999) 26-35.
- 3882 Paik, S.R., Shin, H.-J., Lee, J.-H., Chang, C.-S. and Kim, J.: Copper(II)-induced self-oligomerization of α -synuclein. *Biochem. J.*, 340 (1999) 821-828.
- 3883 Paudel, H.K. and Li, W.: Heparin-induced conformational change in microtubule-associated protein tau as detected by chemical cross-linking and phosphopeptide mapping. *J. Biol. Chem.*, 274 (1999) 8029-8038.
- 3884 Qu, Z., Kao, K., Szuki, S., Taniguchi, T. and Ishida, N.: Detection of PERIOD/PAS-binding proteins from rat brain nuclear extracts by affinity chromatography. *Neurosci. Lett.*, 259 (1999) 59-61; *C.A.*, 130 (1999) 249868.
- 3885 Sandmeier, E., Hunziker, P., Kunz, B., Sack, R. and Christen, P.: Spontaneous deamidation and isomerization of Asn108 in prion peptide 106-126 and in full-length prion protein. *Biochem. Biophys. Res. Commun.*, 261 (1999) 578-583.
- 3886 Simonovic, M., Soskic, V. and Joksimovic, J.: Purification of Gai.2 subunit from bovine brain by affinity chromatography. *Jugosl. Med. Biochem.*, 17 (1998) 385-389; *C.A.*, 130 (1999) 278747.
- 3887 Van Noort, J.M., van Veelen, P. and Hopstaken, F.: Purification of the stress protein α B-crystallin and its differentially phosphorylated forms. *J. Immunol. Methods*, 221 (1998) 159-168; *C.A.*, 130 (1999) 234119.
- For additional information see C.A.: 130 (1999) 247466.
- See also 3856, 3951, 3967.
- 19k. *Proteins of neoplastic tissue and transformed cells*
- 3888 Chong, B.E., Lubman, D.M., Rosenspire, A. and Miller, F.: Protein profiles and identification of high performance liquid chromatography isolated proteins of cancer cell lines using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry. *Rapid Commun. Mass Spectrom.*, 12 (1998) 1986-1993; *C.A.*, 130 (1999) 195093.
- 3889 Jensen, T.B., Hilsted, L. and Rehfeld, J.F.: Library of sequence-specific radioimmunoassays for human chromogranin A. *Clin. Chem. (Washington)*, 45 (1999) 549-560.
- For additional information see C.A.: 130 (1999) 208822.
- 19l. *Specific binding and receptor proteins*
- 3890 Anders, J., Blüggel, M., Meyer, H.E., Kühne, R., ter Laak, A.M., Kojro, E. and Fahrenholz, F.: Direct identification of the agonist binding site in the human brain cholecystokinin_B receptor. *Biochemistry*, 38 (1999) 6043-6055.
- 3891 Battersby, J.E., Vanderlaan, M. and Jones, A.J.S.: Purification and quantitation of tumor necrosis factor receptor immunoadhesin using a combination of immunoaffinity and reversed-phase chromatography. *J. Chromatogr. B*, 728 (1999) 21-33.
- 3892 Gadgil, H. and Jarrett, H.W.: Heparin elution of transcription factors from DNA-Sepharose columns. *J. Chromatogr. A*, 848 (1999) 131-138.

- 3893 Herbertsson, H., Kühme, T. and Hammarström, S.: The 650-kDa 12(S)-hydroxyeicosatetraenoic acid binding complex: occurrence in human platelets, identification of Hsp90 as a constituent, and binding properties of its 50-kDa subunit. *Arch. Biochem. Biophys.*, 367 (1999) 33-38.
- 3894 Holm, J., Hansen, S.I., Hoier-Madsen, M., Birn, H. and Helkjaer, P.-E.: High affinity folate receptor in human ovary, serum ovarian adenocarcinoma and ascites: radioligand binding mechanism, molecular size, ionic properties, hydrophobic domain and immunoreactivity. *Arch. Biochem. Biophys.*, 366 (1999) 183-191.
- 3895 Johnson, K.L., Veenstra, T.D., Londowski, J.M., Tomlinson, A.J., Kumar, R. and Naylor, S.: Online sample clean-up and chromatography coupled with electrospray ionization mass spectrometry to characterize the primary sequence and disulfide bond content of recombinant calcium binding proteins. *Biomed. Chromatogr.*, 13 (1999) 39-45; *C.A.*, 130 (1999) 293588.
- 3896 Kasai, S.: Occurrence of P-flavin binding protein in *Vibrio fischeri* and properties of the protein. *J. Biochem. (Tokyo)*, 126 (1999) 307-312.
- 3897 Kumar, R. and Prasad, R.: Purification and characterization of a major zinc binding protein from renal brush border membrane of rat. *Biochim. Biophys. Acta*, 1428 (1999) 23-32.
- 3898 Li, H. and Zassenhaus, H.P.: Purification and characterization of an RNA dodecamer sequence binding protein from mitochondria of *Saccharomyces cerevisiae*. *Biochem. Biophys. Res. Commun.*, 261 (1999) 740-745.
- 3899 Montero-Lomeli, M. and Facanha, A.L.O.: Expression of a mammalian Na⁺/H⁺ antiporter in *Saccharomyces cerevisiae*. *Biochem. Cell Biol.*, 77 (1999) 25-31.
- 3900 Nelson, T.J., Zhao, W.-Q., Yuan, S., Favitt, A., Pozzo-Miller, L. and Alkon, D.L.: Calcixitin interaction with neuronal ryanodine receptors. *Biochem. J.*, 341 (1999) 423-433.
- 3901 Neumann, G.M. and Bach, L.A.: The N-terminal disulfide linkages of human insulin-like growth factor-binding protein-6 (hIGFBP-6) and hIGFBP-1 are different as determined by mass spectrometry. *J. Biol. Chem.*, 274 (1999) 14587-14594.
- 3902 Tanaka, N., Nakada, H., Inoue, M. and Yamashina, I.: Binding characteristics of an anti-Siaα2-6GalNAcα-Ser/Thr (sialyl Tn) monoclonal antibody (MLS 132). *Eur. J. Biochem.*, 263 (1999) 27-32.
- 3903 Yamaguchi, T., Yamada, T., Okutani, R., Shijubo, N., Singh, G. and Itoh, Y.: Characterization of monoclonal antibodies to human protein 1/Clara cell 10 kilodalton protein. *Clin. Chem. Lab. Med.*, 37 (1999) 631-637.
- 3904 Zhang, J.-H., Hanesworth, J.M., Sardinia, M.F., Alt, J.A., Wright, J.W. and Harding, J.W.: Structural analysis of angiotensin IV receptor (AT₄) from selected bovine tissues. *J. Pharmacol. Exp. Ther.*, 289 (1999) 1075-1083.
- See also 3776, 3780, 3813, 3835, 3856.
- 19n. *Other proteins (incl. proteinous inhibitors of enzymic activity)*
- 3905 Angeli, S., Ceron, F., Scaloni, A., Monti, M., Monteforti, G., Minnocci, A., Petacchi, R. and Pelosi, P.: Purification, structural characterization, cloning and immunocytochemical localization of chemoreception proteins from *Schistocerca gregaria*. *Eur. J. Biochem.*, 262 (1999) 745-754.
- 3906 Bania, J., Stachowiak, D. and Polanowski, A.: Primary structure and properties of the cathepsin G/chymotrypsin inhibitor from the larval hemolymph of *Apis mellifera*. *Eur. J. Biochem.*, 262 (1999) 680-687.
- 3907 Nau, F., Mallard, A., Pages, J. and Brulé, G.: Reversed-phase liquid chromatography of egg white proteins. Optimization of ovalbumin elution. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1129-1147.
- 3908 Odani, S., Tominaga, K., Kondou, S., Hori, H., Koide, T., Hara, S., Isemura, M. and Tsunasawa, S.: The inhibitory properties and primary structure of a novel serine proteinase inhibitor from the fruiting body of basidiomycete, *Lentinus edodes*. *Eur. J. Biochem.*, 262 (1999) 915-923.
- 3909 Wang, R., Kini, R.M. and Chung, M.C.M.: Rhodocetin, a novel platelet aggregation inhibitor from the venom of *Calloselasma rhodostoma* (malayan pit viper): synergistic and noncovalent interaction between its subunits. *Biochemistry*, 38 (1999) 7584-7593.
- See also 3588, 3755, 3776.
20. ENZYMES AND ENZYME ACTIVITY ESTIMATION
- 20a. *Oxidoreductases*
- 3910 Aguilar, C., Urzua, U., Koenig, C. and Vicuna, R.: Oxalate oxidase from *Ceriporiopsis subvermispora*: biochemical and cytochemical studies. *Arch. Biochem. Biophys.*, 366 (1999) 275-282.
- 3911 Curtis, A.J., Shirk, M.C. and Fall, R.: Allylic or benzylic stabilization is essential for catalysis by bacterial benzyl alcohol dehydrogenase. *Biochem. Biophys. Res. Commun.*, 259 (1999) 220-223.
- 3912 Fujiwara, N., Fujii, T., Fujii, J. and Taniguchi, N.: Functional expression of rat thioredoxin reductase: selenocysteine insertion sequence element is essential for the active enzyme. *Biochem. J.*, 340 (1999) 439-444.
- 3913 Gadda, G., Dangott, L.J., Johnson, W.J., Jr., Whitman, C.P. and Fitzpatrick, P.F.: Characterization of 2-oxo-3-pentynoate as an active-site-directed inactivator of flavoprotein oxidases: identification of active-site peptides in tryptophan 2-monooxygenase. *Biochemistry*, 38 (1999) 5822-5828.
- 3914 Gardas, A., Sutton, B.J., Piotrowska, U., Pasięka, Z., Barnett, P.S., Huang, G.C., McGregor, A.M. and Banga, J.P.: Distinct immunological and biochemical properties of thyroid peroxidase purified from human thyroid glands and recombinant protein produced in insect cells. *Biochim. Biophys. Acta*, 1433 (1999) 229-239.
- 3915 Hayashi, H., de Bellis, L., Ciurli, A., Kondo, M., Hayashi, M. and Nishimura, M.: A novel acyl-CoA oxidase that can oxidize short-chain acyl-CoA in plant peroxisomes. *J. Biol. Chem.*, 274 (1999) 12715-12721.
- 3916 Hosny, G., Roman, L.J., Mostafa, M.H. and Masters, B.S.S.: Unique properties of purified, *Escherichia coli*-expressed constitutive cytochrome P4504A5. *Arch. Biochem. Biophys.*, 366 (1999) 199-206.

- 3917 Jiang, F. and Mannervik, B.: Optimized heterologous expression of glutathione reductase from cyanobacterium *Anabaena* PCC 7120 and characterization of the recombinant protein. *Protein Expression Purif.*, 15 (1999) 92-98; *C.A.*, 130 (1999) 277415.
- 3918 Kharasch, E.D., Hankins, D.C., Jubert, C., Thummel, K.E. and Taraday, J.K.: Lack of single-dose disulfiram effects on cytochrome P-450 2C9, 2C19, 2D6 and 3A4 activities: evidence for specificity toward P-450 2E1. *Drug Metab. Disp.*, 27 (1999) 717-723.
- 3919 Kikonyogo, A., Abriola, D.P., Dryjanski, M. and Pietruszko, R.: Mechanism of inhibition of aldehyde dehydrogenase by citral, a retinoid antagonist. *Eur. J. Biochem.*, 262 (1999) 704-712.
- 3920 Kobayashi, M., Shinmoto, H., Tshida, T. and Tokuda, S.: (Simple purification of lactoperoxidase from goat milk). *Nippon Shokuhin Kagaku Gokaku Kaishi*, 46 (1999) 99-101; *C.A.*, 130 (1999) 193495.
- 3921 Lee, Y.B., Joe, Y.A., Wolff, E.C., Dimitriadis, E.K. and Park, M.H.: Complex formation between deoxyhypusine synthase and its protein substrate, the eukaryotic translation initiation factor 5A (eIF5A) precursor. *Biochem. J.*, 340 (1999) 273-281.
- 3922 Ma, H. and Penning, T.M.: Characterization of homogeneous recombinant rat ovarian 20 α -hydroxysteroid dehydrogenase: fluorescent properties and inhibition profile. *Biochem. J.*, 341 (1999) 853-859.
- 3923 Moore, A.B. and May, S.W.: Kinetic and inhibition studies on substrate channeling in the bifunctional enzyme catalyzing C-terminal amidation. *Biochem. J.*, 341 (1999) 33-40.
- 3924 Rhee, S.-K. and Fuchs, G.: Phenylacetyl-CoA:acceptor oxidoreductase, a membrane-bound molybdenum-iron-sulfur enzyme involved in anaerobic metabolism of phenyl-alanine in the denitrifying bacterium *Thauera aromatica*. *Eur. J. Biochem.*, 262 (1999) 507-515.
- 3925 Rondet, S., Taton, M. and Rahier, A.: Identification, characterization and partial purification of 4 α -carboxysterol-C3-dehydrogenase/C4-decarboxylase from *Zea mays*. *Arch. Biochem. Biophys.*, 366 (1999) 249-260.
- 3926 Ryter, S., Kvam, E. and Tyrrell, R.M.: Heme oxygenase activity determination by high-performance liquid chromatography. *Methods Enzymol.*, 300 (1999) 322-336; *C.A.*, 130 (1999) 193429.
- 3927 Stumpp, M.T., Motohashi, K. and Hisabori, T.: Chloroplast thioredoxin mutants without active-site cysteines facilitate the reduction of the regulatory disulphide bridge on the γ -subunit of chloroplast ATP synthase. *Biochem. J.*, 341 (1999) 157-163.
- 3928 Subramaniam, S.S., Nagalla, S.R. and Renganathan, V.: Cloning and characterization of a thermostable cellobiose dehydrogenase from *Sporotrichum thermophile*. *Arch. Biochem. Biophys.*, 365 (1999) 223-230.
- 3929 Suto, R.K., Whalen, M.A. and Finke, R.G.: Adenosylcobalamin-dependent ribonuclease triphosphate reductase from *Lactobacillus Leichmannii*. Rapid, improved purification involving dGTP-based affinity chromatography plus biophysical characterization studies demonstrating enhanced, "crystallographic level" purity. *Prepar. Biochem. Biotechnol.*, 29 (1999) 273-309.
- 3930 Truan, G., Komandla, M.R., Falck, J.R. and Peterson, J.A.: P450BM-3: absolute configuration of the primary metabolites of palmitic acid. *Arch. Biochem. Biophys.*, 366 (1999) 192-198.
- 3931 Tuckey, R.C. and Sadleir, J.: The concentration of adrenodoxin reductase limits cytochrome P450scc activity in the human placenta. *Eur. J. Biochem.*, 263 (1999) 319-325.
- 3932 Varela, E., Martínez, A.T. and Martínez, M.J.: Molecular cloning of aryl-alcohol oxidase from the fungus *Pleurotus eryngii*, an enzyme involved in lignin degradation. *Biochem. J.*, 341 (1999) 113-117.
- 3933 Watabe, S., Makino, Y., Ogawa, K., Hiroi, T., Yamamoto, Y. and Takahashi, S.Y.: Mitochondrial thioredoxine reductase in bovine adrenal cortex. Its purification, properties, nucleotide/amino acid sequences and identification of selenocysteine. *Eur. J. Biochem.*, 264 (1999) 74-84.
- 3934 Wilkin, J.-M., Soetaert, K., Stélandre, M., Buysens, P., Castillo, G., Demoulin, V., Bottu, G., Laneelle, M.-A., Daffe, M. and de Bruyn, J.: Overexpression, purification and characterization of *Mycobacterium bovis* BCG alcohol dehydrogenase. *Eur. J. Biochem.*, 262 (1999) 299-307.
- 3935 Yu, S.-W., Kim, Y.-R. and Kang, S.-O.: Spectral characterization and chemical modification of FMN-containing ascorbyl free-radical reductase from *Pleurotus ostreatus*. *Biochem. J.*, 341 (1999) 755-763.
- For additional information see *C.A.*:
130 (1999) 263125.
- See also 4077.
- 20b. *Transferases (excl. E.C. 2.7.-.-)*
- 3936 Eis, C. and Nidetzky, B.: Characterization of trehalose phosphorylase from *Schizophyllum commune*. *Biochem. J.*, 341 (1999) 385-393.
- 3937 Ellingson, T., Duddempudi, S., Greenberg, B.D., Hooper, D. and Eisenhofer, G.: Determination of differential activities of soluble and membrane-bound catechol-O-methyltransferase in tissues and erythrocytes. *J. Chromatogr. B*, 729 (1999) 347-353.
- 3938 Fujita, K.-i., Nagata, K., Yamazaki, T., Watanabe, E., Shimada, M. and Yamazoe, Y.: Enzymatic characterization of human cytosolic sulfotransferases, identification of ST1B2 as a thyroid hormone sulfotransferase. *Biol. Pharm. Bull.*, 22 (1999) 446-452.
- 3939 Higai, K., Masuda, D., Matsuzawa, Y., Satoh, T. and Matsumoto, K.: A fluorometric assay for glycosyltransferase activities using sugars aminated and tagged with 7-hydroxycoumarin-3-carboxylic acid as substrates and high performance liquid chromatography. *Biol. Pharm. Bull.*, 22 (1999) 333-338.
- 3940 Hiratsuka, A., Saito, H., Hirose, K. and Watabe, T.: Marked expression of glutathione S-transferase A4-4 detoxifying 4-hydroxy-2(E)-nonenal in the skin of rats irradiated by ultraviolet B-band light (UVB). *Biochem. Biophys. Res. Commun.*, 260 (1999) 740-746.
- 3941 Hoch, G., Peterbauer, T. and Richter, A.: Purification and characterization of stachyose synthase from lentil (*Lens culinaris*) seeds: galactopinitol and stachyose synthesis. *Arch. Biochem. Biophys.*, 366 (1999) 75-81.
- 3942 Indiver, C., Tonazzi, A., Stipani, I. and Palmieri, F.: The purified and reconstituted ornithine/citrulline carrier from rat liver mitochondria catalyses a second transport mode: ornithine⁺/H⁺ exchange. *Biochem. J.*, 341 (1999) 705-711.

- 3943 Mukherjee, S.B., Aravinda, S., Gopalakrishnan, B., Nagpal, S., Salunke, D.M. and Shaha, C.: Secretion of glutathione S-transferase isoforms in the seminiferous tubular fluid, tissue distribution and sex steroid binding of rat GSTM1. *Biochem. J.*, 340 (1999) 309-320.
- 3944 Paniego, N.B., Zuurbier, K.W.M., Fung, S.-Y., van der Heijden, R., Scheffer, J.J.C. and Verpoorte, R.: Phlorisovalerophenone synthase, a novel polyketide synthase from hop (*Humulus lupulus* L.) cones. *Eur. J. Biochem.*, 262 (1999) 612-616.
- 3945 Reeve, A.M. and Townsend, C.A.: Inhibitors of an AdoMet-dependent 3-amino-3-carboxypropyl transferase and their use as ligands for protein affinity chromatography. *Tetrahedron*, 54 (1998) 15959-15974; *C.A.*, 130 (1999) 179136.
- 3946 Ross, J.R., Nam, K.H., D'Auria, J.C. and Pichersky, E.: S-Adenosyl-L-methionine:salicylic acid carboxyl methyltransferase, an enzyme involved in floral scent production and plant defense, represents a new class of plant methyltransferases. *Arch. Biochem. Biophys.*, 367 (1999) 9-16.
- 3947 Schröder, I. and Thauer, R.K.: Methylcobalamin:homocysteine methyltransferase from *Methanobacterium thermoautotrophicum*. Identification as the metE gene product. *Eur. J. Biochem.*, 263 (1999) 789-796.
- 3948 Song, D.D. and Jacques, N.A.: Purification and enzymic properties of the fructosyltransferase of *Streptococcus salivarius* ATCC 25975. *Biochem. J.*, 341 (1999) 285-291.
- 3949 Srivastava, S.K., Singhal, S.S., Hu, X., Awasthi, Y.C., Zimniak, P. and Singh, S.V.: Differential catalytic efficiency of allelic variants of human glutathione S-transferase Pi in catalyzing the glutathione conjugation of thiopepa. *Arch. Biochem. Biophys.*, 366 (1999) 89-94.
- For additional information see *C.A.*:
130 (1999) 179311.
- See also 4008.
- 20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.-)*
- 3950 Cao, J., Fernandez, M. and Villamarin, J.A.: A method for the purification of cAMP-dependent protein kinase using immunoaffinity chromatography. *Protein Expression Purif.*, 14 (1998) 418-424; *C.A.*, 130 (1999) 179181.
- 3951 Cheng, H.-L. and Louis, C.F.: Endogenous casein kinase I catalyzes the phosphorylation of the lens fiber cell connexin49. *Eur. J. Biochem.*, 263 (1999) 276-286.
- 3952 Kirchberger, J., Edelmann, A., Kopperschlager, G. and Heinisch, J.J.: A single point mutation leads to an instability of the hetero-octameric structure of yeast phosphofructokinase. *Biochem. J.*, 341 (1999) 15-23.
- 3953 Marie, I., Rebouillat, D. and Hovanessian, A.G.: The expression of both domains of the 69/71 kDa 2',5'-oligoadenylate synthetase generates a catalytically active enzyme and mediates an anti-viral response. *Eur. J. Biochem.*, 262 (1999) 155-165.
- 3954 Park, C., Jin, U.-H., Lee, Y.-C., Cho, T.-J. and Kim, C.-H.: Characterization of UDP-N-acetylglucosamine:α-6-D-mannoside β-1,6-N-acetylglucosaminyltransferase V from a human hepatoma cell line Hep3B. *Arch. Biochem. Biophys.*, 367 (1999) 281-288.
- 3955 Pete, M.J., Liao, C.-X., Bartleson, C. and Graves, D.J.: A recombinant form of the catalytic subunit of phosphorylase kinase that is soluble, monomeric and includes key C-terminal residues. *Arch. Biochem. Biophys.*, 367 (1999) 104-114.
- 3956 Suzuki, T., Kamidochi, M., Inoue, N., Kawamichi, H., Yazawa, Y., Furukohri, T. and Ellington, W.R.: Arginine kinase evolved twice: evidence that echinoderm arginine kinase originated from creatine kinase. *Biochem. J.*, 340 (1999) 671-675.
- 3957 Uchida, H., Chen, Y.-X., Morinaga, H., Hayashi, Y., Matsuda, A., Obata, T., Endo, Y. and Sasaki, T.: Isolation of deoxycytidine kinase from Ehrlich carcinoma cells by affinity chromatography based on a substrate analog, 2'-C-cyano-2'-deoxy-1-β-D-arabinofuranosyl-N4-palmitoylcytosine. *Biol. Pharm. Bull.*, 22 (1999) 83-86; *C.A.*, 130 (1999) 263877.
- 3958 Yang, Y., Park, Y.-D., Yu, T.W. and Zhoo, H.M.: Reactivation and refolding of a partially folded creatine kinase modified by 5,5'-dithio-bis(2-nitrobenzoic acid). *Biochem. Biophys. Res. Commun.*, 259 (1999) 450-454.
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*
- 3959 Chang, T., Chang, C.H., Wagner, D.R. and Chey, W.Y.: Porcine pancreatic phospholipase A₂ stimulates secretin release from secretin-producing cells. *J. Biol. Chem.*, 274 (1999) 10758-10764.
- 3960 Diogo, M.M., Silva, S., Cabral, J.M.S. and Queiroz, J.A.: Hydrophobic interaction chromatography of *Chromobacterium viscosum* lipase on polypropylene glycol immobilised on Sepharose. *J. Chromatogr. A*, 849 (1999) 413-419.
- 3961 Farooqui, A.A. and Horrocks, L.A.: Purification of lipases and phospholipases by heparin-Sepharose chromatography. *Methods Mol. Biol.*, 109 (1999) 133-143; *C.A.*, 130 (1999) 193383 - a review with 40 refs.
- 3962 Imura, A., Itoh, M. and Miyadera, A.: Purification, properties and reactivity of the esterase from *Micrococcus* sp. *Biol. Pharm. Bull.*, 22 (1999) 654-656.
- 3963 Moriyama, T., Urade, R. and Kito, M.: Purification and characterization of diacylglycerol lipase from human platelets. *J. Biochem. (Tokyo)*, 125 (1999) 1077-1085.
- 3964 Okumura, K., Masui, K., Inoue, S., Ikeda, K. and Hayashi, K.: Purification, characterization and cDNA cloning of a phospholipase A₂ inhibitor from the serum of the non-venomous snake *Elaphe quadrivirgata*. *Biochem. J.*, 341 (1999) 165-171.
- 3965 Roknabadi, S.M., Bose, S.K. and Taneja, V.: A histidine thiol 100 kDa, tetrameric acid phosphatase from lentil, *Lens esculenta*, seeds with the characteristics of protein tyrosine phosphatases. *Biochim. Biophys. Acta*, 1433 (1999) 272-280.
- 3966 Szameit, C., Miech, C., Balleininger, M., Schmidt, B., von Figura, K. and Dierks, T.: The iron sulfur protein atpB is required for posttranslational formation of formylglycine in the Klebsiella sulfatase. *J. Biol. Chem.*, 274 (1999) 15375-15381.
- 3967 Uchiyama, S.-i., Miyazaki, Y., Amakasu, Y., Kuwata, H., Nakatani, Y., Atsumi, G.-i., Murakami, M. and Kudo, I.: Characterization of heparin low-affinity phospholipase A₁ present in brain and testicular tissue. *J. Biochem. (Tokyo)*, 125 (1999) 1001-1010.
- 3968 Volles, M.J., Xu, X. and Scheraga, H.A.: Distribution of disulfide bonds in the two-disulfide intermediates in the regeneration of bovine pancreatic ribonuclease A: further insights into the folding process. *Biochemistry*, 38 (1999) 7284-7293.

See also 3541.

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

- 3969 Artolozaga, M.J., Jonas, R., Schneider, A.L., Furlan, S.A. and de Datima Carvalho-Jonas, M.: One step partial purification of β -D-galactosidase from *Kluyveromyces marxianus* CDB 002 using STREAMLINE-DEAE. *Bioseparation*, 7 (1998) 137-143; C.A., 130 (1999) 293121.
- 3970 Dietrich, O., Mills, K., Johnson, A.W., Hasilik, A. and Winchester, B.G.: Application of magnetic chromatography to the isolation of lysosomes from fibroblasts of patients with lysosomal storage disorders. *FEBS Lett.*, 441 (1998) 369-372; C.A., 130 (1999) 248873.
- 3971 Hashimoto, W., Nankai, H., Sato, N., Kawai, S. and Murata, K.: Characterization of α -L-rhamnosidase of *Bacillus* sp. GL 1 responsible for the complete depolymerization of gellan. *Arch. Biochem. Biophys.*, 368 (1999) 56-60.
- 3972 Jin, Y.-Z., Dacheux, F., Dacheux, J.-L., Bannai, S., Sugita, Y. and Okamura, N.: Purification and properties of major α -D-mannosidase in the luminal fluid of porcine epididymis. *Biochim. Biophys. Acta*, 1432 (1999) 382-392.
- 3973 Kimura, Y., Hess, D. and Sturm, A.: The N-glycans of jack bean α -mannosidase. Structure, topology and function. *Eur. J. Biochem.*, 264 (1999) 169-175.
- 3974 Park, G.-G., Kim, W.-D., Park, Y.-S., Gang, J.-B. and Kobayashi, H.: Purification and properties of sunflower seed α -galactosidase by affinity chromatography. *Sanop Misaengmul Hakhochi*, 26 (1998) 316-322; C.A., 130 (1999) 278436.
- 3975 Shikita, M., Fahey, J.W., Golden, T.R., Holtzclaw, W.D. and Talalay, P.: An unusual case of "uncompetitive activation" by ascorbic acid: purification and kinetic properties of a myrosinase from *Raphanus sativus* seedlings. *Biochem. J.*, 341 (1999) 725-732.
- 3976 Tan, T., Deng, L., Xu, W. and Zhang, S.: (Purification of cellulase from blue mussel homogenate with expended bed metal affinity chromatography). *Shengwu Gongcheng Xuebao*, 14 (1998) 434-438; C.A., 130 (1999) 179155.

20f. *Other hydrolases*

- 3977 Asano, M., Suzuki, S., Kawai, M., Miwa, T. and Shibai, H.: Characterization of novel cysteine proteases from germinating cotyledons of soybean [*Glycine max* (L.) Merrill]. *J. Biochem. (Tokyo)*, 126 (1999) 296-301.
- 3978 Cao, C.-J., Wu, X.-Y., Zhu, K.-Y. and Dai, G.-C.: (Affinity chromatography for purification of urokinase using cefazoline as ligand). *Shengwu Kuaxue Yu Shengwu Wuli Xuebao*, 30 (1998) 635-637; C.A., 130 (1999) 179152.
- 3979 Cao, X., Tang, M., Wu, X. and Dai, G.: (Purification of urokinase by affinity chromatography). *Huadong Ligong Daxue Xuebao*, 24 (1998) 515-520, 536; C.A., 130 (1999) 179167.
- 3980 Chikuma, T., Ogura, Y., Kasamatsu, M., Taguchi, K., Mitsui, K., Kato, T. and Tanaka, A.: High-performance liquid chromatographic-fluorimetric assay for cathepsin A (lysosomal protective protein) activity. *J. Chromatogr. B*, 728 (1999) 59-65.
- 3981 Cregar, L., Elrod, K.C., Putnam, D. and Moore, W.R.: Neutrophil myeloperoxidase is a potent and selective inhibitor of mast cell tryptase. *Arch. Biochem. Biophys.*, 366 (1999) 125-130.
- 3982 Doran, J.D., Nomizu, M., Takebe, S., Ménard, R., Griffith, D. and Ziomek, E.: Autocatalytic processing of the streptococcal cysteine protease zymogen. Processing mechanism and characterization of the autoproteolytic cleavage sites. *Eur. J. Biochem.*, 263 (1999) 145-151.
- 3983 Du, Z. and Gromet-Elhenan, Z.: Refolding of recombinant α and β subunits of the *Rhodospirillum rubrum* F₀F₁ ATP synthase into functional monomers that reconstitute an active $\alpha_1\beta_1$ -dimer. *Eur. J. Biochem.*, 263 (1999) 430-437.
- 3984 Faivre-Nitschke, S.E., Grienberger, J.M. and Gualberto, J.M.: A prokaryotic-type cytidine deaminase from *Arabidopsis thaliana*. Gene expression and functional characterization. *Eur. J. Biochem.*, 263 (1999) 896-903.
- 3985 Fernandez-Espina, M.D. and Rul, F.: Pep5 from *Streptococcus thermophilus*. A new member of the aminopeptidase T family of thermophilic bacteria. *Eur. J. Biochem.*, 263 (1999) 502-510.
- 3986 Fredline, V.F., Kovacs, E.M., Taylor, P.J. and Johnson, A.G.: Measurement of plasma renin activity with use of HPLC-electrospray-tandem mass spectrometry. *Clin. Chem. (Washington)*, 45 (1999) 659-664.
- 3987 Gebauer, W. and Harris, J.R.: Controlled cleavage of KLH1 and KLH2 by the V8 protease from *Staphylococcus aureus*. Reassociation, electrophoretic and transmission electron microscopy study of peptide fragments. *Eur. J. Biochem.*, 262 (1999) 166-175.
- 3988 Grobe, K., Becker, W.-M., Schlaak, M. and Petersen, A.: Grass group I allergens (β -expansins) are novel, papain-related proteinases. *Eur. J. Biochem.*, 263 (1999) 33-40.
- 3989 Hiraishi, H., Yokoi, F. and Kumon, A.: Bovine liver phosphamidase as a protein histidine/lysine phosphatase. *J. Biochem. (Tokyo)*, 126 (1999) 368-374.
- 3990 Jiang, K.-Y., Pitiot, O., Anissimova, M., Adenier, H. and Vijayalakshmi, M.A.: Structure-function relationship in glycosylated α -chymotrypsin as probed by IMAC and IMACE. *Biochim. Biophys. Acta*, 1433 (1999) 198-209.
- 3991 Matsushima, M., Ichinose, M., Yahagi, N., Tsukada-Kato, S., Miki, K., Omata, M., Kim, Y.-T., Ito, H., Takahashi, T., Sakurai, Y., Tsuchiya, Y., Athauda, S.B.P., Inoue, H. and Takahashi, K.: Purification and further characterization of enteropeptidase from porcine duodenum. *J. Biochem. (Tokyo)*, 125 (1999) 947-951.
- 3992 Mistry, R., Snashall, P.D., Totty, N., Guz, A. and Tetley, T.D.: Purification and N-terminal amino acid sequence of sheep neutrophil cathepsin G and elastase. *Arch. Biochem. Biophys.*, 368 (1999) 7-13.
- 3993 Morisseau, C., Archelas, A., Guitton, C., Faucher, D., Furstoss, R. and Baratti, J.C.: Purification and characterization of a highly enantioselective oxide hydrolase from *Aspergillus niger*. *Eur. J. Biochem.*, 263 (1999) 386-395.
- 3994 Nirasawa, S., Nakajima, Y., Zhang, Z.-Z., Yoshida, M. and Hayashi, K.: Intramolecular chaperone and inhibitor activities of a propeptide from a bacterial zinc aminopeptidase. *Biochem. J.*, 341 (1999) 25-31.
- 3995 Richter, R., Hejazi, M., Kraft, R., Ziegler, K. and Lockau, W.: Cyanophycinase, a peptidase degrading the cyanobacterium reserve material multi-L-arginyl-poly-L-aspartic acid (cyanophycin). Molecular cloning of the gene of *Synechocystis* sp. PCC 6803, expression in *Escherichia coli*, and biochemical characterization of the purified enzyme. *Eur. J. Biochem.*, 263 (1999) 163-169.

- 3996 Usha, R. and Singh, M.: Purification of a multicatalytic protease complex from developing winged bean seeds by indirect immunoaffinity chromatography. *Protein Expression Purif.*, 15 (1999) 48-56; C.A., 130 (1999) 248623.
- 3997 Van Kuilenburg, A.B.P., van Lenthe, H. and van Gennip, A.H.: Radiochemical assay for determination of dihydropyrimidinase activity using reversed-phase high-performance liquid chromatography. *J. Chromatogr. B*, 729 (1999) 307-314.
- 3998 Walther-Rasmussen, J., Johnsen, A.H. and Hoiby, N.: Terminal truncations in Amp c β -lactamase from a clinical isolate of *Pseudomonas aeruginosa*. *Eur. J. Biochem.*, 263 (1999) 478-485.
- 3999 Yonezawa, H., Uchikoba, T., Arima, K., Shimada, M. and Kaneda, M.: Amino acid sequence and some properties of phytoleucin R, a cysteine protease from full-growth fruits of pokeweed, *Phytolacca americana*. *J. Biochem. (Tokyo)*, 126 (1999) 26-33.
- See also 3778.
- 20g. *Lyases*
- 4000 Demir, Y., Demir, N. and Küfrevioğlu, Ö.I.: Carbonic anhydrase from *Vicia canescens* leaves. *Prepar. Biochem. Biotechnol.*, 29 (1999) 235-244.
- 4001 Kato, Y., Tsuda, T. and Asano, Y.: Nitrile hydratase involved in aldoxime metabolism from *Rhodococcus* sp. strain YH3-3. *Eur. J. Biochem.*, 263 (1999) 662-670.
- 4002 Kawata, Y., Tamura, K., Yano, S., Mizobata, T., Nagai, J., Esaki, N., Soda, K., Tokushige, M. and Yumoto, N.: Purification and characterization of thermostable aspartase from *Bacillus* sp. YM55-1. *Arch. Biochem. Biophys.*, 366 (1999) 40-46.
- 4003 Laber, B., Maurer, W., Hanke, C., Gräfe, S., Ehlert, S., Messerschmidt, A. and Clausen, T.: Characterization of recombinant *Arabidopsis thaliana* threonine synthase. *Eur. J. Biochem.*, 263 (1999) 212-221.
- 4004 Tsuda, H., Yamada, S., Miyazono, H., Morikawa, K., Yoshida, K., Goto, F., Tamura, J.-i., Neumann, K.W., Ogawa, T. and Sugahara, K.: Substrate specificity studies of *Flavobacterium chondroitinase C* and heparitinases towards the glycosaminoglycan-protein linkage region. Use of a sensitive analytical method developed by chromophore-labeling of linkage glycoserine using dimethylaminoazobenzenesulfonyl chloride. *Eur. J. Biochem.*, 262 (1999) 127-133.
- 4005 Tursky, T. and Bandzuchova, E.: An endogenous activator of renal glutamic acid decarboxylase. Effects of adenosine triphosphate, phosphate and chloride on the activity of this enzyme. *Eur. J. Biochem.*, 262 (1999) 696-703.
- See also 3923.
- 20h. *Isomerases*
- 4006 Chuang, S.S., Banerjee, D. and Das, H.K.: Purified alipoprotein B gene regulatory factor-3 is DNA topoisomerase I. *Eur. J. Biochem.*, 263 (1999) 773-781.
- 4007 Mitterauer, T., Nanoff, C., Ahorn, H., Freissmuth, M. and Henenegger, M.: Metal-dependent nucleotide binding to the *Escherichia coli* rotamase SlyD. *Biochem. J.*, 342 (1999) 33-39.
- 4008 Riedel, B., Finkerstrand, T., Refsum, H. and Ueland, P.M.: Co-ordinate variations in methylamonyl-CoA mutase and methionine synthase and the cobalamin cofactor in human glioma cells during nitrous oxide exposure and the subsequent recovery phase. *Biochem. J.*, 341 (1999) 133-138.
- 4009 Watanabe, K., Kurihara, K. and Suzuki, T.: Purification and characterization of membrane-bound prostaglandin E synthase from bovine heart. *Biochim. Biophys. Acta*, 1439 (1999) 406-414.
- 20i. *Ligases*
- 4010 Binieda, A., Fuhrmann, M., Lehner, B., Rey-Berthod, C., Frutiger-Hughes, S., Hughes, G. and Shaw, N.M.: Purification, characterization, DNA sequence and cloning of a pimeloyl-CoA synthetase from *Pseudomonas mendocina*. *Biochem. J.*, 340 (1999) 793-801.
- 4011 Boone, A.N., Rodrigues, B. and Brownsey, R.W.: Multiple-site phosphorylation of the 280 kDa isoform of acetyl-CoA carboxylase in rat cardiac myocytes: evidence that cAMP-dependent protein kinase mediates effects of β -adrenergic stimulation. *Biochem. J.*, 341 (1999) 347-354.
- 4012 Genschel, U., Powell, C.A., Abell, C. and Smith, A.G.: The final step of pantothenate biosynthesis in higher plants: cloning and characterization of pantothenate synthetase from *Lotus japonicus* and *Oryza sativum* (rice). *Biochem. J.*, 341 (1999) 669-678.
- 4013 Lipps, G. and Krauss, G.: Adenylosuccinate synthase from *Saccharomyces cerevisiae*: homologous overexpression, purification and characterization of the recombinant protein. *Biochem. J.*, 341 (1999) 537-543.
- 4014 Vessey, D.A., Kelley, M. and Warren, R.S.: Characterization of the CoA ligases of human liver mitochondria catalyzing the activation of short- and medium-chain fatty acids and xenobiotic carboxylic acids. *Biochim. Biophys. Acta*, 1428 (1999) 455-462.
- 20j. *Complex mixtures and incompletely identified enzymes*
- 4015 Ono, H., Sawada, K., Khunajakr, N., Tao, Y., Yamamoto, M., Hiramoto, M., Shinmyo, A. and Takano, M. and Murooka, Y.: Characterization of biosynthetic enzymes for ectoine as a compatible solute in a moderately halophilic eubacterium, *Halomonas elongata*. *J. Bacteriol.*, 181 (1999) 91-99; C.A., 130 (1999) 179205.
21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. *Purines, pyrimidines, nucleosides, nucleotides*
- 4016 Arranz, J.A., Riudor, E., Rodés, M., Roig, M., Climent, C., Rubio, V., Sentís, M. and Burlina, A.: Optimization of allopurinol challenge: sample purification, protein intake control, and the use of orotidine response as a discriminative variable improve performance of the test for diagnosing ornithine carbamoyltransferase deficiency. *Clin. Chem. (Washington)*, 45 (1999) 995-1001.

- 4017 Benzie, I.F.F., Chung, W.-Y. and Tomlinson, B.: Simultaneous measurement of allantoin and urate in plasma: analytical evaluation and potential clinical application in oxidant:antioxidant balance studies. *Clin. Chem. (Washington)*, 45 (1999) 901-904.
- 4018 Diaz Enrich, M.J., Barcia, R., Ramos Martinez, J.I. and Ibarguren, I.: Determination of adenine nucleotides in *Mytilus galloprovincialis* Lmk by ion-pair high-performance liquid chromatography with a diode array detector. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1391-1402.
- 4019 Grigg, M., Musgrave, I.F. and Barrow, C.J.: Isolation and partial structure determination of a clonidine-displacing substance from bovine lung and brain. *J. Auton. Nerv. Syst.*, 72 (1998) 86-93; *C.A.*, 130 (1999) 180321.
- 4020 Guieu, R., Sampieri, F., Bechis, G., Halimi, G., Dussol, B., Berland, Y., Sampol, J. and Rochat, H.: Development of an HPLC/diode array detector method for the determination of human plasma adenosine concentrations. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1829-1841.
- 4021 Lucas, L.T., Gatehouse, D. and Shuker, D.E.G.: Efficient nitroso group transfer from N-nitrosoindoles to nucleotides and 2'-deoxyguanosine at physiological pH. A new pathway for N-nitrosocompounds to exert genotoxicity. *J. Biol. Chem.*, 274 (1999) 18319-18326.
- 4022 Mita, M., Yoshikuni, M. and Nagahama, Y.: 1-Methyladenine production from ATP by starfish ovarian follicle cells. *Biochim. Biophys. Acta*, 1428 (1999) 13-20.
- 4023 Song, Y., Zhang, H. and Liu, M.: (Determination of creatinine and uric acid in urine with direct sample injection by high performance liquid chromatography). *Fenxi Huaxue*, 27 (1999) 243; *C.A.*, 130 (1999) 293439.
- 4024 Terzuoli, L., Porcelli, B., Setacci, C., Giubolini, M., Cinci, G., Carlucci, F., Pagani, R. and Marinello, E.: Comparative determination of purine compounds in carotid plaque by capillary zone electrophoresis and high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 185-192.
- For additional information see *C.A.*:
130 (1999) 181566, 219875.
- See also 3399, 3401, 3485, 3997.
- 21b. *Nucleic acids, RNA*
- 4025 Kulseth, M.A., Kolset, S.O. and Ranheim, T.: Stimulation of serglycin and CD44 mRNA expression in endothelial cells exposed to TNF- α and IL-1 α . *Biochim. Biophys. Acta*, 1428 (1999) 225-232.
- 21c. *Nucleic acids, DNA*
- 4026 Kai, E., Sumikura, K., Ikebukuro, K. and Karube, I.: Purification of single stranded DNA from asymmetric PCR product using the SMART system. *Biotechnol. Tech.*, 12 (1998) 935-939; *C.A.*, 130 (1999) 292170.
- 4027 Ljunglöf, A., Bergvall, P., Bhikhabhai, R. and Hjorth, R.: Direct visualisation of plasmid DNA in individual chromatography adsorbent particles by confocal scanning laser microscopy. *J. Chromatogr. A*, 844 (1999) 129-135.
- 21e. *Structural studies on DNA and DNA mapping*
- For additional information see *C.A.*:
130 (1999) 192725, 293611.
22. ALKALOIDS
- 4028 De Smet, R., Vogeleere, P., van Kaer, J., Lameire, N. and Vanholder, R.: Study by means of high-performance liquid chromatography of solutes that decrease theophylline/protein binding in the serum of uremic patients. *J. Chromatogr. A*, 847 (1999) 141-153.
- 4029 Gambelunghe, C., Rufini, S., Parisse, I., Valiani, M. and Rossi, R.: (Comparison of two chromatographic methods for the determination of caffeine in urine). *G. Ital. Chim. Clin.*, 22 (1998) 13-17; *C.A.*, 130 (1999) 191359.
- 4030 Golkiewicz, W. and Gadzikowska, M.: Isolation of some quaternary alkaloids from the extract of roots of *Chelidonium majus* L. by column and thin-layer chromatography. *Chromatographia*, 50 (1999) 52-56.
- 4031 Hara, S., Mochinaga, S., Fukuzawa, M., Ono, N. and Kuroda, T.: Simple and highly sensitive determination of morphine in rat plasma by liquid chromatography with fluorescence detection. *Anal. Chim. Acta*, 387 (1999) 121-126.
- 4032 Nakakuki, H., Horie, H., Yamauchi, Y. and Kohata, K.: Rapid analysis of methylated xanthines in teas by an improved high-performance liquid chromatographic method using a polyvinylpyrrolidone pre-column. *J. Chromatogr. A*, 848 (1999) 523-527.
- 4033 Nappi, A.J., Vass, E. and Collins, M.A.: Contrasting effects of catecholic and O-methylated tetrahydroisoquinolines on hydroxyl radical production. *Biochim. Biophys. Acta*, 1434 (1999) 64-73.
- 4034 Renault, J.-H., Nuzillard, J.-M., le Crouérou, G., Thépenier, P., Zèches-Hanrot, M. and le Men-Olivier, L.: Isolation of indole alkaloids from *Catharanthus roseus* by centrifugal partition chromatography in the pH-zone refining mode. *J. Chromatogr. A*, 849 (1999) 421-431.
- 4035 Song, S., Suzuki, H., Kawai, R. and Sugiyama, Y.: Effect of PSC 833, a P-glycoprotein modulator, on the disposition of vincristine and dioxin in rats. *Drug Metab. Disp.*, 27 (1999) 689-694.
- 4036 Srivastava, S.K., Desai, H.K., Vobalaboina, V. and Pelletier, S.W.: Separation of diterpenoid alkaloids by high performance centrifugal partition chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1687-1697.
- 4037 Tesarova, E., Zaruba, K. and Flieger, M.: Enantioseparation of semisynthetic ergot alkaloids of vancomycin and teicoplanin stationary phases. *J. Chromatogr. A*, 844 (1999) 137-147.
- 4038 Tsuchiya, H., Shimizu, H. and Inuma, M.: Beta-carboline alkaloids in crude drugs. *Chem. Pharm. Bull.*, 47 (1999) 440-443.
- 4039 Tsuda, T. and Kitagawa, S.: (Chromatographic detection and determination of compounds in human sweat). *Chromatography*, 19 (1998) 252-253; *C.A.*, 130 (1999) 278745.
- See also 3355, 3387, 4193.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23a. Porphyrins and other pyrroles

4040 Hindmarsh, J.T., Oliveras, L. and Greenway, D.C.: Plasma porphyrins in the porphyrias. *Clin. Chem. (Washington)*, 45 (1999) 1070-1076.

4041 Kühnel, A., Gross, U., Jacob, K. and Doss, M.O.: Studies on coproporphyrin isomers in urine and feces in the porphyrias. *Clin. Chim. Acta*, 282 (1999) 45-58.

See also 4149.

23b. Bile pigments

4042 Itoh, S., Isobe, K. and Onishi, S.: Accurate and sensitive high-performance liquid chromatographic method for geometrical and structural photoisomers of bilirubin IX α using the relative molar absorptivity values. *J. Chromatogr. A*, 848 (1999) 169-177.

23c. Indole derivatives and plant hormones (gibberelins)

4043 Fang, N., Shao, X., He, Y. and Zhao, G.: (Separation and determination of plant growth hormones in germinating rice grains by reversed phase-high performance liquid chromatography). *Fenxi Huaxue*, 27 (1999) 120; *C.A.*, 130 (1999) 206243.

4044 Startin, J.R., Hird, S.J., Sykes, M.D., Taylor, J.C. and Hill, A.R.C.: Determination of residues of plant growth regulator chomequat in pears by ion-exchange high performance liquid chromatography-electrospray mass spectrometry. *Analyst (Cambridge)*, 124 (1999) 1011-1015.

23d. Pyridine derivatives

4045 Liu, D.Y., Liu, Z.D., Lu, S.L. and Hider, R.C.: Gradient ion-pair high-performance liquid chromatographic method for analysis of 3-hydroxypyridin-4-one iron chelators. *J. Chromatogr. B*, 730 (1999) 135-139.

4046 Meger, M., Richter, E., Zwickpenflug, W., Oehlmann, C., Hargaden, M.B., A-Rahim, Y.I. and Vesell, E.S.: Metabolism and disposition of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) in rhesus monkeys. *Drug Metab. Disp.*, 27 (1999) 471-478.

4047 Roth, M. and Uebelhart, D.: Determination of pyridinolines (free, peptide bound, glycosylated and total) in urine by high performance liquid chromatography. *Cells Mater.*, 7 (1997) 323-328; *C.A.*, 130 (1999) 193774.

23e. Other N-heterocyclic compounds

4048 Csiktusnadi-Kiss, G.A., Forgacs, E., Markuszewski, M. and Balogh, S.: Application of multivariate mathematical-statistical methods to compare reversed-phase thin-layer and liquid chromatographic behavior of tetrazolium salts in quantitative structure-retention relationships (QSRR) studies. *Analysis*, 26 (1998) 400-406; *C.A.*, 130 (1999) 261202.

4049 Peyrin, E. and Guillaume, Y.C.: Peculiarities of the mechanism of retention of imidazole derivatives when using hydroxypropyl- β -cyclodextrin as mobile phase additive. *Chromatographia*, 49 (1999) 691-698.

See also 3383, 3745, 4023, 4047, 4249, 4299.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

4050 Angelino, S., Prevot, A.B., Gennaro, M.C. and Pramauro, E.: Ion-interaction high-performance liquid chromatography and micellar electrokinetic capillary chromatography: two complementary techniques for the separation of aromatic sulfonated compounds. *J. Chromatogr. A*, 845 (1999) 257-271.

4051 Bjork, H., Kiljunen, H. and Vanninen, P.: Characterization of alkylated salts of alkylphosphonothiolates by LC-MS/MS. *Adv. Mass Spectrom.*, 14 (1998) D037170/1-D037170/12; *C.A.*, 130 (1999) 204459.

4052 Hooijschuur, E.W.J., Kientz, C.E. and Brinkman, U.A.T.: Determination of the sulfur mustard hydrolysis product thiodiglycol by microcolumn liquid chromatography coupled on-line with sulfur flame photometric detection using large-volume injections and peak compression. *J. Chromatogr. A*, 849 (1999) 433-444.

4053 Matsuura, K. and Takashina, H.: Effects of functional groups of acrylic acid derivatives as derivatization reagents for thiol compounds on molecular ion responses in electrospray ionization-mass spectrometry. *J. Mass Spectrom.*, 33 (1998) 1199-1208; *C.A.*, 130 (1999) 206940.

4054 Oxelbark, J. and Allenmark, S.: Barriers to stereoinversion of N-aryl-1,3,2-benzodithiazole 1-oxides studied by dynamic enantioselective liquid chromatography. *J. Org. Chem.*, 64 (1999) 1483-1486; *C.A.*, 130 (1999) 267043.

4055 Possanzini, M., di Palo, V., Desiderio, C., Fanali, S. and Liberti, A.: Determination of carbon disulphide in air as xanthogenate by ion chromatography and capillary electrophoresis. *Chromatographia*, 49 (1999) 678-680.

4056 Quinsac, A., Krouti, M., Ribaillier, D., Deschamps, M., Herbach, M., Lallemand, J., Lem, P., Millet, Ch., Mabon, N., Marlier, M. and Wathelet, J.-P.: (Determination of the total glucosinolate content in rapeseed seeds by liquid chromatography: comparative study between the rapid isocratic and the reference gradient methods by a ring test). *Ol., Corps Gras, Lipides*, 5 (1998) 398-406; *C.A.*, 130 (1999) 251367.

4057 Ridnour, L.A., Winters, R.A., Ercal, N. and Spitz, D.R.: Measurement of glutathione, glutathione disulfide, and other thiols in mammalian cell and tissue homogenates using high-performance liquid chromatography separation of N-(1-pyrenyl)maleimide derivatives. *Methods Enzymol.*, 299 (1999) 258-267; *C.A.*, 130 (1999) 234127.

4058 Stolcova, M., Kaszonyi, A., Liptaj, T. and Hronec, M.: Determination of the products of the reaction of N-alkyl-2-benzothiazolesulfenamide by high-performance liquid chromatography with acetone. *J. Chromatogr. A*, 847 (1999) 351-358.

4059 Traber, K. and Packer, L.: Quantitation of anethole dithiolthione using high performance liquid chromatography with electrochemical detection. *Methods Enzymol.*, 299 (1999) 300-306; *C.A.*, 130 (1999) 234129.

- 4060 Xu, S. and Wu, L.: (Determination of sulfacetamide sodium and sulfanilamide in Shaotangling ointments by high-performance liquid chromatography). *Sepu*, 17 (1999) 206-207; *C.A.*, 130 (1999) 272130.
- 4061 Zhaowen, Y., Zhiqiang, Z., Yueqi, L., Schengxiang, J. and Liren, C.: HPLC resolution of the enantiomers of glycidyl sulfides and glycidyl selenides on amylose tris-(phenylcarbamate) stationary phases. *Chromatographia*, 49 (1999) 572-574.

For additional information see *C.A.*:
130 (1999) 245917.

See also 3477, 3485, 3490, 3628, 3722, 3768, 4213, 4310, 4354.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 4062 Asensio, A.C., Oaknin, S. and Rotllán, P.: Fluorimetric detection of enzymatic activity associated with the human tumor suppressor p53 protein. *Biochim. Biophys. Acta*, 1432 (1999) 396-400.
- 4063 Fischer, C., Schmidt, U., Dwars, T. and Oehme, G.: Enantiomeric resolution of derivatives of α -aminophosphonic and α -aminophosphinic acids by high-performance liquid chromatography and capillary electrophoresis. *J. Chromatogr. A*, 845 (1999) 273-283.
- 4064 Ivanova, G.G., Ivanov, A.A. and Shpigun, O.A.: (Ion chromatographic study of the alkaline hydrolysis of phosphorus-containing esters). *Vestn. Mosk. Univ., Ser. 2: Khim.*, 39 (1998) 400-404; *C.A.*, 130 (1999) 296738.
- 4065 Mercier, J.-P., Morin, P., Dreux, M. and Tambuté, A.: Liquid chromatography analysis of phosphonic acids on porous graphitic carbon stationary phase with evaporative light-scattering and mass spectrometry detection. *J. Chromatogr. A*, 849 (1999) 197-207.
- 4066 Mohsin, S.B.: Ion chromatography coupled with mass spectrometry for the determination of ionic compounds in agricultural chemicals. *Anal. Chem.*, 71 (1999) 3603-3609.
- 4067 Noort, D., Hulst, A.G., Platenburg, D.H.J.M., Polhuijs, M. and Benschop, H.P.: Quantitative analysis of O-isopropyl methylphosphonic acid in serum samples of Japanese citizens allegedly exposed to sarin: estimation of internal dosage. *Arch. Toxicol.*, 72 (1998) 671-675; *C.A.*, 130 (1999) 178417.
- 4068 Talamond, P., Gallon, G., Guyot, J.P., Lape, I.M. and Treche, S.: Comparison of high-performance ion chromatography and absorptiometric methods for the determination of phytic acid and food samples. *Analisis*, 26 (1998) 396-400; *C.A.*, 130 (1999) 281020.
- 4069 Zhu, X. and Dass, C.: Analysis of phosphoenkephalins by combined high performance liquid chromatography and electrospray ionization mass spectrometry. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1635-1647.

See also 3545, 3644, 4022, 4051.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. Organometallic compounds

- 4070 Graupera, E., Leal, C., Granados, M., Prat, M.D. and Compañó, R.: Determination of tributyltin and triphenyltin in sediments by liquid chromatography with fluorimetric detection. Assessment of spiking procedures. *J. Chromatogr. A*, 846 (1999) 413-423.
- 4071 Morabito, R., Muntau, H., Cofino, W. and Quevauviller, Ph.: A new mussel certified reference material (CRM 477) for the quality control of butyltin determination in the marine environment. *J. Environ. Monit.*, 1 (1999) 75-82; *C.A.*, 130 (1999) 277726.

26c. Coordination compounds

- 4072 Dilli, S. and Tong, P.: Liquid chromatography of metal chelates. Chromatographic studies of homologous dialkyldithiocarbamates. *Anal. Chim. Acta*, 395 (1999) 101-112.
- 4073 Yu, Z., Zhou, Z., Jiang, S. and Chen, L.: (Enantioseparation of glycidol-selenide by high performance liquid chromatography). *Fenxi Huaxue*, 27 (1999) 206-209; *C.A.*, 130 (1999) 245898.

See also 4396, 4405.

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

- 4074 Aebischer, C.-P., Schierle, J. and Schuep, W.: Simultaneous determination of retinol, tocopherols, carotene, lycopene, and xanthophylls in plasma by means of reversed-phase high-performance liquid chromatography. *Methods Enzymol.*, 299 (1999) 348-382; *C.A.*, 130 (1999) 234132.
- 4075 Chase, G.W., Jr., Eitenmiller, R.R. and Long, A.R.: A liquid chromatographic method for the analysis of retinyl acetate in soy based infant formula using matrix solid phase dispersion. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1205-1212.
- 4076 Chen, Q., Hu, K. and Miura, Y.: (Separation of vitamin C, sulfite and thiosulfate by ion chromatography and postcolumn reaction-cerium(III) fluorescence detection). *Fudan Xuebao, Ziran Kexueban*, 38 (1999) 34-38; *C.A.*, 130 (1999) 276012.
- 4077 Cho, S.-H., Na, J.-U., Youn, H., Hwang, C.-S., Lee, C.-H. and Kang, S.-O.: Sepiapterin reductase producing L-threo-dihydrobiopterin from *Chlorobium tepidum*. *Biochem. J.*, 340 (1999) 497-503.
- 4078 Finckh, B., Kontush, A., Commentz, J., Hubner, Ch., Burdelski, M. and Kohlschutter, A.: High-performance liquid chromatography-coulometric electrochemical detection of ubiquinol 10, ubiquinone 10, carotenoids, and tocopherols in neonatal plasma. *Methods Enzymol.*, 299 (1999) 341-348; *C.A.*, 130 (1999) 234289.
- 4079 Kall, M.A. and Andersen, C.: Improved method for simultaneous determination of ascorbic acid and dehydroascorbic acid, isoascorbic acid and dehydroisoascorbic acid in food and biological samples. *J. Chromatogr. B*, 730 (1999) 101-111.

- 4080 Kramer, J.K.G., Fouchard, R.C. and Kallury, K.M.R.: Determination of vitamin E forms in tissues and diets by high-performance liquid chromatography using normal-phase diol column. *Methods Enzymol.*, 299 (1999) 318-329; *C.A.*, 130 (1999) 234130.
- 4081 Molander, P., Gundersen, T.E., Haas, C., Greibrokk, T., Blomhoff, R. and Lundanes, E.: Determination of retinoids by packed-capillary liquid chromatography with large-volume on-column focusing and temperature optimization. *J. Chromatogr. A*, 847 (1999) 59-68.
- 4082 Mouly, P.P., Gaydou, E.M. and Corsetti, J.: Characterization of paprika (*Capsicum annum*) extract in orange juices by liquid chromatography of carotenoid profiles. *J. Agric. Food Chem.*, 47 (1999) 968-976.
- 4083 Mouly, P.P., Gaydou, E.M. and Corsetti, J.: Determination of the geographical origin of valencia orange juice using carotenoid liquid chromatographic profiles. *J. Chromatogr. A*, 844 (1999) 149-159.
- 4084 Podda, M., Weber, Ch., Traber, M.G., Milbradt, R. and Packer, L.: Sensitive high-performance liquid chromatography techniques for simultaneous determination of tocopherols, tocotrienols, ubiquinol, and ubiquinones in biological samples. *Methods Enzymol.*, 299 (1999) 330-341; *C.A.*, 130 (1999) 234131.
- 4085 Rümelin, A., Fauth, U. and Halmágyi, M.: Determination of ascorbic acid in plasma and urine by high performance liquid chromatography with ultraviolet detection. *Clin. Chem. Lab. Med.*, 37 (1999) 533-536.
- 4086 Sasaki, T., Sawada, N., Nonaka, Y., Ohyama, Y. and Inouye, K.: Metabolic studies using recombinant *Escherichia coli* cells producing rat mitochondrial CYP24. CYP24 can convert 1 α ,25-dihydroxyvitamin D₃ to calcitric acid. *Eur. J. Biochem.*, 262 (1999) 43-48.
- 4087 Sawada, K., Turusawa, M. and Fujimoto, T.: (Pharmacokinetic study of leucovorin and 5-methyltetrahydrofolate using a high-performance liquid chromatography). *Nippon Shoni Rinsho Yakuri Gakkai Zasshi*, 11 (1998) 115-118; *C.A.*, 130 (1999) 246220.
- 4088 Strohschein, S., Rentel, C., Lacker, T., Bayer, E. and Albert, K.: Separation and identification of tocotrienol isomers by HPLC-MS and HPLC-NMR coupling. *Anal. Chem.*, 71 (1999) 1780-1785.
- 4089 Tsuji, S., Mishima, I., Ishimitsu, S., Shibata, T. and Tonogai, Y.: (Determination of tocopherols in oils of mixed tocopherol as food additive using reverse-phase high-performance liquid chromatography). *Kokuritsu Iyakuhin Shokuhin Eisei Kenkyusho Hokoku*, 116 (1998) 113-116; *C.A.*, 130 (1999) 195908.
- 4090 Weinmann, A.R.M., Oliveira, M.S., Jorge, S.M. and Martins, A.R.: Simultaneous high-performance liquid chromatographic determination of retinol by fluorometry and of tocopherol by ultraviolet absorbance in the serum of newborns. *J. Chromatogr. B*, 729 (1999) 231-236.
- 4091 Wielinski, S. and Olszanowski, A.: Simultaneous determination of retinol acetate, retinol palmitate, cholecalciferol, α -tocopherol acetate and alphacalcidol in capsules by non-aqueous reversed-phase HPLC and column backflushing. *Chromatographia*, 50 (1999) 109-112.
- 4092 Zhang, H., Li, W., Zhang, S. and Mu, S.: (Determination of neopterin in serum by high performance liquid chromatography). *Fenxi Yiqi*, No. 1 (1998) 58-60; *C.A.*, 130 (1999) 234121.
- See also 3387, 4146, 4148.
28. ANTIBIOTICS
- 4093 Bormann, C., Lauer, B. and Kálmánczelyi, A.: Novel nikkomycins L_x and L₂ produced by genetically engineered *Streptomyces tendae* Tü901. *J. Antibiot.*, 52 (1999) 582-585.
- 4094 Buehler, P.W., Robbles, S.J., Adami, G.R., Gajee, R. and Negrusz, A.: Analysis of doxorubicin in cell culture media and human plasma using solid phase extraction and HPLC. *Chromatographia*, 49 (1999) 557-561.
- 4095 Cavaleri, M., Pollini, W. and Colombo, L.: Determination of ramoplanin in human urine by high-performance liquid chromatography with automated column switching. *J. Chromatogr. A*, 846 (1999) 185-192.
- 4096 Fujitomo, H., Nagaoka, T., Nishino, I. and Umeda, T.: Determination of a new oral cephalosporin, S-1090, in human plasma and urine by direct injection high-performance liquid chromatography with ultraviolet detection and column switching. *J. Chromatogr. B*, 728 (1999) 125-131.
- 4097 Furusawa, N.: Rapid and simple determination of oxytetracycline in chicken products. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 770-772.
- 4098 Grangemard, I., Bonmatin, J.-M., Bernillon, J., Das, B.C. and Peypoux, F.: Lichensins G, a novel family of lipopeptide biosurfactants from *Bacillus licheniformis* IM 1307: production, isolation and structural evaluation by NMR and mass spectrometry. *J. Antibiot.*, 52 (1999) 363-373.
- 4099 Holtzapfel, C.K., Buckley, S.A. and Stanker, L.H.: Determination of four fluoroquinolones in milk by on-line immunoaffinity capture coupled with reversed-phase liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 607-613.
- 4100 Jarukamjorn, K., Jaeger, W. and Fleischhacker, W.: Quantitative determination of roxithromycin in human plasma by high performance liquid chromatography with UV detection. *Warasan Pheasatthasat*, 24 (1997) 41-45; *C.A.*, 130 (1999) 217517.
- 4101 Jegorov, A., Sedmera, P., Ryska, M. and Havlicek, V.: Liquid chromatography/tandem mass spectrometry of cyclosporins. *Adv. Mass Spectrom.*, 14 (1998) C011490/1-C011490/10; *C.A.*, 130 (1999) 248912.
- 4102 Klimes, J., Dohnalova, M. and Sedlacek, J.: Microcolumn high-performance liquid chromatographic assay for doxycycline in isolated alveolar macrophages. *J. Chromatogr. A*, 746 (1999) 181-184.
- 4103 Kohno, J., Nonaka, N., Nishio, M., Ohnuki, T., Kawano, K., Okuda, T. and Komatsubara, S.: TMC-169, a new antibiotic of the aspochalasin group produced by *Aspergillus flavipes*. *J. Antibiot.*, 52 (1999) 575-577.

- 4104 Kudo, F., Tamegai, H., Fujiwara, T., Tagami, H., Hirayama, K. and Kaninuma, K.: Molecular cloning of the gene for the key carbocycle-forming enzyme in the biosynthesis of 2-deoxystreptamine-containing aminocyclitol antibiotics and its comparison with dehydroquinase synthase. *J. Antibiot.*, 52 (1999) 559-571.
- 4105 Kuhlmann, O., Hofmann, S. and Weiss, M.: Determination of idarubicin and idarubicinol in rat plasma using reversed-phase high-performance liquid chromatography and fluorescence detection. *J. Chromatogr. B*, 728 (1999) 279-282.
- 4106 Kwei, G.Y., Alvaro, R.F., Chen, Q., Jenkins, H.J., Hop, C.E.A.C., Ly, K.V.T., Strauss, J.R., Wang, R.W., Wang, Z., Pippert, T.R., and Umbenhauer, D.R.: Disposition of ivermectin and cyclosporin A in CF-1 mice deficient in MDR1A P-glycoprotein. *Drug Metab. Disp.*, 27 (1999) 581-587.
- 4107 Lacramioara, S.M., Nacu, A. and Bulgaru, L.: (Chromatographic techniques for the assay of an ampicillin-sulbactam combination). *Farmacia (Bucharest)*, 46 (1998) 65-77; *C.A.*, 130 (1999) 272087.
- 4108 Lin, C.-c., Korduba, C. and Parker, D.: Simple and sensitive high-performance liquid chromatographic method for the determination of an everninomycin, SCH 27899, in rat plasma. *J. Chromatogr. A*, 730 (1999) 55-59.
- 4109 Moisuc, L.S., Nacu, A. and Bulgaru, L.: (High-pressure liquid chromatography used on determination on control of purity for ceftriaxone). *Farmacia (Bucharest)*, 46 (1998) 41-45; *C.A.*, 130 (1999) 272088.
- 4110 Nara, F., Tanaka, M., Hosoya, T., Suzuki-Konagai, K. and Ogita, T.: Scyphostatin, a neutral sphingomyelinase inhibitor from a discomycete, *Trichopeziza mollissima*: taxonomy of the producing organism, fermentation, isolation and physico-chemical properties. *J. Antibiot.*, 52 (1999) 525-530.
- 4111 Oh, S.-Y. and Jang, W.-Ch.: (The pharmacokinetic study of jansomycin in flounder by reversed-phase high performance liquid chromatography). *J. Toxicol. Public Health*, 14 (1998) 563-567; *C.A.*, 130 (1999) 261426.
- 4112 Otani, T., Yoshida, K.-i., Sasaki, T. and Minami, Y.: C-1027 enediyne chromophore: presence of another active form and its chemical structure. *J. Antibiot.*, 52 (1999) 415-421.
- 4113 Owens, H.M., Destache, C.J. and Dash, A.K.: Simple liquid chromatographic method for the analysis of the blood brain barrier permeability characteristics of ceftriaxone in an experimental rabbit meningitis model. *J. Chromatogr. B*, 728 (1999) 97-105.
- 4114 Raines, D.A., Yusuf, A., Jabak, M.H., Ahmed, W.S., Karciglu, Z.A. and El-Yazigi, A.: Simultaneous high-performance liquid chromatography analysis of azithromycin and two of its metabolites in human tears and plasma. *Ther. Drug Monit.*, 20 (1998) 680-684; *C.A.*, 130 (1999) 217523.
- 4115 Rosen, J.: SPE work-up for online electrospray LC/MS(MS) for routine analysis of polyether antibiotics. *Adv. Mass Spectrom.*, 14 (1998) D047800/1-D047800/10; *C.A.*, 130 (1999) 251352.
- 4116 Sakurai, T., Cheeptham, N., Mikawa, T., Yokota, A. and Tomita, F.: A novel screen for the detection of chitin acting antifungal compounds. *J. Antibiot.*, 52 (1999) 508-511.
- 4117 Scott, C.A., Yordy, D.W. and Coleman, M.R.: Determination of avilamycin in poultry feeds by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 579-585.
- 4118 Shimotohno, K.W., Iida, J. and Endo, T.: A new enzyme, edeine B₁ amidinohydrolase, from *Bacillus brevis* TTO2-8. Purification and determination of the N-terminal amino acid sequence. *J. Antibiot.*, 52 (1999) 407-411.
- 4119 Tan, J., Xu, J. and Zhuo, H.: (High-performance liquid chromatography and pharmacokinetics of ampicillin in sultamicillin tablet). *Zhongguo Yaoke Daxue Xuebao*, 29 (1998) 366-369; *C.A.*, 130 (1999) 177048.
- 4120 Xi, Z., Mao, Q.K. and Goldberg, I.H.: Mechanistic studies on the base-catalyzed transformation of neocarzinostatin chromophore: roles of bulged DNA. *Biochemistry*, 38 (1999) 4342-4354.
- 4121 Zeng, S., Zhong, J., Pan, L. and Li, Y.: High-performance liquid chromatography separation and quantitation of ofloxacin enantiomers in rat microsomes. *J. Chromatogr. B*, 728 (1999) 151-155.

For additional information see C.A.:
130 (1999) 209923, 220190.

See also 3659, 4233.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 4122 Martinez-Cored, M., Pujadas, E., Diaz-Ferrero, J., Coll, M., Marti, R., Broto-Puig, F., Comellas, L. and Rodriguez-Larena, M.C.: Fractionation of polychlorinated dibenzo-*p*-dioxins, polychlorinated dibenzofurans and planar polychlorinated biphenyls by high performance liquid chromatography on pyrenyl-silica column. *Fresenius J. Anal. Chem.*, 364 (1999) 576-583.
- 4123 Masqué, N., Galià, M., Marcé, R.M. and Borrull, F.: Influence of chemical modification of polymeric resin on retention of polar compounds in solid-phase extraction. *Chromatographia*, 50 (1999) 21-26.
- 4124 Sherma, J.: Pesticide residue analysis: 1997-1998. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 561-574 - a review with 231 refs.

For additional information see C.A.:
130 (1999) 195909.

See also 3389, 4066.

29b. Chlorinated insecticides

- 4125 Manadas, R., Veiga, F., Sousa, J.J. and Pina, M.E.: Development and validation of an HPLC method for simultaneous determination of *cis*- and *trans*-permethrin and piperonyl butoxide in pharmaceutical dosage forms. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1867-1876.
- 4126 Vetter, W., Klobes, U., Luckas, B. and Hottinger, G.: Use of 6-*O*-*tert*-butyldimethylsilylated β -cyclodextrins for the enantioseparation of chiral organochlorine compounds. *J. Chromatogr. A*, 846 (1999) 375-381.

See also 4122.

29c. *Phosphorus insecticides*

- 4127 Rühling, I., Schäfer, H. and Ternes, W.: HPLC online reductive scanning voltametric detection of diquat, paraquat and difenzoquat with mercury electrodes. *Fresenius J. Anal. Chem.*, 364 (1999) 565-569.
- 4128 Spinks, C.A., Wang, B., Mills, E.N.C. and Morgan, M.R.A.: Development of an ELISA for paraquat: improvement of antibody characteristics by reversed affinity chromatography. *Analyst (Cambridge)*, 124 (1999) 847-850.

See also 4131, 4141.

29d. *Carbamates*

- 4129 Nagai, Sh., Ito, Sh., Tomioka, M. and Ishizuka, T.: (Study of carbamate pesticides analysis by LC/MS). *Chromatography*, 19 (1998) 290-291; *C.A.*, 130 (1999) 206214.
- 4130 Nunes, G.S. and Berceño, D.: Analysis of carbamate insecticides in foodstuffs using chromatography and immunoassay techniques. *TrAC*, 18 (1999) 99-107.

29e. *Herbicides*

- 4131 Beeson, M.D., Driskell, W.J. and Barr, D.B.: Isotope dilution high-performance liquid chromatography/tandem mass spectrometry method for quantifying urinary metabolites of atrazine, melathion and 2,4-dichlorophenoxyacetic acid. *Anal. Chem.*, 71 (1999) 3526-3530.
- 4132 Bjarnason, B., Chimuka, L. and Ramström, O.: On-line solid-phase extraction of triazine herbicides using a molecularly imprinted polymer for selective sample enrichment. *Anal. Chem.*, 71 (1999) 2152-2156.
- 4133 Bonato, P.S., Lanchote, V.L., de Carvalho Dreossi, S.A., Gomes, M.A., Cerdeira, A.L. and de Carvalho, D.: High performance liquid chromatographic screening and gas chromatography-mass spectrometry confirmation of tebutiuron residues in drinking water. *J. High Resolut. Chromatogr.*, 22 (1999) 239-241.
- 4134 Buchholz, B.A., Fultz, E., Haack, K.W., Vogel, J.S., Gilman, S.D., Gee, S.J., Hammock, B.D., Hui, X., Wester, R.C. and Maibach, H.I.: HPLC - accelerator MS measurement of atrazine metabolites in human urine after dermal exposure. *Anal. Chem.*, 71 (1999) 3519-3525.
- 4135 Crescenzi, C., D'Ascenzo, G., di Corcia, A., Nazzari, M., Marchese, S. and Samperi, R.: Multiresidue herbicide analysis in soil: subcritical water extraction with an on-line sorbent trap. *Anal. Chem.*, 71 (1999) 2157-2163.
- 4136 Nemeth Konda, L., Begona Barroso, M., Morovjan, G. and Csokan, P.: High-performance liquid chromatography column switching applied to the trace determination of herbicides in environmental and drinking water samples. *J. Chromatogr. Sci.*, 37 (1999) 71-76.
- 4137 Novakova, O.: Determination of flupoxam residues in soil by high performance liquid chromatography. *Chromatographia*, 49 (1999) 535-538.
- 4138 Pinto, G.M.F. and Jardim, I.C.S.F.: Determination of bentazon residues in water by high-performance liquid chromatography. Validation of the method. *J. Chromatogr. A*, 846 (1999) 369-374.

- 4139 Wintersteiger, R., Goger, B. and Krautgartner, H.: Quantitation of chlorophenoxy acid herbicides by high-performance liquid chromatography with coulometric detection. *J. Chromatogr. A*, 846 (1999) 349-357.
- 4140 Xu, X., Yin, Q., Jin, X. and Jin, D.: (Analysis of 20% Chucaoling hygroscopic powder by HPLC). *Yanbian Daxue Xuebao, Ziran Kexueban*, 23 (1997) 69-72; *C.A.*, 129 (1998) 157919m.

See also 4338.

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

- 4141 Fuh, C.B. and Wu, M.L.: Impurity analysis of methamidophos with chromatographic methods. *Anal. Chim. Acta*, 395 (1999) 257-263.
- 4142 Zanella, R., Pavan, F.A., Flores, E.M.M. and Martins, A.F.: Determination of Amitraz in cattle dipping baths by high-performance liquid chromatography. *J. High Resolut. Chromatogr.*, 22 (1999) 247-249.

See also 4044, 4125.

30. SYNTHETIC AND NATURAL DYES

30a. *Synthetic dyes*

- 4143 Doerge, D.R., Churchwell, M.I., Gehring, Th.A., Bajic, S. and Kay, J.F.: Analysis of malachite green and metabolites in fish using isotope dilution LC-APCI/MS. *Adv. Mass Spectrom.*, 14 (1998) D043100/1-D043100/12; *C.A.*, 130 (1999) 208925.

See also 3476, 4151.

30b. *Chloroplast and other natural pigments*

- 4144 Chase, G.W., Jr., Eitenmiller, R.R. and Long, A.R.: Analysis of β -carotene in medical food by liquid chromatography with matrix solid-phase dispersion. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 663-665.
- 4145 Lepane, V.: Comparison of XAD resins for the isolation of humic substances from seawater. *J. Chromatogr. A*, 845 (1999) 329-335.
- 4146 Linden, H.: Carotenoid hydroxylase from *Haematococcus pluvialis*: cDNA sequence, regulation and functional complementation. *Biochim. Biophys. Acta*, 1446 (1999) 203-212.
- 4147 Pan, M.-H., Huang, T.-M. and Lin, J.-K.: Biotransformation of curcumin through reduction and glucuronidation in mice. *Drug Metab. Disp.*, 27 (1999) 486-494.
- 4148 Su, Q., Rowley, K.G. and O'Dea, K.: Stability of individual carotenoids, retinol and tocopherols in human plasma during exposure to light and after extraction. *J. Chromatogr. B*, 729 (1999) 191-198.
- 4149 Verzeznassi, L., Riffé-Chalard, C., Kloeti, W. and Gulacar, F.O.: Analysis of tetrapyrrolic pigments and derivatives in sediments by high performance liquid chromatography/atmospheric pressure chemical ionization mass spectrometry. *Fresenius J. Anal. Chem.*, 364 (1999) 249-253.

- 4150 Wolz, E., Liechti, H., Notter, B., Oesterhelt, G. and Kistler, A.: Characterization of metabolites of astaxanthin in primary cultures of rat hepatocytes. *Drug Metab. Disp.*, 27 (1999) 456-462.
- 4151 Yuan, J.-P. and Chen, F.: Chromatographic separation and purification of *trans*-astaxanthin from the extract of *Haematococcus pluvialis*. *J. Agric. Food Chem.*, 46 (1998) 3371-3375.
- See also 3312, 4074, 4082.
31. PLASTICS AND THEIR INTERMEDIATES
- 4152 Choi, I.S., Li, X., Simanek, E.E., Akaba, R. and Whitesides, G.M.: Self-assembly of hydrogen-bonded polymeric rods based on the cyanuric acid-melamine lattice. *Chem. Mater.*, 11 (1999) 684-690; *C.A.*, 130 (1999) 237254.
- 4153 Ferrari, G., Cerulli, T., Clemente, P. and Dragoni, M.: Adsorption of naphthalene sulfonate superplasticizers by cement particles through gel permeation chromatography. *Am. Concr. Inst., SP*, SP-173 (1997) 869-892; *C.A.*, 130 (1999) 186084.
- 4154 Gallardo, A., Rocio, L.A., San Roman, J., Cifuentes, A. and Diez-Masa, J.-C.: Micellar electrokinetic chromatography applied to copolymer systems with heterogeneous distribution. *Macromolecules*, 32 (1999) 610-617; *C.A.*, 130 (1999) 197011.
- 4155 Hongbin, Y., Xingying, Z., Zhang, G. and Jin, Y.: (Study of gel permeation chromatography of star-shaped low-*cis*-polybutadiene). *Beijing Huagong Daxue Xuebao, Ziran Kexueban*, 25 (1998) 42-46; *C.A.*, 130 (1999) 253004.
- 4156 Hritcu, D., Mueller, W. and Brooks, D.E.: Poly(styrene) latex carrying cerium(IV)-initiated terminally attached cleavable chains: analysis of grafted chains and model of the surface layer. *Macromolecules*, 32 (1999) 565-573; *C.A.*, 130 (1999) 182856.
- 4157 Kurata, Sh., Kawase, T., Fukuzawa, M., Sano, K. and Okuyama, Ts.: (Molecular weight estimation of polysuccinimide by gel permeation chromatography). *Chromatography*, 19 (1998) 306-307; *C.A.*, 130 (1999) 252878.
- 4158 Li, J.: (GPC characterization of rosin modified N-octyl phenolic resin for printing ink). *Linchan Huaxue Yu Gongye*, 18 (1998) 39-42; *C.A.*, 130 (1999) 210830.
- 4159 Makihara, J., Kaneta, T. and Imasaka, T.: Optical chromatography size determination by eluting particles. *Talanta*, 48 (1999) 551-557; *C.A.*, 130 (1999) 272447.
- 4160 Martin, M., van Batten, Ch. and Hoyos, M.: Thermal field-flow fractionation: separation and characterization of polymers and colloids. *Entropie*, 34 (1998) 69-75; *C.A.*, 130 (1999) 298534.
- 4161 Mbachu, R.: New polymer analysis method helps improve wood resin performance. *GIT Lab. J.*, 2 (1998) 269-270; *C.A.*, 130 (1999) 239035.
- 4162 Mes, E.P.C., Tjissen, R. and Kok, W.T.: Rapid detection of compositional drift of polydisperse copolymers using thermal field-flow fractionation and multi-angle light scattering. *Chromatographia*, 50 (1999) 45-51.
- 4163 Mrkvickova, L., Porsch, B. and Sundeloef, L.-O.: Study of poly(methyl methacrylate) stereocomplexes by size exclusion chromatography and dynamic light scattering. *Macromolecules*, 32 (1999) 1189-1193; *C.A.*, 130 (1999) 210072.
- 4164 Nguyen, S.H. and Berek, D.: Liquid chromatography of polymer mixtures applying a combination of exclusion and full adsorption mechanisms. Part 5. Six-component blends of chemically similar polymers. *Colloid Polym. Sci.*, 277 (1999) 318-324. *C.A.*, 130 (1999) 282593.
- 4165 Nielen, M.W.F. and Buijtenhuijs, F.A.: Polymer analysis by liquid chromatography/electrospray ionization time-of-flight mass spectrometry. *Anal. Chem.*, 71 (1999) 1809-1814.
- 4166 Pasch, H. and Kiltz, P.: (Analysis of copolymers by online-coupled two-dimensional chromatography). *GIT Labor-Fachz.*, 43 (1999) 239-244; *C.A.*, 130 (1999) 252860 - a review with 15 refs.
- 4167 Rissler, K.: Improved separation of polyethylene glycols widely differing in molecular weight range by reversed-phase high performance liquid chromatography and evaporative light scattering detection. *Chromatographia*, 49 (1999) 615-620.
- 4168 Stein, G., Wuenstel, E. and Held, Ch.: (A critical comparison of GC and HPLC in the analysis of rubber formulations). *Kautsch. Gummi Kunstst.*, 52 (1999) 124-133; *C.A.*, 130 (1999) 197762.
- 4169 Yang, L., Jia, L., Zou, H., Zhou, D. and Zhang, Y.: Immobilized metal affinity composite membrane based on cellulose for separation of biopolymers. *Sci. China, Ser. B: Chem.*, 41 (1998) 596-605; *C.A.*, 130 (1999) 264199.
- 4170 Zhan, X., Xu, X., Yang, M. and Lu, S.: (Determination of Mark-Houwink constants and study on molecular weights and molecular weight distributions of poly(*p*-diethynylbenzene)). *Gaofenzi Xuebao*, (1998) 709-713; *C.A.*, 130 (1999) 197261.
- See also 3307.
32. DRUG ANALYSIS
- 32a. *Drug analysis, general techniques*
- 4171 Aksenova, T.I., Tetko, I.V., Ivakhenko, A.G., Villa, A.E.P., Welsh, W.J. and Zielinski, W.L.: Pharmaceutical fingerprinting in phase space. 1. Construction of phase fingerprints. *Anal. Chem.*, 71 (1999) 2423-2430.
- 4172 Fernandez-Metzler, C.L., Owens, K.G., Baillie, T.A. and King, R.C.: Rapid liquid chromatography with tandem mass spectrometry-based screening procedures for studies on the biotransformation of drug candidates. *Drug Metab. Dispos.*, 27 (1999) 32-40; *C.A.*, 130 (1999) 246195.
- 4173 Gunaratna, Ch.: BioTrap sample extraction column: a new approach for online sample preparation in drug metabolism studies. *Curr. Sep.*, 17 (1998) 83-86; *C.A.*, 130 (1999) 276908.
- 4174 Hou, J., Wang, Y., Mao, X., Gao, J. and Xue, R.: (Direct determination of optical purity of the drugs by high performance liquid chromatography on a chiral column). *Xibeifan Daxue Xuebao, Ziran Kexueban*, 35 (1999) 43-46; *C.A.*, 130 (1999) 201012.
- 4175 Hubert, P., Chiap, P., Crommen, J., Boulanger, B., Chapuzet, E., Mercier, N., Bervoas-Martin, S., Chevalier, P., Grandjean, D., Lagorce, P., Lallier, M., Laparra, M.C., Laurentie, M. and Nivet, J.C.: The SFSTP guide on the validation of chromatographic methods for drug bioanalysis: from the Washington Conference to the laboratory. *Anal. Chim. Acta*, 391 (1999) 135-148.

- 4176 Jemal, M. and Xia, Y.-Q.: The need for adequate chromatographic separation in the quantitative determination of drugs in biological samples by high performance liquid chromatography with tandem mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 97-106; *C.A.*, 130 (1999) 276170.
- 4177 Li, L., Chi, C., Wright, M., Timby, D. and Unger, S.: Use of the N-in-1 approach for rapid pharmacokinetic screening of drug candidates using LC-MS-MS. *Am. Lab. (Shelton)*, 30 (1998) 11-14; *C.A.*, 130 (1999) 246237.
- 4178 Szpunar, J., Makarov, A., Pieper, T., Keppler, B.K. and Lobinski, R.: Investigation of metalloid-protein interactions by size-exclusion chromatography coupled with inductively coupled plasma mass spectrometry (ICP-MS). *Anal. Chim. Acta*, 387 (1999) 135-144.
- 4179 Tetko, I.V., Aksenova, T.I., Patiokha, A.A., Villa, A.E.P., Welsh, W.J., Zielinski, W.L. and Livingstone, D.J.: Pharmaceutical fingerprinting in phase space. 2. Pattern recognition. *Anal. Chem.*, 71 (1999) 2431-2439.
- For additional information see *C.A.*:
130 (1999) 236503.
- See also 3278, 3284, 3316, 3399, 3453, 3457, 3459, 3460, 3656, 4301.
- 32b. Antirheumatics and antiinflammatory drugs**
- 4180 Agarwal, V.K., Rose, D.L. and Krol, G.J.: Quantitative HPLC analysis of 4-[4-(4-(chlorophenyl)phenyl)-4-oxo-2S-(phenylthiomethyl) butanoic acid (BAY 12-9566), a metalloproteinase inhibitor and its metabolites in human plasma. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1893-1906.
- 4181 Bakkali, A., Corta, E., Berrueta, L.A., Gallo, B. and Vicente, F.: Study of the solid-phase extraction of diclofenac sodium, indomethacin and phenylbutazone for their analysis in human urine by liquid chromatography. *J. Chromatogr. B*, 729 (1999) 1393-145.
- 4182 Bartsch, H., Eiper, A., Habiger, K. and Kopelent-Frank, H.: Comparison of analytical methods for investigating the photostability of isoxicam. *J. Chromatogr. A*, 846 (1999) 207-216.
- 4183 De Jager, A.D., Ellis, H., Hundt, H.K.L., Swart, K.J. and Hundt, A.F.: High-performance liquid chromatographic determination with amperometric detection of piroxicam in human plasma and tissues. *J. Chromatogr. B*, 729 (1999) 183-189.
- 4184 Herczegova, A. and Polonsky, J.: Determination of non-steroidal anti-inflammatory drugs in biological fluids. *Pharmazie*, 54 (1999) 479-486 - a review with 73 refs.
- 4185 Joseph-Charles, J. and Bertucat, M.: Determination of meloxicam in tablet formulations by ultraviolet spectrophotometry and high-performance liquid chromatography. *Anal. Lett.*, 32 (1999) 2051-2059.
- 4186 Mao, Y., Tao, X. and Lipsky, P.E.: Pharmacokinetics of triptolide. Development and application of a high performance liquid chromatographic method for quantitation of triptolide in plasma. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1355-1366.
- 4187 Matoga, M., Pehourcq, F., Lagrange, F., Tramu, G. and Bannwarth, B.: Influence of molecular lipophilicity on the diffusion of arylpropionate non-steroidal anti-inflammatory drugs into the cerebrospinal fluid. *Arzneim.-Forsch.*, 49 (1999) 477-482.
- 4188 Sho, Y., Ishiodori, T., Oketani, M., Kubozono, O., Nakamura, A., Takeuchi, A., Morino, A. and Arima, T.: Effects of urinary metabolites of etodolac on diagnostic tests of bilirubin in urine. *Arzneim.-Forsch.*, 49 (1999) 572-576.
- 4189 Suzen, S., Akay, C., Tartilmis, S., Erdol, R.S., Onal, A. and Cevheroglu, S.: Quantitation of acetaminophen in pharmaceutical formulations using high-performance liquid chromatography. *Ankara Univ. Eczacilik Fak. Derg.*, 27 (1998) 93-100; *C.A.*, 130 (1999) 272125.
- 4190 Taylor, P.J., Jones, Ch.E., Dodds, H.M., Hogan, N.S. and Johnson, A.G.: Plasma indomethacin assay using high-performance liquid chromatography-electrospray-tandem mass spectrometry: application to therapeutic drug monitoring and pharmacokinetic studies. *Ther. Drug Monit.*, 20 (1998) 691-696; *C.A.*, 130 (1999) 217525.
- 4191 Vincent, C.-M., Langel, C. and Maty, J.-P.: *In vitro* topical delivery of non-steroidal anti-inflammatory drugs through human skin. *Arzneim.-Forsch.*, 49 (1999) 509-513.
- 4192 Yamazaki, R., Kawai, S., Matsumoto, T., Matsuzaki, T., Hashimoto, S., Yokokura, T., Okamoto, R., Koshino, T. and Mizushima, Y.: Hydrolytic activity is essential for aceclofenac to inhibit cyclooxygenase in rheumatoid synovial cells. *J. Pharmacol. Exp. Ther.*, 289 (1999) 676-681.
- 4193 Yoshida, I. and Sakai, Y.: The applications of the content uniformity test and the weight variation test on process validation tests of multiple ingredient preparations. *Chem. Pharm. Bull.*, 47 (1999) 678-683.
- 4194 Yritia, M., Parra, P., Fernández, J.M. and Barbanjo, J.M.: Piroxicam quantitation in human plasma by high-performance liquid chromatography with on- and off-line solid-phase extraction. *J. Chromatogr. A*, 846 (1999) 199-205.
- 4195 Zhang, Y. and Yun, Z.: (Direct resolution of ibuprofen enantiomers by reversed-phase high performance liquid chromatography with amide derivative as chiral stationary phase). *Fenxi Huaxue*, 27 (1999) 309-311; *C.A.*, 130 (1999) 287137.
- See also 3368, 4274.
- 32c. Autonomic and cardiovascular drugs**
- 4196 Baek, M., Chung, H.S., Kim, Y. and Kim, D.-H.: Disposition and metabolism of 2-(2''(1'', 3''-dioxalan-2-yl)-2-methyl-4-(2'-oxopyrrolidin-1-yl)-6-nitro-2H-1-benzopyran (SKP-450) in rats. *Drug Metab. Disp.*, 27 (1999) 510-516.
- 4197 Bazylak, G. and Aboul-Enein, H.Y.: Direct separation of labetalol stereoisomers in a high performance liquid chromatography system using helically self-assembled chelate as chiral selector in the mobile phase. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1171-1192.
- 4198 Carda-Broch, S., Rapado-Martinez, I., Esteve-Romero, J. and Celia Garcia-Alvarez-Coque, M.: Analysis of urine samples containing cardiovascular drugs by micellar liquid chromatography with fluorimetric detection. *J. Chromatogr. Sci.*, 37 (1999) 93-102.

- 4199 Christensen, H., Carlson, E., Asberg, A., Schram, L. and Berg, K.J.: A simple and sensitive high-performance liquid chromatography assay of diltiazem and main metabolites in renal transplant patients. *Clin. Chim. Acta*, 283 (1999) 63-75.
- 4200 Cirilli, R., di Bugno, C. and la Torre, F.: Stereoselective analysis of idrapril and its stereoisomers by reversed-phase high-performance liquid chromatography on a chiral-AGP column. *Chromatographia*, 49 (1999) 628-634.
- 4201 Duchêne, P., Laneury, J.P., Tran, G., Ladure, P., Ollivier, R., Buzas, A., Merour, J.-Y. and Houin, G.: Pharmacokinetics, metabolism and bioavailability of the new anti-allergic drug BM 113. Part III: Pharmacokinetics, metabolism, dose dependency and gender effect after single or repeated administration to human healthy volunteers. *Arzneim.-Forsch.*, 49 (1999) 699-704.
- 4202 Georgerakis, E. and Zougrou, F.: High pressure liquid chromatographic determination of nitrendipine in human plasma after solid phase extraction. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1381-1390.
- 4203 Metwally, M.E.-S.: Chromatographic separation and analysis of chlorpheniramine maleate, methscopolamine nitrate and phenylephrine hydrochloride in sustained release capsules. *Chromatographia*, 50 (1999) 113-117.
- 4204 Müller-Enoch, D.: Investigations on the role of cytochrome b5 and divalent cations in the maximal nifedipine oxidase activity of human liver. *Arzneim.-Forsch.*, 49 (1999) 470-475.
- 4205 Nakamura, I., Takahashi, M. and Izumi, H.: Sensitive high-performance liquid chromatographic determination of nifedipine in cat plasma following improved sample treatment. *J. Chromatogr. B*, 729 (1999) 265-270.
- 4206 Oertel, R., Richter, K. and Kirch, W.: Sensitive method for the determination of the antiarrhythmic drug detajmium in serum by solid-phase extraction and high-performance liquid chromatography with fluorimetric detection. *J. Chromatogr. A*, 846 (1999) 217-222.
- 4207 Ohkura, T., Yamada, S., Deguchi, Y. and Kimura, R.: Comparative study on pharmacokinetics and *in vivo* α_1 -adrenoceptor binding of [3 H]tamsulosin and [3 H]prazosin in rats. *Biol. Pharm. Bull.*, 22 (1999) 412-417.
- 4208 Pless, D., Gouze, J.N., Senay, C., Herber, R., Leroy, P., Barberousse, V., Fournel-Gieleux, S. and Magdalou, J.: Characterization of the UDP-glucuronosyltransferases involved in the glucuronidation of an antithrombotic thioxyloside in rat and humans. *Drug Metab. Disp.*, 27 (1999) 588-595.
- 4209 Serajuddin, A.T.M., Thakur, A.B., Ghoshal, R.N., Fakes, M.G., Ranadive, S.A., Morris, K.R. and Varia, S.A.: Selection of solid dosage form composition through drug-excipient compatibility testing. *J. Pharm. Sci.*, 88 (1999) 696-704.
- 4210 Sourí, E., Farsam, H. and Amini, L.: Stereospecific determination of propranolol by high performance liquid chromatography using UV detection. *Daru, J. Fac. Pharm., Tehran Univ. Med. Sci.*, 7 (1999) 18-21; *C.A.*, 130 (1999) 287139.
- 4211 Uno, T., Ohkubo, T. and Sugawara, K.: Enantioselective high performance liquid chromatographic determination of manidipine in human plasma. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1117-1128.
- 4212 Williams, R.C., Miyawa, J.H., Boucher, R.J. and Brockson, R.W.: Optimization and validation of chiral high-performance liquid chromatographic method for analysis of a fibrinogen (gpIIb/IIIa) receptor antagonist. *J. Chromatogr. A*, 844 (1999) 171-179.
- 4213 Wong, P.S.-Y. and Fukuto, J.M.: Reaction of organic nitrate esters and S-nitrosothiols with reduced flavins: a possible mechanism of bioactivation. *Drug Metab. Disp.*, 27 (1999) 502-509.
- 4214 Yoshimura, A., Koide, Y., Yoshioka, K., Hino, M., Sugawara, H., Sakato, M. and Endoh, M.: Investigation on SCH00013, a novel cardiotoxic agent with Ca^{++} sensitizing action. 2nd Communication: *In vivo* cardiovascular effects and bioavailability in dogs. *Arzneim.-Forsch.*, 49 (1999) 407-411.
- 4215 Zhang, M., Fawcett, J.P. and Shaw, J.P.: Rapid chiral high-performance liquid chromatographic assay for salmeterol and α -hydroxysalmeterol. Application to *in vitro* metabolism studies. *J. Chromatogr. B*, 729 (1999) 225-230.
- 4216 Zou, X. and Yun, Z.: (Separation of racemic propranolol by high performance liquid chromatography with amide derivative as chiral stationary phase). *Fenxi Huaxue*, 26 (1998) 1516; *C.A.*, 130 (1999) 187102.

See also 3430, 4223.

32d. Central nervous system drugs

- 4217 Abdel-Hafez, A.A., Meselhy, M.R., Nakamura, N., Hattori, M., Watanabe, H., Murakami, Y., El-Gendy, M.A., Mahfouz, N.M. and Mohamed, T.A.: Anticonvulsant activity of paeonimetalbin-I adducts obtained by incubation of paeoniflorin and thiol compounds with *Lactobacillus brevis*. *Biol. Pharm. Bull.*, 22 (1999) 491-497.
- 4218 Addison, R.S., Duffy, S.L. and Mathers, S.R.: A simple high-performance liquid chromatography assay for the major cisapride metabolite, norcisapride, in human urine. *J. Chromatogr. Sci.*, 37 (1999) 61-64.
- 4219 Almeida, A.E. and Ribeiro, M.L.: High-performance liquid chromatographic determination of amfepramone hydrochloride, mazindol, and diazepam in tablets. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1759-1769.
- 4220 Chen, S.-H., Wu, H.-L., Shen, M.-C. and Kou, H.-S.: Trace analysis of ethosuximide in human plasma with a chemically removable derivatizing reagent and high-performance liquid chromatography. *J. Chromatogr. B*, 729 (1999) 111-117.
- 4221 Cheng, Y.-F., Neue, U.D. and Woods, L.L.: Novel high-performance liquid chromatographic and solid-phase extraction methods for quantitating methadone and its metabolite in spiked human urine. *J. Chromatogr. B*, 729 (1999) 19-31.
- 4222 De Baere, S.M., Lambert, W.E., Esmans, E.L. and de Leenheer, A.P.: Identification and quantification of despropionyl-bezitramide in postmortem samples by liquid chromatography coupled to electrospray ionization tandem mass spectrometry. *Anal. Chem.*, 71 (1999) 2908-2914.
- 4223 Ferretti, R., Gallinella, B., la Torre, F. and Zanitti, L.: Direct resolution of isomoltane (CGP-361A) and enciprazine (WY 48624) enantiomers, using chiral high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1877-1892.
- 4224 Fracasso, C., Ceci, A., Vanoni, P. and Caccia, S.: A high-performance liquid chromatographic assay for 5-methoxy-3-[N-(4-(4-fluoro-phenyl)-4-oxobutyl)-1,2,5,6-tetrahydropyridin-3-yl-methyl]-1H-indole (BIMG 80), a potential antipsychotic agent, and its application in brain-to-plasma distribution studies in the rat. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1785-1795.

- 4225 Fuh, M.-R.S. and Lu, K.-T.: Determination of methylamphetamine and related compounds in human urine by high-performance liquid chromatography-electrospray mass spectrometry. *Talanta*, 48 (1999) 415-423; *C.A.*, 130 (1999) 247968.
- 4226 Fujinami, A., Miyazawa, T. and Kobayashi, Y.: Development of a method for the quantitation of benzphetamine metabolites in human urine by high-performance liquid chromatography. *Ann. Clin. Biochem.*, 35 (1998) 775-779; *C.A.*, 130 (1999) 217515.
- 4227 Gross, A.S., Nicolay, A. and Eschaliar, A.: Simultaneous analysis of ketamine and bipivacaine in plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 107-115.
- 4228 Hempel, R., Schupke, H., McNeilly, P.J., Heinecke, K., Kronbach, C., Grunwald, C., Zimmermann, G., Greisinger, C., Engel, J. and Kronbach, T.: Metabolism of retigabine (D-23129), a novel anticonvulsant. *Drug Metab. Disp.*, 27 (1999) 613-622.
- 4229 Hiller, A., Nguyen, N., Strassburg, C.P., Li, Q., Jainta, H., Pechstein, B., Ruus, P., Engel, J., Tukey, R.H. and Kronbach, T.: Retigabine N-glucuronidation and its potential role in heterohepatic circulation. *Drug Metab. Disp.*, 27 (1999) 605-612.
- 4230 Hurst, W.J., Zagon, I.S. and Aboul-Enein, H.Y.: A rapid sample preparation method for the HPLC determination of the opioid antagonist naltrexone in serum. *Pharmazie*, 54 (1999) 595-596.
- 4231 Makino, Y., Suzuki, A., Ogawa, T. and Shirota, O.: Direct determination of methamphetamine enantiomers in urine by liquid chromatography with a strong cation-exchange precolumn and phenyl- β -cyclodextrin-bonded semi-microcolumn. *J. Chromatogr. B*, 729 (1999) 97-101.
- 4232 Martin, W., Ring, J., Gaupp, M., Arnold, P., Sennewald, R. and Doser, K.: Bioavailability investigation of a new tilidine/naloxone liquid formulation compared to a reference formulation. *Arzneim.-Forsch.*, 49 (1999) 599-607.
- 4233 Masa, K., Arimori, K., Nakayama, T., Miyamoto, S., Fuji, J. and Nakano, M.: Effect of clarithromycin and other macrolides on the sulfoxidation and 5-hydroxylation of lansoprazole in dogs. *Biol. Pharm. Bull.*, 22 (1999) 504-509.
- 4234 May, Th.W., Rambeck, B., Jurges, U., Blankenhorn, V. and Jurgens, U.: Comparison of total and free phenytoin serum concentrations measured by high-performance liquid chromatography and standard TDx assay: implications for the prediction of free phenytoin serum concentrations. *Ther. Drug Monit.*, 20 (1998) 619-623; *C.A.*, 130 (1999) 191384.
- 4235 Narimatsu, S., Yamamoto, S., Kato, R., Masubuchi, Y. and Horie, T.: Contribution of flavin-containing monooxygenase and cytochrome P450 to imipramine N-oxidation in rat hepatic microsomes. *Biol. Pharm. Bull.*, 22 (1999) 567-571.
- 4236 Ohnishi, N., Yonekawa, Y., Nakasano, S., Nagasawa, K., Yokoyama, T., Yoshioka, M. and Kuroda, K.: Studies on interactions between traditional herbal and western medicines. I. Effects of Sho-seiryu-to on the pharmacokinetics of carbamazepine in rats. *Biol. Pharm. Bull.*, 22 (1999) 527-531.
- 4237 Pereira, D.G., Souza-Brito, A.R.M. and Durán, N.: Determination of the geometrical diarylpropenamide isomers in feces by high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 117-123.
- 4238 Reith, D.M. and Cannell, G.R.: An HPLC assay for carbamazepine phase I metabolites and their glucuronides in urine. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1907-1918.
- 4239 Rizzo, M., de Sarro, G., Gitto, R., Zappalà, M. and Chimirri, A.: Determination of 2,3-benzodiazepine derivatives in rat plasma by high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 165-168.
- 4240 Rukhadze, A.D., Okudzhava, V.M., Sebiskveradze, M.V. and Rogova, M.M.: (Behavior of barbiturates in reversed-phase and ion-pair chromatographic systems). *Zh. Fiz. Khim.*, 72 (1998) 1711-1713; *C.A.*, 130 (1999) 200999.
- 4241 Seguru, N.V., Evtushenko, N.S., Pikhtar, A.V., Simonova, E.P., Kudryavtseva, M.P. and Pudel, M.E.: (Quality control and standardization of the preparation of the preparation "Valoserdin" by HPLC and GLC methods). *Farmatsiya (Moscow)*, 47 (1998) 42-43; *C.A.*, 130 (1999) 242395.
- 4242 Srivastava, K., Hatanaka, T., Aiba, T., Katayama, K. and Koizumi, T.: Single dose pharmacokinetics and pharmacodynamics of oxazepam in normal and renal dysfunction. *Biol. Pharm. Bull.*, 22 (1999) 627-632.
- 4243 Takasaki, W., Yamamura, M., Shigehara, E., Suzuki, Y., Tonohiro, T., Hara, T. and Tanaka, Y.: Stereoselective pharmacokinetics of RS-8359, a selective and reversible inhibitor of A-type monoamine oxidase, in rats, mice, dogs and monkeys. *Biol. Pharm. Bull.*, 22 (1999) 498-503.
- 4244 Tokunaga, H., Kudo, K., Jitsufuchi, N., Ohtsuka, Y. and Imamura, T.: Sensitive determination of sulpiride in human plasma by high-performance liquid chromatography. In: Takatori, T. and Akihiro, T. (Editors), *Curr. Top. Forensic Sci., Proc. Mett. Int. Assoc. Forensic Sci., 14th 1996*, 2, Shunderson Communications, Ottawa, 1997, pp. 231-234; *C.A.*, 129 (1998) 156394z.
- 4245 Tserng, K.-Y., McPeak, R.J., Dejak, I. and Tserng, K.: Prevention of tricyclic antidepressant adsorption loss with diethylamine during solvent evaporation. *Ther. Drug Monit.*, 20 (1998) 646-651; *C.A.*, 130 (1999) 217518.
- 4246 Xu, X. and Stewart, J.T.: HPLC analysis of haloperidol and its related compound in the drug substance and a tablet dosage form using a non-porous silica octadecylsilane column. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1857-1866.
- 4247 Yamaguchi, J.-i., Watanabe, Y., Ohmichi, M., Jingu, S., Ogawa, N., Kokatsu, J., Fukushima, K. and Goto, J.: Ultrasensitive determination of NE-100, a novel sigma ligand, in human plasma by liquid chromatography and electrospray ionization tandem mass spectrometry combined with a column-switching technique. *J. Chromatogr. B*, 730 (1999) 61-70.
- 4248 Ye, L.-M., Li, Z.-W., Hong, Z. and Qian, G.-S.: Determination of lansoprazole by direct injection of plasma and high performance liquid chromatography with column switching. *J. Chin. Pharm. Sci.*, 7 (1998) 197-200; *C.A.*, 130 (1999) 276164.
- See also 3291, 3310, 3408, 4193, 4203, 4289, 4309.
- 32e. *Chemotherapeutics (exc. cytostatics and antibiotics)*
- 4249 Argekar, A.P. and Shah, S.J.: Stability indicating HPLC method for the determination of sparfloxacin (SPAR). *Anal. Lett.*, 32 (1999) 1363-1370.

- 4250 Besse, S., Guyonnet, J. and Delatour, P.: Quantification of flumequine enantiomers in plasma by high-performance liquid chromatography. *J. Vet. Pharmacol. Ther.*, 21 (1998) 330-332; C.A., 129 (1998) 325664v.
- 4251 Biró, E.J. and Rácz, I.: Examination of veterinary boluses containing albendazole and prepared by dry granulation. *Pharmazie*, 54 (1999) 552-553.
- 4252 Bishop, L.P.D., Maggs, J.L., O'Neill, P.M. and Park, B.K.: Metabolism of the antimalarial endoperoxide Ro 42-1611 (arteplene) in the rat: evidence for endoperoxide bioactivation. *J. Pharmacol. Exp. Ther.*, 289 (1999) 511-520.
- 4253 Borner, K., Hartwig, H. and Lode, H.: Determination of trovafloxacin in human body fluids by high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 175-180.
- 4254 Enanga, B., Boudra, H., Chauvière, G., Labat, C., Bouteille, B., Dumas, M. and Houin, G.: Pharmacokinetics, metabolism and excretion of megalol, a new potent trypanocidal drug in animals. *Arzneim.-Forsch.*, 49 (1999) 441-447.
- 4255 Furusawa, N.: Liquid chromatographic determination of sulfadimidine in milk and eggs. *Fresenius J. Anal. Chem.*, 364 (1999) 270-272.
- 4256 Gibbs, M.A., Kunze, K.L., Howald, W.N. and Thummel, K.E.: Effect of inhibitor depletion on inhibitory potency: tight binding inhibition of CYP3A by clotrimazole. *Drug Metab. Disp.*, 27 (1999) 596-599.
- 4257 Kudo, M., Ohkubo, T. and Sugawara, K.: Determination of fleroxacin in plasma by direct injection high performance liquid chromatography with column switching. *Anal. Lett.*, 32 (1999) 1589-1601.
- 4258 Pawar, S.P., Pal, S.C., Kasture, S.B., Kasture, V.S., Chatterjee, B.P. and Nandy, A.: Separation of rifampicin and sioniazid by high-performance liquid chromatography on micro Bondapak-CN column. *East. Pharm.*, 41 (1998) 123-124; C.A., 130 (1999) 213731.
- 4259 Plakas, S.M., El Said, K.R., Bencsath, E.A., Musser, S.M. and Walker, C.C.: Determination of flumequine in channel catfish by liquid chromatography with fluorescence detection. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 614-619.
- 4260 Shaw, N.O., de Villiers, M.M. and Lötter, A.P.: Preformulation stability screening of ivermectin with non-ionic emulsion excipients. *Pharmazie*, 54 (1999) 572-576.
- 4261 Tønnesen, H.H.: Photoreactivity of biologically active compounds. XV. Photochemical behaviour of mefloquine in aqueous solution. *Pharmazie*, 54 (1999) 590-594.
- 4262 Zhou, S.Y., Fleisher, D., Pao, L.H., Li, C., Winward, B. and Zimmermann, E.M.: Intestinal metabolism and transport of 5-aminosalicylate. *Drug Metab. Disp.*, 27 (1999) 479-485.
- 4265 Cai, X., Woo, M.H., Edick, M.J. and Relling, M.V.: Simultaneous quantitation of etoposide and its catechol metabolite in human plasma using high-performance liquid chromatography with electrochemical detection. *J. Chromatogr. B*, 728 (1999) 241-250.
- 4266 Chen, C.L., Narla, R.K., Liu, X.P. and Uckun, F.M.: A quantitative HPLC detection method for WHI-P154 [4-(3'-bromo-4'-hydroxyphenyl)-amino-6,7-dimethoxyquinazoline]. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1771-1783.
- 4267 Fotsis, T., Breit, S., Lutz, W., Rössler, J., Hatzi, E., Schwab, M. and Schweigerer, L.: Down-regulation of endothelial cell growth inhibitors by enhanced MYCN oncogene expression in human neuroblastoma cells. *Eur. J. Biochem.*, 263 (1999) 757-764.
- 4268 Khan, P., Abbas, S., Hargreaves, R.H.J., Caffrey, R., Megram, V. and McGown, A.: Development and validation of a sensitive solid-phase extraction and high-performance liquid chromatographic assay for the novel bio-reductive anti-tumor agent RH1 in human and mouse plasma. *J. Chromatogr. B*, 729 (1999) 287-295.
- 4269 Kim, H., Likhari, P., Lin, C.-C. and Nomeir, A.A.: High-performance liquid chromatographic analysis of the anti-tumor agent SCH 66336 in cynomolgus monkey plasma and evaluation of its chiral inversion in animals. *J. Chromatogr. B*, 728 (1999) 133-141.
- 4270 Mittner, A., Vincze, Y. and Jemnitz, K.: Stability of vinblastine sulfate containing infusions. *Pharmazie*, 54 (1999) 625-626.
- 4271 Morikawa, N., Mori, T., Abe, T., Kawashima, H., Takeyama, M. and Hori, S.: Pharmacokinetics of etoposide and carboplatin in cerebrospinal fluid and plasma during hyperosmotic disruption of the blood brain barrier and intraarterid combination chemotherapy. *Biol. Pharm. Bull.*, 22 (1999) 428-431.
- 4272 Peris, J.-E., Latorre, J.-A., Castel, V., Verdeguer, A., Esteve, S. and Torres-Molina, F.: Determination of busulfan in human plasma using high-performance liquid chromatography with pre-column derivatization and fluorescence detection. *J. Chromatogr. B*, 730 (1999) 33-40.
- 4273 Placidi, L., Scott, E.C., Eckoff, D., Bynon, S. and Sommadossi, J.-P.: Metabolic drug interactions between angiogenic inhibitor, TNP-470 and anticancer agents in primary cultured hepatocytes and microsomes. *Drug Metab. Disp.*, 27 (1999) 623-626.
- 4274 Steinborner, S. and Henion, J.: Liquid-liquid extraction in the 96-well plate format with SRM LC/MS quantitative determination of methotrexate and its major metabolite in human plasma. *Anal. Chem.*, 71 (1999) 2340-2345.
- 4275 Tanaka, M., Kuwahara, E., Shimizu, T., Chikazawa, H., Hisada, S. and Takahashi, N.: Rectal absorption of [bis(acetato)amine dichloro(cyclohexylamine) platinum(IV)] (BMS-182751), a new anti-tumor agent, in rats. *Biol. Pharm. Bull.*, 22 (1999) 521-526.
- See also 3676, 3770, 4105, 4120.
- 32f. *Cytostatics*
- 4263 Ariöz, F., Yalcin, G. and Dölen, E.: Determination of cisplatin, transplatin and aminotrichloroplatinate by high performance liquid chromatography in one run using 4-methyl-2-thiouracil as derivatizing agent. *Chromatographia*, 49 (1999) 562-566.
- 4264 Baumann, F., Lorenz, C., Jaehde, U. and Preiss, R.: Determination of cyclophosphamide and its metabolites in human plasma by high-performance liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 729 (1999) 297-305.
- 32g. *Other drug categories*
- 4276 Arbughi, T., Bertani, F., Celeste, R. and Tirone, P.: High-performance liquid chromatographic assay of the X-ray contrast agent iopiperidol in plasma and urine of rats and humans. *J. Chromatogr. B*, 729 (1999) 323-332.

- 4277 Avery, B.A., Venkatesh, K.K. and Avery, M.A.: Rapid determination of artemisinin and related analogues using high-performance liquid chromatography and an evaporative light scattering detector. *J. Chromatogr. B*, 730 (1999) 71-80.
- 4278 Crowe, A., Bruelisauer, A., Duerr, L., Guntz, P. and Lemaire, M.: Absorption and intestinal metabolism of SD2-RAD and rapamycin in rats. *Drug Metab. Disp.*, 27 (1999) 627-632.
- 4279 Dear, G.J., Ayrton, J., Plumb, R., Sweatman, B.C., Isamil, I.M., Fraser, I.J. and Mutch, P.J.: A rapid and efficient approach to metabolite identification using nuclear magnetic resonance spectroscopy, liquid chromatography/mass spectrometry and liquid chromatography/nuclear magnetic resonance spectroscopy/sequential mass spectrometry. *Rapid Commun. Mass Spectrom.*, 12 (1998) 2023-2030; *C.A.*, 130 (1999) 204632.
- 4280 Flårdh, M. and Jacobson, B.-M.: Sensitive method for the determination of baclofen in plasma by means of solid-phase extraction and liquid chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 846 (1999) 169-173.
- 4281 Fu, C.H., Tata, P.N.V., Okada, K., Akiyama, H. and Bramer, S.L.: Simultaneous quantitative determination of cilostazol and its metabolites in human plasma by high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 251-262.
- 4282 Garcia, M.A., Solans, C., Aramayona, J.J., Rueda, S. and Bregante, M.A.: Determination of marbofloxacin in plasma samples by high-performance liquid chromatography using fluorescence detection. *J. Chromatogr. B*, 729 (1999) 157-161.
- 4283 Gatti, G., de Pascalis, C.R., Miletich, F., Casazza, R. and Bassetti, D.: Specific high-performance liquid chromatography assay for determination of rifabutin plasma concentration following Extrelut column extraction. *J. Chromatogr. B*, 728 (1999) 233-239.
- 4284 Gorman, S.H.: Determination of the D- and L-enantiomers of modafinil in human plasma utilizing liquid-liquid extraction and high-performance liquid chromatography. *J. Chromatogr. B*, 730 (1999) 1-7.
- 4285 Iyer, G.R., Bellantone, R.A. and Taft, D.R.: *In vitro* characterization of the erythrocyte distribution of methazolamide: a model of erythrocyte transport and binding kinetics. *J. Pharmacokin. Biopharm.*, 27 (1999) 45-66.
- 4286 Jing, L.: (Determining methods for the radiochemical purity of radiopharmaceuticals). *Tongweisu*, 11 (1998) 113-123; *C.A.*, 130 (1999) 179320 - a review with 45 refs.
- 4287 Kiehr, B. and Christensen, M.S.: Assay for levormexifene, a selective estrogen receptor modulator, in human and monkey plasma employing high-performance liquid chromatography and solid-phase extraction. *J. Chromatogr. B*, 729 (1999) 315-322.
- 4288 Korecka, M., Nikolic, D., van Breemen, R.B. and Shaw, L.M.: The apparent inhibition of inosine monophosphate dehydrogenase by mycophenolic acid glucuronide is attributable to the presence of trace quantities of mycophenolic acid. *Clin. Chem. (Washington)*, 45 (1999) 1047-1050.
- 4289 Matsui, K., Oda, Y., Nakata, H. and Yoshimura, T.: Simultaneous determination of donepezil (aricept®) enantiomers in human plasma by liquid chromatography-electrospray tandem mass spectrometry. *J. Chromatogr. B*, 729 (1999) 147-155.
- 4290 Murphy, A.T., Lake, B.G., Bernestein, J.R., Franklin, T.B. and Gillespie, T.A.: Characterization of olanzapine (LY170053) in human liver slices by liquid chromatography/tandem mass spectrometry. *J. Mass Spectrom.*, 33 (1998) 1237-1245; *C.A.*, 130 (1999) 217570.
- 4291 Nava-Ocampo, A.A., Velázquez-Armenta, E.Y., Reyes-Pérez, H., Ramírez-Lopez, E. and Ponce-Monter, H.: Simplified method to quantify furosemide in urine by high-performance liquid chromatography and ultraviolet detection. *J. Chromatogr. B*, 730 (1999) 49-54.
- 4292 Sparidans, R.W., den Hartigh, J., Cremers, S., Beijnen, J.H. and Vermeij, P.: Semi-automatic liquid chromatographic analysis of pamidronate in urine after derivatization with 1-naphthylisothiocyanate. *J. Chromatogr. B*, 730 (1999) 95-99.
- 4293 Stoev, G., Dakova, T. and Michailova, A.: Quantitative determination of Closantel residues in milk by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr. A*, 846 (1999) 383-386.
- 4294 Suckow, R.F., Zhang, M.F., Collins, E.D., Fischman, M.W. and Cooper, T.B.: Sensitive and selective liquid chromatographic assay of memantine in plasma with fluorescence detection after pre-column derivatization. *J. Chromatogr. B*, 729 (1999) 217-224.
- 4295 Tarbin, J.A., Clarke, P. and Shearer, G.: Screening of sulphonamides in egg using gas chromatography-mass selective detection and liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 729 (1999) 127-138.
- 4296 Yu, X., Cui, D. and Davis, M.R.: Identification of *in vitro* metabolites of indinavir by "intelligent automated LC-MS/MS" (IN-TAMS) utilizing triple quadrupole tandem mass spectrometry. *J. Am. Soc. Mass Spectrom.*, 10 (1999) 175-183; *C.A.*, 130 (1999) 264396.
- 4297 Zavitsanos, A.P., MacDonald, C., Bassoo, E. and Gopaul, D.: Determination of domperidone in human serum and human breast milk by high-performance liquid chromatography-electrospray mass spectrometry. *J. Chromatogr. B*, 730 (1999) 9-24.
- 4298 Zhou, D.: (Separation and determination of radiopharmaceutical In-DTPA complex and unreacted free DTPA). *Sichuan Daxue Xuebao, Ziran Kexueban*, 35 (1998) 725-728; *C.A.*, 130 (1999) 242394.
- 4299 Zhou, X., Handie, A., Salari, H., Fifer, E.K., Breen, P.J. and Compadre, C.M.: High-performance liquid chromatography determination of residue levels on chicken carcasses treated with cetylpyridinium chloride. *J. Chromatogr. B*, 728 (1999) 273-277.
- See also 3459, 3587, 3605, 3659, 3706, 3745, 3760, 4059, 4101, 4117, 4144, 4186, 4264.
- 32h. *Toxicological and forensic applications*
- 4300 Betz, J.M.: Committee on natural toxins. Plant toxins. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 781-784.
- 4301 Bogusz, M.J., Maier, R.-D., Krüger, K.D., Webb, K.S., Romeril, J. and Miller, M.L.: Poor reproducibility of in-source collisional atmospheric pressure ionization mass spectra of toxicologically relevant drugs. *J. Chromatogr. A*, 844 (1999) 409-418.

- 4302 Comesana Losada, M., Leao, J.M., Gago-Martinez, A., Rodriguez Vazquez, J.A. and Quilliam, M.A.: Further studies on the analysis of DSP toxin profiles in Galician mussels. *J. Agric. Food Chem.*, 47 (1999) 618-621.
- 4303 Draisci, R., Palleschi, L., Giannetti, L., Lucentini, L., James, K.J., Bishop, A.G., Satake, M. and Yasumoto, T.: New approach to the direct detection of known and new diarrhoeic shellfish toxins in mussels and phytoplankton by liquid chromatography-mass spectrometry. *J. Chromatogr. A*, 847 (1999) 213-221.
- 4304 Ikegami, T., Kimata, K., Hosoya, K., Tanaka, N., Oida, T., Smith, C.J., Moffett, D.B., Grainger, J. and Patterson, D.G., Jr.: Isolation of polychlorodibenzo-*p*-dioxins and polychlorobiphenyls upon deproteinization of a serum sample by HPLC with restricted-access reversed-phase packing material. *J. High Resolut. Chromatogr.*, 22 (1999) 287-293.
- 4305 James, K.J., Bishop, A.G., Draisci, R., Palleschi, L., Marchiafava, C., Ferretti, E., Satake, M. and Yasumoto, T.: Liquid chromatographic methods for the isolation and identification of new pectenotoxin-2 analogues from marine phytoplankton and shellfish. *J. Chromatogr. A*, 844 (1999) 53-65.
- 4306 Kawatsu, K., Hamano, Y., Shibata, T. and Hamada, K.: (Detection of toxic domoic acid in shellfish using high performance liquid chromatography). *Osaka-furitsu Kosu Eisei Kenkyusho Kenkyu Hokoku*, 36 (1998) 187-190; *C.A.*, 130 (1999) 266466.
- 4307 Kawatsu, K., Shibata, T. and Hamano, Y.: Application of immunoaffinity chromatography for detection of tetrodotoxin from urine samples of poisoned patients. *Toxicol.*, 37 (1999) 325-333; *C.A.*, 130 (1999) 263233.
- 4308 Quilliam, M.A.: Committee on natural toxins. Phycotoxins. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 773-781 - a review with 118 refs.
- 4309 Singh, G., Arora, V., Fenn, P.T., Mets, B. and Blair, I.A.: A validated stable isotope dilution liquid chromatography tandem mass spectrometry assay for the trace analysis of cocaine and its major metabolites in plasma. *Anal. Chem.*, 71 (1999) 2021-2027.
- 4310 Truchon, G., Begin, D., Lesage, J., Goldberg, M., Talbot, D., Drolet, D. and Gerin, M.: Urinary excretion of thioethers related to styrene exposure. *J. Occup. Health*, 40 (1998) 350-355; *C.A.*, 130 (1999) 300835.
- See also 3683, 3686, 3750, 3753, 3754, 4031, 4067, 4222.
- 32i. *Plant extracts*
- 4311 Andlauer, W., Martena, M.J. and Fürst, P.: Determination of selected phytochemicals by reversed-phase high-performance liquid chromatography combined with ultraviolet and mass spectrometric detection. *J. Chromatogr. A*, 849 (1999) 341-348.
- 4312 Bringmann, G., Ruckert, M., Saeb, W. and Mudogo, V.: Characterization of metabolites in plant extracts of *Ancistrocladus likoko* by high-performance liquid chromatography coupled online with ¹H NMR spectroscopy. *Magn. Reson. Chem.*, 37 (1999) 98-102; *C.A.*, 130 (1999) 264810.
- 4313 Castillo, M.L., Herraiz, M. and Blanch, G.P.: Rapid analysis of cholesterol-elevating compounds in coffee brews by off-line high-performance liquid chromatography/high-resolution gas chromatography. *J. Agric. Food Chem.*, 47 (1999) 1525-1529.
- 4314 Chan, K.-L., Choo, C.-Y., Morita, H. and Itokawa, H.: High performance liquid chromatography in phytochemical analysis of *Eurycoma longifolia*. *Planta Med.*, 64 (1998) 741-745; *C.A.*, 130 (1999) 193779.
- 4315 Chen, L.-G., Yen, K.-Y. and Yang, L.-L.: Determination of six bioactive components in Yu-Ping-Feng-San by high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1149-1159.
- 4316 Gong, F., Peng, Y.-G., Cui, H., Liang, Y.-Z., Alexander, K.M.L. and Foo-Tim, C.: (HELP applied to traditional Chinese medicine analysis - determination of components of *Cordyceps sinensis*). *Gaodeng Xuexiao Huaxue Xuebao*, 20 (1999) 199-203; *C.A.*, 130 (1999) 213728.
- 4317 Kim, K.H., Lee, J.G., Park, J.H., Shin, Y.G., Lee, S.K., Cho, T.H. and Oh, S.T.: Determination of aloesin in plasma by high-performance liquid chromatography as fluorescent 9-anthroyl derivative. *Arch. Pharmacol. Res.*, 21 (1998) 651-656; *C.A.*, 130 (1999) 191348.
- 4318 Kim, S.-K., Kwak, Y.-S., Kim, S.-W., Hwang, S.-Y., Ko, Y.-S. and Yoo, C.-M.: (Improved method for preparation of crude ginseng saponin). *J. Ginseng Res.*, 22 (1998) 155-160; *C.A.*, 130 (1999) 301548.
- 4319 Kim, S.-W., Ryu, G., Hwang, S.-Y., Ko, Y.-S., Yoo, C.-M. and Kim, S.-K.: (New efficient method for isolation and purification of ginsenosides). *J. Ginseng Res.*, 22 (1998) 284-288; *C.A.*, 130 (1999) 301551.
- 4320 Kinjo, J., Aoki, K., Okawa, M., Shii, Y., Hirakawa, T., Nohara, T., Nakajima, Y., Yamazaki, T., Hosono, T., Someya, M., Niiho, Y. and Kurashige, T.: HPLC profile analysis of hepatoprotective oleanene-glucuronides in Puerariae Flos. *Chem. Pharm. Bull.*, 47 (1999) 708-710.
- 4321 Li, N., Lin, G., Kwan, Y.-W. and Min, Z.-D.: Simultaneous quantification of five major biologically active ingredients of saffron by high-performance liquid chromatography. *J. Chromatogr. A*, 849 (1999) 349-355.
- 4322 Liu, X., Tang, Z., Chai, B. and Wang, J.: (Preparation of highly purified ¹²⁵I-venom neural growth factor). *Tongweisu*, 11 (1998) 144-148; *C.A.*, 130 (1999) 179521.
- 4323 Morganti, P., Fionda, A., Elia, U. and Tiberi, L.: Extraction and analysis of cosmetic active ingredients from an anti-cellulitis transdermal delivery system by high-performance liquid chromatography. *J. Chromatogr. Sci.*, 37 (1999) 51-55.
- 4324 Okamoto, M., Kato, M., Nobuhara, K., Satoh, K., Yamamoto, Y. and Ihara, H.: Retention behaviour of products extracted from oriental medicine formulations in high-performance liquid chromatography on octadecyl acrylate-modified silicas. *J. Chromatogr. A*, 845 (1999) 409-415.
- 4325 Ouyang, H., Hu, M., Wang, L. and Zuo, S.: (Determination of capsaicin in capsicum fruits by reversed-phase high performance liquid chromatography). *Fenxi Huaxue*, 26 (1998) 1521; *C.A.*, 130 (1999) 181636.
- 4326 Takasaki, M., Konoshima, T., Tokuda, H., Masuda, K., Arai, Y., Shiojima, K. and Ageta, H.: Anti-carcinogenic activity of Taraxacum plant. II. *Biol. Pharm. Bull.*, 22 (1999) 606-610.

- 4327 Wang, Y. and Ye, H.: (Determination of *p*-tyrosol in extracts of rhodiola plants and fructus *Ligustrum lucidum* by reversed phase high-performance liquid chromatography (RP-HPLC)). *Zhejiang Yike Daxue Xuebao*, 27 (1998) 274-276; C.A., 130 (1999) 301797.
- 4328 Yoshikawa, M., Murakami, T., Otuki, K., Yamahara, J. and Matsuda, H.: (Bioactive saponins and glycosides. XIII. Horse chestnut. (3): quantitative analysis of escins Ia, Ib, IIa, and IIb by means of high performance liquid chromatography). *Yakugaku Zasshi*, 119 (1999) 81-87; C.A., 130 (1999) 194300.
- 4329 Zhang, Y., Li, Y., Zhang, P. and Zhao, W.: (Determination of patulin in apple juice by high performance liquid chromatography). *Weisheng Yanjiu*, 27 (1998) 146-148; C.A., 130 (1999) 264501.

For additional information see C.A.:
130 (1999) 248872, 292511.

See also 3356, 3417, 3492, 3519, 3523, 3529, 3611, 3675, 3676, 4356.

33. CLINICO-CHEMICAL APPLICATIONS

33a. General papers and reviews

For additional information see C.A.:
130 (1999) 261162, 261242.

See also 3273, 3440.

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

- 4330 Black, M.H., Magklara, A., Obiezu, C.V., Melegos, D.N. and Diamandis, E.P.: Development of an ultrasensitive immunoassay for human glandular kallikrein with no cross-reactivity from prostate-specific antigen. *Clin. Chem. (Washington)*, 45 (1999) 790-799.
- 4331 Campbell, M., Henthorn, J.S. and Davies, S.C.: Evaluation of cation-exchange HPLC compared with isoelectric focusing for neonatal hemoglobinopathy screening. *Clin. Chem. (Washington)*, 45 (1999) 969-975.
- 4332 Divjak, B. and Goessler, W.: Ion chromatographic separation of sulfur-containing inorganic anions with an ICP-MS as element-specific detector. *J. Chromatogr. A*, 844 (1999) 161-169.
- 4333 Eastman, J.W., Lorey, F., Arnopp, J., Currier, R.J., Sherwin, J. and Cunningham, G.: Distribution of hemoglobin F, A, S, C, E, and D quantities in 4 million newborn screening specimens. *Clin. Chem. (Washington)*, 45 (1999) 683-685.

See also 3488, 3556, 3653, 3695, 3709, 3711, 3720, 3735, 3889, 3986, 4016, 4017, 4020, 4040, 4041, 4090.

34. FOOD ANALYSIS

34a. General papers and reviews

- 4334 Sorensen, H., Sorensen, S., Bjerregaard, C. and Michaelsen, S.: *Chromatography and Capillary Electrophoresis in Food Analysis*. Royal Soc. Chem., Cambridge, 1999, 470 pp.; C.A., 130 (1999) 295819.

See also 3466, 4068.

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

- 4335 Fulcrand, H., Remy, S., Souquet, J.-M., Cheynier, V. and Moutounet, M.: Study of wine tannin oligomers by online liquid chromatography electrospray ionization mass spectrometry. *J. Agric. Food Chem.*, 47 (1999) 1023-1028.
- 4336 Matsushita, I., Muramoto, Y., Ozaki, S. and Tashiro, T.: (Production of tasty brewer's yeast extract by simulated moving-bed system chromatography). *Nippon Shokuhin Kagaku Kogaku Kaishi*, 46 (1999) 75-80; C.A., 130 (1999) 209062.

See also 3493, 3498, 3525, 3640, 3647, 3649, 3662, 3826, 3827, 4032, 4075, 4083, 4097, 4099.

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

See 3452, 4336.

35. ENVIRONMENTAL ANALYSIS

35a. General papers and reviews

- 4337 De Diego, A., Pecheyran, C., Tseng, C.M. and Donard, O.F.X.: Cryofocusing for on-line metal and metalloid speciation in the environment. *Anal. Spectrosc. Libr.*, 9 (1999) 375-406; C.A., 130 (1999) 305638 - a review with 101 refs.
- 4338 Ferrer, I. and Barceló, D.: Validation of new solid-phase extraction materials for the selective enrichment of organic contaminants from environmental samples. *TrAC*, 18 (1999) 180-192.
- 4339 Grange, A.H., Brumley, W.C. and Sovocool, G.W.: Powerful new tools for analyzing environmental contaminants: mass peak profiling from selected-ion-recording data (MPPSIRD) and a profile generation model (PGM). *Am. Environ. Lab.*, 10 (1998) C1, 6-7; C.A., 130 (1999) 204462.
- 4340 Hock, B., Marx, A., Seifert, M. and Brenner-Weiss, G.: Immunochemical techniques applied to the environmental field. A perspective. *Quim. Anal. (Barcelona)*, 17 (1998) 185-190; C.A., 130 (1999) 245880 - a review with 17 refs.
- 4341 Poole, S.K. and Poole, C.F.: Chromatographic models for the sorption of neutral organic compounds by soil from water and air. *J. Chromatogr. A*, 845 (1999) 381-400.

See also 3389, 3446, 3704, 4438.

- 35b. *Air pollution (complex mixtures; single compounds by cross-reference only)*
- 4342 Allegrini, I., Ianniello, A., Montagnoli, M., Sparapani, R., Mazziotti, C. and de Teran, G.: Carbon-coated annular denuders and ion chromatographic measurements for the determination of nitrogen-containing species (NO₂ and NO_y) in remote atmospheres. *J. Chromatogr. A*, 846 (1999) 265-268.
- 4343 Belloli, R., Barletta, B., Bolzacchini, E., Meinardi, S., Orlandi, M. and Rindone, B.: Determination of toxic nitrophenols in the atmosphere by high-performance liquid chromatography. *J. Chromatogr. A*, 846 (1999) 277-281.
- 4344 Cecinato, A., Marino, F., di Filippo, P., Lepore, L. and Possanzini, M.: Distribution of *n*-alkanes, polynuclear aromatic hydrocarbons and nitrated polynuclear aromatic hydrocarbons between the fine and coarse fractions of inhalable atmospheric particulates. *J. Chromatogr. A*, 846 (1999) 255-264.
- 4345 Dominguez, M.J. and Sanchez, M.L.: Determination of pollutant background concentrations in ambient air by use of a wet annular denuder system and ion chromatography. *Quim. Anal. (Barcelona)*, 17 (1998) 191-197; *C.A.*, 130 (1999) 226737.
- 4346 Kurita, K. and Aoki, K.: (Automated measurement of air pollutants by continuous concentrator). *Tokyo-to Kankyo Kagaku Kenkyusho Nenpo*, (1998) 40-46; *C.A.*, 130 (1999) 226722.
- 4347 Perrino, C., Concetta, M., Scianò, T. and Allegrini, I.: Use of ion chromatography for monitoring atmospheric pollution in background networks. *J. Chromatogr. A*, 846 (1999) 269-275.
- See also 3526, 3527, 4055, 4341, 4449.
- 35c. *Water pollution (complex mixtures; single compounds by cross-reference only)*
- 4348 Hogenboom, A.C., Niessen, W.M.A., Little, D. and Brinkman, U.A.Th.: Accurate mass determinations for the confirmation and identification of organic microcontaminants in surface water using online solid-phase extraction liquid chromatography electrospray orthogonal-acceleration time-of-flight mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 125-133; *C.A.*, 130 (1999) 186864.
- 4349 Manoli, E. and Samara, C.: Polycyclic aromatic hydrocarbons in natural waters: sources, occurrence and analysis. *TrAC*, 18 (1999) 417-428.
- 4350 Newcombe, G., Pelekani, C., Hepplewhite, C. and Nguyen, K.: Size is important. *Water (Artarmon)*, 25 (1998) 16-20; *C.A.*, 130 (1999) 242015.
- 4351 Slobodník, J., Lingeman, H. and Brinkman, U.A.T.: Large-volume liquid chromatographic trace-enrichment system for environmental analysis. *Chromatographia*, 50 (1999) 141-149.
- For additional information see *C.A.*:
130 (1999) 200653, 271617, 271731, 271740, 305831.
- See also 3415, 3476, 3495, 3497, 3612, 3622, 3692, 4123, 4133, 4136, 4138, 4341, 4352, 4354, 4388, 4408, 4409, 4434, 4436, 4437, 4439, 4450.
- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*
- 4352 Ding, J., Xie, K., Liu, E., Zhang, Y., Hsia, Y.-P. and Luo, Z.-P.: Study of surrogates for SW846 method 8330. *J. Chromatogr. Sci.*, 37 (1999) 65-70.
- 4353 Kuang, X. and Wu, J.: (Ion chromatographic analysis of soluble salt in soil and degree of mineralization of water). *Sichuan Daxue Xuebao, Ziran Kexueban*, 35 (1998) 937-941; *C.A.*, 130 (1999) 245782.
- See also 3495, 3684, 4052, 4135, 4137, 4393, 4409, 4418, 4435, 4454.
36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36a. *Surfactants*
- 4354 Alonso, M.C., Castillo, M. and Barceló, D.: Solid-phase extraction procedure of polar benzene- and naphthalenesulfonates in industrial effluents followed by unequivocal determination with ion pair chromatography/electrospray-mass spectrometry. *Anal. Chem.*, 71 (1999) 2586-2593.
- 4355 Chaimbault, P., Cassel, S., Claude, S., Debaig, C., Benvegna, T., Plusquellec, D., Rollin, P. and Lafosse, M.: Direct analysis of industrial oligoglycerols by liquid chromatography with evaporative light-scattering detection and mass spectrometry. *Chromatographia*, 50 (1999) 239-242.
- 4356 Renukappa, T., Roos, G., Klaiber, I., Vogler, B. and Kraus, W.: Application of high-performance liquid chromatography coupled to nuclear magnetic resonance spectrometry, mass spectrometry and bioassay for the determination of active saponins from *Bacopa monniera* Wettst. *J. Chromatogr. A*, 847 (1999) 109-116.
- 4357 Shang, D.Y., Ikonomou, M.G. and Macdonald, R.W.: Quantitative determination of nonylphenol polyethoxylate surfactants in marine sediment using normal-phase liquid chromatography-electrospray mass spectrometry. *J. Chromatogr. A*, 849 (1999) 467-482.
- See also 4098.
- 36b. *Antioxidants and preservatives*
- 4358 Abidi, S.L.: Reversed-phase retention characteristics of tocotrienol antioxidants. *J. Chromatogr. A*, 844 (1999) 67-75.
- 4359 Bode, A.M. and Rose, R.C.: Analysis of water-soluble antioxidants by high-performance liquid chromatography with electrochemical detection. *Methods Enzymol.*, 299 (1999) 77-83; *C.A.*, 130 (1999) 234088 - a review with 12 refs.
- 4360 Goldberg, D.M. and Soleas, G.J.: Analysis of antioxidant wine polyphenols by high-performance liquid chromatography. *Methods Enzymol.*, 299 (1999) 122-137; *C.A.*, 130 (1999) 195887.
- 4361 Noguera-Ortí, J.F., Villanueva-Camañas, R.M. and Ramis-Ramos, G.: Direct injection of edible oils as microemulsions in a micellar mobile phase applied to the liquid chromatographic determination of synthetic antioxidants. *Anal. Chim. Acta*, 387 (1999) 127-134.

- 4362 Noguera-Orti, J.F., Villanueva-Camanas, R.M. and Ramis-Ramos, G.: Determination of parabens in cosmetics without previous extraction by micellar liquid chromatography. *J. Chromatogr. Sci.*, 37 (1999) 83-87.
- 4363 Wang, G.: (Determination of antioxidant 1010 in SIS by high-performance liquid chromatography). *Tanxingti*, 8 (1998) 28-31; C.A., 130 (1999) 183590.
- 4364 Xie, Y.-T., Chen, P. and Wei, W.-Z.: Rapid analysis of preservatives in beverages by ion chromatography with series piezoelectric quartz crystal as detector. *Microchem. J.*, 61 (1999) 58-68; C.A., 130 (1999) 295671.

See also 4059.

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

- 4365 Bermejo, J., Fernández, A.L., Prada, V., Granda, M. and Menéndez, R.: Monitoring the synthesis of new pitches from coal tar and its fractions by chromatography and related techniques. *J. Chromatogr. A*, 849 (1999) 507-519.
- 4366 Fuhr, B.J., Johansson, R.G. and Tosto, F.: Fingerprinting of extractives in woods and pulps. In: *Pulping Conf.*, Vol. 3, TAPPI Press, Atlanta, 1998, pp. 1389-1402; C.A., 130 (1999) 183961.
- 4367 Gough, M.A. and Langley, G.J.: Analysis of oilfield chemicals by electrospray-mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 227-236; C.A., 130 (1999) 239663.
- 4368 Kingsbury, J.S., Harrity, J.P.A., Bonitatebus, P.J., Jr. and Hoveyda, A.H.: A recyclable Ru-based metathesis catalyst. *J. Am. Chem. Soc.*, 121 (1999) 791-799; C.A., 130 (1999) 182137.
- 4369 Lage, L.E.C., Sant'Anna, G.L., Jr. and Nobrega, R.: Molecular weight distribution of chlorolignin in bleached kraft effluent by GPC and ultrafiltration. *Bioresour. Technol.*, 68 (1998) 63-70; C.A., 130 (1999) 210960.
- 4370 Li, G., Chen, G. and Yan, Y.-J.: Instrumental analysis of coal liquids. *Proc.-Annu. Int. Pittsburgh Coal Conf.*, 15th, (1998) 1227-1235. C.A., 130 (1999) 254719.
- 4371 Mori, Y.: (Analysis of particle morphology. Analysis of particle size. Chromatographic method). *Funtai Kogaku Kaishi*, 36 (1999) 46-52; C.A., 130 (1999) 228036 - a review with 17 refs.
- 4372 Pang, L.S.K., George, S.C. and Quezada, R.A.: A study of the gross compositions of oil-bearing fluid inclusions using high performance liquid chromatography. *Org. Geochem.*, 29 (1998) 1149-1161; C.A., 130 (1999) 184583.
- 4373 Rahimi, P., Gentzsis, Th. and Cotte, E.: Investigation of the thermal behavior and interaction of Venezuelan heavy oil fractions obtained by ion-exchange chromatography. *Energy Fuels*, 13 (1999) 694-701; C.A., 130 (1999) 299081.
- 4374 Wahlhab, H.I., Al-Abdul, A.I.M. and Al-Dubabi, I.A.: Prediction of asphalt rheological properties using HP-GPC. *J. Mater. Civ. Eng.*, 11 (1999) 6-14; C.A., 130 (1999) 254670.

For additional information see C.A.:
130 (1999) 269221.

See also 3463, 3465, 3481, 3502.

37. *CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES*

- 4375 Jiang, Y., Myers, M.N. and Giddings, J.C.: Separation behavior of blood cells in sedimentation field-flow fractionation. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1213-1234.
- 4376 O'Keefe, R.S., Johnston, M.D. and Slater, N.K.H.: The affinity adsorptive recovery of an infectious herpes simplex virus vaccine. *Biotechnol. Bioeng.*, 62 (1999) 537-545; C.A., 130 (1999) 251270.
- 4377 Wei, G.T., Liu, F.-K., and Wang, C.R.C.: Shape separation of nanometer gold particles by size-exclusion chromatography. *Anal. Chem.*, 71 (1999) 2085-2091.

For additional information see C.A.:

130 (1999) 233229, 278933, 292435.

See also 3465, 3873, 4160, 4371.

38. *INORGANIC COMPOUNDS*

38a. *Cations*

- 4378 Agarwal, Y.K., Kaur, H. and Menon, S.K.: Poly(styrene-*p*-hydroxamic acids): synthesis, and ion exchange separation of rare earths. *React. Funct. Polym.*, 39 (1999) 155-164; C.A., 130 (1999) 191066.
- 4379 Akseli, A. and Kutun, S.: Separation and determination of various elements by cation-exchange chromatography with sodium trimetaphosphate as the eluent. *J. Chromatogr. A*, 847 (1999) 245-250.
- 4380 Al-Shawi, A.W. and Dahl, R.: The determination of cadmium and six other heavy metals in nitrate/phosphate fertilizer solution by ion chromatography. *Anal. Chim. Acta*, 391 (1999) 35-42.
- 4381 Brouček, F., Brouček, J. and Brouček, J.: (Dynamic and selectivity of metal-ion sorption on complexing polymeric sorbents). *Izv. Akad. Nauk Gruz., Ser. Khim.*, 23 (1997) 105-110; C.A., 130 (1999) 225672.
- 4382 Cardellicchio, N., Cavalli, S., Ragone, P. and Riviello, J.M.: New strategies for determination of transition metals by complexation ion-exchange chromatography and post column reaction. *J. Chromatogr. A*, 847 (1999) 251-259.
- 4383 Casiot, C., Donard, O.F.X. and Potin-Gautier, M.: (Simultaneous speciation analysis by HPLC-ICP-MS coupling applied to metalloid (As, Se, Sb, and Te)). *Spectra Anal.*, 28 (1999) 17-22; C.A., 130 (1999) 245836.
- 4384 Chen, L., Zhang, W. and Dong, C.: (Separation of ^{55,59}Fe from carrier-free ⁶⁰Co and ⁵⁴Mn by pressurized ion-exchange displacement chromatography). *Lanzhou Daxue Xuebao, Ziran Kexueban*, 34 (1998) 60-65; C.A., 130 (1999) 188272.
- 4385 Coo, L. dIc., Cardwell, T.J., Cattrall, R.W. and Kolev, S.D.: Study of the extraction of 1-(2'-pyridylazo)-2-naphthol from ethanol-water solutions into Nafion® membranes. *Anal. Chim. Acta*, 392 (1999) 201-211.

- 4386 Dev, K., Pathak, R. and Rao, G.N.: Sorption behavior of lanthanum(III), neodymium(III), terbium(III), thorium(IV) and uranium(VI) on Amberlite XAD-4 resin functionalized with bicine ligands. *Talanta*, 48 (1999) 579-584; *C.A.*, 130 (1999) 261101.
- 4387 Diógenes, I.C.N., de Cossa, J.R. and Moreira, I.S.: Monitoring of the synthesis of *cis* and *trans* ruthenium macrocyclic complexes by reversed-phase high-performance liquid chromatography. *Chromatographia*, 50 (1999) 105-108.
- 4388 Evans, E.H., Truscott, J.B., Bromley, L., Jones, Ph., Turner, J. and Fairman, B.E.: Evaluation of chelation preconcentration for the determination of actinide elements by flow injection ICP-MS. *ASTM Spec. Tech. Publ.*, STP 1344 (1998) 79-88; *C.A.*, 130 (1999) 381.
- 4389 Gao, P., Hong, D. and Zhou, T.: (Separation and concentration of Cr). *Shanghai Huanjing Kexue*, 18 (1999) 33-36; *C.A.*, 130 (1999) 305631 - a review with 25 refs.
- 4390 Grate, J.W., Egorov, O.B. and Fiskum, S.K.: Automated extraction chromatographic separations of actinides using separation-optimized sequential injection techniques. *Analyst (Cambridge)*, 124 (1999) 1143-1150.
- 4391 Guillaume, Y.C., Peyrin, E. and Berthelot, A.: Chromatographic study of magnesium and calcium binding to immobilized human serum albumin. *J. Chromatogr. B*, 728 (1999) 167-174.
- 4392 Heo, Y.W. and Lim, H.B.: Determination of inorganic species in the solution extracted from cleanroom gloves used in semiconductor process. *Bull. Korean Chem. Soc.*, 20 (1999) 226-228; *C.A.*, 130 (1999) 275855.
- 4393 Hils, A., Grote, M., Janssen, E. and Eichhorn, J.: Speciation of trace amounts of aluminium in percolating water of forest soil by online coupling HPLC-ICP-MS. *Fresenius J. Anal. Chem.*, 364 (1999) 457-461.
- 4394 Hoshi, H., Nakamura, S. and Akiba, K.: Separation of lanthanoids and actinoids by centrifugal partition chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1319-1330.
- 4395 Hu, W., Haddad, P.R., Hasebe, K. and Tanaka, K.: Electrostatic ion chromatography of cations using an N-dodecylphosphocholine zwitterionic stationary phase and water as the mobile phase. *Anal. Commun.*, 36 (1999) 97-100; *C.A.*, 130 (1999) 261102.
- 4396 Hubicki, Z. and Olszak, M.: Studies of the influence of the percentage content of polar organic solvent on the sorption and separation of rare earth elements nitrate complexes on anion exchangers. *Adsorpt. Sci. Technol.*, 16 (1998) 817-836; *C.A.*, 130 (1999) 305703.
- 4397 Huddleston, J.G., Griffin, S.T., Zhang, J., Willauer, H.D. and Rogers, R.D.: Metal ion separations in aqueous biphasic systems and using aqueous biphasic extraction chromatography. *ACS Symp. Ser.*, 716 (1999) 79-100; *C.A.*, 130 (1999) 201835 - a review with 38 refs.
- 4398 Inoue, Y., Date, T., Sakai, T., Shimizu, N., Yoshida, K., Chen, H., Kuroda, K. and Endo, G.: (Speciation of arsenic compounds in the urine of rats orally exposed to dimethylarsinic acid by LC-ICP-MS). *Nippon Iyo Masu Supekutoru Gakkai Koenshu*, 23 (1998) 99-100; *C.A.*, 130 (1999) 206015.
- 4399 Itoh, A., Hamanaka, T., Rong, W., Ikeda, K., Sawatari, H., Chiba, K. and Haraguchi, H.: Multielement determination of rare earth elements in geochemical samples by liquid chromatography/inductively coupled plasma mass spectrometry. *Anal. Sci.*, 15 (1999) 17-22; *C.A.*, 130 (1999) 191087.
- 4400 Jauhainen, T., Moore, J., Perämäki, P., Derome, J. and Derome, K.: Simple procedure for ion chromatographic determination of anions and cations at trace levels in ice core samples. *Anal. Chim. Acta*, 389 (1999) 21-29.
- 4401 Kim, J.S., Jeon, Y.S., Park, Y.J., Lee, Ch.H. and Kim, W.H.: (Separation and purification for the determination of zirconium and its isotopes in PWR spent nuclear fuels). *Anal. Sci. Technol.*, 11 (1998) 421-428; *C.A.*, 130 (1999) 245776.
- 4402 Kocjan, R. and Swieboda, R.: A chelate sorbent prepared by the modification of silica gel with Acid Orange 8 and its application. *Chem. Anal. (Warsaw)*, 44 (1999) 35-42; *C.A.*, 130 (1999) 275829.
- 4403 Kulkarni, S.V., Hankare, P.P. and Ganbawale, V.S.: Anion exchange separation of cadmium, mercury, zinc, calcium and lead from other elements on Amberlite IRA 402 (Cl⁻). *Acta Cienc. Indica, Chem.*, 23 (1997) 155-160; *C.A.*, 130 (1999) 305699.
- 4404 Kutun, S. and Akseli, A.: New elution agent, sodium trimetaphosphate, for the separation and determination of rare earths by anion-exchange chromatography. *J. Chromatogr. A*, 847 (1999) 261-269.
- 4405 Lam, N.T. and Nguyen, P.H.: (Research on using Fe(PAR)3 complex for enrichment and determination of Fe(III) by photometric method). *Tap Chi Hoa Hoc*, 36 (1998) 13-16; *C.A.*, 130 (1999) 290697.
- 4406 Li, W., Peng, C., Yuan, P. and Qi, W.: (Determination of 14 rare earth impurities in Y203 by petroleum sulfoxide extraction chromatography). *Guangpuxue Yu Guangpu Fenxi*, 19 (1999) 53-56; *C.A.*, 130 (1999) 275876.
- 4407 Lindemann, T., Prange, A., Dannecker, W. and Neidhart, B.: Simultaneous determination of arsenic, selenium and antimony species using HPLC-ICP-MS. *Fresenius J. Anal. Chem.*, 364 (1999) 462-466.
- 4408 Martin-Esteban, A., Garcinuno, R.M., Angelino, S., Fernandez, P. and Camara, C.: Determination of trace metals in waters and compost by online precipitation coupled to flame atomic absorption spectrophotometry or ion chromatography. *Talanta*, 48 (1999) 959-966; *C.A.*, 130 (1999) 227351.
- 4409 Mitrovic, B., Milacic, R., Pihlar, B. and Simoncic, P.: Speciation of trace amounts of aluminium in environmental samples by cation-exchange FPLC-ETAAS. *Analisis*, 26 (1998) 381-388; *C.A.*, 130 (1999) 245806.
- 4410 Miyahara, T., Kitamura, H., Narita, K. and Toyooka, T.: Ion exchange chromatography of aluminum using 3-carboxy-2-naphthylamine, N,N-diacetic acid as a fluorescent post-column chelating reagent. *Biomed. Chromatogr.*, 13 (1999) 70-74; *C.A.*, 130 (1999) 281015.
- 4411 Muentner, M.M., Stokes, K.C., Obie, R.T. and Jezorek, J.R.: Simultaneous separation of inorganic ions and neutral organics on ion-exchange stationary phases. *J. Chromatogr. A*, 844 (1999) 39-51.
- 4412 Muralidharan, S. and Freiser, H.: Fundamental aspects of metal-ion separations by centrifugal partition chromatography. *ACS Symp. Ser.*, 716 (1999) 347-389; *C.A.*, 130 (1999) 213900 - a review with 21 refs.

- 4413 Nogami, M., Sakashita, T., Mason, Ch., Bush, R. and Ikeda, Y.: Adsorption behavior of U(VI), Pu(IV), and Am(III) species on styrene divinylbenzene copolymer particles impregnated with dihexyl-N,N-diethylcarbamoylmethylphosphonate. *J. Nucl. Sci. Technol.*, 35 (1998) 966-969; C.A., 130 (1999) 229032.
- 4414 Oguma, K., Kato, K., Kurashima, Y., Seki, T., Ono, A. and Ishibashi, Y.: (Determination of traces of metals in steel by ion-exchange separation and atomic spectrometry). *Tetsu to Hagane*, 85 (1999) 119-123; C.A., 130 (1999) 245829.
- 4415 Paquet, P.M., Gravel, J.-F., Nobert, Ph. and Boudreau, D.: Speciation of chromium by ion chromatography and laser-enhanced ionization: optimization of the excitation-ionization scheme. *Spectrochim. Acta, Part B*, 53B (1998) 1907-1917; C.A., 130 (1999) 217224.
- 4416 Paull, B. and Haddad, P.R.: Chelation ion chromatography of trace metal ions using metallochromic ligands. *TrAC*, 18 (1999) 107-114.
- 4417 Pezzin, S.H., Collins, C.H., Archundia, C. and Collins, K.E.: Speciation of the products resulted from the reaction of $^{51}\text{Cr(VI)}$ with concentrated perchloric and trifluoromethanesulfonic acids. *J. Radioanal. Nucl. Chem.*, 236 (1998) 209-212; C.A., 130 (1999) 305768.
- 4418 Ruiz-Haas, P., Amarasiriwardena, D. and Xing, B.: Determination of trace metals bound to soil humic acid species by size exclusion chromatography and inductively coupled plasma mass spectrometry. *Spec. Publ.-R. Soc. Chem.*, 228 (1998) 147-163; C.A., 130 (1999) 196239.
- 4419 Saha, P.K. and Roy, U.S.: Extraction chromatographic studies of indium(III) with high molecular mass carboxylic acid. *Chem. Environ. Res.*, 6 (1997) 81-86; C.A., 130 (1999) 217209.
- 4420 Sandier, A., Amiel, C., Sebille, B., Rouchaud, J.-C. and Feforoff, M.: A study of strontium binding to albumins, by a chromatographic method involving atomic emission spectrometric detection. *Int. J. Biol. Macromol.*, 24 (1999) 43-48; C.A., 130 (1999) 264243.
- 4421 Sarzanini, C., Bruzzoniti, M.C., Abollino, O. and Mentasti, E.: Sulphonated azoligand for metal ion determination in ion interaction chromatography. *J. Chromatogr. A*, 847 (1999) 233-244.
- 4422 Seeber, G., Brunner, P., Buchmeiser, M.R. and Bonn, G.K.: Poly(7-oxanorborn-2-ene-5,6-dicarboxylate)-coated silica prepared by ring-opening metathesis polymerization for the selective enrichment of radioactive lanthanides. *J. Chromatogr. A*, 848 (1999) 193-202.
- 4423 Shapovalova, E.N., Ofitserova, M.N., Prokhorova, G.V., Slackov, V.E. and Shpigun, O.A.: Application of an amperometric detector for the determination of metals by ion-pair high-performance liquid chromatography. *J. Anal. Chem.*, 54 (1999) 271-274; C.A., 130 (1999) 245827.
- 4424 Sheng, R., Li, W., Yin, D., He, W. and Hu, W.: (Chromatographic separation of tungsten and rhenium). *Hejishu*, 21 (1998) 602-606; C.A., 130 (1999) 234013.
- 4425 Shiobara, Y., Ogra, Y. and Suzuki, K.T.: Speciation of metabolites of selenate in rats by HPLC-ICP-MS. *Analyst (Cambridge)*, 124 (1999) 1237-1241.
- 4426 Takeaji, H., Nishikawa, S. and Moriyama, H.: (Separation analysis of actinide elements and nuclear fission products). *Kyoto Daigaku Genshiro Jikkensho Gakujutsu Koenkai Hobunshu*, 33 (1999) 49-50; C.A., 130 (1999) 243345.
- 4427 Tan, L., Wang, M., Liao, M. and Chen, Y.: (Study on continuous separation and determination of gold(III) and thallium(III) by reversed-phase extraction chromatography on silica gel-tributyl phosphate column). *Fenxi Shiyanshi*, 18 (1999) 1-4; C.A., 130 (1999) 204318.
- 4428 Wang, Y., Zhou, C., Xiong, X. and Chen, J.: (Study on the separation of Co^{2+} from Cu^{2+} , Cd^{2+} , Mn^{2+} , Zn^{2+} and Fe^{3+} by extraction chromatography). *Sepu*, 17 (1999) 55-57; C.A., 130 (1999) 204317.
- 4429 Warwick, Ph.E., Croudace, I.W. and Dale, A.A.: An optimized and robust method for the determination of uranium and plutonium in aqueous samples. *Appl. Radiat. Isot.*, 50 (1999) 579-583; C.A., 130 (1999) 257011.
- 4430 Yamasaki, Sh.: (Experimental and clinical studies on the measurement and significance of inorganic anions in bile of patients and rabbits with reperfusion injury in the ischemic liver). *Wakayama Igaku*, 50 (1999) 7-18; C.A., 130 (1999) 250540.
- 4431 Yang, X.-J. and Pin, C.: Separation of hafnium and zirconium from Ti- and Fe-rich geological materials by extraction chromatography. *Anal. Chem.*, 71 (1999) 1706-1711.
- 4432 Yin, M., Li, B., Cao, X. and Zhang, Y.: (Determination of rare earth element impurities in high-purity Pr_6O_{11} by inductively coupled plasma mass spectrometry). *Fenxi Huaxue*, 27 (1999) 304-308; C.A., 130 (1999) 275904.
- 4433 Zhou, W., Zhou, C., Liu, X. and Xiong, X.: (Separation of matrix and determination of trace components in highly pure zinc by ICP-MS). *Kuangye*, 8 (1999) 98-101; C.A., 130 (1999) 305740.

For additional information see C.A.:

130 (1999) 212036, 217253, 225700, 231576, 253857, 271486, 285934, 301349, 304928.

See also 3336, 3367, 3398, 3400, 3415, 3437, 3628, 4342, 4347, 4353, 4437, 4440, 4444, 4454.

38b. Anions

- 4434 Achilli, M. and Romele, L.: Ion chromatographic determination of bromate in drinking water by post-column reaction with fuchsin. *J. Chromatogr. A*, 847 (1999) 271-277.
- 4435 Amati, B., DiPalo, V. and Possanzini, M.: Simultaneous determination of inorganic and organic acids in air by use of annular denuders and ion chromatography. *Chromatographia*, 50 (1999) 150-154.
- 4436 Büldt, A. and Karst, U.: Determination of nitrite in waters by microplate fluorescence spectroscopy and HPLC with fluorescence detection. *Anal. Chem.*, 71 (1999) 3003-3007.
- 4437 Chen, Z.L. and Adams, M.A.: 2,6-Pyridinedicarboxylic acid as an eluent for UV and conductivity detection of inorganic anions, magnesium and calcium in water by ion chromatography. *Chromatographia*, 49 (1999) 496-502.
- 4438 Colina, M. and Gardiner, P.H.E.: Simultaneous determination of total nitrogen, phosphorus and sulphur by means of microwave digestion and ion chromatography. *J. Chromatogr. A*, 847 (1999) 285-290.
- 4439 Colombini, S., Polesello, S., Valsecchi, S. and Cavalli, S.: Matrix effects in the determination of bromate in drinking water by ion chromatography. *J. Chromatogr. A*, 847 (1999) 279-284.

- 4440 Deguchi, K., Kohda, K. and Ito, M.: Simultaneous separation of anions and cations by flow-gradient ion chromatography. *J. Chromatogr. A*, 845 (1999) 165-170.
- 4441 Fujimoto, K., Shimura, M. and Yoshioka, K.: (Determination of trace amounts of boron in steel and silicon by anion exchange chromatography/ICP mass spectrometry). *Tetsu to Hagane*, 85 (1999) 114-118; C.A., 130 (1999) 217251.
- 4442 Havel, J., Madden, J.E. and Haddad, P.R.: Prediction of retention times for anions in ion chromatography using artificial neural networks. *Chromatographia*, 49 (1999) 481-488.
- 4443 Hiraoka, A., Masuya, T. and Tominaga, I.: (Simultaneous determination by high-performance liquid chromatography of nitrate and nitrite in human cerebrospinal fluid and serum). *Chromatography*, 19 (1998) 382-385; C.A., 130 (1999) 293430.
- 4444 Isildak, I. and Asan, A.: Simultaneous detection of monovalent anions and cations using all solid-state contact PVC membrane anion and cation-selective electrodes as detectors in single column ion chromatography. *Talanta*, 48 (1999) 967-978; C.A., 130 (1999) 272446.
- 4445 Ivask, J. and Kaljurand, M.: Reduction of the detection limits of anions in polar ice core analysis using correlation ion chromatography with detector signal processing. *J. Chromatogr. A*, 844 (1999) 419-423.
- 4446 Kang, M.-J. and Lee, S.-G.: (The effect of high concentration cation matrix on the analysis of the low anion concentration in suppressed ion chromatography). *Anal. Sci. Technol.*, 11 (1998) 495-498; C.A., 130 (1999) 245777.
- 4447 Lathan, B.R.: Optional techniques for assaying linear sodium polyphosphates. *Am. Lab. (Shelton)*, 31 (1999) 36-46; C.A., 130 (1999) 245766.
- 4448 Liu, Y. and Jensen, D.: (The first eluent generator for online production of high-purity acids and caustic solutions for the ion chromatography). *Oesterr. Chem. Z.*, 100 (1999) 13-15; C.A., 130 (1999) 204304.
- 4449 Moskvina, L.N. and Nikitina, T.G.: Determination of trace concentrations of HNO₂ and NO₂ in the atmosphere by ion chromatography with chromatomembrane preconcentration. *J. Anal. Chem.*, 54 (1999) 290-295; C.A., 130 (1999) 256323.
- 4450 Nowack, B. and von Gunten, U.: Determination of chlorate at low µg/l levels by ion-chromatography with postcolumn reaction. *J. Chromatogr. A*, 849 (1999) 209-215.
- 4451 Schnetger, B., Muramatsu, Y. and Yoshida, S.: Iodine (and other halogens) in twenty six geological reference materials by ICP-MS and ion chromatography. *Geostand. Newsl.*, 22 (1998) 181-186; C.A., 130 (1999) 231461.
- 4452 Schroeder, N.C., Radzinski, S.D., Ball, J.R., Ashley, K.R. and Whitener, G.D.: Reillex-HPQ anion exchange column chromatography: removal of pertechnetate ion from DSSF-5 simulant. *ACS Symp. Ser.*, 716 (1999) 219-233; C.A., 130 (1999) 214955.
- 4453 Stratford, M.-R.L.: Measurement of nitrite and nitrate by high-performance ion chromatography. *Methods Enzymol.*, 301 (1999) 259-269; C.A., 130 (1999) 234124.
- 4454 Tagami, K. and Uchida, S.: Comparison of the TEVA-Spec resin and liquid-liquid extraction methods for the separation of technetium in soil samples. *J. Radioanal. Nucl. Chem.*, 239 (1999) 643-648; C.A., 130 (1999) 296027.
- 4455 Zanella, R., Primel, E.G., Flores, E.M.M., Martins, A.F. and Dalago, R.M.: Suppressed ion chromatographic determination of chloride concrete. *J. High Resolut. Chromatogr.*, 22 (1999) 245-246.
- See also 3354, 3631, 4076, 4332, 4342, 4347, 4353, 4400, 4411.
- 38c. *Permanent and rare gases*
- See 3692.
- 38d. *Volatile inorganic compounds*
- 4456 Acworth, I.N., Bogdanov, M.B., McCabe, D.R. and Beal, M.F.: Estimation of hydroxyl free radical levels *in vivo* based on liquid chromatography with electrochemical detection. *Methods Enzymol.*, 300 (1999) 297-313; C.A., 130 (1999) 192808 - a review with 46 refs.
- 4457 Alexander, J.S. and Okayama, N.: Quantifying role of nitric oxide in endothelial barrier regulation. *Methods Enzymol.*, 301 (1999) 3-13; C.A., 130 (1999) 234279.
- 4458 Komazaki, Y., Hamada, Y., Hashimoto, S., Fujita, T. and Tanaka, S.: Development of an automated, simultaneous and continuous measurement system by using a diffusion scrubber coupled to ion chromatography for monitoring trace acidic and basic gases (HCl, HNO₃, SO₂ and NH₃) in the atmosphere. *Analyst (Cambridge)*, 124 (1999) 1151-1157.
- See also 4449.
39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS
- 4459 Becker, J.S., Kerl, W. and Dietze, H.-J.: Nuclide analysis of an irradiated tantalum target of a spallation neutron source using high performance ion chromatography and inductively coupled plasma mass spectrometry. *Anal. Chim. Acta*, 387 (1999) 145-154.
- 4460 Chartier, F., Aubert, M. and Pilier, M.: Determination of Am and Cm in spent nuclear fuels by isotope dilution inductively coupled plasma mass spectrometry and isotope dilution thermal ionization mass spectrometry after separation by high performance liquid chromatography. *Fresenius J. Anal. Chem.*, 364 (1999) 320-327.
- 4461 Turnowski, M., Yamakawa, N., Meller, J., Kimata, K., Ikegami, T., Hosoya, K. and Tanaka, N.: Deuterium isotope effect in chromatography as examined by various HPLC systems. Comments on retention and H/D differentiation mechanism. *Chromatography*, 19 (1998) 356-359; C.A., 130 (1999) 191178.
- For additional information see C.A.: 130 (1999) 243472, 303081.
- See also 3275, 3344, 3805, 4384, 4413, 4422, 4426, 4429, 4452.

Gas Chromatography

1. REVIEWS AND BOOKS

- 1361 Anderson, D.G.: Coatings. *Anal. Chem.*, 71, No. 12 (1999) 21R-32R - a review with 61 refs.
- 1362 Jones, G.R. and Oldham, N.J.: Pheromone analysis using capillary gas chromatographic techniques. *J. Chromatogr. A*, 843 (1999) 199-236 - a review with 180 refs.
- 1363 Lipschutz, M.E., Wolf, S.F., Hanchar, J.M. and Culp, F.B.: Geochemical and cosmochemical materials. *Anal. Chem.*, 71, No. 12 (1999) 1R-20R - a review with 11 refs.
- 1364 Workman, J., Jr., Veltkamp, D.J., Doherty, S., Anderson, B.B., Creasy, K.E., Koch, M., Tatera, J.F., Robinson, A.L., Bond, L., Burgess, L.W., Bokerman, G.N., Ullman, A.H., Darsey, G.P., Mozayani, F., Bamberg, J.A. and Greenwood, M.S.: Process analytical chemistry. *Anal. Chem.*, 71, No. 12 (1999) 121R-180R - a review with 44 refs.

See also 1409, 1422, 1429, 1438, 1445, 1446, 1447, 1454, 1477, 1481, 1482, 1517, 1522, 1528, 1531, 1541, 1558, 1559, 1574, 1611, 1613, 1616, 1630, 1632, 1650, 1653, 1657, 1676, 1698, 1699, 1704, 1708, 1709, 1723, 1752, 1759.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

- 1365 Arlard, E.R.: 80th Birthday of Jim Lovelock. *Chromatographia*, 50 (1999) 5.
- 1366 Comes, P. and Rosell-Melé, A.: Modelling of the effect of chromatographic resolution on the determination of the UK_{37} index. *J. Chromatogr. Sci.*, 37 (1999) 245-250.
- 1367 Wu, Z.: (Discussion on the concept problem of the specific retention volume in gas chromatography). *Sepu*, 17 (1999) 315-316.

2b. Thermodynamics and theoretical relationships

- 1368 Bruno, T.J., Lewandowska, A., Tsvetkov, F. and Hanley, H.J.M.: Determination of heats of adsorption of hydrocarbons on a synthetic clay by gas-solid chromatography using a wall coated open tubular column approach. *J. Chromatogr. A*, 844 (1999) 191-199.
- 1369 Gonzalez, F.R., Alessandrini, J.L. and Nardillo, A.M.: Revision of a theoretical expression for gas-liquid chromatographic retention. *J. Chromatogr. A*, 852 (1999) 583-588.
- 1370 Tudor, E. and Oncescu, T.: Influence of temperature and *n*-alkane pair on the methylene increments to the thermodynamic functions of solution on SE-30 and Carbowax-20M capillary columns. *J. Chromatogr. A*, 844 (1999) 201-215.

- 1371 Zhou, L.-M., Nie, M.-Y., Wang, Q.-H., Zhu, D.-Q. and Shen, H.-Q.: Enthalpy-entropy compensation effect in gas chromatographic enantiomeric separation. *Chin. J. Chem.*, 17 (1999) 363-376.

See also 1403, 1418, 1453, 1464, 1474, 1609.

2c. Relationship between structure and chromatographic behaviour

- 1372 Héberger, K. and Görgényi, M.: Principal component analysis of Kováts indices for carbonyl compounds in capillary gas chromatography. *J. Chromatogr. A*, 845 (1999) 21-31.
- 1373 Heinzen, V.E.F., Soares, M.F. and Yunes, R.A.: Semi-empirical topological method for the prediction of the chromatographic retention of *cis*- and *trans*-alkene isomers and alkanes. *J. Chromatogr. A*, 849 (1999) 495-506.
- 1374 Roshchina, T.M., Gurevich, K.B., Fadeev, A.Y., Astakhov, A.L. and Lisichkin, G.V.: Gas chromatography study of retention of organic compounds on silica with an attached layer of hydrophobic groups. *J. Chromatogr. A*, 844 (1999) 225-237.

See also 1459, 1490, 1604.

2d. Measurement of physico-chemical and related values

- 1375 Blokhina, S.V., Alekseeva, O.V., Prusov, A.N., Olkhovich, M.V. and Lokhanova, A.V.: (Gas-chromatographic study of the thermodynamic parameters of interaction between ethyl cellulose and low-molecular weight compounds). *Vysokomol. Soedin., Ser. A Ser. B*, 40 (1998) 2099-2104.
- 1376 Brandon, D.D., Isabelle, L.M., Samuels, M.H., Kendall, J.W. and Loriaux, D.L.: Cortisol production rate measurement by stable isotope dilution using gas chromatography-negative ion chemical ionization mass spectrometry. *Steroids*, 64 (1999) 372-378.
- 1377 Chehimi, M.M., Abel, M.-L., Perruchot, C., Delamar, M., Lascelles, S.F. and Armes, S.P.: The determination of the surface energy of conducting polymers by inverse gas chromatography at infinite dilution. *Synth. Met.*, 104 (1999) 51-59.
- 1378 Gavril, D. and Karaiskakis, G.: Study of the sorption of carbon monoxide, oxygen and carbon dioxide on platinum-rhodium alloy catalysts by a new gas chromatographic methodology. *J. Chromatogr. A*, 845 (1999) 67-83.
- 1379 Gavril, D., Katsanos, N.A. and Karaiskakis, G.: Gas chromatographic kinetic study of carbon monoxide oxidation over platinum-rhodium alloy catalysts. *J. Chromatogr. A*, 852 (1999) 507-523.
- 1380 Guha, O.K.: Study of coal by molecular probe chromatography. *Fuel Sci. Technol.*, 16 (1997) 45-52; *C.A.*, 130 (1999) 327061r.
- 1381 Gutierrez, M.C., Rubio, J., Rubio, F. and Oteo, J.L.: Inverse gas chromatography: a new approach to the estimation of specific interactions. *J. Chromatogr. A*, 845 (1999) 53-66.

- 1382 Katsanos, N.A., Rakintzis, N., Roubani-Kalantzopoulou, F., Arvanitopoulou, E. and Kalantzopoulos, A.: Measurement of adsorption energies on heterogenous surfaces by inverse gas chromatography. *J. Chromatogr. A*, 845 (1999) 103-111.
- 1383 Kaya, I. and Mart, H.: Determination of thermodynamic properties of poly(4-*tert*-butylstyrene) by inverse gas chromatography. *J. Polym. Eng.*, 19 (1999) 197-208.
- 1384 Kleemiss, M.: (Measurement of phase-composition for multi-component mixtures in vapor-liquid equilibrium). *Forsch. Ingenieurwes.*, 64 (1999) 325-328; *C.A.*, 131 (1999) 7031t.
- 1385 Papirer, E., Brendle, E., Ozil, F. and Balard, H.: Comparison of the surface properties of graphite, carbon black and fullerene samples, measured by inverse gas chromatography. *Carbon*, 37 (1999) 1265-1274.
- 1386 Romero, L.M., Filgueira, M.R., Gagliardi, L.G., Nardillo, A.M. and Castells, R.C.: Determination of activity coefficients in gas chromatographic systems in the presence of mixed retention mechanisms: alkanols (C₃-C₅) at infinite dilution in squalene and in *n*-octadecane. *Phys. Chem. Chem. Phys.*, 1 (1999) 3351-3355.
- 1387 Turbiez, A., Devynck, P., Desgroux, P. and Pauwels, J.F.: Coupling of gas chromatography and molecular beam/mass spectrometry analytical techniques: application to flame structure study. *Rev. Sci. Instrum.*, 70 (1999) 2828-2835.
- 1388 Vahle, A., Hubener, S., Funke, H., Eichler, B., Jost, D.T., Turler, A., Bruchle, W. and Jager, E.: Gas chromatographic studies of oxide and hydroxide species of tungsten. Model experiments with respect to the physico-chemical characterization of seaborgium (element 106). *Radiochim. Acta*, 84 (1999) 43-51.
- See also 1414, 1421, 1452, 1504, 1646, 1649, 1651, 1756, 1762, 1763.
- ### 3. GENERAL TECHNIQUES
- #### 3a. Apparatus and accessories
- 1389 Boselli, E., Grob, K. and Lercker, G.: Solvent trapping during large volume injection with an early vapor exit. *J. High Resolut. Chromatogr.*, 22 (1999) 327-334.
- 1390 Bungo, H.: (Chromatograph with accurate data acquisition). *Jpn. Kokai Tokkyo Koho JP 11 118,781 [99 118,781]* (Cl. G01N30/86), 30 Apr. 1999, Appl. 97/299,338, 15 Oct. 1997; 4 pp.; *C.A.*, 130 (1999) 332042q.
- 1391 Medina, J.C., Andrus, D.B., Bartholomew, C.H. and Lee, M.L.: Design and construction of a reactor-chromatographic system for on-line monitoring of gaseous reaction products. *Fresenius J. Anal. Chem.*, 364 (1999) 656-659.
- 1392 Miyazawa, K., Kondo, T., Nagano, H. and Sakurada, H.: (Apparatus for automatic analysis of chlorobenzenes). *Jpn. Kokai Tokkyo Koho JP 11 153,589 [99 153,589]* (Cl. G01N30/88), 8 Jun. 1999, JP Appl. 1997/253,231, 18 Sep. 1997; 12 pp.; *C.A.*, 131 (1999) 22682z.
- 1393 Mondello, L., Catalfamo, M., Cotroneo, A., Dugo, G., Dugo, G. and McNair, H.: Multidimensional capillary GC-GC for the analysis of real complex samples. *J. High Resolut. Chromatogr.*, 22 (1999) 350-356.
- 1394 Müller, L., Górecki, T. and Pawliszyn, J.: Optimization of the SPME device design for field applications. *Fresenius J. Anal. Chem.*, 364 (1999) 610-616.
- 1395 Sato, K., Yanagida, A., Negami, M. and Takenaka, A.: (An apparatus for estimating peroxidized lipids in a body by measuring pentane in breath sample). *Jpn. Kokai Tokkyo Koho JP 11 160,301 [99 160,301]* (Cl. G01N30/88), 18 Jun. 1999, Appl. 1997/343,961, 28 Nov. 1997; 11 pp.; *C.A.*, 131 (1999) 16089v.
- 1396 Tanihata, H.: (Autosampler for gas chromatograph). *Jpn. Kokai Tokkyo Koho JP 11 148,924 [99 148,924]* (Cl. G01N30/18), 2 Jun. 1999, Appl. 1997/312,935, 14 Nov. 1997; 6 pp.; *C.A.*, 131 (1999) 13087g.
- 1397 Theuerl, T., Kleibohmer, W. and Blanke, R.: (Rapid gas chromatography with resistance heated capillary columns. Analysis of essential oils from aromatic plants). *GIT Spez. Sep.*, 19 (1999) 40-43; *C.A.*, 131 (1999) 2324f.
- 1398 Tsuge, S. and Watanabe, T.: (Container for use in the reactive pyrolysis gas chromatographic analysis). *Jpn. Kokai Tokkyo Koho JP 11 142,383 [99 142,383]* (Cl. G01N30/06), 28 May 1999, Appl. 1997/310,096, 12 Nov. 1997; 7 pp.; *C.A.*, 131 (1999) 19599x.
- 1399 Van Hout, M.W.J., de Zeeuw, R.A., Franke, J.P. and de Jong, G.J.: Evaluation of the programmed temperature vaporiser for large-volume injection of biological samples in gas chromatography. *J. Chromatogr. B*, 729 (1999) 199-210.
- See also 1435, 1437, 1454, 1455, 1479, 1526, 1557, 1563, 1625.
- #### 3b. Detectors and detection reagents
- 1400 Cowie, A., Maeda, Y. and Goh, J.: Application of a high performance TCD in process gas chromatography. *Proc. Annu. ISA Anal. Div. Symp.*, 32 (1999) 59-68.
- 1401 Jin, Q., Shi, Y., Yu, A., Yang, W. and Peng, Z.: An improved argon microwave-induced plasma ionization detector for gas chromatography. *Microchem. J.*, 62 (1999) 282-290.
- 1402 Sanz-Vicente, I., Cabredo, S., Sanz-Vicente, F. and Galbán, J.: Heated flow-cell for gas phase UV-Visible detector in gas chromatography of polycyclic aromatic hydrocarbons. *Chromatographia*, 50 (1999) 202-208.
- See also 1423, 1433, 1437, 1455, 1469, 1473, 1485, 1489, 1494, 1501, 1547, 1563, 1769.
- #### 3c. Sorbents and columns, packing procedures
- 1403 Blumberg, L.M.: Theory of fast capillary gas chromatography - Part 3: column performance vs. gas flow rate. *J. High Resolut. Chromatogr.*, 22 (1999) 403-413.
- 1404 Chen, G.-C. and Rohwer, E.R.: Dynamic modification of the stationary phase in capillary gas chromatography. II. Continuous introduction of water vapour. *J. Chromatogr. A*, 845 (1999) 43-52.
- 1405 Chen, Y., Fang, P., Zeng, Z. and Fan, J.: Synthesis of linear fullerene-containing polysiloxanes and their application to capillary gas chromatography. *Chem. Lett.*, (1999) 499-500.

- 1406 Dorman, F.L., English, C.J., Feeney, M.J. and Kowalski, J.: Rational design of gas chromatographic capillary column stationary phases. *Am. Lab. (Shelton)*, 31, No. 6 (1999) 20-26.
- 1407 Haberhauer-Troyer, C., Rosenberg, E. and Grasserbauer, M.: Investigation of membrane dryers and evaluation of a new ozone scrubbing material for the sampling of organosulphur compounds in air. *J. Chromatogr. A*, 852 (1999) 589-595.
- 1408 Jennings, W. and Stremple, P.: (The correct use of low-bleed-columns in the gas chromatography). *GIT Spez. Sep.*, 19, No. 1 (1999) 44-46; *C.A.*, 130 (1999) 346547v.
- 1409 Kou, D., Hou, L. and Lu, X.: (Molten organic salt - a new class of stationary phases for GC). *Sepu*, 17 (1999) 257-258 - a review with 14 refs.
- 1410 Lai, X.H., Lin, L. and Wu, C.Y.: Preparation and chromatographic characteristics of calix[4]arene polysiloxane as stationary phases for capillary gas chromatography. *Chromatographia*, 50 (1999) 82-88.
- 1411 Lobinski, R., Sidelnikov, V., Patrushev, Y., Rodriguez, I. and Wasik, A.: Multicapillary column gas chromatography with element-selective detection. *TrAC*, 18 (1999) 449-460.
- 1412 Luo, C., Xu, H. and Tian, W.: (Preparation of β -cyclodextrin polymer glass capillary column by collosol adsorption method). *Fenxi Kexue Xuebao*, 15 (1999) 128-131; *C.A.*, 131 (1999) 38964d.
- 1413 Matisova, E., Hrouzkova, S., Novak, I., Berek, D. and Kozankova, J.: Novel porous carbons and their utilization in trace analysis. *Chem. Pap.*, 53 (1999) 40-48.
- 1414 Mayer, B.X., Zöllner, P. and Kählig, H.: Characterization of stationary phases for gas chromatography by ^{29}Si NMR spectroscopy. *J. Chromatogr. A*, 848 (1999) 251-260.
- 1415 Roeder, W. and Lennartz, D.: (New selfselective GC phase in the mid-polar region for environmental analysis). *GIT Labor-Fachz.*, 43 (1999) 226-229; *C.A.*, 130 (1999) 332028q.
- 1416 Rykowska, I., Smyka, S., Urbaniak, W. and Wasiaik, W.: Chemically bonded chelates as selective complexing sorbents for gas chromatography. VII. N-[3-(Trimethoxysilyl)propyl]diethylenetriamine complexes with CuCl_2 and CrCl_3 . *J. Chromatogr. A*, 844 (1999) 239-248.
- 1417 Schneider, M. and Ballschmiter, K.: Alkyl nitrates as achiral and chiral solute probes in gas chromatography. Novel properties of a β -cyclodextrin derivative and characterization of its enantioselective forces. *J. Chromatogr. A*, 852 (1999) 525-534.
- 1418 Stoev, G.: Influence of capillary column efficiency on the reliability of the identification of complex mixtures by gas chromatography. *J. Chromatogr. A*, 845 (1999) 3-11.
- 1419 Takeichi, T., Takahashi, K., Tanaka, T. and Takayama, Y.: Deactivation of metal capillaries for gas chromatography. *J. Chromatogr. A*, 845 (1999) 33-42.
- 1420 Tang, Q., Shen, Y., Wu, N. and Lee, M.L.: In situ crosslinked polybutadiene-encapsulated zirconia as a monolithic column for fast solvating gas chromatography. *J. Microcolumn Separ.*, 11 (1999) 415-420.
- 1421 Yuan, L.M., Fu, R.N., Chen, X.X., Gui, S.H. and Dai, R.J.: Synergistic effect in mixed capillary gas chromatographic stationary phases containing heptakis (2,3,6-tri-*o*-pentyl)- β -cyclodextrin and dibenzo-18-crown-6. *Chin. Chem. Lett.*, 10 (1999) 223-226.
- 3d. *Quantitative analysis*
- 1422 Barwick, V.J.: Sources of uncertainty in gas chromatography and high-performance liquid chromatography. *J. Chromatogr. A*, 849 (1999) 13-33 - a review with 75 refs.
- 1423 Elbast, W., Caubet, M.S., Deruaz, D. and Brazier, J.L.: Compound-independent calibration by gas chromatography-atomic emission detection (GC-AED): analysis of molecules with 12 carbon atoms. *Anal. Lett.*, 32 (1999) 1627-1641.
- 1424 Imamura, K., Eguchi, M., Ohira, S., Tashiro, T., Tachibana, S., Tanaka, M., Hirai, K., Fujikata, Y., Fujise, G., Maeda, Y., Yasaka, Y. and Warashina, M.: (Evaluation of a canister method for the determination of volatile organic compounds by GC/MS). *Bunseki Kagaku*, 48 (1999) 717-723.
- See also 1434, 1562, 1624, 1701, 1712.
- 3f. *Programmed temperature, pressure, vapors, gradients*
- 1425 Dallüge, J., Ou-Aissa, R., Vreuls, J.J., Brinkman, U.A.T. and Veraart, J.R.: Fast temperature programming in gas chromatography using resistive heating. *J. High Resolut. Chromatogr.*, 22 (1999) 459-464.
- 1426 Leonard, C., Grall, A. and Sacks, R.: Temperature programming for high-speed GC. *Anal. Chem.*, 71 (1999) 2123-2129.
- 1427 Vezzani, S., Pierani, D., Moretti, P. and Castello, G.: Automatic prediction of retention times in programmed-pressure isothermal gas chromatography. *J. Chromatogr. A*, 848 (1999) 229-238.
4. SPECIAL TECHNIQUES
- 4a. *Automation*
- 1428 Horner, G. and Keil, E.M.: Chemosensory system for rapid automated quality control. *J. Chromatogr. A*, 845 (1999) 85-92.
- 1429 Spinner, R. and Maurer, T.: (Process chromatography in the industrial chlorine production). *GIT Spez. Sep.*, 19, No. 1 (1999) 30-31; *C.A.*, 130 (1999) 346442g.
- See also 1364, 1392, 1400, 1496.
- 4b. *Computerization and modelling*
- 1430 Klawun, C., Trimble, S., Diehl, B., Saadat, S. and Peariman, M.: Implementing laboratory method development and data processing software in process gas chromatographs. *Proc. Annu. ISA Anal. Div. Symp.*, 32 (1999) 75-83.
- 1431 McDowall, R.D.: Chromatography data systems II: Specifying, evaluating and selecting a system. *LC-GC Int.*, 12 (1999) 422-431.
- 1432 Zhu, P., Guo, W.-Q., Xu, M.-Y. and Tang, J.-S.: (Optimization of chromatographic conditions based on feed forward neural networks with nonlinear inputs). *Zhejiang Daxue Xuebao, Ziran Kexueban*, 33, No. 1 (1999) 20-25; *C.A.*, 131 (1999) 38966f.
- See also 1390.

See also 1374, 1471, 1574, 1609, 1706.

- 4c. *Combination with other physico-chemical techniques (MS, IR etc.)*
- 1433 Brede, C., Pedersen-Bjergaard, S., Lundanes, E. and Greibrokk, T.: (Microplasma, a new and simple ion sources for GC-MS). *Kjemi*, 59 (1999) 6-7; *C.A.*, 131 (1999) 96500k.
- 1434 Dube, G., Henrion, A. and Ohlendorf, R.: Memory effects in combining isotope ratio monitoring with isotope dilution mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 1186-1188.
- 1435 Gorshteyn, A., Smarason, S. and Robbat, A., Jr.: Speciation of subsurface contaminants by cone penetrometry gas chromatography/mass spectrometry. *Environ. Sci. Technol.*, 33 (1999) 2474-2480.
- 1436 Hall, J.A., Barth, J.A.C. and Kalin, R.M.: Routine analysis by high precision gas chromatography/mass selective detector/isotope ratio mass spectrometry to 0.1 parts per mil. *Rapid Commun. Mass Spectrom.*, 13 (1999) 1231-1236.
- 1437 Heger, H.J., Dorfner, R., Zimmermann, R., Rohwer, E.R., Boesl, U. and Kettrup, A.: A novel interface for optimized coupling of gas chromatography and supersonic jet spectroscopy. *J. High Resolut. Chromatogr.*, 22 (1999) 391-394.
- 1438 Henry, C.M.: GC/MS not the same old combination. *Anal. Chem.*, 71 (1999) 401A-406A.
- 1439 Hilkert, A.W., Douthitt, C.B., Schluter, H.J. and Brand, W.A.: Isotope ratio monitoring gas chromatography/mass spectrometry of D/H by high temperature conversion isotope ratio mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 1226-1230.
- 1440 Stein, S.E.: An integrated method for spectrum extraction and compound identification from gas chromatography/mass spectrometry data. *J. Am. Soc. Mass Spectrom.*, 10 (1999) 770-781.
- 1441 Zapata, A.M., Bock, C.L. and Robbat, A., Jr.: Performance evaluation of a gas chromatograph coupled to a capillary microwave-induced plasma mass spectrometer. *J. Anal. At. Spectrom.*, 14 (1999) 1187-1192.
- 1442 Zenkevich, I.G.: Application of molecular dynamics to chromatographic-spectral identification of isomeric products of organic reactions. *Russ. J. Org. Chem.*, 34 (1998) 1403-1409; *C.A.*, 131 (1999) 110675e.
- See also 1457, 1494, 1611, 1613.
- 4e. *Functional analysis*
- 1443 Dai, T.-y., Wang, Q.-h., Wei, F.-s., Tan, P.-g. and Jin, L.: Sampling and determination of carbonyls in stack gas. *J. Environ. Sci. (China)*, 11 (1999) 48-56; *C.A.*, 131 (1999) 8637g.
- 1444 Hardas, N.R. and Uden, P.C.: Empirical formulae studies of chlorofluorocarbons using gas chromatography coupled to atomic emission detection. *J. Chromatogr. A*, 844 (1999) 271-281.
- 1445 Little, J.L.: Artifacts in trimethylsilyl derivatization reactions and ways to avoid them. *J. Chromatogr. A*, 844 (1999) 1-22 - a review with 65 refs.
- 1446 Rosenfeld, J.M.: Solid-phase analytical derivatization: enhancement of sensitivity and selectivity of analysis. *J. Chromatogr. A*, 843 (1999) 19-27 - a review with 36 refs.
- 1447 Wells, R.J.: Recent advances in non-silylation derivatization techniques for gas chromatography. *J. Chromatogr. A*, 843 (1999) 1-18 - a review with 157 refs.
- 1448 Zaikin, V.G., Yakushin, V.N., Volnina, E.A. and Mikaya, A.I.: Cycloorganosilyl derivatives for the determination of alcohols and carboxylic acids by gas chromatography/mass spectrometry. *Eur. Mass Spectrom.*, 5 (1999) 23-31.
- See also 1753.
- 4f. *Trace analysis and preseparation techniques*
- 1449 Liu, S. and Pleil, J.D.: Method for liquid-liquid extraction of blood surrogates for assessing human exposure to jet fuel. *J. Chromatogr. B*, 728 (1999) 193-207.
- 1450 McDaniel, L.H. and Taylor, L.T.: Modification of the collection solvent to enhance liquid trapping efficiencies after supercritical fluid extraction. *J. Chromatogr. Sci.*, 37 (1999) 203-209.
- 1451 Rodinkov, V., Moskvina, L.N. and Grigorev, G.L.: Comparative analysis of the performance of techniques for the preconcentration of volatile organic compounds from aqueous solutions. *J. Anal. Chem.*, 54 (1999) 409-413; *C.A.*, 130 (1999) 356776h.
- See also 1413, 1436, 1468.
- 4g. *Enantiomers, separation*
- 1452 Reich, S. and Schurig, V.: Stopped-flow multidimensional gas chromatography: a new method for the determination of enantiomerization barriers. *J. Microcolumn Separ.*, 11 (1999) 475-479.
- 1453 Spáňik, I., Krupčík, J. and Schurig, V.: Comparison of two methods for the gas chromatographic determination of thermodynamic parameters of enantioselectivity. *J. Chromatogr. A*, 843 (1999) 123-128.
- See also 1371, 1417, 1465, 1492, 1574, 1577, 1609, 1637, 1689.
- 4h. *Other special techniques*
- 1454 Akapo, S.O., Dimandja, J.-M.D., Kojiro, D.R., Valentin, J.R. and Carle, G.C.: Gas chromatography in space. *J. Chromatogr. A*, 843 (1999) 147-162 - a review with 55 refs.
- 1455 Anonymous: (Selective and sensitive gas measurements by gas chromatography with semiconductor gas sensors placed along predetermined column lengths). *Ger. Offen.* DE 19,752,909 (Cl. G01N30/88), 2 Jun. 1999, Appl. 19,752,909, 28 Nov. 1997; 4 pp.; *C.A.*, 130 (1999) 360811h.
- 1456 Kopeikin, V.A., Grinshteyn, I.L. and Kuss, M.: Separation of metal vapors using a high temperature chromatographic effect on graphite. *GIT Lab. J.*, 3 (1999) 46-49; *C.A.*, 131 (1999) 53209e.
- 1457 Ma, C.Y., McCorkle, D.L., Ding, W. and Pinnaduwa, L.A.: Methodology for gas chromatographic-mass spectral analysis of volatile organic compounds emerging from a low-pressure, flow-through reaction cell. *J. Chromatogr. A*, 844 (1999) 217-224.
- 1458 Negelein, D.L., Bonnet, E. and White, R.L.: Effluent monitoring by repetitive injection gas chromatography-mass spectrometry. *J. Chromatogr. Sci.*, 37 (1999) 263-269.

See also 1462.

4i. Supercritical fluid chromatography

- 1459 Gurdale, K., Lesellier, E. and Tchaplá, A.: Methylene selectivity and eluotropic strength variations in subcritical fluid chromatography with packed columns and CO₂-modifier mobile phases. *Anal. Chem.*, 71 (1999) 2164-2170.
- 1460 Janda, V.: Supercritical fluid extraction in environmental analysis. *Crit. Rev. Anal. Chem.*, 29 (1999) 87-89.
- 1461 Laitinen, A. and Kaunisto, J.: Supercritical fluid extraction of 1-butanol from aqueous solutions. *J. Supercrit. Fluids*, 15 (1999) 245-252.
- 1462 Levy, J.M.: Supercritical fluid-solid phase sample preparation: a selective extraction strategy. *LC-GC Suppl.*, 17, No. 65 (1999) S14-S21.
- 1463 O'Connell, M., O'Mahony, T., O'Sullivan, M., Harris, S.J., Jennings, W.B. and Glennon, J.D.: Monitoring the selectivity of supercritical fluid extractions of metal ions using ion chromatography. *Spec. Publ. - R. Soc. Chem.*, 239 (1999) 137-143.
- 1464 Roth, M.: Relative retention in supercritical fluid chromatography as a source of partial molar properties. *J. Phys. Chem. B*, 103 (1999) 4492-4496.
- 1465 Selditz, U., Copinga, S., Grol, C.J., Franke, J.P., de Zeeuw, R.A., Wikstroem, H. and Gyllenhaal, O.: Temperature effects on the chromatographic behavior of racemic 2-amidotetralins on a Whelk-O1 stationary phase in super- and subcritical fluid chromatography. *Pharmazie*, 54 (1999) 183-191.
- 1466 Spricigo, C.B., Pinto, L.T., Bolzan, A. and Novais, A.F.: Extraction of essential oil and lipids from nutmeg by liquid carbon dioxide. *J. Supercrit. Fluids*, 15 (1999) 253-259.
- 1467 Ventura, M.C., Farrell, W.P., Aurigemma, C.M. and Greig, M.J.: Packed column supercritical fluid chromatography/mass spectrometry for high-throughput analysis. *Anal. Chem.*, 71 (1999) 2410-2416.

See also 1450, 1472, 1478, 1491, 1502, 1514, 1537, 1554, 1555, 1568, 1573, 1582, 1587, 1603, 1609, 1616, 1644, 1647, 1659, 1662, 1667, 1700, 1724, 1730, 1738.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. Aliphatic hydrocarbons

- 1468 Habram, M. and Welsch, T.: Improvement in the detection limit in capillary gas chromatographic trace analysis of C₂-C₄ hydrocarbons by post column cryogenic trapping. *J. High Resolut. Chromatogr.*, 22 (1999) 335-338.
- 1469 Hardas, N.R., Adam, R. and Uden, P.C.: Alkene determination by bromination and gas chromatography with element-selective atomic plasma spectroscopic detection. *J. Chromatogr. A*, 844 (1999) 249-258.

See also 1368, 1373, 1395, 1442, 1465, 1707, 1765, 1766.

5b. Cyclic hydrocarbons, fullerenes

- 1470 Andreoli, R., Manini, P., Bergamaschi, E., Brustolin, A. and Mutti, A.: Solid-phase microextraction and gas chromatography-mass spectrometry for determination of monoaromatic hydrocarbons in blood and urine: application to people exposed to air pollutants. *Chromatographia*, 50 (1999) 167-172.
- 1471 Andronikashvili, T.G., Eprikashvili, L.G., Dzaganian, M.A. and Zautashvili, M.G.: The effect of the nature of the carrier gas on the character of the gas chromatographic separation of isomeric mixtures of benzene derivatives. *Chromatographia*, 50 (1999) 57-60.
- 1472 Berset, J.D. and Holzer, R.: Quantitative determination of polycyclic aromatic hydrocarbons, polychlorinated biphenyls and organochlorine pesticides in sewage sludges using supercritical fluid extraction and mass spectrometric detection. *J. Chromatogr. A*, 852 (1999) 545-558.
- 1473 Cai, C. and Lu, C.-x.: (Determination of weight correction factor of toluene and its nitro-derivatives on flame ionization detector). *Hanneng Cailiao*, 7 (1999) 28-30; *C.A.*, 130 (1999) 354348w.
- 1474 Héberger, K. and Kowalska, T.: Thermodynamic significance of boiling point correlations for alkylbenzenes in gas chromatography. Extension of Trouton's rule. *J. Chromatogr. A*, 845 (1999) 13-20.
- 1475 Jiang, T. and Guan, Y.: Analysis of polycyclic aromatic hydrocarbon derivatives by on-line coupled packed-capillary high-performance liquid chromatography-high-temperature gas chromatography. *J. Chromatogr. Sci.*, 37 (1999) 255-262.
- 1476 Korenaga, T., Kajihara, T. and Tsukiyama, Y.: (Determination of dynamic analysis of polycyclic aromatic hydrocarbons in soil and plant samples). *Bunseki Kagaku*, 48 (1999) 631-636.
- 1477 Manoli, E. and Samara, C.: Polycyclic aromatic hydrocarbons in natural waters: sources, occurrence and analysis. *TrAC*, 18 (1999) 417-428 - a review with 50 refs.
- 1478 Oda, J.: (Application of supercritical fluid extraction for the analysis of polycyclic aromatic hydrocarbons in airborne particulates). *Bunseki Kagaku*, 48 (1999) 595-607.
- 1479 Samman, A. and Wyllie, S.G.: The use of a programmable temperature vaporizer in the thermal desorption mode for the quantitative analysis of airborne volatiles. *J. Chromatogr. Sci.*, 37 (1999) 215-218.
- 1480 Struppe, C., Nuchter, M. and Ondruschka, B.: (Microwave assisted extraction for preparing of samples for GC analytic of polycyclic aromatic hydrocarbons in soils). *Chem. Tech. (Leipzig)*, 51 (1999) 127-129; *C.A.*, 131 (1999) 87381v.

See also 1402, 1702, 1707, 1715, 1719, 1721, 1731, 1737.

5c. Halogen derivatives

- 1481 Cochran, J.W. and Frame, G.M.: Recent developments in the high-resolution gas chromatography of polychlorinated biphenyls. *J. Chromatogr. A*, 843 (1999) 323-368 - a review with 231 refs.
- 1482 De Boer, J.: Capillary gas chromatography for the determination of halogenated micro-contaminants. *J. Chromatogr. A*, 843 (1999) 179-198 - a review with 182 refs.

- 1483 Engen, M.A., Culbertson, J.A. and Grimsrud, E.P.: Analysis of brominated compounds in background air by gas chromatography-high-resolution mass spectrometry. *J. Chromatogr. A*, 848 (1999) 261-277.
- 1484 Giese, B., Laturnus, F., Adams, F.C. and Wiencke, C.: Release of volatile iodinated C₁-C₄ hydrocarbons by marine macroalgae from various climate zones. *Environ. Sci. Technol.*, 33 (1999) 2432-2439.
- 1485 Hughes, R.A., Knighton, W.B. and Grimsrud, E.P.: Enhancement of electron-capture detection of methyl bromide in air by iodination. *J. Chromatogr. A*, 852 (1999) 535-543.
- 1486 Li, H.-J., Yokouchi, Y. and Akimoto, H.: Measurement of methyl halides in the marine atmosphere. *Atmos. Environ.*, 33 (1999) 1881-1887.
- 1487 Llompert, M., Li, K. and Fingas, M.: Headspace solid-phase microextraction for the determination of polychlorinated biphenyls in soils and sediments. *J. Microcolumn Separ.*, 11 (1999) 397-402.
- 1488 Mimura, K., Tamura, M., Haraguchi, K. and Masuda, Y.: (Analysis of 209 PCB congeners by high separation gas chromatography/low resolution mass spectrometer). *Fukuoka Igaku Zasshi*, 90 (1999) 192-201; *C.A.*, 131 (1999) 98580k.
- 1489 Mu, H., Wesén, C., Odenbrand, I. and Wahlund, K.-G.: Response factors of organochlorine compounds in the electrolytic conductivity detector. *J. Chromatogr. A*, 849 (1999) 285-292.
- 1490 Olivero, J. and Kannan, K.: Quantitative structure-retention relationships of polychlorinated naphthalenes in gas chromatography. *J. Chromatogr. A*, 849 (1999) 621-627.
- 1491 Oudin, P., Toth, J.A., Bonaly, R. and Balogh, C.: Quantitation of intercellular polychlorobiphenyls during growth of *Rhodotorula glutinis*. *Biotechnol. Tech.*, 13 (1999) 101-105; *C.A.*, 131 (1999) 41654h.
- 1492 Reich, S., Jimenez, B., Marsili, L., Hernández, L.M., Schurig, V. and González, M.J.: Congener specific determination and enantiomeric ratios of chiral polychlorinated biphenyls in striped dolphins (*Stenella coeruleoalba*) from the Mediterranean sea. *Environ. Sci. Technol.*, 33 (1999) 1787-1793.
- 1493 Salvini, R. and Caselli, R.: Gas chromatographic analysis of freons and chlorinated solvents in aviation breathing oxygen. *J. Chromatogr. A*, 846 (1999) 283-286.
- 1494 Slaets, S., Laturnus, F. and Adams, F.C.: Microwave induced plasma atomic emission spectrometry: a suitable detection system for the determination of volatile halocarbons. *Fresenius J. Anal. Chem.*, 364 (1999) 133-140.
- 1495 Szostek, B., Tinklenberg, J.A. and Aldstadt, J.H., III.: A simple method for the quantitative microextraction of polychlorinated biphenyls from soils and sediments. *Chemosphere*, 38 (1999) 3131-3139.
- 1496 Wang, J.-L., Chang, C.-J., Chang, W.-D., Chew, C. and Chen, S.-W.: Construction and evaluation of automated gas chromatography for the measurement of anthropogenic halocarbons in the atmosphere. *J. Chromatogr. A*, 844 (1999) 259-269.
- 1497 Yang, H.: (Solid phase microextraction-capillary GC determination of chlorobenzene compounds in waters). *Lihua Jiannan, Huaxue Fence*, 35 (1999) 103-105; *C.A.*, 131 (1999) 92213w.
- 1498 Zhang, J.-Z., Zhang, H.-J. and Liang, A.-Z.: (Capillary column and ECD detector gas chromatographic method for the determination of PCBs in water and wastewater). *Guangpu Shiyanshi*, 16 (1999) 329-332; *C.A.*, 131 (1999) 106379u.
- See also 1392, 1424, 1444, 1452, 1471, 1472, 1517, 1518, 1637, 1702, 1725.
- 5d. *Complex hydrocarbon mixtures (incl. analysis of tars, bitumens and mineral oils)*
- 1499 Krupčík, J., Oktavec, D., Skacani, L. and Daucík, P.: Problems with the determination of petroleum hydrocarbons in environmental samples. *Crit. Rev. Anal. Chem.*, 29 (1999) 90-91.
- 1500 Krupčík, J., Oswald, P., Spánik, I., Benická, E. and Daucík, P.: On the capillary gas chromatographic determination of petroleum hydrocarbons in environmental samples. *Crit. Rev. Anal. Chem.*, 29 (1999) 92-93.
- 1501 Shearer, R.L. and Meyer, L.M.: Simultaneous measurement of hydrocarbons and sulfur compounds using flame ionization and sulfur chemiluminescence detection for sulfur simulated distillation. *J. High Resolut. Chromatogr.*, 22 (1999) 386-390.
- 1502 Venter, A., Rohwer, E.R. and Laubscher, A.E.: Analysis of alkane, alkene, aromatic and oxygenated groups in petrochemical mixtures by supercritical fluid chromatography on silica gel. *J. Chromatogr. A*, 847 (1999) 309-321.
- See also 1449, 1703, 1727, 1730, 1759.
- ## 6. ALCOHOLS
- 1503 Anttinen-Klemetti, T., Vaaranrinta, R. and Peltonen, K.: Gas chromatographic determination of 3-butene-1,2-diol in urine samples after 1,3-butadiene exposure. *J. Chromatogr. B*, 730 (1999) 257-264.
- 1504 Castells, R.C., Romero, L.M. and Nardillo, A.M.: Alkanol gas-liquid partition coefficients in squalane measured with packed columns. A revision of measurement methods. *J. Chromatogr. A*, 848 (1999) 203-214.
- 1505 Mangani, F., Berloni, A., Maione, M., Piatti, E. and Accorsi, A.: Gas chromatographic - mass spectrometric determination of polyols in blood samples. *Ann. Chim. (Rome)*, 89 (1999) 585-590.
- 1506 Strassnig, S. and Lankmayr, E.P.: Elimination of matrix effects for static headspace analysis of ethanol. *J. Chromatogr. A*, 849 (1999) 629-636.
- 1507 Watanabe-Suzuki, K., Seno, H., Ishii, A., Kumazawa, T. and Suzuki, O.: Sensitive detection of ethanol in human breath by headspace capillary gas chromatography with cryogenic oven trapping. *Jpn. J. Forensic Toxicol.*, 17 (1999) 61-65.
- See also 1386, 1448, 1461, 1543, 1673, 1758.
- ## 7. PHENOLS
- 1508 Baltussen, E., David, F., Sandra, P., Janssen, H.-G. and Cramers, C.: Automated sorptive extraction-thermal desorption-gas chromatography-mass spectrometry analysis: determination of phenols in water samples. *J. Microcolumn Separ.*, 11 (1999) 471-474.

- 1509 Crespin, M.A., Gallego, M. and Valcarcel, M.: A semiautomatic module for the direct leaching and determination of sixteen phenols in agricultural soils. *Anal. Chem.*, 71 (1999) 2687-2696.
- 1510 Guidotti, M., Ravaioli, G. and Vitali, M.: Total *p*-chlorophenol determination in urine samples of subjects exposed to chlorobenzene, using SPME and GC-MS. *J. High Resolut. Chromatogr.*, 22 (1999) 427-428.
- 1511 Isobe, T., Satoh, M., Ogura, N. and Takada, H.: (Determination of nonylphenol by GC-MS in environmental samples in Tokyo). *Mizu Kankyo Gakkaishi*, 22 (1999) 118-126; *C.A.*, 130 (1999) 328907h.
- 1512 Takao, Y., Lee, H.C. and Arizono, K.: (An attempt by solid-phase microextraction with on-column silylation for a rapid and highly sensitive determination of bisphenol A). *Bunseki Kagaku*, 48 (1999) 589-593.
- 1513 Zuloaga, O., Etxebarria, N., Fernández, L.A. and Madariaga, J.M.: MultiSimplex optimisation of purge-and-trap extraction of phenols in soil samples. *J. Chromatogr. A*, 849 (1999) 225-234.

See also 1587, 1702, 1748.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 1514 Liu, Z., Zhao, S., Wang, R. and Yang, G.: Separation of polyhydroxyflavonoids by packed-column supercritical fluid chromatography. *J. Chromatogr. Sci.*, 37 (1999) 155-158.

See also 1656.

8b. Aflatoxins and other mycotoxins

- 1515 Lee, P.K., Kee, S.Y.K., Ng, W. and Gopalakrishnakone, P.: Determination of trichothecene toxin (T2 mycotoxin) in aqueous sample with solid phase microextraction technique followed by gas chromatography with flame ionization detection. *J. High Resolut. Chromatogr.*, 22 (1999) 424-426.

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

- 1516 Cardoso, C.A.L., Vilegas, W. and Honda, N.K.: Quantitative determination of furocoumarins in samples of "Carapiá" by capillary gas chromatography. *Chromatographia*, 50 (1999) 11-14.
- 1517 Liem, A.K.D.: Basic aspects of methods for the determination of dioxins and PCBs in foodstuffs and human tissues. *TrAC*, 18 (1999) 429-439 - a review with 33 refs.
- 1518 Liem, A.K.D.: Important developments in methods and techniques for the determination of dioxins and PCBs in foodstuffs and human tissues. *TrAC*, 18 (1999) 499-507.

See also 1482, 1578.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 1519 Bensoam, J., Cicolella, A. and Dujardin, R.: Improved extraction of glycol ethers from water by solid-phase micro extraction by carboxen polydimethylsiloxane-coated fiber. *Chromatographia*, 50 (1999) 155-159.
- 1520 Chiesa, L.M., de Wasch, K., Pecile, A.M., Biondi, P.A. and de Brabander, H.: Gas-chromatographic determination of pig plasma malondialdehyde with negative-ion chemical ionization tandem mass spectrometry detection. *Arch. Lebensmittelhyg.*, 50, No. 2 (1999) 41-43; *C.A.*, 130 (1999) 310844a.
- 1521 Keszler, A. and Héberger, K.: Influence of extraction parameters and medium on efficiency of solid-phase microextraction sampling in analysis of aliphatic aldehydes. *J. Chromatogr. A*, 845 (1999) 337-347.
- 1522 Spittler, G., Kern, W. and Spittler, P.: Investigation of aldehydic lipid peroxidation products by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 843 (1999) 29-98 - a review with 151 refs.
- 1523 Wennrich, L., Engewald, W. and Popp, P.: GC trace analysis of haloethers in water. Comparison of different extraction techniques. *Int. J. Environ. Anal. Chem.*, 73 (1999) 31-41.
- 1524 Zhong, L., Su, H., Yie, X., Wang, J. and Zheng, X.: (Analysis of methyl isopropyl ketone by gas chromatography). *Huaxue Yu Nianhe*, No. 2 (1999) 104-105; *C.A.*, 131 (1999) 53352w.

See also 1372, 1384, 1654.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 1525 Asres, D.D. and Perreault, H.: Preparation, isolation, and characterization of permethylated galactosides and fucosides. *Can. J. Chem.*, 77 (1999) 319-325.
- 1526 Chiesa, L.M., Radice, L., Belloli, R., Renon, P. and Biondi, P.A.: Gas chromatographic determination of galactose in milk. Example of a switching valve used for the protection of the capillary column. *J. Chromatogr. A*, 847 (1999) 47-51.
- 1527 Cline, D.J., Fried, B. and Sherma, J.: TLC and GC-MS identification of glucose and maltose in *Biomphalaria glabrata* (Gastropoda), and use of quantitative TLC to determine the effect of starvation on the amounts of these carbohydrates. *Acta Chromatogr.*, No. 9 (1999) 79-86.
- 1528 Fox, A.: Carbohydrate profiling of bacteria by gas chromatography-mass spectrometry and their trace detection in complex matrices by gas chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 843 (1999) 287-300 - a review with 40 refs.
- 1529 Hirsch, D. and Maier, H.G.: (Detection of the total xylose content in coffee extracts by HPTLC and GC). *Lebensmittelchemie*, 53, No. 3 (1999) 58-59; *C.A.*, 130 (1999) 351357n.
- 1530 Katona, Z.F., Sass, P. and Molnár-Perl, I.: Simultaneous determination of sugars, sugar alcohols, acids and amino acids in apricots by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 847 (1999) 91-102.

- 1531 Niwa, T.: 3-Deoxyglucosone: metabolism, analysis, biological activity, and clinical implication. *J. Chromatogr. B*, 731 (1999) 23-36.
- 1532 Ratsimba, V., Fernández, J.M.G., Defaye, J., Nigay, H. and Voilley, A.: Qualitative and quantitative evaluation of mono- and disaccharides in D-fructose, D-glucose and sucrose caramels by gas-liquid chromatography-mass spectrometry. Di-D-Fructose dianhydrides as tracers of caramel authenticity. *J. Chromatogr. A*, 844 (1999) 283-293.
- 1533 Tetsuo, M., Zhang, C., Matsumoto, H. and Matsumoto, I.: Gas chromatographic-mass spectrometric analysis of urinary sugar and sugar alcohols during pregnancy. *J. Chromatogr. B*, 731 (1999) 111-120.
- 1534 Tsukushi, S., Shimokata, K. and Niwa, T.: Gas chromatographic-mass spectrometric analysis of erythrocyte 3-deoxyglucosone in hemodialysis patients. *J. Chromatogr. B*, 731 (1999) 37-44.
- 1535 Zanetta, J.-P., Timmerman, P. and Leroy, Y.: Gas-liquid chromatography of the heptafluorobutyrate derivatives of the O-methyl-glycosides on capillary columns: a method for the quantitative determination of the monosaccharide composition of glycoproteins and glycolipids. *Glycobiology*, 9 (1999) 255-266; *C.A.*, 130 (1999) 322481t.
- 10c. *Glycoproteins and their constituents*
- See 1531, 1535.
11. ORGANIC ACIDS AND LIPIDS
- 11a. *Organic acids and simple esters*
- 1536 Dion, A. and Jubinville, S.: A new and easy method to screen and quantify gamma-hydroxybutyric acid in blood and urine by gas phase chromatography. *J. - Can. Soc. Forensic Sci.*, 31 (1998) 303-312.
- 1537 Eller, F.J.: Interference by methyl levulinate in determination of total fat in low-fat, high-sugar products by gas chromatographic fatty acid methyl ester (GC-FAME) analysis. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 766-769.
- 1538 Gu, H. and Feng, Y.: (Collection and GC determination of methyl methacrylate). *Huanjing Wuran Yu Fangzhi*, 21, No. 2 (1999) 45-46; *C.A.*, 131 (1999) 53344v.
- 1539 Kuhara, T., Shinka, T., Inoue, Y., Ohse, M., Zhen-wei, X., Yoshida, I., Inokuchi, T., Yamaguchi, S., Takayanagi, M. and Matsumoto, I.: Pilot study of gas chromatographic-mass spectrometric screening of newborn urine for inborn errors of metabolism after treatment with urease. *J. Chromatogr. B*, 731 (1999) 141-147.
- 1540 Kulik, W., Jakobs, C. and de Meer, K.: Determination of extracellular and intracellular enrichments of [1-¹³C]- α -ketoglutarate using enzymatically converted [1-¹³C]-valine standardization curves and gas chromatography-mass spectrometry. *J. Chromatogr. B*, 729 (1999) 211-216.
- 1541 Liebich, H.M. and Gesele, E.: Profiling of organic acids by capillary gas chromatography-mass spectrometry after direct methylation in urine using trimethoxyloxonium tetrafluoroborate. *J. Chromatogr. A*, 843 (1999) 237-245.
- 1542 Mills, G.A., Walker, V. and Mughal, H.: Headspace solid-phase microextraction with 1-pyrenyldiazomethane in-fibre derivatization for analysis of fecal short-chain fatty acids. *J. Chromatogr. B*, 730 (1999) 113-122.
- 1543 Pinsi, G., Signorini, C., Gelmi, M., Garrafa, E., Albertini, A. and Turano, A.: Gas chromatographic assay of cellular fatty acids and alcohols for the identification of Mycobacterium species. *Microbiologica*, 22 (1999) 151-154.
- 1544 Quigley, M.E., Hudson, G.J. and Englyst, H.N.: Determination of resistant short-chain carbohydrates (non-digestible oligosaccharides) using gas-liquid chromatography. *Food Chem.*, 65 (1999) 381-390.
- 1545 Renner, T., Baer-Koetzle, M. and Scherer, G.: Determination of sorbic acid in urine by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 847 (1999) 127-133.
- 1546 Saraf, A., Park, J.-H., Milton, D.K. and Larsson, L.: Use of quadrupole GC-MS and ion trap GC-MS-MS for determining 3-hydroxy fatty acids in settled house dust: relation to endotoxin activity. *J. Environ. Monit.*, 1, No. 2 (1999) 163-168; *C.A.*, 130 (1999) 328302g.
- 1547 Ulberth, F., Gabernig, R.G. and Schrammel, F.: Flame-ionization detector response to methyl, ethyl, propyl, and butyl esters of fatty acids. *J. Am. Oil Chem. Soc.*, 76 (1999) 263-266.
- 1548 Wolff, R.L.: Simple methods for the identification and quantification by GLC of most individual trans-18:1 isomers present in foods and human tissues. *Lipid Technol.*, 11 (1999) 16-18.
- 1549 Yan, S., Zhang, Y., Qiu, T. and Wang, R.: (New determination method for process control of chloroacetic acid). *Jingxi Huagong*, 16 (1999) 26-28; *C.A.*, 130 (1999) 326532h.
- See also 1448, 1530, 1597, 1664, 1674, 1687, 1733.
- 11b. *Prostaglandins*
- 1550 Hammes, W., Büchler, U., Kinder, P. and Bökens, H.: Simultaneous determination of prostaglandin E₁, prostaglandin E₀ and 15-keto-prostaglandin E₀ in human plasma by gas chromatography/negative-ion chemical-ionization tandem mass spectrometry. *J. Chromatogr. A*, 847 (1999) 187-202.
- 1551 O'Sullivan, S., Mueller, M.J., Dahlen, S.-E. and Kumlin, M.: Analyses of prostaglandin D₂ metabolites in urine: comparison between enzyme immunoassay and negative ion chemical ionization gas chromatography-mass spectrometry. *Prostaglandins Other Lipid Mediators*, 57 (1999) 149-165.
- 1552 Obata, T., Nagakura, T., Maeda, H., Yamashita, K. and Maekawa, K.: Simultaneous assay of prostaglandins and thromboxane in the cerebrospinal fluid by gas chromatography-mass spectrometry-selected ion monitoring. *J. Chromatogr. B*, 731 (1999) 73-81.
- 1553 Proudfoot, J., Barden, A., Mori, T.A., Burke, V., Croft, K.D., Beilin, L.J. and Puddey, I.B.: Measurement of urinary F₂-isoprostanes as markers of *in vivo* lipid peroxidation - a comparison of enzyme immunoassay with gas chromatography/mass spectrometry. *Anal. Biochem.*, 272 (1999) 209-215.
- 11c. *Lipids and their constituents*
- 1554 Brühl, L. and Matthäus, B.: Extraction of oilseeds by SFE - a comparison with other methods for the determination of the oil content. *Fresenius J. Anal. Chem.*, 364 (1999) 631-634.

- 1555 Dermaux, A., Medvedovici, A., Ksir, M., van Hove, E., Talbi, M. and Sandra, P.: Elucidation of the triglycerides in fish oil by packed-column supercritical fluid chromatography fractionation followed by capillary electrochromatography and electrospray mass spectrometry. *J. Microcolumn Separ.*, 11 (1999) 451-459.
- 1556 Simoneau, C., Hannaert, P. and Anklam, E.: Detection and quantification of cocoa butter equivalents in chocolate model systems: analysis of triglyceride profiles by high resolution GC. *Food Chem.*, 65 (1999) 111-116.

See also 1466, 1522, 1724.

12. ORGANIC PEROXIDES

- 1557 Hong, J., Maguhn, J., Freitag, D. and Kettrup, A.: Determination of organic peroxides by gas chromatography with cold on-column injection. *J. High Resolut. Chromatogr.*, 22 (1999) 475-476.

13. STEROIDS

13a. General techniques

- 1558 Müller, R.K., Grosse, J., Thieme, D., Lang, R., Teske, J. and Trauer, H.: Introduction to the application of capillary gas chromatography of performance-enhancing drugs in doping control. *J. Chromatogr. A*, 843 (1999) 275-285 - a review with 105 refs.
- 1559 Wolthers, B.G. and Kraan, G.P.B.: Clinical application of gas chromatography and gas chromatography-mass spectrometry of steroids. *J. Chromatogr. A*, 843 (1999) 247-274 - a review with 134 refs.

13c. Estrogens

- 1560 Morton, M., Arisakaf, O., Miyake, A. and Evans, B.: Analysis of phytoestrogens by gas chromatography-mass spectrometry. *Environ. Toxicol. Pharmacol.*, 7 (1999) 217-221.
- 1561 Shimada, K., Mitamura, K., Shiroyama, M. and Yago, K.: Studies on neurosteroids. IX. Characterization of estrogens in rat brains using gas chromatography-tandem mass spectrometry. *J. Chromatogr. A*, 847 (1999) 171-178.
- 1562 Torigai, M., Okita, S., Yun, S.-J., Hashiba, T. and Iwashima, K.: (Investigation of internal standard substances for the determination of beta-estradiol in environmental samples). *Bunseki Kagaku*, 48 (1999) 725-729.

13d. Sterols

- 1563 Jayasinghe, L.Y., Marriott, P.J. and Nguyen, A.M.: Effect of injector conditions on the reproducibility of gas chromatographic-electron capture detection of sterol derivatives and synthetic pyrethroids. *J. High Resolut. Chromatogr.*, 22 (1999) 362-366.

- 1564 Lechner, M., Reiter, B. and Lorbeer, E.: Determination of free and esterified sterols in potential new oil seed crops by coupled on-line liquid chromatography-gas chromatography. *Fett/Lipid*, 101 (1999) 171-177.
- 1565 Reina, R.J., White, K.D. and Firestone, D.: Sterol and triterpene diol contents of vegetable oils by high-resolution capillary gas chromatography. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 929-935.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 1566 Allahverdiev, A.I., Irandoust, S. and Andersson, M.: Chromatographic separation of α -pinene isomerization products. *J. Chromatogr. A*, 848 (1999) 297-303.
- 1567 Elias, V.O., Simoneit, B.R.T., Pereira, A.S., Cabral, J.A. and Cardoso, J.N.: Detection of high molecular weight organic tracers in vegetation smoke samples by high-temperature gas chromatography-mass spectrometry. *Environ. Sci. Technol.*, 33 (1999) 2369-2376.
- 1568 Lesellier, E., Gurdale, K. and Tchaplá, A.: Separation of *cis/trans* isomers of β -carotene by supercritical fluid chromatography. *J. Chromatogr. A*, 844 (1999) 307-320.
- 1569 Ligor, M. and Buszewski, B.: Determination of menthol and menthone in food and pharmaceutical products by solid-phase microextraction-gas chromatography. *J. Chromatogr. A*, 847 (1999) 161-169.
- 1570 Ojala, M., Ketola, R.A., Mansikka, T., Kotiaho, T. and Kostianen, R.: Determination of mono- and sesquiterpenes in water samples by membrane inlet mass spectrometry and static head-space gas chromatography. *Talanta*, 49 (1999) 179-188.
- 1571 Termonia, A. and Termonia, M.: Characterization and on-site monitoring of odorous organic compounds in the environment of a landfill site. *Int. J. Environ. Anal. Chem.*, 73 (1999) 43-57.

See also 1674, 1692.

15b. Essential oils

- 1572 Ahmad, V.U., Jassbi, A.R. and Pannahi, M.S.C.: Analysis of the essential oil of *Echinophora sibthorpiana* Guss. by means of GC, GC/MS and ^{13}C -NMR techniques. *J. Essent. Oil Res.*, 11 (1999) 107-108.
- 1573 Ammann, A., Hinz, D.C., Addleman, R.S., Wai, C.M. and Wenclawiak, B.W.: Superheated water extraction, steam distillation and SFE of peppermint oil. *Fresenius J. Anal. Chem.*, 364 (1999) 650-653.
- 1574 Bicchi, C., D'Amato, A. and Rubiolo, P.: Cyclodextrin derivatives as chiral selectors for direct gas chromatographic separation of enantiomers in the essential oil, aroma and flavour fields. *J. Chromatogr. A*, 843 (1999) 99-121 - a review with 118 refs.
- 1575 Bonsignore, L., Cottiglia, F. and Loy, G.: GC-MS and GC-FTIR analysis of the volatile fraction of *Pistacia lentiscus* L. aerial parts. *Boll. Chim. Farm.*, 137 (1998) 476-479; *C.A.*, 131 (1999) 92397j.

- 1576 Jirovetz, L., Puschmann, C., Buchbauer, G., Fleischhacker, W. and Kaul, V.K.: Essential oil analysis of *Erigeron canadensis* flowers from India using GC-FID, GC-MS, and olfactometry. *Sci. Pharm.*, 67 (1999) 89-95.
- 1577 Kartnig, T., Fischer, E. and Bucar, F.: (Comparative gas chromatographic investigation of juniper volatile oil with emphasis on the separation of enantiomeric components). *Sci. Pharm.*, 67 (1999) 77-82; *C.A.*, 130 (1999) 356871k.
- 1578 Lang, Q. and Wai, C.M.: An extraction method for determination of ginkgolides and bilobalide in ginkgo leaf extracts. *Anal. Chem.*, 71 (1999) 2929-2933.
- 1579 Mondello, L., Dugo, P., Cotroneo, A., Proteggente, A.R. and Dugo, G.: Multidimensional advanced techniques for the analysis of bergamot oil. *Riv. Ital. EPPOS*, No. 26 (1998) 3-27; *C.A.*, 131 (1999) 106590f.
- 1580 Sawada, M., Teranishi, K. and Yamada, T.: (The analysis and sensory evaluation of lemon oils prepared by three extraction methods. 3. Application of lemon oils prepared by different extraction methods to a beverage and stabilities to sunlight). *Nippon Shokuhin Kagaku Kogaku Kaishi*, 46 (1999) 181-186; *C.A.*, 131 (1999) 43982n.
- 1581 Yang, H., Mao, Y., Qiu, Y., Yang, S. and Shi, Z.: (Study on stability and technology of valerian oil coated with β -cyclodextrin (β -CD) by GC). *Zhongguo Yiyuan Yaoxue Zazhi*, 18 (1998) 544-546; *C.A.*, 130 (1999) 357004s.
- 1582 Yuan, H., Zhang, C., Li, X., Liu, Z. and Guo, C.: (Determination of rhein, emodin, and physcion in tuber fleeceflower (*Polygonum multiflorum*) by supercritical fluid extraction-HPLC). *Zhongcaoyao*, 30 (1999) 258-260; *C.A.*, 131 (1999) 106898n.
- See also 1397, 1466.
16. NITRO AND NITROSO COMPOUNDS
- 1583 Tsikas, D., Sandmann, J., Rossa, S., Gutzki, F.-M. and Frölich, J.C.: Gas chromatographic-mass spectrometric detection of S-nitroso-cysteine and S-nitroso-glutathione. *Anal. Biochem.*, 272 (1999) 117-122.
- 1584 Tsikas, D., Sandmann, J., Rossa, S., Gutzki, F.-M. and Frölich, J.C.: Investigations of S-transnitrosylation reactions between low- and high-molecular-weight S-nitroso compounds and their thiols by high-performance liquid chromatography and gas chromatography-mass spectrometry. *Anal. Biochem.*, 270 (1999) 231-241.
- See also 1645, 1707, 1713.
17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17a. *Amines and polyamines*
- 1585 Maris, C., Laplanche, A., Morvan, J. and Bloquel, M.: Static headspace analysis of aliphatic amines in aqueous samples. *J. Chromatogr. A*, 846 (1999) 331-339.
- See also 1748.
- 17d. *Other amine derivatives and amides (excl. peptides)*
- 1586 Bologna, L.S., Andrawes, F.F., Barvenik, F.W., Lentz, R.D. and Sojka, R.E.: Analysis of residual acrylamide in field crops. *J. Chromatogr. Sci.*, 37 (1999) 240-244.
- 1587 Fuchslueger, U., Socher, G., Grether, H.-J. and Grasserbauer, M.: Capillary supercritical fluid chromatography/mass spectrometry of phenolic Mannich bases with dimethyl ether modified ethane as the mobile phase. *Anal. Chem.*, 71 (1999) 2324-2333.
- 1588 Gee, A.J., Groen, L.A. and Johnson, M.E.: Determination of fatty acids amides as trimethylsilyl derivatives by gas chromatography with mass spectrometric detection. *J. Chromatogr. A*, 849 (1999) 541-552.
- 1589 Keszler, A., Kazinczy, B. and Kótai, L.: GC-MS determination and optimization of extraction of N,N'-dimethyl-N,N'-diphenylcarbamide from building materials. *Fresenius J. Anal. Chem.*, 364 (1999) 328-332.
- 1590 Lee, J., Kim, K. and Lho, D.-S.: Analysis of cyclic boronated and trimethylsilylated phenolalkylamines by gas chromatography and electron impact mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 1491-1505.
- 1591 Niederer, M., Schlegel, U., Hohl, C. and Herrmann, A.: Quantitative GC-MS method for the determination of aniline, chloroaniline, and toluidine released from inks of ballpoint and fiber-tip pens. *Mitt. Geb. Lebensmittelunters. Hyg.*, 90 (1999) 229-235; *C.A.*, 131 (1999) 98582n.
- 1592 Stuff, J.R., Cheicante, R.L., Durst, H.D. and Ruth, J.L.: Detection of the chemical warfare agents bis-(2-chloroethyl)ethylamine (HN-1) and tris-(2-chloroethyl)amine (HN-3) in air. *J. Chromatogr. A*, 849 (1999) 529-540.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 1593 Cai, J. and Hurst, H.E.: Identification and quantitation of N-(carboxymethyl)valine adduct in hemoglobin by gas chromatography/mass spectrometry. *J. Mass Spectrom.*, 34 (1999) 537-543.
- 1594 Ducros, V., Schmitt, D., Pernod, G., Faure, H., Polack, B. and Favier, A.: Gas chromatographic-mass spectrometric determination of total homocysteine in human plasma by stable isotope dilution: method and clinical applications. *J. Chromatogr. B*, 729 (1999) 333-339.
- 1595 Geypens, B., Claus, D., Gorris, N., Evenepoel, P., Luybaerts, A., Rutgeerts, P. and Ghoois, Y.: Determination of deuterated phenylalanine and tyrosine in egg protein by GCQ. *J. High Resolut. Chromatogr.*, 22 (1999) 465-468.
- 1596 Haefelinger, G., Nimtz, M., Horstmann, V. and Benz, T.: (Trifluoroacetylation of methylated derivatives of tryptamine and serotonin by different reagents. Synthesis, spectroscopic characterizations, and separations by capillary gas-chromatography). *Z. Naturforsch., B: Chem. Sci.*, 54 (1999) 397-414; *C.A.*, 130 (1999) 332029r.
- 1597 Kimura, M. and Yamaguchi, S.: Screening for fatty acid beta oxidation disorders. Acylglycine analysis by electron impact ionization gas chromatography-mass spectrometry. *J. Chromatogr. B*, 731 (1999) 105-110.

- 1598 Pahler, A., Völkel, W. and Dekant, W.: Quantitation of *N*^F-(di-chloroacetal)-L-lysine in proteins after perchloroethene exposure by gas chromatography-mass spectrometry using chemical ionization and negative ion detection following immunoaffinity chromatography. *J. Chromatogr. A*, 847 (1999) 25-34.
- 1599 Ubbink, J.B., Delport, R., Riezler, R. and Vermaak, W.J.H.: Comparison of three different plasma homocysteine assays with gas chromatography-mass spectrometry. *Clin. Chem. (Washington)*, 45 (1999) 670-675.

See also 1530, 1583, 1739, 1740.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

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

See 1607.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

- 1600 Tanada, N., Kashimura, S., Kageura, M. and Hara, K.: Utility of caffeine analysis for forensic hair discrimination. *Nippon Hōgaku Zasshi*, 52 (1998) 233-237; *C.A.*, 130 (1999) 321666v.

22. ALKALOIDS

- 1601 Jung, B.H., Chung, B.C., Chung, S.-J., Lee, M.-H. and Shim, C.-K.: Simultaneous GC-MS determination of nicotine and cotinine in plasma for the pharmacokinetic characterization of nicotine in rats. *J. Pharm. Biomed. Anal.*, 20 (1999) 195-202.
- 1602 Stevens, N.A. and Borgerding, M.F.: GC-AED studies of nicotine fate in a burning cigarette. *Anal. Chem.*, 71 (1999) 2179-2185.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23c. *Indole derivatives and plant hormones (gibberelins)*

- 1603 Buskov, S., Sorensen, H. and Sorensen, S.: Separation of chlorophylls and their degradation products using packed column supercritical fluid chromatography (SFC). *J. High Resolut. Chromatogr.*, 22 (1999) 339-342.

23d. *Pyridine derivatives*

- 1604 Golovnya, R.V., Kuzmenko, T.E. and Zhuravleva, I.L.: Gas chromatographic indicator of the ability of five- and six-membered heterocyclic nitrogen-containing compounds for self-association in pure liquids. *Russ. Chem. Bull.*, 48 (1999) 726-729.

See also 1602.

23e. *Other N-heterocyclic compounds*

See 1467, 1669.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 1605 Haberhauer-Troyer, C., Rosenberg, E. and Grasserbauer, M.: Evaluation of solid-phase microextraction for sampling of volatile organic sulfur compounds in air for subsequent gas chromatographic analysis with atomic emission detection. *J. Chromatogr. A*, 848 (1999) 305-315.
- 1606 Mestres, M., Marti, M.P., Busto, O. and Guasch, J.: Simultaneous analysis of thiols, sulphides and disulphides in wine aroma by headspace solid-phase microextraction-gas chromatography. *J. Chromatogr. A*, 849 (1999) 293-297.
- 1607 Ritter, C.A., Bohnenstengel, F., Hofmann, U., Kroemer, H.K. and Sperker, B.: Determination of tetrahydrothiophene formation as a probe of *in vitro* busulfan metabolism by human glutathione S-transferase A1-1: use of a highly sensitive gas chromatographic-mass spectrometric method. *J. Chromatogr. B*, 730 (1999) 25-31.
- 1608 Steliga, T. and Jakubowicz, P.: (Optimization of conditions for separation of sulfur compounds in natural gas using gas chromatography). *Nafta-Gaz*, 55 (1999) 154-163.
- 1609 Yaku, K., Aoe, K., Nishimura, N. and Morishita, F.: Thermodynamic study and separation mechanism of diltiazem optical isomers in packed-column supercritical fluid chromatography. *J. Chromatogr. A*, 848 (1999) 337-345.

See also 1501, 1584, 1689.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 1610 Brochez, V., van Heuverswyn, D., Diniz, J.A., de Boer, N.F., de Potter, C.R. and van den Eckhout, E.G.: Cellular uptake and retention measurements of alkylphosphocholines in the SK-BR-3 breast cancer and Molt-4 leukemia cell line using capillary gas chromatography. *Lipids*, 34 (1999) 511-516.

See also 1755.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26a. *Organometallic compounds*

- 1611 Bayona, J.M.: Organometallic speciation by combining aqueous phase derivatization with SPME-GC-FPD-MS. In: Pawliszyn, J. (Editor), *Appl. Solid Phase Microextr.*, Royal Society of Chemistry, Cambridge, 1999, pp. 284-295; *C.A.*, 131 (1999) 110643t - a review with 16 refs.
- 1612 Brede, C., Pedersen-Bjergaard, S., Lundanes, E. and Greibrokk, T.: Capillary gas chromatography coupled with microplasma mass spectrometry for organotin speciation. *J. Chromatogr. A*, 849 (1999) 553-562.

- 1613 De Smaele, T., Moens, L., Dams, R. and Sandra, P.: Metal speciation by SPME-CGC-ICPMS. In: Pawliszyn, J. (Editor), *Appl. Solid Phase Microextr.*, Royal Society of Chemistry, Cambridge, UK, 1999, pp. 296-310; *C.A.*, 131 (1999) 92023j - a review with 40 refs.
- 1614 De Smaele, T., Moens, L., Sandra, P. and Dams, R.: Determination of organometallic compounds in surface water and sediment samples with SPME-CGC-ICPMS. *Mikrochim. Acta*, 130 (1999) 241-251.
- 1615 Iwamura, T., Kadokami, K., Jin-Ya, D., Hanada, Y. and Suzuki, M.: (Determination of organotin compounds in water and sediment samples by isotope dilution GC/MS). *Bunseki Kagaku*, 48 (1999) 555-561.
- 1616 Lorenzo, R.A., Vázquez, M.J., Carro, A.M. and Cela, R.: Methylmercury extraction from aquatic sediments. A comparison between manual, supercritical fluid and microwave-assisted techniques. *TrAC*, 18 (1999) 410-416 - a review with 38 refs.
- 1617 Louise Armstrong, H.E., Corns, W.T., Stockwell, P.B., O'Connor, G., Ebdon, L. and Hywel, E.E.: Comparison of AFS and ICP-MS detection coupled with gas chromatography for the determination of methylmercury in marine samples. *Anal. Chim. Acta*, 390 (1999) 245-254.
- 1618 Pongratz, R. and Heumann, K.G.: Determination of concentration profiles of methyl mercury compounds in surface waters of polar and other remote oceans by GC-AFD. *Int. J. Environ. Anal. Chem.*, 71 (1998) 41-56.
- 1619 Reuther, R., Jaeger, L. and Allard, B.: Determination of organometallic forms of mercury, tin and lead by in situ derivatization, trapping and gas chromatography - atomic emission detection. *Anal. Chim. Acta*, 394 (1999) 259-269.
- 1620 Yu, X., Yuan, H., Górecki, T. and Pawliszyn, J.: Determination of lead in blood and urine by SPME/GC. *Anal. Chem.*, 71 (1999) 2998-3002.
- 26b. *Boranes, silanes and related non-metallic compounds*
- 1621 De la Calle-Guntiñas, M.B., Laturus, F. and Adams, F.C.: Purge and trap/thermal desorption device for the determination of dimethylselenide and dimethyldiselenide. *Fresenius J. Anal. Chem.*, 364 (1999) 147-153.
- 1622 Prohaska, T., Pfeffer, M., Tulipan, M., Stingeder, G., Mentler, A. and Wenzel, W.W.: Speciation of arsenic of liquid and gaseous emissions from soil in a microcosmos experiment by liquid and gas chromatography with inductively coupled plasma mass spectrometer (ICP-MS) detection. *Fresenius J. Anal. Chem.*, 364 (1999) 467-470.
27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- See 1749.
28. ANTIBIOTICS
- 1623 Webster, G.K. and Bell, R.G.: Gas chromatographic analysis of fosfomicin in plasma for pharmacokinetic analysis. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 620-624.
29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS
- 29a. *General techniques*
- 1624 Emteborg, H., Snell, J., Qian, J. and Frech, W.: Sources of systematic errors in mercury speciation using Grignard reagents and capillary gas chromatography coupled to atomic spectrometry. *Chemosphere*, 39 (1999) 1137-1152.
- 1625 Godula, M., Hajslová, J. and Alterová, K.: Pulsed splitless injection and the extent of matrix effects in the analysis of pesticides. *J. High Resolut. Chromatogr.*, 22 (1999) 395-402.
- 1626 Ibaraki, T., Oguma, C., Tanabe, A., Kawata, K., Sakai, M. and Kifune, I.: (Determination of endocrine disrupting pesticides in river water by GC/MS). *Bunseki Kagaku*, 48 (1999) 637-641.
- 1627 Mogadati, P., Louis, J.B. and Rosen, J.D.: Multiresidue determination of pesticides in high-organic-content soils by solid-phase extraction and gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 705-715.
- 1628 Niessner, G., Buchberger, W. and Eckerstorfer, R.: Multiresidue screening methods for the determination of pesticides in plant materials. *J. Chromatogr. A*, 846 (1999) 341-348.
- 1629 Sheridan, R.S. and Meola, J.R.: Analysis of pesticide residues in fruits, vegetables, and milk by gas chromatography/tandem mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 982-990.
- 1630 Sherma, J.: Pesticide residue analysis: 1997-1998. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 561-574 - a review with 231 refs.
- 1631 Tseng, C.M., de Diego, A., Wasserman, J.C., Amouroux, D. and Donard, O.F.X.: Potential interferences generated during mercury species determination using acid leaching, aqueous ethylation, cryogenic gas chromatography and atomic spectrometry detection techniques. *Chemosphere*, 39 (1999) 1119-1136.
- 1632 Van der Hoff, G.R. and van Zoonen, P.: Trace analysis of pesticides by gas chromatography. *J. Chromatogr. A*, 843 (1999) 301-322 - a review with 159 refs.
- 1633 Yoshii, K., Tsumura, Y., Nakamura, Y., Ishimitsu, S., Tonogai, Y., Tsuchiya, T., Kimura, M. and Sekiguchi, Y.: (Multiresidue analysis of various kinds of pesticides in cereals by SFE, GC and HPLC). *Shokuhin Eiseigaku Zasshi*, 40 (1999) 68-74.
- See also 1415, 1753.
- 29b. *Chlorinated insecticides*
- 1634 Aguilar, C., Peñalver, A., Pocerull, E., Ferré, J., Borrull, F. and Marcé, R.M.: Optimization of solid-phase microextraction conditions using a response surface methodology to determine organochlorine pesticides in water by gas chromatography and electron-capture detection. *J. Chromatogr. A*, 844 (1999) 425-432.
- 1635 Columé, A., Cárdenas, S., Gallego, M. and Valcárcel, M.: Semi-automatic method for the screening and determination of 23 organochlorine pesticides in horticultural samples by gas chromatography with electron-capture detection. *J. Chromatogr. A*, 849 (1999) 235-243.

- 1636 Mattina, M.J.I., Iannucci-Berger, W., Dykas, L. and Pardus, J.: Impact of long-term weathering, mobility, and land use on chlordane residues in soil. *Environ. Sci. Technol.*, 33 (1999) 2425-2431.
- 1637 Vetter, W., Klobes, U., Luckas, B. and Hottinger, G.: Use of 6-O-tert.-butyldimethylsilylated β -cyclodextrins for the enantioseparation of chiral organochlorine compounds. *J. Chromatogr. A*, 846 (1999) 375-381.

See also 1435, 1472.

29c. Phosphorus insecticides

- 1638 Musshoff, F., Junker, H. and Madea, B.: Rapid analysis of parathion in biological samples using headspace solid-phase microextraction (HS-SPME) and gas chromatography/mass spectrometry (GC/MS). *Clin. Chem. Lab. Med.*, 37 (1999) 639-642.
- 1639 Silva, F.C., Cardeal, Z.D. and de Carvalho, C.R.: (Determination of organophosphorus pesticides in water using SPME-GC-MS). *Quim. Nova*, 22 (1999) 197-200; *C.A.*, 130 (1999) 328909k.
- 1640 Tanaka, Y., Sasao, T., Kirigaya, T., Hosoi, S., Kawamura, T. and Nakazawa, H.: (Analysis of disulfoton metabolites in crops with GC-FPD and GC/MS). *Shokuhin Eiseigaku Zasshi*, 40 (1999) 137-142; *C.A.*, 131 (1999) 101504w.

29d. Carbamates

- 1641 Hardt, J. and Angerer, J.: Determination of metabolites of pirimicarb in human urine by gas chromatography-mass spectrometry. *J. Chromatogr. B*, 730 (1999) 229-238.

29e. Herbicides

- 1642 Chen, P. and Mai, M.: The study about residual determination of oxadiargyl on the rice field. *Nongyao*, 38, No. 4 (1999) 20-21; *C.A.*, 130 (1999) 334016h.
- 1643 Krappe, M., Hawthorne, S.B. and Wenclawiak, B.W.: Heterogenic catalytic hydrolysis and analysis of natural pyrethrins in subcritical water coupled with solid phase microextraction (SPME) and GC-MS. *Fresenius J. Anal. Chem.*, 364 (1999) 625-630.
- 1644 Lancas, F.M., Rissato, S.R. and Galhiane, M.S.: Determination of 2,4-D and dicamba in food crops by MEKC. *Chromatographia*, 50 (1999) 35-40.

See also 1628.

29f. Fungicides

- 1645 Bravo Sanchez, L.R., Jimenez Lopez, E., Muro Tamayo, D., Calvo Alonso, A.M., Morales Fernandez, S., Consuegra, S., Rodriguez Baez, M. and Valdes Rojas, T.: (Validation of techniques for determination of the purity of bioactive 1-(5-bromofur-2-yl)-2-bromo-2-nitroethene). *Afinidad*, 56 (1999) 29-33; *C.A.*, 130 (1999) 343086h.

31. PLASTICS AND THEIR INTERMEDIATES

- 1646 Bate, D.M. and Lehrle, R.S.: A new method for using pyrolysis-GC-MS to study the oxidative degradation of polymers or oils. *Polym. Degrad. Stab.*, 64 (1999) 75-79.
- 1647 Carrott, M.J. and Davidson, G.: Separation and characterisation of phenol-formaldehyde (resol) prepolymers using packed-column supercritical fluid chromatography with APCI mass spectrometric detection. *Analyst (Cambridge)*, 124 (1999) 993-997.
- 1648 Park, B.-I., Bozzelli, J.W., Booty, M.R., Bernhard, M.J., Mesuere, K., Pettigrew, C.A., Shi, J.-C. and Simonich, S.L.: Polymer pyrolysis and oxidation studies in a continuous feed and flow reactor: cellulose and polystyrene. *Environ. Sci. Technol.*, 33 (1999) 2584-2592.
- 1649 Radhakrishnan, T.S.: New method for evaluation of kinetic parameters and mechanism of degradation from pyrolysis-GC studies: thermal degradation of poly(dimethyl siloxanes). *J. Appl. Polym. Sci.*, 73 (1999) 441-450.
- 1650 Smith, P.B., Pasztor, A.J.Jr., McKelvy, M.L., Meunier, D.M., Froelicher, S.W. and Wang, F.C.-Y.: Analysis of synthetic polymers and rubbers. *Anal. Chem.*, 71, No. 12 (1999) 61R-80R - a review with 38 refs.
- 1651 Tihminlioglu, F. and Danner, R.P.: Application of inverse gas chromatography to the measurement of diffusion and phase equilibria in polyacrylate-solvent systems. *J. Chromatogr. A*, 845 (1999) 93-101.
- 1652 Tsuge, S., Ichimura, K., Arata, J., Kiura, M. and Ito, H.: (Method for measuring the stereoregularity of methyl methacrylate type polymers). *Jpn. Kokai Tokkyo Koho JP 11 148,925 [99 148,925] (Cl. G01N30/88)*, 2 Jun. 1999, Appl. 1997/330,847, 17 Nov. 1997; 7 pp.; *C.A.*, 131 (1999) 5834h.
- 1653 Wang, F.C.-Y.: Polymer analysis by pyrolysis gas chromatography. *J. Chromatogr. A*, 843 (1999) 413-423 - a review with 50 refs.
- 1654 Wu, Z., Fengming, H., Shucui, G. and Yuedong, W.: Gas chromatographic analysis in the synthesis of poly(ethylene oxide) dimethyl ethers. *Anal. Lett.*, 32 (1999) 1683-1694.

See also 1377, 1383, 1428, 1538, 1660, 1735, 1751.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 1655 Brinkmann, K. and Ebel, S.: (Detection of residual solvents as impurities in drug substances by headspace-gas chromatography. Detection. Part 2. Method development, discussion, problems). *Pharm. Ind.*, 61 (1999) 372-376; *C.A.*, 130 (1999) 343095k.
- 1656 Dos Santos Pereira, A., Freiman de Souza Ramos, M., Carneiro Pocas, E.S., Dias, P.C.M., Pereira dos Santos, E., Mendes da Silva, J.F., Nobrega Cardoso, J. and Radler de Aquino Neto, F.: Study of propolis by high temperature high resolution gas chromatography-mass spectrometry. *Z. Naturforsch., C: J. Biosci.*, 54 (1999) 395-400.
- 1657 Gilpin, R.K. and Pachla, L.A.: Pharmaceuticals and related drugs. *Anal. Chem.*, 71 (1999) 217R-233R.

- 1658 Hida, M., Mitsui, T., Ohtani, H. and Tsuge, S.: Determination of benzodiazepine in tablets studied by thermal desorption gas chromatography. *J. Pharm. Biomed. Anal.*, 20 (1999) 419-426.
- 1659 McAvoy, Y., Cole, M.D. and Gueniat, O.: Analysis of amphetamines by supercritical fluid chromatography, high-performance liquid chromatography, gas chromatography and capillary zone electrophoresis; a preliminary comparison. *Forensic Sci. Int.*, 102 (1999) 13-22.
- 1660 Muguruma, S., Uchino, S., Oguri, N. and Kiji, J.: Quantitative analysis of poly(methylmethacrylate) in drugs by Curie-point pyrolysis gas chromatography. *LC-GC Int.*, 12 (1999) 432-436.
- 1661 Navalgund, S.G., Khanolkar, D.H., Prabhu, P.S., Sahasrabudhe, P.S. and Sane, R.T.: A gas chromatographic method for the determination of nimesulide from its pharmaceutical preparation. *Indian Drugs*, 36 (1999) 173-174.
- 1662 Spell, J.C.: Part I. Supercritical fluid extraction and liquid chromatography-electrospray mass spectrometry of selected drugs of abuse from various biological matrices. Part II. HPLC determination of selected drugs using smallbore and nonporous octadecylsilane columns. Avail. *UMI*, Order No. 9908647, 1998, 205 pp.; C.A., 130 (1999) 292511h.
- See also 1569.
- 32b. *Antirheumatics and antiinflammatory drugs*
- 1663 Kivisto, K.T., Laitila, J., Martensson, K. and Neuvonen, P.J.: Determination of buspirone and 1-(2-pyrimidinyl)-piperazine (1-PP) in human plasma by capillary gas chromatography. *Ther. Drug Monit.*, 21 (1999) 317-321.
- 1664 Shinozuka, T., Nakajima, R., Takei, S., Ohue, O., Ogamo, A., Terada, M., Murai, T. and Yanagida, J.: Simultaneous analysis of propionic acid analgesic and antipyretic drugs in human plasma by gas chromatography. *Jpn. J. Forensic Toxicol.*, 17 (1999) 51-60.
- 32c. *Autonomic and cardiovascular drugs*
- 1665 Ramos, F., Matos, A., Oliveira, A. and da Silveira, M.I.N.: Diphasic dialysis extraction technique for clenbuterol determination in bovine retina by gas chromatography-mass spectrometry. *Chromatographia*, 50 (1999) 118-120.
- See also 1675.
- 32d. *Central nervous system drugs*
- 1666 Adam, L.A.: Confirmation of azaperone and its metabolically reduced form, azaperol, in swine liver by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 815-824.
- 1667 Eckard, P.R. and Taylor, L.T.: Modifier and additive effects in the supercritical fluid extraction of pseudoephedrine hydrochloride from spiked-sand and Suphedrine tablets. *J. High Resolut. Chromatogr.*, 22 (1999) 469-474.
- 1668 Everhart, E.T., Shwonek, P., Jacob, P., III, Rowbotham, M.C. and Jones, R.T.: Quantitation of levorphanol in human plasma at subnanogram per milliliter levels using capillary gas chromatography with electron-capture detection. *J. Chromatogr. B*, 729 (1999) 173-181.
- 1669 Igarashi, K., Sugiyama, Y., Kasuya, F., Saiki, K., Yamakawa, T. and Ohata, S.: Determination of 1-methyl-1,2,3,4-tetrahydroisoquinoline in mouse brain after treatment with haloperidol by gas chromatography-selected ion monitoring. *J. Chromatogr. B*, 731 (1999) 53-58.
- 1670 Kongshaug, K.E., Pedersen-Bjergaard, S., Rasmussen, K.E. and Krogh, M.: Solid-phase microextraction/capillary gas chromatography for the profiling of confiscated ecstasy and amphetamine. *Chromatographia*, 50 (1999) 247-252.
- See also 1659, 1664, 1677.
- 32e. *Chemotherapeutics (exc. cytostatics and antibiotics)*
- 1671 Tarbin, J.A., Clarke, P. and Shearer, G.: Screening of sulphonamides in egg using gas chromatography-mass-selective detection and liquid chromatography-mass spectrometry. *J. Chromatogr. B*, 729 (1999) 127-138.
- 32f. *Cytostatics*
- 1672 Buser, H.-R., Poiger, T. and Müller, M.D.: Occurrence and environmental behaviour of the chiral pharmaceutical drug ibuprofen in surface waters and in wastewater. *Environ. Sci. Technol.*, 33 (1999) 2529-2535.
- 32g. *Other drug categories*
- 1673 Canavaciolo, V.L.G. and Hernández, J.M.: Validation of a gas chromatographic method for determining fatty alcohols that compose policosanol in five-milligram film-coated tablets. *J. Assoc. Off. Anal. Chem. Int.*, 82 (1999) 834-839.
- 1674 Valdez, J.S., Martin, D.K. and Mayersohn, M.: Sensitive and selective gas chromatographic methods for the quantitation of camphor, menthol and methyl salicylate from human plasma. *J. Chromatogr. B*, 729 (1999) 163-171.
- See also 1376.
- 32h. *Toxicological and forensic applications*
- 1675 Black, S.B. and Hansson, R.C.: Determination of salbutamol and detection of other β -agonists in human postmortem whole blood and urine by GC-MS-SIM. *J. Anal. Toxicol.*, 23 (1999) 113-118.
- 1676 Brettell, T.A., Inman, K., Rudin, N. and Saferstein, R.: Forensic science. *Anal. Chem.*, 71 (1999) 235R-255R.
- 1677 Duydu, Y.: (Simultaneous determination of morphine, codeine and 6-monoacetylmorphine in urine by GC/MS). *Ankara Univ. Eczacilik Fak. Derg.*, 27 (1998) 101-113; C.A., 131 (1999) 96875m.
- 1678 Vincent, F., Bessard, J., Vacheron, J., Mallaret, M. and Bessard, G.: Determination of buprenorphine and norbuprenorphine in urine and hair by gas chromatography-mass spectrometry. *J. Anal. Toxicol.*, 23 (1999) 270-279.
- 1679 Whitter, P.D., Cary, P.L., Leaton, J.I. and Johnson, J.E.: Automated extraction for the analysis of 11-nor- Δ^9 -tetrahydrocannabinol-9-carboxylic acid (THCCOOH) in urine using a six-head probe Hamilton Microlab 2200 system and gas chromatography-mass spectrometry. *J. Anal. Toxicol.*, 23 (1999) 286-289.

1680 Williams, T.A., Riddle, M., Morgan, S.L. and Brewer, W.E.: Rapid gas chromatographic analysis of drugs of forensic interest. *J. Chromatogr. Sci.*, 37 (1999) 210-214.

See also 1558.

33. CLINICO-CHEMICAL APPLICATIONS

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

1681 Phillips, M., Herrera, J., Krishnan, S., Zain, M., Greenberg, J. and Cataneo, R.N.: Variation in volatile organic compounds in the breath of normal humans. *J. Chromatogr. B*, 729 (1999) 75-88.

1682 Sykes, A.G. and Caple, G.: Bridging native American culture and chemistry: gas chromatography experiments that examine native foods. *J. Chem. Educ.*, 76 (1999) 392-395.

1683 Wahl, H.G., Hoffmann, A., Luft, D. and Liebich, H.M.: Analysis of volatile organic compounds in human urine by headspace gas chromatography-mass spectrometry with a multipurpose sampler. *J. Chromatogr. A*, 847 (1999) 117-125.

See also 1395, 1505, 1507, 1533, 1534, 1536, 1539, 1540, 1541, 1559, 1565, 1594, 1597, 1599, 1607, 1610, 1746, 1774.

34. FOOD ANALYSIS

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

1684 Bak, L.S., Jacobsen, L. and Jorgensen, S.S.: Characterization of qualitative changes in frozen, unpeeled cold-water shrimp (*Pandalus borealis*) by static headspace gas chromatography and multivariate data analysis. *Z. Lebensm. - Unters. Forsch. A*, 208 (1999) 10-16.

1685 Crews, C., Calvet-Sarret, R. and Brereton, P.: Identification of steroidal hydrocarbons in refined confectionery fats by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 847 (1999) 179-185.

1686 Weinert, B., Ulrich, M. and Mosandl, A.: GC-IRMS analysis of black Ceylon, Assam, and Darjeeling teas. *Z. Lebensm. - Unters. Forsch. A*, 208 (1999) 277-281; *C.A.*, 131 (1999) 31164j.

1687 Zhou, L., Hou, J. and Fan, H.: (Determination of nervonic acid in oral tonic by GC). *Sepu*, 17 (1999) 306-307; *C.A.*, 131 (1999) 49558a.

See also 1517, 1518, 1526, 1529, 1530, 1532, 1537, 1554, 1555, 1556, 1564, 1569, 1586, 1629, 1644, 1702, 1732, 1764.

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

1688 Adahchour, M., Vreuls, R.J.J., van der Heijden, A. and Brinkman, U.A.T.: Trace-level determination of polar flavour compounds in butter by solid-phase extraction and gas chromatography-mass spectrometry. *J. Chromatogr. A*, 844 (1999) 295-305.

1689 Beck, T. and Mosandl, A.: γ -Dithiolactones - analytical and sensory characteristics. *J. High Resolut. Chromatogr.*, 22 (1999) 421-423.

1690 Dirinck, P. and de Winne, A.: Flavour characterisation and classification of cheeses by gas chromatographic-mass spectrometric profiling. *J. Chromatogr. A*, 847 (1999) 203-208.

1691 Kotseridis, Y., Baumes, R.L. and Skouroumounis, G.K.: Quantitative determination of free and hydrolytically liberated β -damascenone in red grapes and wines using a stable isotope dilution assay. *J. Chromatogr. A*, 849 (1999) 245-254.

1692 Kotseridis, Y., Baumes, R.L., Bertrand, A. and Skouroumounis, G.K.: Quantitative determination of β -ionone in red wines and grapes of Bordeaux using a stable isotope dilution assay. *J. Chromatogr. A*, 848 (1999) 317-325.

1693 Rosillo, L., Salinas, M.R., Garijo, J. and Alonso, G.L.: Study of volatiles in grapes by dynamic headspace analysis. Application to the differentiation of some *Vitis vinifera* varieties. *J. Chromatogr. A*, 847 (1999) 155-159.

1694 Siegmund, B. and Pfannhauser, W.: Changes of the volatile fraction of cooked chicken meat during chill storing. Results obtained by the electronic nose in comparison to GC-MS and GC olfactometry. *Z. Lebensm. - Unters. Forsch. A*, 208 (1999) 336-341; *C.A.*, 131 (1999) 43890f.

1695 Ulrich, D., Hoberg, E. and Standhardt, D.: Investigation of *Asparagus officinalis* L. flavour by sensory methods and gas chromatography. *Spec. Publ. - R. Soc. Chem.*, 229 (1999) 332-334; *C.A.*, 131 (1999) 43753p.

1696 Wallner, E., Kreuz, S., Flak, W. and Nikiforov, A.: (Characterization of Austrian wines of the Riesling cultivar by means of GC-MS and multivariate data analysis. 1st Report. Vintage 1996). *Mitt. Klosterneuburg*, 49, No. 1-2 (1999) 14-22; *C.A.*, 130 (1999) 310985x.

1697 Weber, J., Beeg, M., Bartsch, C., Feller, K.-H., de la Calle Garcia, D., Reichenbächer, M. and Danzer, K.: Improvement of the chemometric variety characterization of wines by improving the detection limit for aroma compounds. *J. High Resolut. Chromatogr.*, 22 (1999) 322-326.

See also 1580, 1606.

35. ENVIRONMENTAL ANALYSIS

35a. *General papers and reviews*

1698 Clement, R.E., Yang, P.W. and Koester, C.J.: Environmental analysis. *Anal. Chem.*, 71 (1999) 257R-292R.

1699 Dewulf, J., van Langenhove, H.: Anthropogenic volatile organic compounds in ambient air and natural waters: a review on recent developments of analytical methodology, performance and interpretation of field measurements. *J. Chromatogr. A*, 843 (1999) 163-177 - a review with 157 refs.

- 1700 Fuoco, R., Ceccarini, A., Onor, M. and Marrara, L.: Analysis of priority pollutants in environmental samples by on-line supercritical fluid chromatography cleanup-cryo-trap-gas chromatography-mass spectrometry. *J. Chromatogr. A*, 846 (1999) 387-393.
- 1701 Gautrois, M. and Koppmann, R.: Diffusion technique for the production of gas standards for atmospheric measurements. *J. Chromatogr. A*, 848 (1999) 239-249.
- 1702 Nakada, N., Isobe, T., Nishiyama, H., Okuda, K., Tsutsumi, S., Yamada, J., Kumata, H. and Takada, H.: (Broad-spectrum analysis of endocrine disruptors in environmental samples). *Bunseki Kagaku*, 48 (1999) 535-547.
- 1703 Pavlova, A., Dimov, N. and Papazova, D.: Gas-chromatographic investigation of spilled oil weathering. *Acta Chromatogr.*, No. 9 (1999) 133-141.
- 1704 Peñalver, A., Pocurull, E., Borrull, F. and Marcé, R.M.: Trends in solid-phase microextraction for determining organic pollutants in environmental samples. *TrAC*, 18 (1999) 557-568 - a review with 52 refs.
- 1705 Poole, S.K. and Poole, C.F.: Chromatographic models for the sorption of neutral organic compounds by soil from water and air. *J. Chromatogr. A*, 845 (1999) 381-400.
- See also 1460, 1499, 1500.
- 35b. *Air pollution (complex mixtures; single compounds by cross-reference only)*
- 1706 Brancaleoni, E., Scovaventi, M., Frattoni, M., Mabilia, R. and Ciccio, P.: Novel family of multi-layer cartridges filled with a new carbon adsorbent for the quantitative determination of volatile organic compounds in the atmosphere. *J. Chromatogr. A*, 845 (1999) 317-328.
- 1707 Cecinato, A., Marino, F., di Filippo, P., Lepore, L. and Possanzini, M.: Distribution of *n*-alkanes, polynuclear aromatic hydrocarbons and nitrated polynuclear aromatic hydrocarbons between the fine and coarse fractions of inhalable atmospheric particulates. *J. Chromatogr. A*, 846 (1999) 255-264.
- 1708 Fox, D.L.: Air pollution. *Anal. Chem.*, 71 (1999) 109R-119R - a review with 89 refs.
- 1709 Helmig, D.: Air analysis by gas chromatography. *J. Chromatogr. A*, 843 (1999) 129-146 - a review with 173 refs.
- 1710 Juskiewicz, A. and Kijak, B.: Gas chromatographic examination of the dispersion of VOCs emitted by motor vehicles in urban and semi-rural Krakow. *Acta Chromatogr.*, No. 9 (1999) 154-175.
- 1711 Kallenborn, R., Gatermann, R., Planting, S., Rimkus, G.G., Lund, M., Schlabach, M. and Burkow, I.C.: Gas chromatographic determination of synthetic musk compounds in Norwegian air samples. *J. Chromatogr. A*, 846 (1999) 295-306.
- 1712 Namiesnik, J., Gorlo, D., Wolska, L. and Zygumt, B.: On calibration of solid phase microextraction-gas chromatography-mass spectrometry system for analysis of organic air contaminants using gaseous standard mixtures. *Chem. Anal. (Warsaw)*, 44 (1999) 201-213.
- 1713 Werner, G., Kastler, J., Looser, R. and Ballschmiter, K.: Organic nitrates of isoprene as atmospheric trace compounds. *Angew. Chem. Int. Ed.*, 38 (1999) 1634-1637.
- 1714 Woidich, S., Froescheis, O., Luxenhofer, O. and Ballschmiter, K.: EI and NCI-mass spectrometry of arylalkyl nitrates and their occurrence in urban air. *Fresenius J. Anal. Chem.*, 364 (1999) 91-99.
- 1715 Yassaa, N., Meklati, B.Y. and Cecinato, A.: Analysis of volatile organic compounds in the ambient air of Algiers by gas chromatography with a β -cyclodextrin capillary column. *J. Chromatogr. A*, 846 (1999) 287-293.
- See also 1454, 1470, 1478, 1479, 1483, 1486, 1496, 1571, 1592, 1605.
- 35c. *Water pollution (complex mixtures; single compounds by cross-reference only)*
- 1716 Hankemeier, T., Steketeer, P.C., Vreuls, J.J. and Brinkman, U.A.T.: At-line SPE-GC-MS of micropollutants in water using the Prep-Station. *Fresenius J. Anal. Chem.*, 364 (1999) 106-112.
- 1717 Hassett, A.J. and Rohwer, E.R.: Analysis of odorous compounds in water by isolation by closed-loop stripping with a multichannel silicone rubber trap followed by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 849 (1999) 521-528.
- 1718 Huang, W. and Chen, J.: (Analysis of odoriferous pollutants in cooling water by on-line LC-GC/FTIR method). *Guangpuxue Yu Guangpu Fenxi*, 19 (1999) 339-340; *C.A.*, 131 (1999) 92210t.
- 1719 Ibaraki, T., Kawata, K., Utagawa, N., Sakai, M., Kifune, I. and Morita, M.: (Determination of endocrine disrupting aromatic compounds in water and sediment by using an essential oil distillator). *Bunseki Kagaku*, 48 (1999) 609-615.
- 1720 Knepper, T.P., Sacher, F., Lange, F.T., Brauch, H.J., Karrenbrock, F., Roerden, O. and Lindner, K.: Detection of polar organic substances relevant for drinking water. *Waste Manage. (Oxford)*, 19, No. 2 (1999) 77-99; *C.A.*, 131 (1999) 49064m.
- 1721 Lee, H.L.: Permeation sampling of monocyclic aromatic priority pollutants in water. Avail. *UML*, Order No. DA9842106, 1998, 149 pp.; *C.A.*, 130 (1999) 316280k.
- 1722 Milyukin, M.V.: (Solid-phase extraction and GC-MS identification and quantitative evaluation of the content of microtraces of semivolatile organic compounds in deionized waters used in the electronic industry). *Khim. Tekhnol. Vody*, 20 (1998) 353-379; *C.A.*, 131 (1999) 92199w.
- 1723 Richardson, S.D.: Water analysis. *Anal. Chem.*, 71 (1999) 181R-215R - a review with 210 refs.
- See also 1451, 1472, 1477, 1497, 1498, 1508, 1523, 1570, 1614, 1615, 1618, 1634, 1639, 1672, 1754, 1765, 1767.
- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*
- 1724 Bautista, J.M., González-Vila, F.J., Martín, F., del Río, J.C., Gutiérrez, A., Verdejo, T. and González, A.G.: Supercritical-carbon-dioxide extraction of lipids from a contaminated soil. *J. Chromatogr. A*, 845 (1999) 365-371.
- 1725 Cuppett, C.M., Findeis, P.M., Klotz, J.C., Woods, L.A. and Strein, T.G.: Thermal desorption GC-MS as a screening method for chlorinated hydrocarbon contamination in soil. *LC-GC*, 17 (1999) 532-542.

- 1726 Dermietzel, J. and Strenge, G.: Determination of VOC contamination in borehole sediments by headspace-SPME-GC analysis. *Fresenius J. Anal. Chem.*, 364 (1999) 645-647.
- 1727 Havenga, W.J. and Rohwer, E.R.: Chemical characterization and screening of hydrocarbon pollution in industrial soils by headspace solid-phase microextraction. *J. Chromatogr. A*, 848 (1999) 279-295.
- 1728 Jovancicevic, B.S., Polic, P.S., Nedeljkovic, J.M. and Vitorovic, D.K.: GC-MS in the organic matter investigation of Yugoslav sediments. *Hem. Ind.*, 52 (1998) 504-514; *C.A.*, 130 (1999) 354359a.
- 1729 Makarov, O.A., Meshalkina, Y.L., Gruzdkova, R.A., Sizov, N.I., Shatilov, V.V. and Yakunina, I.V.: (Express analysis of organic toxic substances in soils of the museum country-estate of L. N. Tolstoi "Yasnaya Polyana" and adjacent territories). *Vestn. Mosk. Univ., Ser. 17: Pochvoved.*, (1999) 16-20; *C.A.*, 131 (1999) 91946a.
- 1730 Morselli, L., Setti, L., Iannuccilli, A., Maly, S., Dinelli, G. and Quattroni, G.: Supercritical fluid extraction for the determination of petroleum hydrocarbons in soil. *J. Chromatogr. A*, 845 (1999) 357-363.
- 1731 Schultz, L.F., Young, T.M. and Higashi, R.M.: Sorption-desorption behavior of phenanthrene elucidated by pyrolysis-gas chromatography-mass spectrometry studies of soil organic matter. *Environ. Toxicol. Chem.*, 18 (1999) 1710-1719.
- See also 1478, 1480, 1487, 1495, 1509, 1511, 1513, 1546, 1615, 1616, 1622, 1636, 1719, 1768.
36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES
- 36b. Antioxidants and preservatives
- 1732 González, M., Gallego, M. and Valcárcel, M.: Gas chromatographic flow method for the preconcentration and simultaneous determination of antioxidant and preservative additives in fatty foods. *J. Chromatogr. A*, 848 (1999) 529-536.
- 1733 Katase, T. and Kim, Y.: (Determination of adipic acid esters potentially migrated from plastic films for foods-wrapping by gas chromatography/gas chromatograph combined with mass spectrometry). *Bunseki Kagaku*, 48 (1999) 649-655.
- 1734 Pesce-Rodriguez, R.A., Fell, N.F., Jr., Widder, J.M. and Greer, R.: Plasticizer migration in nitrocellulose-based propellants. *J. Energ. Mater.*, 17 (1999) 197-214; *C.A.*, 131 (1999) 104139s.
- 1735 Stareczek, T., Kaminska, G., Ermel, J. and Kortylewska, K.: (Determination of the migration of dimethyl terephthalate and dimethyl isophthalate from plastics). *Polimery (Warsaw)*, 44 (1999) 218-221; *C.A.*, 131 (1999) 45434j.
- 1736 Wahl, H.G., Hoffmann, A., Häring, H.-U. and Liebich, H.M.: Identification of plasticizers in medical products by a combined direct thermodesorption-cooled injection system and gas chromatography-mass spectrometry. *J. Chromatogr. A*, 847 (1999) 1-7.
- See also 1361.
- 36c. Complex mixtures, technical products and unidentified compounds
- 1737 Bermejo, J., Fernández, A.L., Prada, V., Granda, M. and Menéndez, R.: Monitoring the synthesis of new pitches from coal tar and its fractions by gas chromatography and related techniques. *J. Chromatogr. A*, 849 (1999) 507-519.
- 1738 Clifford, A.A., Basile, A. and Al-Saidi, S.H.R.: A comparison of the extraction of clove buds with supercritical carbon dioxide and superheated water. *Fresenius J. Anal. Chem.*, 364 (1999) 635-637.
- 1739 Colombini, M.P., Modugno, F. and Giacomelli, A.: Two procedures for suppressing interference from inorganic pigments in the analysis by gas chromatography-mass spectrometry of proteinaceous binders in paintings. *J. Chromatogr. A*, 846 (1999) 101-111.
- 1740 Colombini, M.P., Modugno, F., Giacomelli, M. and Francesconi, S.: Characterization of proteinaceous binders and drying oils in wall painting samples by gas chromatography-mass spectrometry. *J. Chromatogr. A*, 846 (1999) 113-124.
- 1741 Creasy, W.R., Brickhouse, M.D., Morrissey, K.M., Stuff, J.R., Cheicante, R.L., Jr., Ruth, J., Mays, J., Williams, B.R., O'Connor, R. and Durst, H.D.: Analysis of chemical weapons decontamination waste from old ton containers from Johnston Atoll using multiple analytical methods. *Environ. Sci. Technol.*, 33 (1999) 2157-2162.
- 1742 De Angelis, F., di Tullio, A., Mellerio, G., Quaresima, R. and Volpe, R.: Investigation by solid-phase micro-extraction and gas chromatography/mass spectrometry of organic films on stone monuments. *Rapid Commun. Mass Spectrom.*, 13 (1999) 895-900.
- 1743 Du, L. and Xu, Q.: (Determination of four kinds of organic residues in plastic packing bag by headspace gas chromatography). *Fenxi Huaxue*, 27 (1999) 372; *C.A.*, 131 (1999) 31200t.
- 1744 Elizade-González, M.P. and Ruiz-Palma, R.: Gas chromatographic characterization of the adsorption properties of the natural adsorbent CACMM2. *J. Chromatogr. A*, 845 (1999) 373-379.
- 1745 Gaines, R.B., Frysinger, G.S., Hendrick-Smith, M.S. and Stuart, J.D.: Oil spill source identification by comprehensive two-dimensional gas chromatography. *Environ. Sci. Technol.*, 32 (1999) 2106-2112.
- 1746 Georgescu, L.P., Georgescu, M.E., Leonte, M. and Florea, T.: Evaluation of radical products from β -alanine/sugar mixtures by use of GC-MS with the galvinoxyl radicals. *J. Agric. Food Chem.*, 47 (1999) 1427-1430.
- 1747 He, L., Dong, Y., Li, X., Yao, C. and Fang, Z.: (Analysis of C_5 fractions and carbonyl compounds by capillary gas chromatography). *Sepu*, 17 (1999) 259-261.
- 1748 Hinz, D.C., Kwarteng-Acheampong, W. and Wenclawiak, B.W.: Analysis of volatile varnishes of coated wires by SPME. *Fresenius J. Anal. Chem.*, 364 (1999) 641-642.
- 1749 Jeong, H.-J., Lee, M.-H., Ro, K.-W., Hur, C.-W. and Kim, J.-W.: Determination of panthenol, cholecalciferol and tocopherol in cosmetic products by gas chromatography-mass spectrometry in SIM mode. *Int. J. Cosmet. Sci.*, 21 (1999) 41-50.

- 1750 Kunigami, C.N., Sanctos, M.S. and Morelli-Cardoso, M.H.W.: Development of a methodology for the identification of volatiles in industrial adhesive formulations by GC/MS with manual headspace sampling. *J. High Resolut. Chromatogr.*, 22 (1999) 477-480.
- 1751 Maeno, S., Eddy, C.L. and Rodriguez, P.A.: Identification of compounds responsible for an off-odor in wet polyacrylate superabsorbent polymers. *J. Chromatogr. A*, 849 (1999) 217-224.
- 1752 Mansfield, C.T., Barman, B.N., Thomas, J.V., Mehrotra, A.K. and McCann, J.M.: Petroleum and coal. *Anal. Chem.*, 71, No. 12 (1999) 81R-107R - a review with 53 refs.
- 1753 Mol, H.G.J., Hankemeier, T. and Brinkman, U.A.T.: Gas chromatography of organic microcontaminants using atomic-emission and mass spectrometry detection. *LC-GC*, 17 (1999) 544-555.
- 1754 Saba, A., Pucci, S., Raffaelli, A. and Salvadori, P.: Studies of the composition of distillates from leachate by gas chromatography/mass spectrometry coupled to solid-phase microextraction. *Rapid Commun. Mass Spectrom.*, 13 (1999) 966-970.
- 1755 Spila, E., Sechi, G. and Barnabei, M.: Determination of organophosphate contaminants in jet fuel. *J. Chromatogr. A*, 847 (1999) 331-337.
- 1756 Tudor, E. and Moldovan, D.: Temperature dependence of the retention index for perfumery compounds on a SE-30 glass capillary column. II. The hyperbolic equation. *J. Chromatogr. A*, 848 (1999) 215-227.
- 1757 Vo, E., Berardinelli, S.P. and Hall, R.C.: Recovery of some common solvents from protective clothing breakthrough indicator pads by microwave-solvent extraction and gas chromatography. *Analyst (Cambridge, U.K.)*, 124 (1999) 941-944.
- 1758 Wang, J. and Hu, J.: (Determination of methanol in hair spray by GC method). *Weisheng Yanjiu*, 27 (1998) 389-390; *C.A.*, 130 (1999) 308571r.
- 1759 Wang, Z., Fingas, M. and Page, D.S.: Oil spill identification. *J. Chromatogr. A*, 843 (1999) 369-411 - a review with 201 refs.
- 1760 Wu, S. and Olatunji, G.: GC-MS of photosynthetic bacterium (PSB) treated spent liquor of Tianjin Paper Mill. *Cellul. Chem. Technol.*, 32 (1998) 241-245; *C.A.*, 131 (1999) 9312j.
- 1761 Yaylayan, V.A.: Analysis of complex reaction mixtures: Applications of Py-GC-MS and the microwave-assisted process. *Am. Lab. (Shelton)*, 31, No. 9 (1999) 30-31.
- 1762 Zaborski, M., Lipinska, M., Kosmalska, A. and Slusarski, L.: Surface properties of fillers as studied by inverse gas chromatography. *Chem. Anal. (Warsaw)*, 44 (1999) 505-521.
- 1763 Ziani, A., Xu, R., Schreiber, H.P. and Kobayashi, T.: Inverse gas chromatography, surface properties, and interactions among components of paint formulations. *J. Coat. Technol.*, 71 (1999) 53-60.
- See also 1363, 1375, 1380, 1429, 1591, 1608, 1648, 1770.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- 1764 Foster, A. and Andersen, L.B.: Gas chromatographic technique for the confirmation of *Megasphaera* and *Pectinatus* spp. *J. Am. Soc. Brew. Chem.*, 57 (1999) 91-93.
- See also 1528, 1760.
38. INORGANIC COMPOUNDS
- 38a. Cations
- See 1463.
- 38c. Permanent and rare gases
- 1765 Ohta, K., Terai, H., Kimura, I. and Tanaka, K.: Simultaneous determination of hydrogen, methane, and carbon monoxide in water by gas chromatography with a semiconductor detector. *Anal. Chem.*, 71 (1999) 2697-2699.
- 1766 Sternberg, R., Szopa, C., Coscia, D., Zubrzycki, S., Raulin, F., Vidal-Madjar, C., Niemann, H. and Israel, G.: Gas chromatography in space exploration. Capillary and micropacked columns for in situ analysis of Titan's atmosphere. *J. Chromatogr. A*, 846 (1999) 307-315.
- See also 1378, 1379, 1407, 1493.
- 38d. Volatile inorganic compounds
- 1767 Careri, M., Mori, G., Musci, M. and Viaroli, P.: Evaluation of dynamic headspace and purge-and-trap techniques for the high-resolution gas chromatography analysis of nitrous oxide in seawater. *J. Chromatogr. A*, 848 (1999) 327-335.
- 1768 De Klein, C.A.M., McTaggart, I.P., Smith, K.A., Stevens, R.J., Harrison, R. and Laughlin, R.J.: Measurement of nitrous oxide emissions from grassland soil using photo-acoustic infra-red spectroscopy, long-path infra-red spectroscopy, gas chromatography, and continuous flow isotope-ratio mass spectrometry. *Commun. Soil Sci. Plant Anal.*, 30 (1999) 1463-1477.
- 1769 Guidotti, M., Ravaioli, G. and Vitali, M.: Selective determination of Se⁴⁺ and Se⁶⁺ using SPME and GC/MS. *J. High Resolut. Chromatogr.*, 22 (1999) 414-416.
- 1770 Jalbert, J., Gilbert, R. and Tétreault, P.: Determination of the analytical performance of a headspace capillary gas chromatographic technique and Karl Fischer coulometric titration by system calibration using oil samples containing known amounts of moisture. *Anal. Chem.*, 71 (1999) 3283-3291.
- 1771 Miki, A. and Tsuchihashi, H.: Determination of hydrogen sulfide in blood by gas chromatography/mass spectrometry after liquid-liquid-solid phase-transfer catalyzed pentafluorobenzylolation. *Jpn. J. Forensic Toxicol.*, 17 (1999) 14-21.
- 1772 Sich, I. and Russow, R.: ¹⁵N Analysis of nitric oxide and nitrous oxide by cryotrap enrichment using a gas chromatograph quadrupole mass spectrometer and its application to ¹⁵N-tracer investigations of NO/N₂O formation in soil. *Rapid Commun. Mass Spectrom.*, 13 (1999) 1325-1328.
- See also 1766, 1774.
39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS
- 1773 König, T., Hor, K., Ruff, C. and Schreier, P.: (Multielement isotope ratio analysis for detection of authenticity of natural substances). *GIT Labor-Fachz.*, 43 (1999) 496-498; *C.A.*, 131 (1999) 15968u.

1774 Plath, C., Wutzke, K.-D., Russow, R., Sich, I. and von Bismarck, P.: (Method for determination of [¹⁵N]nitrogen monooxide exhalation for diagnosis and therapy of illnesses in humans). *Ger. DE 19,719,098* (Cl. A61K49/00), 12 May 1999, *Appl. 19,719,098*, 6 May 1997; 2 pp.; *C.A.*, 130 (1999) 335004q.

See also 1540, 1595, 1772.

Planar Chromatography

1. REVIEWS AND BOOKS

476 Filer, C.N.: Isotopic fractionation of organic compounds in chromatography. *J. Labelled Compd. Radiopharm.*, 42 (1999) 169-197; *C.A.*, 130 (1999) 231591 - a review with 307 refs.

477 Pradeau, D., Rabiand, J., Bernard, C., Compagnon, P.A., Dauphin, C., de Richter, R., Hocquemiller, R., Minet, J.J., Reisdorf, D. and Sarbach, C.: New perspectives in planar chromatography: general methods. Report of an SFSTP commission. *S.T.P. Pharma Prat.*, 8 (1998) 451-477; *C.A.*, 130 (1999) 290800 - a review with 54 refs.

See also 519, 578, 590, 626.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

478 Kaczmarek, K., Prus, W. and Kowalska, T.: A new adsorption-partition model of solute retention in chromatographic systems with chemically bonded stationary phases. *J. Planar Chromatogr.*, 12 (1999) 175-179.

479 Klama, B. and Kowalska, T.: Separation efficiency of polyamide and cellulose TLC layers in terms of the separation number (S/N). *J. Planar Chromatogr.*, 12 (1999) 207-210.

For additional information see *C.A.*:
130 (1999) 256766.

See also 628.

2b. Thermodynamics and theoretical relationships

See 582.

2c. Relationship between structure and chromatographic behaviour

480 Dimov, N.: The solute molecule-rigid or partially flexible? Calculation of benzodiazepine R_f values as an example. *Chromatographia*, 50 (1999) 61-64.

481 Dross, K., Rekker, R.F., de Vries, G. and Mannhold, R.: The lipophilic behavior of organic compounds. Part 3. The search for interconnections between reversed-phase chromatographic data and log P_{oct} values. *Quant. Struct.-Act. Relat.*, 17 (1998) 549-557; *C.A.*, 130 (1999) 201415.

See also 503.

2d. Measurement of physico-chemical and related values

See 544.

3. GENERAL TECHNIQUES

3a. Apparatus and accessories

482 Hawryl, M.A., Soczewinski, E. and Dzido, T.H.: Two-dimensional liquid chromatography in a coupled micro-HPLC-thin-layer chromatography apparatus. *Chem. Anal.*, 44 (1999) 15-21; *C.A.*, 130 (1999) 275968.

See also 487.

3b. Detectors and detection reagents

See 485, 621.

3c. Sorbents and columns, packing procedures

483 Maxwell, R.J. and Lightfield, A.R.: An improved method for efficient predevelopment washing of HPTLC plates. *J. Planar Chromatogr.*, 12 (1999) 109-113.

See also 479, 500, 598.

3e. Preparative scale chromatography

See 604.

4. SPECIAL TECHNIQUES

4b. Computerization and modelling

484 Cimpoi, C., Jantschi, L. and Hodisan, T.: A new mathematical model for the optimization of the mobile phase composition in HPTLC and the comparison with other models. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1429-1441.

See also 494.

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

485 Kocsis, L., Horváth, E., Kristóf, J., Frost, R.L., Rédey, Á. and Mink, J.: Effect of the preparation conditions on the surface-enhanced Raman-spectrometric identification of thin-layer-chromatographic spots. *J. Chromatogr. A*, 845 (1999) 197-202.

See also 488, 523, 562, 587.

4g. Enantiomers, separation

486 Lepri, L., Coas, V., del Bubba, M. and Cincinelli, A.: Reversed-phase planar chromatography of optical isomers with bovine serum albumin as mobile-phase additive. *J. Planar Chromatogr.*, 12 (1999) 221-224.

See also 598, 602.

4h. *Other special techniques*

- 487 Mincsovcics, E., Garami, M., Keckes, L., Tapa, B., Vegh, Z., Katay, G. and Tyihak, E.: Personal overpressured-layer chromatography (OPLC) basic system 50, flexible tool in analytical and semipreparative work. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 587-598.

See also 493, 561.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5a. *Aliphatic hydrocarbons*

- 488 Unterleutner, H., Ecker, A. and Hartner, O.: (Determination of the content of heptane-insolubles and the paraffin content from results of the bitumen analysis by TLC-FID). *Bitumen*, 60 (1998) 133-136; *C.A.*, 130 (1999) 186160.

5b. *Cyclic hydrocarbons, fullerenes*

- 489 Bodzek, D., Dobosz, C., Janoszka, B. and Bodzek, P.: Determination of highly carcinogenic polycyclic aromatic hydrocarbons by thin-layer chromatography with densitometric detection. *J. Planar Chromatogr.*, 12 (1999) 140-144.

6. ALCOHOLS

See 479.

7. PHENOLS

- 490 Huang, S., Xu, J. and Wang, Q.: (Simultaneous determination of *o*-, *m*-, *p*-dihydroxybenzene isomers by thin-layer chromatography). *Fenxi Huaxue*, 27 (1999) 331-333; *C.A.*, 130 (1999) 261238.
- 491 Misra, A.K., Agarwal, S.K., Kumar, S. and Rajput, R.P.S.: Thin layer chromatographic separation and identification of some phenols on calcium sulfate: determination of phloroglucinol and resorcinol. *Indian J. Chem. Technol.*, 5 (1998) 383-386; *C.A.*, 130 (1999) 251698.

See also 478, 479, 487, 498.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. *Flavonoids*

- 492 Bieganowska, M.L. and Petruczynik, A.: Retention behavior of coumarins and flavonoids on polyamide and alumina layers. Part I. *J. Planar Chromatogr.*, 12 (1999) 135-139.

- 493 Galand, N., Pothier, J., Mason, V. and Viel, C.: Separation of flavonoids, coumarins and anthocyanins in plant extracts by overpressured layer chromatography. *Pharmazie*, 54 (1999) 468-471.

- 494 Medic-Saric, M. and Males, Z.: Selection of an optimal set of solvents in thin-layer chromatography of flavonoids and phenolic acids of *Lavandulae flos*. *Pharmazie*, 54 (1999) 362-364.

See also 622.

8b. *Aflatoxins and other mycotoxins*

- 495 Dawlatana, M., Coker, R.D., Nagler, M.J., Gibbs, J. and Blunden, G.: An HPTLC method for the quantitative determination of T-2 toxin and deoxynivalenol in rice. *Chromatographia*, 49 (1999) 547-551.

- 496 Groves, F.D., Zhang, L., Chang, Y.-S., Ross, P.F., Casper, H., Norred, W.P., You, W.-C. and Fraumeni, J.F., Jr.: Fusarium mycotoxins in corn and corn products in a high-risk area for gastric cancer in Shandong province, China. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 657-662.

- 497 Vero, S., Vazques, A., Cerdeiras, M.P. and Soubes, M.: A rapid TLC-scanning method for the determination of patulin in apple products. *J. Planar Chromatogr.*, 12 (1999) 172-174.

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

- 498 Singh, H.P., Ravindranath, S.D. and Singh, C.: Analysis of tea shoot catechins: spectrophotometric quantitation and selective visualization on two-dimensional paper chromatograms using diazotized sulfanilamide. *J. Agric. Food Chem.*, 47 (1999) 1041-1045.

See also 493.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

See 486.

10. CARBOHYDRATES

10a. *Mono and oligosaccharides. Structural studies*

- 499 Jolly, L., Ferrari, P., Blanot, D., van Heijenoort, J., Fassy, F. and Mengin-Lecreux, D.: Reaction mechanism of phosphoglycosamine mutase from *Escherichia coli*. *Eur. J. Biochem.*, 262 (1999) 202-210.

- 500 Kalinina, K.B. and Litvinova, L.S.: Impregnation of silica gel with inorganic salts from the standpoint of specific adsorption theory. The effect of this impregnation on the separation of sugars by TLC. *J. Planar Chromatogr.*, 12 (1999) 190-195.

- 501 Kamst, E., Bakkens, J., Quaedly, N.E.M., Pilling, J., Kijne, J.W., Lugtenberg, B.J.J. and Spaink, H.P.: Chitin oligosaccharide synthesis by rhizobia and zebrafish embryos starts by glycosyl transfer to O4 of the reducing-terminal residue. *Biochemistry*, 38 (1999) 4045-4052.

- 502 Lanne, B., Schierbeck, B. and Ångström, J.: Binding of cholera toxin B-subunits to derivatives of the natural ganglioside receptor, GM1. *J. Biochem. (Tokyo)*, 126 (1999) 226-234.
- 503 Petrovic, S.M., Popovic, D., Popsavin, M. and Popsavin, V.: Normal and reversed phase thin-layer chromatography of selected 2,5-anhydroaldohexose ethylene acetal derivatives. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1473-1491.
11. ORGANIC ACIDS AND LIPIDS
- 11a. *Organic acids and simple esters*
- 504 De la Fuente, M.A. and Juarez, M.: (Application of chromatographic techniques to the study of triglycerides and sterols of milk fat). *Food Sci. Technol. Int. (Frederick)*, 5 (1999) 103-119; C.A., 130 (1999) 295662.
- 505 Ellnain-Wojtaszek, M. and Zgorka, G.: High-performance liquid chromatography and thin-layer chromatography of phenolic acids from *Ginkgo biloba* L. leaves collected within vegetative period. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1457-1471.
- 506 Knauer, K., Wintersteiger, R., Markl, R., Sametz, W. and Juan, H.: Derivatization of carboxylic acids with fluorescent reagents. *J. Planar Chromatogr.*, 12 (1999) 211-214.
- 507 Liu, P., Xu, Y.-J., Hopfner, R.L. and Gopalakrishnan, V.: Phosphatidic acid increases inositol-1,4,5-trisphosphate and $[Ca^{2+}]_i$ levels in neonatal rat cardiomyocytes. *Biochim. Biophys. Acta*, 1440 (1999) 89-99.
- 508 Tani, M., Okino, N., Mitsutake, S. and Ito, M.: Specific and sensitive assay for alkaline and neutral ceramidases involving C12-NBD-ceramide. *J. Biochem. (Tokyo)*, 125 (1999) 746-749.
- 509 Xu, X., Hu, L. and Wu, W.: (Studies on analysis of fatty acids). *Yaowu Shengwu Jishu*, 5 (1998) 161-165; C.A., 130 (1999) 234122.
- See also 479, 494, 523, 524.
- 11c. *Lipids and their constituents*
- 510 Bieberich, E. and Yu, R.K.: Multi-enzyme kinetic analysis of glycolipid biosynthesis. *Biochim. Biophys. Acta*, 1432 (1999) 113-124.
- 511 Bodenec, J., Brichon, G., Portoukalian, J. and Zwingelstein, G.: Improved methods for the simultaneous separation of free diacylglycerol species from ceramides containing phytosphingosine and sphingosine bases with non hydroxy and alpha-hydroxy fatty acids. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1493-1502.
- 512 Collin, S., Justin, A.-M., Cantrel, C., Arondel, V. and Kader, J.-C.: Identification of AtPIS, a phosphatidylinositol synthase from *Arabidopsis*. *Eur. J. Biochem.*, 262 (1999) 652-658.
- 513 Franzot, S.P. and Doering, T.L.: Inositol acylation of glycosylphosphatidylinositols in the pathogenic fungus *Cryptococcus neoformans* and the model yeast *Saccharomyces cerevisiae*. *Biochem. J.*, 340 (1999) 25-32.
- 514 Grishin, V.V., Evstratova, K.I. and Molodtsova, E.A.: (Methods for production of phospholipids from plant- and animal-based resources). *Zh. Prikl. Khim. (S.-Peterburg)*, 71 (1998) 1045-1047; C.A., 130 (1999) 278758.
- 515 Itabe, H., Hosoya, R., Karasawa, K., Jimi, S., Saku, K., Takebayashi, S., Imanaka, T. and Takano, T.: Metabolism of oxidized phosphatidylcholines formed in oxidized low density lipoprotein by lecithin-cholesterol acyltransferase. *J. Biochem. (Tokyo)*, 126 (1999) 153-161.
- 516 Jackman, M.R., Ellis, J.A., Gray, S.R., Shurety, W. and Luzio, J.P.: Cell polarization is required for ricin sensitivity in a Caco-2 cell line selected for ricin resistance. *Biochem. J.*, 341 (1999) 323-327. C.A.,
- 517 Muller, E.E., Fried, B. and Sherma, J.: HPTLC determination of neutral lipids and phospholipids in snail conditioned water from *Lymnaea elodes*. *J. Planar Chromatogr.*, 12 (1999) 155-158.
- 518 Muller, E.E., Simpkins, H., Fried, B. and Sherma, J.: High performance thin-layer chromatographic analysis of neutral lipids in the marine snails *Ilyanassa obsoletus* and *Littorina littorea* infected with larval trematodes. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1539-1545.
- 519 Nikolova-Damyanova, B.: Quantitative thin-layer chromatography of triacylglycerols. Principles and application. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1513-1537 - a review with 43 refs.
- 520 Perona, J.S. and Ruiz-Gutiérrez, V.: Characterization of the triacylglycerol molecular species of fish oil by reversed-phase high performance liquid chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1699-1714.
- 521 Pouliot, R., Germain, L., Auger, F.A., Tremblay, N. and Juhasz, J.: Physical characterization of the stratum corneum of an *in vitro* human skin equivalent produced by tissue engineering and its comparison with normal human skin by ATR-FTIR spectroscopy and thermal analysis (DSC). *Biochim. Biophys. Acta*, 1439 (1999) 341-352.
- 522 Stevens, V.L., Zhang, H. and Krystianne, E.S.: Stimulation of glycosylphosphatidylinositol biosynthesis in mammalian cell-free systems by GTP hydrolysis: evidence for the involvement of membrane fusion. *Biochem. J.*, 341 (1999) 577-584.
- 523 Striby, L., Lafont, R. and Goutx, M.: Improvement in the *in vitro* thin-layer chromatographic-flame ionisation detection analysis of marine lipids. Separation and quantitation of monoacylglycerols and diacylglycerols in standards and natural samples. *J. Chromatogr. A*, 849 (1999) 371-380.
- 524 Testet, E., Verdoni, N., Cassagne, C. and Bessoule, J.-J.: Transfer and subsequent metabolism of lysolipids studied by immobilizing subcellular compartments in alginate beads. *Biochim. Biophys. Acta*, 1440 (1999) 73-80.
- 525 Uda, I., Sugai, A., Kon, K., Ando, S., Itoh, Y.H. and Itoh, T.: Isolation and characterization of novel neutral glycolipids from *Thermoplasma acidophilum*. *Biochim. Biophys. Acta*, 1439 (1999) 363-370.
- 526 Yamamoto, H., Iida-Tanaka, N., Kasama, T., Ishizuka, I., Kushi, Y. and Handa, S.: Isolation and characterization of a novel Forssman active acidic glycosphingolipid with branched isoglobo-, ganglio-, and neolacto-series hybrid sugar chains. *J. Biochem. (Tokyo)*, 125 (1999) 923-930.
- 527 Yang, L., Yatomi, Y., Satoh, K., Igarashi, Y. and Ozaki, Y.: Sphingosine 1-phosphate formation and intracellular Ca^{2+} mobilization in human platelets: evaluation with sphingosine kinase inhibitors. *J. Biochem. (Tokyo)*, 126 (1999) 84-89.

- 528 Young, B.A., Frazer, B.A., Fried, B., Lee, M., Lalor, J. and Sherma, J.: Determination of cloacal scent-gland lipids from two sympatric snakes, the Eastern diamondback rattlesnake (*Crotalus adamanteus*) and the Florida cottonmouth (*Agkistrodon piscivorus conanti*). *J. Planar Chromatogr.*, 12 (1999) 196-201.
- 529 Zhou, Z., Lin, S., Cotter, R.J. and Raetz, C.R.H.: Lipid A modifications characteristic of *Salmonella typhimurium* are induced by NH_4VO_3 in *Escherichia coli* K12. Detection of 4-amino-4-deoxy-L-arabinose, phosphoethanolamine and palmitate. *J. Biol. Chem.*, 274 (1999) 18503-18514.

See also 504, 507, 555.

13. STEROIDS

13d. Sterols

- 530 Bensch, W.R., Gadski, R.A., Bean, J.S., Beavers, L.S., Schmidt, R.J., Perry, D.N., Murphy, A.T., McClure, D.B., Eacho, P.I., Breau, A.P. et al.: Effects of LY295427, a low-density lipoprotein (LDL) receptor up-regulator, on LDL receptor gene transcription and cholesterol metabolism in normal and hypercholesterolemic hamsters. *J. Pharmacol. Exp. Ther.*, 289 (1999) 85-92.
- 531 Cabello-Hurtado, F., Taton, M., Forthoffer, N., Kahn, R., Bak, S., Rahier, A. and Werck-Reichart, D.: Optimized expression and catalytic properties of a wheat obtusifolium 14-demethylase (CYP51) expressed in yeast. Complementation of erg 11 yeast mutants by plant CYP51. *Eur. J. Biochem.*, 262 (1999) 435-446.
- 532 Goese, M., Kammhuber, K., Bacher, A., Zenk, M.H. and Eisenreich, W.: Biosynthesis of bitter acids in hops. A ^{13}C -NMR and ^2H -NMR study on the building blocks of humulene. *Eur. J. Biochem.*, 263 (1999) 447-454.
- 533 Rondet, S., Taton, M. and Rahier, A.: Identification, characterization, and partial purification of 4 α -carboxysterol-C3-dehydrogenase/C4-decarboxylase from *Zea mays*. *Arch. Biochem. Biophys.*, 366 (1999) 249-260.

See also 504.

13e. Bile acids and alcohols

- 534 Sasaki, T., Wakabayashi, M., Yamaguchi, T., Kasuga, Y., Nagatsuma, M., Iida, T. and Nambara, T.: Separation of double conjugate of bile acids by two-dimensional high-performance thin-layer chromatography with tetra-*n*-butylammonium phosphate and methyl β -cyclodextrin. *Chromatographia*, 49 (1999) 681-685.

13g. Other steroids

- 535 Kamano, Y., Kotake, A., Nogawa, T., Tozawa, M. and Pettit, G.R.: Application of displacement thin-layer chromatography to toad-poison bufadienolides. *J. Planar Chromatogr.*, 12 (1999) 120-123.

14. STEROID GLYCOSIDES AND SAPONINS

- 536 Arun, P., Ravikumar, A., Leelamma, S. and Kurup, P.A.: Identification and estimation of endogenous digoxin in biological fluids and tissues by TLC and HPLC. *Indian J. Biochem. Biophys.*, 35 (1998) 308-312; *C.A.*, 130 (1999) 217539.

See also 612, 619.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. Terpenes

- 537 Couto, A.S., Kimura, E.A., Peres, V.J., Uhrig, M. and Katzin, A.M.: Active isoprenoid pathway in the intra-erythrocytic stages of *Plasmodium falciparum*: presence of dolichols of 11 and 12 isoprene units. *Biochem. J.*, 341 (1999) 629-637. *C.A.*, 130 (1999) 239600.
- 538 Glasl, S., Kastner, U., Jurenitsch, J. and Kubelka, W.: Qualitative and quantitative determination of sesquiterpenoids in *Achillea* species by reversed-phase high-performance liquid chromatography, mass-spectrometry and thin-layer chromatography. *J. Chromatogr. B*, 729 (1999) 361-368.

See also 561.

16. NITRO AND NITROSO COMPOUNDS

- 539 Bladek, J., Rostowski, A. and Miszczak, M.: A specific method for detection and quantitation of nitrate esters in environmental samples. *Proc. Int. Pyrotech. Semin.*, 23rd, (1997) 105-111; *C.A.*, 130 (1999) 239600.
- 540 Domanski, W. and Makles, Z.: (Identification of some N-nitrosamines by thin-layer chromatography). *Chem. Inz. Ekol.*, 5 (1998) 563-569; *C.A.*, 130 (1999) 226724.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. Amines and polyamines

- 541 Kurbatova, S.V., Moiseev, I.K., Kudryashov, S.Yu., Yashkin, S.N. and Postnikova, I.V.: Chromatographic examination of the intermediate products of midantane synthesis. *J. Anal. Chem.*, 54 (1999) 75-77; *C.A.*, 130 (1999) 301786.
- 542 Pielesz, A., Swierczek, S., Wlochowicz, A. and Baranowska, I.: Adsorption and partition TLC separation of MAK-type aromatic amines, reduction products of azo dyes. *J. Planar Chromatogr.*, 12 (1999) 215-220.

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

- 543 Bieganowska, M.L. and Rompala, A.: Retention behavior of some phenoxyacetic acid derivatives on silica gel and diol bonded silica gel HPTLC precoated plates. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1443-1456.

- 544 Wang, Q.S., Zhang, L., Yang, H.Z. and Liu, H.Y.: Lipophilicity determination of some potential photosystem II inhibitors on reversed-phase high-performance thin-layer chromatography. *J. Chromatogr. Sci.*, 37 (1999) 41-44.
- See also 605.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18a. *Amino acids and their derivatives*
- 545 Bhushan, R. and Joshi, S.: TLC separation of amino acids on silica gel layers impregnated with different anions. *Int. J. Bio-Chromatogr.*, 4 (1998) 95-100; *C.A.*, 130 (1999) 217299.
- 546 Mounsey, J.P., Lu, K.P., Patel, M.K., Chen, Z.-h., Horne, L.T., John, J.E., III, Means, A.R., Jones, L.R. and Moorman, J.R.: Modulation of *Xenopus* oocyte-expressed phospholemman-induced ion currents by co-expression of protein kinases. *Biochim. Biophys. Acta*, 1451 (1999) 305-318.
- 547 Yokogawa, K., Higashi, Y., Tamai, I., Nomura, M., Hashimoto, N., Nikaido, H., Hayakawa, J.-I., Miyamoto, K.-I. and Tsuji, A.: Decreased tissue distribution of L-carnitine in juvenile visceral steatotic mice. *J. Pharmacol. Exp. Ther.*, 289 (1999) 224-230.
- See also 478, 486.
- 18b. *Peptides, peptidic and proteinous hormones, growth factors*
- 548 Boone, A.N., Rodrigues, B. and Brownsey, R.W.: Multiple-site phosphorylation of the 280 kDa isoform of acetyl-CoA carboxylase in rat cardiac myocytes: evidence that cAMP-dependent protein kinase mediates effects of β -adrenergic stimulation. *Biochem. J.*, 341 (1999) 347-354.
- 549 Davis, P.K. and Johanson, G.U.W.: Energy metabolism and protein phosphorylation during apoptosis: a phosphorylation study of tau and high-molecular-weight tau in differentiated PC12 cells. *Biochem. J.*, 340 (1999) 51-58.
- 550 Emaduddin, M., Ekman, S., Rönstrand, L. and Heldin, C.-H.: Functional co-operation between the subunits in heterodimeric platelet-derived growth factor receptor complexes. *Biochem. J.*, 341 (1999) 523-528.
- 551 Mincsovcics, E. and Dibó, G.: Rapid screening of synthetic peptides by use of the personal OPLC system. *J. Planar Chromatogr.*, 12 (1999) 150-151.
- 552 Nagahara, H., Latek, R.R., Ezhevsky, S.A. and Dowdy, S.F.: 2-D Phosphopeptide mapping. *Methods Mol. Biol.*, 112 (1999) 271-279; *C.A.*, 130 (1999) 193922.
- 553 Pelander, A., Ojanpera, I. and Vuori, E.: Analysis of cyanobacterial hepatotoxins by overpressured layer chromatography. *J. Planar Chromatogr.*, 11 (1998) 365-369; *C.A.*, 130 (1999) 206021.
- 18c. *Elucidation of structure of proteins and enzymes*
- 554 Tsuruta, H. and Aizono, Y.: Enzymatical properties of psychrophilic phosphatase I. *J. Biochem. (Tokyo)*, 125 (1999) 690-695.
19. PROTEINS
- 19d. *Microbial and plant proteins*
- 555 Ollesch, G., Kaunzinger, A., Juchelka, D., Schubert-Zsilavecs, M. and Ermiler, U.: Phospholipid bound to the flavohemoprotein from *Alcaligenes eutrophus*. *Eur. J. Biochem.*, 262 (1999) 396-405.
- 19l. *Specific binding and receptor proteins*
- 556 Gasymov, O.K., Abduragimov, A.R., Yusifov, T.N. and Glasgow, B.J.: Binding studies of tear lipocalin: the role of the conserved tryptophan in maintaining structure, stability and ligand affinity. *Biochim. Biophys. Acta*, 1433 (1999) 307-320.
20. ENZYMES AND ENZYME ACTIVITY ESTIMATION
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*
- See 554.
21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. *Purines, pyrimidines, nucleosides, nucleotides*
- 557 Mita, M., Yoshikuni, M. and Nagahama, Y.: 1-Methyladenine production from ATP by starfish ovarian follicle cells. *Biochim. Biophys. Acta*, 1428 (1999) 13-20.
- See also 487.
22. ALKALOIDS
- 558 Golkiewicz, W. and Gadzikowska, M.: Isolation of some quaternary alkaloids from the extract of roots of *Chelidonium majus* L. by column and thin-layer chromatography. *Chromatographia*, 50 (1999) 52-56.
- 559 Jamshidi, A., Adjadi, M., Shahmiri, S., Masoumi, A., Husain, S.W. and Mahmoodian, M.: A new high performance thin-layer chromatography (HPTLC) method for determination of theophylline in plasma. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1579-1587.
- 560 Lairini, Kh. and Ruiz-Rubio, M.: Detoxification of α -tomatine by *Fusarium colani*. *Mycol. Res.*, 102 (1998) 1375-1380; *C.A.*, 130 (1999) 193454.
- 561 Srivastava, S.K., Desai, H.K., Viobalaboina, V. and Pelletier, S.W.: Separation of diterpenoid alkaloids by high performance centrifugal partition chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1687-1697.
- 562 Tames, F., Watson, I.D., Morden, W. and Wilson, I.D.: Detection and identification of morphine in urine extracts using thin-layer chromatography and tandem mass spectrometry. *J. Chromatogr. B*, 729 (1999) 341-346.

- 563 Tanaka, H., Putalun, W. and Shoyama, Y.: Western blotting of steroidal alkaloid glycosides using monoclonal antibody against solamargine. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1503-1512.
- 564 Wei, H., Li, Z.-Z. and Wang, S.-Y.: (Determination of ephedrine in Xiaoqinglong granules by MTLC-scanning). *Zhongguo Yiyao Gongye Zazhi*, 30 (1999) 23-25; C.A., 130 (1999) 201009.
- See also 487.
23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN
- 23e. *Other N-heterocyclic compounds*
- 565 Csiktusnadi-Kiss, G.A., Forgacs, E., Markuszewski, M. and Balogh, S.: Application of multivariate mathematical-statistical methods to compare reversed-phase thin-layer and liquid chromatographic behavior of tetrazolium salts in quantitative structure-retention relationships (QSRR) studies. *Analisis*, 26 (1998) 400-406; C.A., 130 (1999) 261202.
24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)
- 566 Rodrigo, G.A., Robinsohn, A.E. and Fernandez, B.M.: Advantages of rotation planar chromatography in the separation of a benzothiazinone from other reaction products. *J. Planar Chromatogr.*, 12 (1999) 225-227.
25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)
- See 499, 507, 552.
26. ORGANOMETALLIC AND RELATED COMPOUNDS
- 26c. *Coordination compounds*
- 567 Burger, K.N.J., Staffhorst, R.W.H.M. and de Kruijff, B.: Interaction of the anti-cancer drug cisplatin with phosphatidylserine in intact and semi-intact cells. *Biochim. Biophys. Acta*, 1419 (1999) 43-54.
- 568 Lederer, M. and Leipzig-Pagani, E.: Thin layer chromatographic and electrophoretic study of mixed chlorothiocyanato and chloro-selenocyanato complexes of platinum(IV). *Anal. Chim. Acta*, 391 (1999) 315-319.
- 569 Milojkovic-Opsenica, D.M., Malinar, M.J. and Tesic, Z.Lj.: Effect of the chelate ring size of diamine-Co(III) complexes on their hR_F values obtained under salting-out thin-layer chromatography conditions. *J. Chromatogr. A*, 847 (1999) 291-296.
- 570 Tesic, Z.Lj., Baotic, R.M. and Milojkovic-Opsenica, D.M.: Thin-layer chromatography of mixed tris- β -diketonato metal complexes on polyacrylonitrile sorbent. *J. Chromatogr. A*, 847 (1999) 303-307.
- 571 Tesic, Z.Lj., Sabo, T.J., Trifunovic, S.R. and Milojkovic-Opsenica, D.M.: Thin-layer chromatography of *facial* and *meridional* isomers of Co(III) and Cr(III) complexes on polyacrylonitrile sorbent. *J. Chromatogr. A*, 847 (1999) 297-301.
27. VITAMINS AND VARIOUS ANIMAL GROWTH FACTORS (NON-PEPTIDIC)
- 572 Bhushan, R. and Parshad, V.: Improved separation of vitamin B complex and folic acid using some new solvent systems and impregnated TLC. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1607-1623.
28. ANTIBIOTICS
- 573 Dhanesar, S.C.: Quantitation of antibiotics by densitometry on a hydrocarbon-impregnated silica gel HPTLC plate. Part III. Quantitation and evaluation of cephalosporins. *J. Planar Chromatogr.*, 12 (1999) 114-119.
- 574 Dhanesar, S.C.: Quantitation of antibiotics by densitometry on a hydrocarbon-impregnated silica gel HPTLC plate. Part IV. Quantitation and evaluation of penicillins. *J. Planar Chromatogr.*, 12 (1999) 180-185.
- 575 Misztal, G.: Thin-layer reversed-phase ion-pair chromatography of some cephalosporins. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1589-1598.
- 576 Tatsuta, K., Nagai, T., Mase, T. and Tamura, T.: Absolute and atropisomeric structure of E5-242s, N-methyl-D-aspartate receptor antagonist. *J. Antibiot.*, 52 (1999) 433-436.
29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS
- 29a. *General techniques*
- 577 Muzhanovsky, E.B., Fartushnyi, A.F. and Sukhin, A.P.: (Identification of some new pesticides in biological material). *Sud.-Med. Ekspert.*, 41 (1998) 20-22; C.A., 130 (1999) 178421.
- 578 Sherma, J.: Pesticides residue analysis: 1997-1998. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 561-574 - a review with 231 refs.
- 579 Soczewinski, E. and Tuzimski, T.: Chemometric characterization of the R_F values of pesticides for thin-layer chromatographic systems of the type silica + weakly polar diluent-polar modifier. Part II. *J. Planar Chromatogr.*, 12 (1999) 186-189.
- 29b. *Chlorinated insecticides*
- 580 Berny, P.J., Buronfosse, F., Videmann, B. and Buronfosse, T.: Evaluation of the toxicity of imidacloprid in wild burds. A new high performance thin-layer chromatography (HPTLC) method for the analysis of liver and crop samples in suspected poisoning cases. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1547-1559.

29e. *Herbicides*

- 581 Neicheva, A., Bogdanova, A. and Konstantinova, T.: Thin-layer chromatographic study of the synthesis of some unsaturated chlorotriazine derivatives with herbicidal activity. *J. Planar Chromatogr.*, 12 (1999) 145-149.

29f. *Fungicides*

For additional information see C.A.:
130 (1999) 178697.

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

See 605.

30. SYNTHETIC AND NATURAL DYES

30a. *Synthetic dyes*

- 582 Calimente, D.S., Strand, Sh.M., Chang, Sh.-Ch. and Lewis, D.E.: The preparation of a fluorescent dye: a microscale TLC experiment. *J. Chem. Educ.*, 76 (1999) 82-83; C.A., 130 (1999) 222719.
- 583 Rozylo, J.K. and Siembida, R.: OPLC analysis of food dyestuffs. *Chem. Environ. Res.*, 6 (1997) 49-55; C.A., 130 (1999) 295650.
- 584 Shtykov, S.N., Sumina, E.G., Smushkina, E.V. and Tyurina, N.V.: Normal- and reversed-phase thin-layer chromatography of fluorescein dyes with aqueous micellar solutions as mobile phase. *J. Planar Chromatogr.*, 12 (1999) 129-134.
- 585 Ushida, S. and Tanigami, T.: (A simple method for discriminating between natural indigo dyeing and synthetic indigo dyeing by means of TLC). *Nippon Kasei Gakkaishi*, 49 (1998) 1129-1130; C.A., 130 (1999) 210719.

30b. *Chloroplast and other natural pigments*

- 586 Kaga, T.: (Various topics on experiment of separation of assimilated pigments by silica gel). *Iden, Bessatsu*, 10 (1998) 113-116; C.A., 130 (1999) 182022.

See also 493, 585.

32. DRUG ANALYSIS

32a. *Drug analysis, general techniques*

- 587 Brzezinka, H., Dallakian, P. and Budzikiewicz, H.: Thin-layer chromatography and mass spectrometry for screening of biological samples for drugs and metabolites. *J. Planar Chromatogr.*, 12 (1999) 96-108.

See also 625.

32b. *Antirheumatics and antiinflammatory drugs*

- 588 Argekar, A.P. and Sawant, J.G.: Determination of nimesulide in pharmaceutical dosage forms by HPTLC. *J. Planar Chromatogr.*, 12 (1999) 152-154.
- 589 Bartsch, H., Eiper, A., Habiger, K. and Kopelent-Frank, H.: Comparison of analytical methods for investigating the photostability of isoxicam. *J. Chromatogr. A*, 846 (1999) 207-216.
- 590 Hercegova, A. and Polonsky, J.: Determination of non-steroidal anti-inflammatory drugs in biological fluids. *Pharmazie*, 54 (1999) 479-486 - a review with 73 refs.
- 591 Klebovich, I., Mincsovcics, E., Szunyog, J., Ludanyi, K., Karancsi, T., Ujszaszy, K., Kiss, B.D. and Vekey, K.: Isolation and identification of metabolites of 3H- and 14C-deramiclone by OPLC-digital autoradiography online sample collection and mass spectrometry. *J. Planar Chromatogr.*, 11 (1998) 394-399; C.A., 130 (1999) 177059.
- 592 Li, G., An, J., He, J. and Yun, K.: (Determination of acetaminophen in serum with thin-layer chromatography scanning method). *Zhongguo Yiyuan Yaoxue Zazhi*, 18 (1998) 452-453; C.A., 130 (1999) 204626.

32c. *Autonomic and cardiovascular drugs*

- 593 Argekar, A.P. and Sawant, J.G.: Simultaneous determination of atenolol and nitrendipine in pharmaceutical dosage forms by HPTLC. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1571-1578.
- 594 Kopelent-Frank, H. and Schimper, A.: HPTLC-based stability assay for the determination of amiodarone in intravenous admixtures. *Pharmazie*, 54 (1999) 542-544.
- 595 Mukai, H., Watanabe, S. and Morino, A.: Pharmacokinetics of NS-49, a phenethylamine class α_{1A} -adrenoceptor agonist. 1st Communication: Absorption and excretion in rats after a single administration of ^{14}C -NS-49. *Arzneim.-Forsch.*, 49 (1999) 434-440.
- 596 Mukai, H., Watanabe, S. and Morino, A.: Pharmacokinetics of NS-49, a phenethylamine class α_{1A} -adrenoceptor agonist. 3rd Communication: Metabolism in rats, rabbits, dogs and monkeys, and effects on hepatic drug-metabolizing enzyme activities in rats after repeated administration. *Arzneim.-Forsch.*, 49 (1999) 612-617.
- 597 Novakovic, J., Nova, H. and Filka, K.: In-process control and process parametric assessment of isosorbide 5-mononitrate pharmaceuticals. *J. Planar Chromatogr.*, 12 (1999) 161-164.
- 598 Süedee, R., Srichana, T., Sealim, J. and Thavornpibulbut, T.: Chiral determination of various adrenergic drugs by thin-layer chromatography using molecularly imprinted chiral stationary phases prepared with α -agonists. *Analyst (Cambridge)*, 124 (1999) 1003-1009.
- 599 Witek, A., Hopkala, H. and Matysik, G.: TLC-densitometric determination of bisoprolol, labetalol and propafenone, as dabsyl derivatives, in pharmaceutical preparations. *Chromatographia*, 50 (1999) 41-44.

32d. *Central nervous system drugs*

- 600 DiGregorio, D. and Sherma, J.: Analysis of the active ingredient magnesium salicylate in analgesic tablets by HPTLC with ultraviolet absorption densitometry. *J. Planar Chromatogr.*, 12 (1999) 230-232.
- 601 DiGregorio, D. and Sherma, J.: Determination of the sleep aid ingredients diphenhydramine hydrochloride and doxylamine succinate in pharmaceutical products by quantitative HPTLC. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1599-1606.
- 602 Lambroussi, V., Piperaki, S. and Tsantili-Kakoulidou, A.: Formation of inclusion-complexes between cyclodextrins, as mobile-phase additives in RPTLC, and fluoxetine, norfluoxetine and promethazine. *J. Planar Chromatogr.*, 12 (1999) 124-128.

See also 480, 484, 608.

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

- 603 Argekar, A.P. and Sawant, J.G.: Simultaneous determination of ciprofloxacin hydrochloride and tinidazole in tablets by HPTLC. *J. Planar Chromatogr.*, 12 (1999) 202-206.
- 604 Tønnesen, H.H.: Photoreactivity of biologically active compounds. XV. Photochemical behaviour of mefloquine in aqueous solution. *Pharmazie*, 54 (1999) 590-594.

32f. *Cytostatics*

See 567.

32g. *Other drug categories*

- 605 Markovic, G., Agbaba, D., Stacic, D.Z. and Vladimirov, S.: Determination of some insect repellents in cosmetic products by high-performance thin-layer chromatography. *J. Chromatogr. A*, 847 (1999) 365-368.
- 606 Novakovic, J.: High-performance thin-layer chromatography for the determination of ranitidine hydrochloride and famotidine in pharmaceuticals. *J. Chromatogr. A*, 846 (1999) 193-198.
- 607 Sane, R.T., Joshi, S.G., Francis, M., Khatri, A.R. and Hijli, P.: High-performance thin-layer chromatographic determination of azelastine hydrochloride. *J. Planar Chromatogr.*, 12 (1999) 158-160.

See also 596.

32h. *Toxicological and forensic applications*

- 608 Matsunaga, T.: (Discrimination of cannabis seeds). *Jpn. J. Forensic Toxicol.*, 16 (1998) 124-127; C.A., 130 (1999) 206033.

See also 502, 580, 587.

32i. *Plant extracts*

- 609 Chauhan, S.K., Singh, B.P., Kimothi, G.P. and Agarwal, S.: Determination of andrographolide in *Andrographis paniculata* by high-performance thin-layer chromatography. *Indian Drugs*, 36 (1999) 130-132; C.A., 130 (1999) 200991.

- 610 Gong, F., Peng, Y.-G., Cui, H., Liang, Y.-Z., Alexander, K.M.L. and Foo-Tim, C.: (HELP applied to traditional Chinese medicine analysis - determination of components of *Cordyceps sinensis*). *Gaodeng Xuexiao Huaxue Xuebao*, 20 (1999) 199-203; C.A., 130 (1999) 213728.
- 611 Gupta, A.P., Gupta, M.M. and Kumar, S.: Simultaneous determination of curcuminoids in Curcuma samples using high performance thin-layer chromatography. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1561-1569.
- 612 Kim, S.-K., Kwak, Y.-S., Kim, S.-W., Hwang, S.-Y., Ko, Y.-S. and Yoo, Ch.-M.: (Improved method for preparation of crude ginseng saponin). *J. Ginseng Res.*, 22 (1998) 155-160; C.A., 130 (1999) 301548.
- 613 Lin, Q., Huang, J. and Xie, P.: (TLC assay of silybin in lipotropic complex capsule). *Guangdong Yaoxueyuan Xuebao*, 14 (1998) 250-252; C.A., 130 (1999) 257419.
- 614 Lu, Z. and Ye, L.: (Determination of puerarin in Skukang cream by TLC scanning). *Guangdong Yaoxueyuan Xuebao*, 14 (1998) 265-267; C.A., 130 (1999) 201005.
- 615 Ni, S., Zhao, P., Zheng, Y. and Hu, Y.: (Determination of astragaloside in Fuzheng capsules by TLC scanning). *Zhongguo Yaoxue Zazhi (Beijing)*, 34 (1999) 45-47; C.A., 130 (1999) 257402.
- 616 Pachaly, P.: (Essential oils of Rosa. Thin-layer chromatography). *Dtsch. Apoth. Ztg.*, 139 (1999) 1378-1379; C.A., 130 (1999) 272101.
- 617 Qian, H. and Xie, P.: (Analysis of harpagoside in Devil claw extract and tablets by TLC). *Zhongguo Zhongyao Zazhi*, 23 (1998) 726-729; C.A., 130 (1999) 242377.
- 618 Tan, Y., Wu, S., Jiang, Y. and Zeng, R.: (Identification of *Hedyotis diffusa*, rhizoma *Corydalis yanhusuo* and rhizoma *Alpinia officinarum* in Weiyanting capsule by TLC). *Huaxi Yaoxue Zazhi*, 13 (1998) 265-266; C.A., 130 (1999) 213711.
- 619 Zhang, Z., Yang, Y., Luo, J., Li, H. and Wang, X.: (Determination of ginsenoside Rg1 in Guilingji (Longevity powder) by thin-layer chromatographic scanning). *Yaowu Fenxi Zazhi*, 19 (1999) 13-15; C.A., 130 (1999) 301765.

See also 493, 494, 498, 505, 608.

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

- 620 Sun, B., Liu, D. and Zhan, L.: (Rapid method for determination of chlordimeform residue in honey). *Sepu*, 17 (1999) 93-94; C.A., 130 (1999) 295690.

See also 520, 622.

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

See 539.

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

See 539.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

36a. *Surfactants*

621 Simunic, S. and Soljic, Z.: Water as a detecting agent in thin-layer chromatography of surfactants. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1247-1256.

36b. *Antioxidants and preservatives*

622 Von Woedtke, T., Schlüter, B., Pfliegel, P., Lindequist, U. and Jülich, W.-D.: Aspects of the antimicrobial efficacy of grapefruit extract and its relation to preservative substances contained. *Pharmazie*, 54 (1999) 452-456.

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

623 Lozano, P., Pioch, D. and Vaitilingom, G.: Lubricant analysis: Investigation of crankcase lubricant. *J. Planar Chromatogr.*, 12 (1999) 228-229.

624 Yang, H., Chao, R. and Wang, D.: (Quantitative determination of stachydrine in Huisheng oral liquid by TLC scanning). *Huaxi Yaoxue Zazhi*, 13 (1998) 263-264; *C.A.*, 130 (1999) 201001.

38. INORGANIC COMPOUNDS

38a. *Cations*

625 Mancini, M.A.D., Netto, J.Z. and de Souza Valladao, D.M.: (Separation and identification of cations in pharmaceutical preparations by thin-layer chromatography). *Rev. Cienc. Farm.*, 19 (1998) 119-127; *C.A.*, 130 (1999) 187270.

626 Mohammad, A., Tiwari, S., Yusuf, R. and Chahar, J.P.S.: Progress in thin-layer chromatography of d-block elements and their anions. *Chem. Environ. Res.*, 7 (1998) 3-46; *C.A.*, 130 (1999) 305634 - a review with 293 refs.

627 Patel, M., Owunwanne, A., Tuli, M., Al-Za'abi, Zh., Al-Mohannadi, Sh., Sa'ad, M., Jahan, Sh., Jacob, A. and Al-Bunny, A.: Modified preparation and rapid quality control test for technetium-99m-tetroformin. *J. Nucl. Med. Technol.*, 26 (1998) 269-273; *C.A.*, 130 (1999) 301783.

For additional information see *C.A.*:

130 (1999) 233399, 256540.

38b. *Anions*

628 Soljic, Z.: Sorption of acids and formation of hydrogen ion and anion fronts on a thin layer. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1805-1811.

See also 626.

39. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

See 476, 627.

Gel Electrophoresis

1. REVIEWS AND BOOKS

See 2254, 2256, 2259, 2263, 2300, 2346, 2352, 2457, 2476, 2610, 2689, 2707, 2788, 2804, 2851, 2884.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

2184 Deshpande, M., Ghaddar, Ch., Gilbert, J.R., St. John, P.M., Woudenberg, T., Connell, C., Molho, J., Herr, A., Mungal, G. and Kenny, T.: Numerical framework for the modeling of electrokinetic flow. *Proc. SPIE-Int. Soc. Opt. Eng.*, 3515 (1998) 217-227; *C.A.*, 130 (1999) 302166.

2d. Measurement of physico-chemical and related values

See 2509.

3. GENERAL TECHNIQUES

3b. Detectors and detection procedures

2185 Matsui, N.M., Smith-Beckerman, D.M. and Epstein, L.B.: Staining of preparative 2-D gels: Coomassie Blue and imidazole-zinc negative staining. *Methods Mol. Biol.*, 112 (1999) 307-311; *C.A.*, 130 (1999) 193787.

2186 Patton, W.F., Lim, M.J. and Shepro, D.: Protein detection using reversible metal chelate stains. *Methods Mol. Biol.*, 112 (1999) 331-339; *C.A.*, 130 (1999) 193788.

For additional information see *C.A.*:
130 (1999) 210846.

See also 2255, 2413.

3c. Stabilization media for electrophoresis

2187 Zewert, T.E. and Harrington, M.G.: Cross-linked poly(N-acetylenimine) as an isoelectric focusing matrix. *Electrophoresis (Weinheim)*, 20 (1999) 1339-1348.

For additional information see *C.A.*:
130 (1999) 193955, 249103, 252807, 263109, 277628.

See also 2268, 2376, 2792.

3e. Preparative scale electrophoresis

See 2185, 2206, 2572.

4. SPECIAL TECHNIQUES

4a. Automation

2188 Gombocz, E. and Cortez, E.: Carrier ampholytes rehabilitated: gel isoelectric focusing on pH gradients visualized in real-time by automated fluorescence scanning in the HPGE-1000 apparatus. *Electrophoresis (Weinheim)*, 20 (1999) 1365-1372.

4b. Computerization and modelling

2189 Appel, R.D. and Hochstrasser, D.E.: Computer analysis of 2-D images. *Methods Mol. Biol.*, 112 (1999) 363-381; *C.A.*, 130 (1999) 193865.

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

See 2192, 2249, 2254, 2265, 2309, 2329.

4e. Two dimensional databases

2190 Appel, R.D., Hoogland, Ch., Bairoch, A. and Hochstrasser, D.F.: Constructing a 2-D database for the World Wide Web. *Methods Mol. Biol. (Totowa)*, 112 (1999) 411-416; *C.A.*, 130 (1999) 234247.

2191 Hoogland, Ch., Sanchez, J.-Ch., Tonella, L., Bairoch, A., Hochstrasser, D.F. and Appel, R.D.: The SWISS-2DPAGE database: what has changed during the last year. *Nucleic Acids Res.*, 27 (1999) 289-291; *C.A.*, 130 (1999) 281494.

See also 2352, 2478.

4f. Isoelectric focusing

See 2329, 2888.

4h. Two dimensional electrophoresis

2192 Bateman, R.H., Blackstock, W., Bordoli, R.S., Gilbert, A.J., Hoyes, J.B., Langridge, J. and Ward, M.: Protein characterization using 2D gel electrophoresis with nanospray MS and MS/MS on a Q-TOF. *Adv. Mass Spectrom.*, 14 (1998) C015050/1-C015050/10; *C.A.*, 130 (1999) 234251.

2193 Celis, J.E. and Gromov, P.: 2D Protein electrophoresis: can it be perfected? *Curr. Opin. Biotechnol.*, 10 (1999) 16-21; *C.A.*, 130 (1999) 293505.

2194 Lemkin, P.F.: Comparing 2-D electrophoretic gels across Internet databases. *Methods Mol. Biol. (Totowa)*, 112 (1999) 393-410; *C.A.*, 130 (1999) 234246.

For additional information see *C.A.*:
130 (1999) 277343.

See also 2185, 2189, 2197, 2208, 2223, 2247, 2249, 2250, 2251, 2252, 2255, 2257, 2258, 2263, 2264, 2276, 2281, 2290, 2293, 2300, 2307, 2314, 2315, 2318, 2323, 2324, 2343, 2346, 2348, 2349, 2351, 2352, 2373, 2391, 2403, 2418, 2438, 2442, 2444, 2478, 2481, 2493, 2683, 2825, 2897.

4i. Other special techniques

2195 Park, Y.-G.: (Separation of large ionic molecules by electrofiltration). *J. Korean Electrochem. Soc.*, 1 (1998) 18-23; C.A., 130 (1999) 298524.

See also 2685, 2898.

7. PHENOLS

For additional information see C.A.:
130 (1999) 293949.

See also 2885.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

For additional information see C.A.:
130 (1999) 221624.

See also 2209.

10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

2196 Cavalcante, M.C.M., Mourão, P.A.S. and Pavão, M.S.G.: Isolation and characterization of a highly sulfated heparan sulfate from ascidian test cells. *Biochim. Biophys. Acta*, 1428 (1999) 77-87.

2197 Dang, C., Qin, Z., Ji, Z., Li, Y., Zhao, J. and Tian, M.: (Comparative analysis of glycosaminoglycans in normal and carcinomas pancreatic tissues). *Xi'an Yike Daxue Xuebao*, 19 (1998) 434-436, 451; C.A., 130 (1999) 180749.

2198 Dietrich, C.P., Paiva, J.F., Castro, R.A.B., Chavante, S.F., Jeske, W., Fareed, J., Gorin, P.A.J., Mendes, A. and Nader, H.B.: Structural features and anticoagulant activities of a novel natural low molecular weight heparin from the shrimp *Panaeus brasiliensis*. *Biochim. Biophys. Acta*, 1428 (1999) 273-283.

2199 Hiebert, L.M., Wice, S.M., Jacques, L.B., Williams, K.E. and Conly, J.M.: Orally administered dextran sulfate is absorbed in HIV-positive individuals. *J. Lab. Clin. Med.*, 133 (1999) 161-170; C.A., 130 (1999) 291060.

2200 Suda, Y., Mori, K., Bird, K., Marques, D., Ormsby, J., Tanaka, S., Koshida, S., Nakamura, M., Kusumoto, S. and Sobel, M.: A novel crosslinking reagent and its application for the detection and isolation of heparin-binding protein(s) on the platelet surface. *J. Biochem. (Tokyo)*, 125 (1999) 1011-1015.

10c. Glycoproteins and their constituents

2201 Babál, P., Pindak, F.F., Russell, L.C. and Gardner, W.A., Jr.: Sialic acid-specific lectin from *Tritrichomonas foetus*. *Biochim. Biophys. Acta*, 1428 (1999) 106-116.

2202 Bouchez-Mehiout, I., Doyen, C. and Laurière, M.: Accurate detection of both glycoproteins and total proteins on blots: control of side reactions occurring after periodate oxidation of proteins. *Electrophoresis (Weinheim)*, 20 (1999) 1412-1417.

2203 De Faire, J.: Antimicrobial compositions containing active proteins. PCT Int. Appl. WO 9909835 A1 4 Mar 1999, 14 pp.; C.A., 130 (1999) 213631.

2204 Gu, Q.-q., Fang, Y.-c., Eang, Ch.-y., Xiao, H. and Qin, Y.-q.: Studies on the antitumor activity and isolation of the glycoprotein from the gonad of *Chlamys (Azumapecten) farreri*. *Chin. J. Oceanol. Limnol.*, 16 (1998) 359-363; C.A., 130 (1999) 265035.

2205 Herndon, M.E., Stipp, Ch.S. and Lander, A.D.: Interactions of neural glycosaminoglycans and proteoglycans with protein ligands: assessment of selectivity, heterogeneity and the participation of core proteins in binding. *Glycobiology*, 9 (1999) 143-155; C.A., 130 (1999) 278226.

2206 Kongtawelert, P.: Isolation and characterization of lectin from Thai marine crab (*Scylla serrata*) with binding specificity to sialoglycoconjugates and its application. *Mol. Mar. Biol. Biotechnol.*, 7 (1998) 280-286; C.A., 130 (1999) 206890.

2207 Masaoka, H., Shibata, K. and Yamaguchi, H.: Topological and functional characterization of the N-glycans of soybean (*Glycine max*) agglutinin. *J. Biochem. (Tokyo)*, 126 (1999) 212-217.

2208 Miyoshi, E. and Taniguchi, N.: (Biological significance of α 1-6 fucosyltransferase in hepatoma and hepatocarcinogenesis). *Seibutsu Butsuri Kagaku*, 42 (1998) 225-231; C.A., 130 (1999) 221237.

2209 Morimoto, K., Maeda, N., Abdel-Alim, A.F., Toyoshima, S. and Hayakawa, T.: Structural characterization of recombinant human erythropoietins by fluorophore-assisted carbohydrate electrophoresis. *Biol. Pharm. Bull.*, 22 (1999) 5-10; C.A., 130 (1999) 264302.

2210 Oda, T., Shinmura, N., Nishioka, Y., Komatsu, N., Hatakeyama, T. and Muramatsu, T.: Effect of the hemolytic lectin CEL-III from holothuroidea *Cucumaria echinata* on the ANS fluorescence responses in sensitive MDCK and resistant CHO cells. *J. Biochem. (Tokyo)*, 125 (1999) 713-720.

2211 Olczak, T., Olczak, M., Dereniowska, M., Strzelczyk, R. and Kubicz, A.: Alterations of the sugar moiety of Tamm-Horsfall protein in children with malignancies of lymphoid cells. *Electrophoresis (Weinheim)*, 20 (1999) 1382-1389.

2212 Seyama, K., Osborne, W.R.A. and Ochs, H.D.: CD40 ligand mutants responsible for X-linked hyper-IgM syndrome associate with wild type CD40 ligand. *J. Biol. Chem.*, 274 (1999) 11310-11320.

2213 Sugimoto, K., Takahashi, M., Yamamoto, Y., Shimada, K. and Tanzawa, K.: Identification of aggrecanase activity in medium of cartilage culture. *J. Biochem. (Tokyo)*, 126 (1999) 449-455.

2214 Tams, J.W., Vind, J. and Welinder, K.G.: Adapting protein solubility by glycosylation. N-Glycosylation mutants of *Coprinus cinereus* peroxidase in salt and organic solutions. *Biochim. Biophys. Acta*, 1432 (1999) 214-221.

2215 Veau, B., Guillot, J., Damez, M., Dusser, M., Konska, G. and Botton, B.: Purification and characterization of an anti-(A+B) specific lectin from the mushroom *Hygrophorus hypothejus*. *Biochim. Biophys. Acta*, 1428 (1999) 39-44.

For additional information see C.A.:
130 (1999) 279244.

See also 2447.

11. ORGANIC ACIDS AND LIPIDS

11c. Lipids and their constituents

2216 Muira, R., Aspberg, A., Ethell, I.M., Hagihara, K., Schnaar, R.L., Ruoslahti, E. and Yamaguchi, Y.: The proteoglycan lectin domain binds sulfated cell surface glycolipids and promotes cell adhesion. *J. Biol. Chem.*, 274 (1999) 11431-11438.

For additional information see C.A.:
130 (1999) 277470.

See also 2725.

11d. Lipoproteins and their constituents

2217 Aleshkov, S.B., Li, X., Lavrentiadou, S.N. and Zannis, V.I.: Contribution of cysteine 158, the glycosylation site threonine 194, the amino- and carboxy-terminal domains of apolipoprotein E in the binding to amyloid peptide β (1-40). *Biochemistry*, 38 (1999) 8918-8925.

2218 Asset, G., Staels, B., Wolff, R.L., Bauge, E., Madj, Z., Fruchart, J.-Ch. and Dallongeville, J.: Effects of *Pinus pinaster* and *Pinus koraiensis* seed oil supplementation on lipoprotein metabolism in the rat. *Lipids*, 34 (1999) 39-44; *C.A.*, 130 (1999) 295979.

2219 Austin, M.A., Stephens, K., Walden, C.E. and Wijsman, E.: Linkage analysis of candidate genes and the small, dense low-density lipoprotein phenotype. *Atherosclerosis (Shannon)*, 142 (1999) 79-87; *C.A.*, 130 (1999) 195158.

2220 Cobbaert, C., Mulder, P.G.H., Baadenhuijsen, H., Zwang, L., Weykamp, C.W. and Demacker, P.N.M.: Survey of total error of precipitation and homogenous HDL-cholesterol methods and simultaneous evaluation of lyophilized saccharose-containing candidate reference materials for HDL-cholesterol. *Clin. Chem. (Washington)*, 45 (1999) 360-370.

2221 Fazio, S., Linton, M.F., Hasty, A.H. and Swift, L.L.: Recycling of apolipoprotein E in mouse liver. *J. Biol. Chem.*, 274 (1999) 8247-8253.

2222 Gruffat-Mouty, D., Graulet, B., Durand, D., Samson-Bouma, M.-E. and Bauchart, D.: Apolipoprotein B production and very low density lipoprotein secretion by calf liver slices. *J. Biochem. (Tokyo)*, 126 (1999) 188-193.

2223 Handwerger, S., Datta, G., Richardson, B., Siddiqi, T., Turzai, L. and Anantharamaiah, G.M.: Pre- β -HDL stimulates placental lactogen release from human trophoblast cells. *Am. J. Physiol.*, 276 (1999) E384-E389; *C.A.*, 130 (1999) 291766.

2224 Hervio, L., Brunner, C., Sorell, L., Kang, C., Müller, H.-J. and Anglés-Cano, E.: Effect of plasminogen activators on human recombinant apolipoprotein(a) having the plasminogen activation cleavage site. *Biochim. Biophys. Acta*, 1434 (1999) 124-134.

2225 Inchley, K., Cockshutt, A., Veldhuizen, R. and Possmayer, F.: Dissociation of surfactant protein B from canine surfactant large aggregates during formation of small surfactant aggregates by *in vitro* surface area cycling. *Biochim. Biophys. Acta*, 1440 (1999) 49-58.

2226 Kaplan, I.V., Hobbs, G.A. and Levinson, S.S.: Simpler technique for measuring oxidative susceptibility by heparin affinity column isolation of lipoproteins. *Clin. Chim. Acta*, 283 (1999) 89-103.

2227 Kashiwagi, S., Nakamura, K., Arai, H., Yamashita, H. and Ito, H.: Electrophoretic analysis of oxidative modification of apolipoprotein E in very low density lipoprotein from fresh human plasma. *Electrophoresis (Weinheim)*, 20 (1999) 1418-1424.

2228 Levy, E., Yotov, W., Seidman, E.G., Garofalo, C., Delvin, E. and Ménard, D.: Caco-2 cells and human fetal colon: a comparative analysis of their lipid transport. *Biochim. Biophys. Acta*, 1439 (1999) 353-362.

2229 Rainwater, D.L.: Stability of apolipoprotein(a) isoform phenotype to postmortem conditions. *Clin. Chim. Acta*, 282 (1999) 59-63.

2230 Ramharack, R., Bocan, T.M.A., Imperiale, M.J. and Spahr, M.A.: Recombinant adenovirus vector mediated expression of lipoprotein (a) [Lp(a)] in rabbit plasma. *Biochim. Biophys. Acta*, 1438 (1999) 322-328.

2231 Shuvaev, V.V., Fujii, J., Kawasaki, Y., Itoh, H., Hamaoka, R., Barbier, A., Ziegler, O., Siest, G. and Taniguchi, N.: Glycation of apolipoprotein E impairs its binding to heparin: identification of the major glycation site. *Biochim. Biophys. Acta*, 1454 (1999) 296-308.

2232 Tanaka, M., Yanagi, H., Ando, R., Kurihara, S., Hirano, Ch., Kobayashi, K., Kikuchi, Sh., Hamaguchi, H., Tsuchiya, Sh. and Tomura, Sh.: Pentanucleotide repeat and size polymorphism in the apolipoprotein(a) gene are associated with the lipoprotein(a) concentration in chronic hemodialysis patients. *Nephron*, 81 (1999) 414-420; *C.A.*, 130 (1999) 265907.

2233 Tauchi, Y., Takase, M., Zushida, I., Chono, S., Sato, J., Ito, K. and Morimoto, K.: Preparation of a complex of dexamethasone palmitate-low density lipoprotein and its effect on foam cell formation of murine peritoneal macrophages. *J. Pharm. Sci.*, 88 (1999) 709-714.

2234 Tleugabulova, D., Falcón, V. and Pentón, E.: Physico-chemical characterization of recombinant hepatitis B surface antigen by a multidimensional approach. *J. Chromatogr. A*, 845 (1999) 171-179.

2235 Wolfbauer, G., Albers, J.J. and Oram, J.F.: Phospholipid transfer protein enhances removal of cellular cholesterol and phospholipids by high-density lipoprotein apolipoproteins. *Biochim. Biophys. Acta*, 1439 (1999) 65-76.

See also 2236.

13. STEROIDS
- 13d. Sterols
- 2236 Contois, J.H., Gillmor, R.G., Moore, R.E., Contois, L.-R.W., Macer, J.L. and Wu, A.H.B.: Quantitative determination of cholesterol in lipoprotein fractions by electrophoresis. *Clin. Chim. Acta*, 282 (1999) 1-14.
17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS
- 17b. Catecholamines and their metabolites
- 2237 Gardana, C., Pietta, P., Ciappellano, S. and Testolin, G.: Determination of histamine in fish products by capillary electrophoresis and ion-pair liquid chromatography with diode-array detection. *J. Sci. Food Agric.*, 79 (1999) 91-94.
- 17d. Other amine derivatives and amides (excl. peptides)
- 2238 Perrone, P., Hewage, Ch.M., Sadler, I.H. and Fry, S.C.: N α - and N ϵ -D-galacturonyl-L-lysine amides: properties and possible occurrence in plant cell walls. *Phytochemistry*, 49 (1998) 1879-1890; *C.A.*, 130 (1999) 194303.
18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS
- 18b. Peptides, peptidic and proteinous hormones, growth factors
- 2239 Boone, A.N., Rodrigues, B. and Brownsey, R.W.: Multiple-site phosphorylation of the 280 kDa isoform of acetyl-CoA carboxylase in rat cardiac myocytes: evidence that cAMP-dependent protein kinase mediate effects of β -adrenergic stimulation. *Biochem. J.*, 341 (1999) 347-354.
- 2240 Brining, S.K., Chen, N., Yi, D. and Chrambach, A.: Gel electrophoretic distinction between toxic and nontoxic forms of beta-amyloid (1-40). *Electrophoresis (Weinheim)*, 20 (1999) 1398-1402.
- 2241 Davis, P.K. and Johnson, G.U.W.: Energy metabolism and protein phosphorylation during apoptosis: a phosphorylation study of tau and high-molecular-weight tau in differentiated PC12 cells. *Biochem. J.*, 340 (1999) 51-58.
- 2242 Emaduddin, M., Ekman, S., Rönstrand, L. and Heldin, C.-H.: Functional co-operation between the subunits in heterodimeric platelet-derived growth factor receptor complexes. *Biochem. J.*, 341 (1999) 523-528.
- 2243 Fujita, T., Maegawa, H., Kashiwagi, A., Hirai, H. and Kikkawa, R.: Opposite regulation of tyrosine-phosphorylation of p130Cas by insulin and insulin-like growth factor I. *J. Biochem. (Tokyo)*, 124 (1998) 1111-1116.
- 2244 González-Yanes, C., Santos-Alvarez, J. and Sánchez-Margalet, V.: Characterization of pancreastatin receptors and signaling in adipocyte membranes. *Biochim. Biophys. Acta*, 1451 (1999) 153-162.
- 2245 Hoover, D.M., Schalk-Hihi, C., Chou, C.-C., Menon, S., Wlodawer, A. and Zdanov, A.: Purification of receptor complexes of interleukin-10. Stoichiometry and the importance of deglycosylation in their crystallization. *Eur. J. Biochem.*, 262 (1999) 134-141.
- 2246 Lu, W., Luo, Y., Kan, M. and McKeehan, W.L.: Fibroblast growth factor-10. A second candidate stromal to epithelial cell andromedin in prostate. *J. Biol. Chem.*, 274 (1999) 12827-12834.
- 2247 Nagahara, H., Latek, R.R., Ezhevsky, S.A. and Dowdz, S.F.: 2-D Phosphopeptide mapping. *Methods Mol. Biol.*, 112 (1999) 271-279; *C.A.*, 130 (1999) 193922.
- 18c. Elucidation of structure of proteins and enzymes
- 2248 Ishimoto, M., Yamada, T. and Kaga, A.: Insecticidal activity of an α -amylase inhibitor-like protein resembling a putative precursor of α -amylase inhibitor in the common bean, *Phaseolus vulgaris* L. *Biochim. Biophys. Acta*, 1432 (1999) 104-112.
- 2249 Jensen, O.N., Wilm, M., Shevchenko, A. and Mann, M.: Sample preparation methods for mass spectrometric peptide mapping directly from 2-DE gels. *Methods Mol. Biol.*, 112 (1999) 513-530; *C.A.*, 130 (1999) 206858.
- 2250 Kamo, M. and Tsugita, A.: N-terminal amino acid sequencing of 2-DE spots. *Methods Mol. Biol.*, 112 (1999) 461-466; *C.A.*, 130 (1999) 193866.
- 2251 Kobayashi, H., Usami, T., Fujisawa, Y., Kano, T., Umeda, T. and Tsunaki, T.: (Comparison of peaks separated by HPLC and spots of 2D electrophoresis of *C. elegans* proteins using MALDI-TOF mass spectrometry of tryptic peptides). *Chromatography*, 19 (1998) 346-347; *C.A.*, 130 (1999) 278883.
- 2252 Maa, M.-C., Lai, J.-R., Lin, R.-W. and Leu, T.-H.: Enhancement of tyrosyl phosphorylation and protein expression of eps8 by v-Src. *Biochim. Biophys. Acta*, 1450 (1999) 341-351.
- 2253 Tao, T., Gong, B.-J., Grabarek, Z. and Gergely, J.: Conformational changes induced in troponin I by interaction with troponin T and actin/tropomyosin. *Biochim. Biophys. Acta*, 1450 (1999) 423-433.
- 2254 Vankova, H.: (Peptide maps). *Chem. Listy*, 93 (1999) 120-127; *C.A.*, 130 (1999) 179429 - a review with 69 refs.
- 2255 Wilkins, M.R., Yan, J.X. and Gooley, A.A.: 2-DE spot amino acid analysis with 9-fluorenylmethyl chloroformate. *Methods Mol. Biol.*, 112 (1999) 445-460; *C.A.*, 130 (1999) 193775.
- See also 2258, 2387, 2397, 2897.
19. PROTEINS
- 19a. General techniques
- 2256 Dent, A.H. and Aslam, M.: The characterization of protein conjugates. In: Aslam, M. and Dent, A.H. (Editors), *Bioconjugation*, Macmillan Reference, London, 1998, pp. 665-734; *C.A.*, 130 (1999) 264153 - a review with 400 refs.
- 2257 Dunn, M.J.: Detection of total proteins on western blots of 2-D polyacrylamide gels. *Methods Mol. Biol.*, 112 (1999) 319-329; *C.A.*, 130 (1999) 193863.

- 2258 Erdjument-Bromage, H., Lui, M., Lacomis, L. and Tempst, P.: Characterizing proteins from 2-DE gels by internal sequence analysis of peptide fragments: strategies for microsample handling. *Methods Mol. Biol.*, 112 (1999) 467-472; *C.A.*, 130 (1999) 193867.
- 2259 Gianazza, E., Miller, I., Eberini, I. and Castiglioni, S.: Low-tech electrophoresis, small but beautiful, and effective: electrophoretic titration curves of proteins. *Electrophoresis (Weinheim)*, 20 (1999) 1325-1338 - a review with 112 refs.
- 2260 Gobl, A.E., Berg, M., Lopez-Egido, J.R., Öberg, K., Skogseid, B. and Westin, G.: Menin represses JunD-activated transcription by a histone deacetylase-dependent mechanism. *Biochim. Biophys. Acta*, 1447 (1999) 51-56.
- 2261 Gorg, A. and Weiss, W.: Horizontal SDS-PAGE for IPG-Dalt. *Methods Mol. Biol.*, 112 (1999) 235-244; *C.A.*, 130 (1999) 193857.
- 2262 Peterson, F.C., Anderson, P.J., Berliner, L.J. and Brooks, Ch.L.: Expression, folding, and characterization of small proteins with increasing disulfide complexity by a pT7-7-derived phagemid. *Protein Expression Purif.*, 15 (1999) 16-23; *C.A.*, 130 (1999) 292192.
- 2263 Stubberfield, C.R. and Page, M.J.: Applying proteomics to drug discovery. *Expert Opin. Invest. Drugs*, 8 (1999) 65-70; *C.A.*, 130 (1999) 204605 - a review with 21 refs.
- 2264 Wakamiya, A., Kaji, H., Taoka, M., Yamakawa, Y., Seta, K. and Isobe, T.: (Structural analysis of micro-quantities of proteins detected by silver-staining of 2D-gels: a method of pre-treatment for mass spectrometric analysis). *Chromatography*, 19 (1998) 344-345; *C.A.*, 130 (1999) 278882.
- 2265 Winters, M.A., Frankel, D.Z., Devenedetti, P.G., Carey, J., Devaney, M. and Przybycien, T.M.: Protein purification with vapor-phase carbon dioxide. *Biotechnol. Bioeng.*, 62 (1999) 247-258; *C.A.*, 130 (1999) 179524.
- For additional information see *C.A.*:
130 (1999) 264298, 264440.
- See also 2186, 2187, 2188, 2192, 2193, 2202, 2255, 2268, 2478, 2485.
- 19b. *Proteins of cells, viruses and subcellular particles*
- 2266 Aranda-Anzaldo, A., Orozco-Velasco, F., García-Villa, E. and Gariglio, P.: p53 Is a rate-limiting factor in the repair of higher-order DNA structure. *Biochim. Biophys. Acta*, 1446 (1999) 181-192.
- 2267 Arcone, R., Pagliuca, M.G., Chinali, A., Grimaldi, M., Schettini, G., Gast, A. and Pietropaolo, C.: Thrombin mutants with altered enzymatic activity have an impaired mitogenic effect on mouse fibroblasts and are inefficient modulators of stellation of rat cortical astrocytes. *Biochim. Biophys. Acta*, 1451 (1999) 173-186.
- 2268 Buzás, Z., Kolosova, I. and Chrambach, A.: PhastSystem electrophoresis in β -octylglucoside containing gels with immunodetection of a nondenatured vesicle-associated membrane protein. *Electrophoresis (Weinheim)*, 20 (1999) 1390-1397.
- 2269 Chewawiwat, N., Yano, M., Terada, K., Hoogenraad, N.J. and Mori, M.: Characterization of the novel mitochondrial protein import component, Tom34, in mammalian cells. *J. Biochem. (Tokyo)*, 125 (1999) 721-727.
- 2270 Cichowski, K., Orsini, M.J. and Brass, L.F.: PAR1 activation initiates integrin engagement and outside-in signalling in megakaryoblastic CHR2-288 cells. *Biochim. Biophys. Acta*, 1450 (1999) 265-276.
- 2271 Deml, R., Meise, T. and Dettner, K.: Effects of *Bacillus thuringiensis* δ -endotoxins on food utilization, growth, and survival of selected phytophagous insects. *J. Appl. Entomol.*, 123 (1999) 55-64; *C.A.*, 130 (1999) 277990.
- 2272 Dou, Q.P., McGuire, T.F., Peng, Y. and An, B.: Proteasome inhibition leads to significant reduction of Bcr-Abl expression and subsequent induction of apoptosis in K562 human chronic myelogenous leukemia cells. *J. Pharmacol. Exp. Ther.*, 289 (1999) 781-190.
- 2273 Fukuchi, K., Maruyama, H., Takagi, Y. and Gomi, K.: Direct proteasome inhibition by clasto-lactacystin β -lactone permits the detection of ubiquitinated p21^{waf1} in ML-1 cells. *Biochim. Biophys. Acta*, 1451 (1999) 206-210.
- 2274 Gambling, L., Olver, R.E. and Baines, D.L.: Perinatal PTX-sensitive G-protein expression and regulation of conductive ²²Na⁺ transport in lung apical membrane vesicles. *Biochim. Biophys. Acta*, 1450 (1999) 468-479.
- 2275 Harano, T., Shimizu, N., Otera, H. and Fujiki, Y.: Transmembrane topology of the peroxin, Pex2p, an essential component for the peroxisome assembly. *J. Biochem. (Tokyo)*, 125 (1999) 1168-1174.
- 2276 Hu, Z., Wan, J., Wang, L., Qian, X. and He, F.: (Computer analysis of two-dimensional polyacrylamide gel electrophoresis images in proteome research). *Junshi Yixue Kexueyuan Yuankan*, 22 (1998) 301-304; *C.A.*, 130 (1999) 278211.
- 2277 Ishihara, K., Satoh, I., Nittoh, T., Kanaya, T., Okazaki, H., Suzuki, T., Koyama, T., Sakamoto, T., Ide, T. and Ohuchi, K.: Preparation of recombinant rat interleukin-5 by baculovirus expression system and analysis of its biological activities. *Biochim. Biophys. Acta*, 1451 (1999) 48-58.
- 2278 Kang, L.-T., Phillips, T.M. and Vanderhoeck, J.Y.: Novel membrane target proteins for lipoxygenase-derived mono(S)hydroxy fatty acids. *Biochim. Biophys. Acta*, 1438 (1999) 388-398.
- 2279 Liu, J., Liu, Y., Hartley, D., Klaassen, C.D., Shehin-Johnson, S.E., Lucas, A. and Cohen, S.D.: Metallothionein-1/I knockout mice are sensitive to acetaminophen-induced hepatotoxicity. *J. Pharmacol. Exp. Ther.*, 289 (1999) 580-586.
- 2280 Marie-Cardine, A., Kirchgessner, H. and Schraven, B.: Molecular alterations of the Fyn-complex occur as late events of human T cell activation. *Eur. J. Immunol.*, 29 (1999) 1175-1187; *C.A.*, 130 (1999) 280835.
- 2281 Nagaishi, K., Adachi, R., Kawanishi, T., Yamaguchi, T., Kasahara, T., Hayakawa, T. and Suzuki, K.: Participation of cofilin in opsonized zymosan-triggered activation of neutrophil-like HL-60 cells through rapid dephosphorylation and translocation to plasma membranes. *J. Biochem. (Tokyo)*, 125 (1999) 891-898.
- 2282 Nesterenko, M.V., Woods, K. and Upton, S.J.: Receptor/ligand interactions between *Cryptosporidium parvum* and the surface of the host cell. *Biochim. Biophys. Acta*, 1454 (1999) 165-173.
- 2283 Parat, M.-O., Richard, M.-J., Favier, A. and Beani, J.-C.: Metal chelator N,N,N',N'-tetrakis-(2-pyridylmethyl)ethylene diamine inhibits the induction of heat shock protein 70 synthesis by heat in cultured keratinocytes. *Biol. Trace Elem. Res.*, 65 (1998) 261-270; *C.A.*, 130 (1999) 204820.

- 2284 Piquemal, D., Joulia, D., Balaguer, P., Basset, A., Marti, J. and Commes, T.: Differential expression of the RTP/Drg1/Ndr1 gene product in proliferating and growth arrested cells. *Biochim. Biophys. Acta*, 1450 (1999) 364-373.
- 2285 Ranatunga, W., Lebowitz, J., Axe, B., Pavlik, P., Kar, S.R. and Scovell, W.M.: Reexamination of the high mobility group-1 protein for self-association and characterization of hydrodynamic properties. *Biochim. Biophys. Acta*, 1432 (1999) 1-12.
- 2286 Reguenga, C., Oliveira, M.E.M., Gouveia, A.M.M., Eckerskorn, C., Sá-Miranda, C. and Azevedo, J.E.: Identification of a 24 kDa intrinsic membrane protein from mammalian peroxisomes. *Biochim. Biophys. Acta*, 1445 (1999) 337-341.
- 2287 Rey, A., Quartulli, F., Escoubet, L., Sozzani, P., Caput, D., Ferrara, P. and Pipy, B.: IL-13 induces serine phosphorylation of cPLA2 in mouse peritoneal macrophages leading to arachidonic acid and PGE2 production and blocks the zymosan-induced serine phosphorylation of cPLA2 and eicosanoid production. *Biochim. Biophys. Acta*, 1440 (1999) 183-193.
- 2288 Rimmer, S.J., Lane, J.R., Wigham, C.G. and Hodson, S.A.: Demonstration of a Na⁺/H⁺ exchanger NHE1 in fresh bovine corneal endothelial cell basolateral plasma membrane. *Biochim. Biophys. Acta*, 1419 (1999) 283-288.
- 2289 Santoni, V., Rouquie, D., Doumas, P., Mansion, M., Boutry, M., Degand, H., Dupree, P., Packman, L., Sherrier, J., Prime, T., Bauw, G., Posada, E. et al.: Use of a proteome strategy for tagging proteins present at the plasma membrane. *Plant J.*, 16 (1998) 633-641; C.A., 130 (1999) 293570.
- 2290 Solodushko, V.G. and Blyum, Y.B.: (Low affinity of tubulin for amiprofos-methyl and trifluralin in resistant *Nicotiana glauca* mutants). *Dopov. Nats. Akad. Nauk Ukr.*, No. 10 (1997) 163-168; C.A., 130 (1999) 206226.
- 2291 Stuhlmeier, K.M. and Lin, Y.: Camouflaging endothelial cells: does it prolong graft survival? *Biochim. Biophys. Acta*, 1428 (1999) 177-190.
- 2292 Swartzell, L.J., Edelman, R.E., Makaroff, Ch.A. and Kiss, J.Z.: Integrin-like proteins are localized to plasma membrane fractions, not plastids, in *Arabidopsis*. *Plant Cell Physiol.*, 40 (1999) 173-183; C.A., 130 (1999) 279270.
- 2293 Takahashi, I., Iijima, H., Katashima, R., Itakura, M. and Koyono, H.: Clonal expansion of CD4⁺ TCRβ⁺ T cells in TCR α-chain-deficient mice by gut-derived antigens. *J. Immunol.*, 162 (1999) 1843-1850; C.A., 130 (1999) 266269.
- 2294 Talgham, S.A. and Adamo, H.P.: Substitution of the N-terminal segment of the plasma membrane Ca pump isoform 4 by that of isoform 1 results in a fully functional chimeric enzyme. *Biochim. Biophys. Acta*, 1419 (1999) 71-77.
- 2295 Thoidis, G., Kupriyanova, T., Cunningham, J.M., Chen, P., Cadel, S., Foulon, T., Cohen, P., Fine, R.E. and Kandror, K.V.: Glucose transporter Glut3 is targeted to secretory vesicles in neurons and PC12 cells. *J. Biol. Chem.*, 274 (1999) 14062-14066.
- 2296 Usui, T., Marriott, G., Inagaki, M., Swarup, G. and Osada, H.: Protein phosphatase 2A inhibitors, phoslactomycins. Effects on the cytoskeleton in NIH/3T3 cells. *J. Biochem. (Tokyo)*, 125 (1999) 960-965.
- 2297 Volonté, D., Galbiati, F., Li, S., Nishiyama, K., Okamoto, T. and Lisanti, M.P.: Flotillins/cavatellins are differentially expressed in cells and tissues and form a hetero-oligomeric complex with caveolins *in vivo*. Characterization and epitope-mapping of a novel flotillin-1 monoclonal antibody probe. *J. Biol. Chem.*, 274 (1999) 12702-12709.
- 2298 Von Kleist-Retzow, J.-C., Vial, E., Chantrel-Groussard, K., Rötig, A., Munnich, A., Rustin, P. and Taanman, J.-W.: Biochemical, genetic and immunoblot analyses of 17 patients with an isolated cytochrome c oxidase deficiency. *Biochim. Biophys. Acta*, 1455 (1999) 35-44.
- 2299 Walther, A.P., Gomes, X.V., Lao, Y., Lee, Ch.G. and Wold, M.S.: Replication protein A interactions with DNA. 1. Functions of the DNA-binding and zinc-finger domains of the 70-kDa subunit. *Biochemistry*, 38 (1999) 3963-3973.
- 2300 Wang, C.-C. and Tsou, C.-L.: (Post-genome studies - proteomics). *Shengwu Huaxue Yu Shengwu Wuli Xuebao*, 30 (1998) 533-539; C.A., 130 (1999) 177953 - a review with 15 refs.
- For additional information see C.A.:
130 (1999) 279075, 279183, 291201, 293540, 294841.
- See also 2263, 2472, 2525, 2629, 2665, 2874.
- 19c. *Proteins synthesized by genetic manipulation, monoclonal antibodies*
- 2301 Bolland, A., Mahan-Boyce, J.A., Krasts, D.A., Daniels, M., Wang, W. and Gombotz, W.R.: Characterization of the isoforms of PIXY321, a granulocyte-macrophage-colony stimulating factor-interleukin-3 fusion protein, separated by preparative isoelectric focusing on immobilized pH gradients. *J. Chromatogr. A*, 846 (1999) 143-156.
- 2302 Bentley, W.E., Madurawe, R.D., Gill, R.T., Shiloach, M., Chase, T.E., Pulliam-Holoman, T.R. and Valdes, J.J.: Generation of a histidine-tagged antitoxin toxin antibody fragment in *E. coli*: effects of post-induction temperature on yield and IMAC binding-affinity. *J. Ind. Microbiol. Biotechnol.*, 21 (1998) 275-282; C.A., 130 (1999) 295575.
- 2303 Michalopoulos, L. and Hay, R.T.: Role of the conserved lysin 80 in stabilization of NF-κB p50 DNA binding. *Nucleic Acids Res.*, 27 (1999) 503-509; C.A., 130 (1999) 278243.
- 2304 Wang, R.-F., Khan, A.A., Cao, W.-W. and Cerniglia, C.E.: Identification and sequencing of a cDNA encoding 6-phosphogluconate dehydrogenase from a fungus, *Cunninghamella elegans* and expression of the gene in *Escherichia coli*. *FEMS Microbiol. Lett.*, 169 (1998) 397-402; C.A., 130 (1999) 178121.
- See also 2234, 2262, 2267, 2277, 2328, 2375, 2415, 2421, 2540, 2565, 2571, 2591, 2611, 2625, 2635, 2639, 2642, 2874.
- 19d. *Microbial and plant proteins*
- 2305 Al-Rawi, N. and Kavanagh, K.: A rapid method for the extraction of whole cell proteins from *Candida* species. *J. Microbiol. Methods*, 34 (1998) 107-112; C.A., 130 (1999) 264296.
- 2306 Bagyan, I., Setlow, B. and Setlow, P.: New small, acid-soluble proteins unique to spores of *Bacillus subtilis*: identification of the coding genes and regulation and function of two of these genes. *J. Bacteriol.*, 180 (1998) 6704-6712; C.A., 130 (1999) 205773.

- 2307 Barbet, A.F., Blentlinger, R., Yi, J., Lundgren, A.M., Blouin, E.F. and Kocan, K.M.: Comparison of surface proteins of *Anaplasma marginale* grown in tick cell culture, tick salivary glands, and cattle. *Infect. Immun.*, 67 (1999) 102-107; *C.A.*, 130 (1999) 194064.
- 2308 Bryan, P.J., Steffan, R.J., DePaola, A., Foster, J.W. and Bej, A.K.: Adaptive response to cold temperatures in *Vibrio vulnificus*. *Curr. Microbiol.*, 38 (1999) 168-175; *C.A.*, 130 (1999) 293850.
- 2309 Buhler, S., Schnaible, V., Glocker, M.O., Michels, J., Zeth, K., Walte, W. and Przybylski, M.: Conformational differentiation of two porin forms by selective chemical modifications and MALDI-MS. *Adv. Mass Spectrom.*, 14 (1998) C017030/1-C017030/13; *C.A.*, 130 (1999) 249051.
- 2310 Cai, S., Sarkar, H.K. and Singh, B.R.: Enhancement of the endopeptidase activity of botulinum neurotoxin by its associated proteins and dithiothreitol. *Biochemistry*, 38 (1999) 6903-6910.
- 2311 Carp, D.J., Bartholomai, G.B. and Pilosof, A.M.R.: Electrophoretic studies for determining soy proteins-xanthan gum interactions in foams. *Colloids Surf. B*, 12 (1999) 309-316; *C.A.*, 130 (1999) 280971.
- 2312 Ciopraga, J., Gozia, O., Tudor, R., Brezica, L. and Doyle, R.J.: Fusarium sp. growth inhibition by wheat germ agglutinin. *Biochim. Biophys. Acta*, 1428 (1999) 424-432.
- 2313 Coblentz, F.E., Shafer, Th.H. and Roer, R.D.: Cuticular proteins from the blue crab alter *in vitro* calcium carbonate mineralization. *Comp. Biochem. Physiol., Part B: Biochem. Mol. Biol.*, 121B (1998) 349-360; *C.A.*, 130 (1999) 179021.
- 2314 Colussi, V.C., Feyes, D.K., Mulvihill, J.W., Li, Y.-S., Kenney, M.E., Elmets, C.A., Oleinick, N.L. and Mukhtar, H.: Phthalocyanine 4 (Pc 4) photodynamic therapy of human OVCAR-3 tumor xenografts. *Photochem. Photobiol.*, 69 (1999) 236-241; *C.A.*, 130 (1999) 293346.
- 2315 Cox, S.D., Lassiter, M.O., Miller, B.S. and Doyle, R.J.: A new mechanism of action of fluoride on streptococci. *Biochim. Biophys. Acta*, 1428 (1999) 415-423.
- 2316 Crooks, K., Coleman, J. and Hawes, Ch.: The turnover of cell surface proteins of carrot protoplasts. *Planta*, 208 (1999) 46-58; *C.A.*, 130 (1999) 264870.
- 2317 Dassi, B., Samra, A., Dumas-Gaudot, E. and Gianinazzi, S.: Different polypeptide profiles from tomato roots following interactions with arbuscular mycorrhizal (*Glomus mosseae*) or pathogenic (*Phytophthora parasitica*) fungi. *Symbiosis*, 26 (1999) 65-77; *C.A.*, 130 (1999) 294109.
- 2318 Domingues, C., Soares, H., Rodrigues-Pousada, C. and Cyrne, L.: Structure of Tetrahymena CCT0 gene and its expression under colchicine treatment. *Biochim. Biophys. Acta*, 1446 (1999) 443-449.
- 2319 Ehlers, M.M. and Cloete, T.E.: Comparing the protein profiles of 21 different activated sludge systems after SDS-page. *Water Res.*, 33 (1999) 1181-1186; *C.A.*, 130 (1999) 256646.
- 2320 El-Bardisy, M.M. and Gabal, M.A.: Use of Western blot technique for the detection of the immunogenic determinants of *Clostridium chauvoei* whole cellular antigen. *Vet. Med. J. Giza*, 46 (1998) 171-176; *C.A.*, 130 (1999) 221793.
- 2321 Felske, A., Vancanneyt, M., Kersters, K. and Akkermans, A.D.L.: Application of temperature-gradient gel electrophoresis in taxonomy of coryneform bacteria. *Int. J. Syst. Bacteriol.*, 49 (1999) 113-121; *C.A.*, 130 (1999) 293498.
- 2322 Guerra, M., Gonzalez, M., Hung, B. and Martinez, R.: (Determination of proteins in Santiago de Cuba distillery slops). *Rev. Cubana Quim.*, 10 (1998) 18-22; *C.A.*, 130 (1999) 209052.
- 2323 Gygi, S.P., Rochon, Y., Franza, B.R. and Aebersold, R.: Correlation between protein and mRNA abundance in yeast. *Mol. Cell. Biol.*, 19 (1999) 1720-1730; *C.A.*, 130 (1999) 293775.
- 2324 Hamada, T., Hasunuma, K. and Komatsu, S.: Phosphorylation of proteins in the stem section of etiolated rice seedling irradiated with red light. *Biol. Pharm. Bull.*, 22 (1999) 122-126; *C.A.*, 130 (1999) 279322.
- 2325 Hannachi, A.S., Boussaid, M. and Marrakchi, M.: Genetic variability organization and gene flow in natural populations of *Medicago polymorpha* L. prospected in Tunisia. *Genet., Sel., Evol.*, 30 (1998) S121-S135; *C.A.*, 130 (1999) 180017.
- 2326 Hsu, Y.-S., Chang, W.-T., Newell, P.C. and Gross, J.D.: A negative regulatory element in a prespore-specific promoter of *Dictpostelium discoideum*. *Biochim. Biophys. Acta*, 1447 (1999) 64-70.
- 2327 Hu, Q., Marquardt, J., Iwasaki, I., Miyashita, H., Kurano, N., Mörschel, E. and Miyachi, S.: Molecular structure, localization and function of biliproteins in the chlorophyll a/d containing oxygenic photosynthetic prokaryote *Acaryochloris marina*. *Biochim. Biophys. Acta*, 1412 (1999) 250-261.
- 2328 Iwanaga, S., Nagata, R., Miyamoto, A., Kouzuma, Y., Yamasaki, N. and Kimura, M.: Conformation of the primary binding loop folded through an intramolecular interaction contributes to the strong chymotrypsin inhibitory activity of the chymotrypsin inhibitor from *Erythrina variegata* seeds. *J. Biochem. (Tokyo)*, 126 (1999) 162-167.
- 2329 Jensen, P.K., Pasa-Tolic, L., Anderson, G.A., Lipton, M.S., Bruce, J.E. and Smith, R.D.: Probing proteomes using capillary isoelectric focusing - electrospray ionization Fourier transform ion cyclotron resonance mass spectrometry. *Anal. Chem.*, 71 (1999) 2076-2084.
- 2330 Kawamoto, S., Mizuguchi, Y., Morimoto, K., Aki, T., Shigeta, S., Yasueda, H., Wada, T., Suzuki, O., Jyo, T. and Ono, K.: Cloning and expression of Der f 6, a serine protease allergen from the house dust mite, *Dermatophagoides farinae*. *Biochim. Biophys. Acta*, 1454 (1999) 201-207.
- 2331 Knudsen, K., Madsen, A.S., Mygind, P., Christiansen, G. and Birkelund, S.: Identification of two novel genes encoding 97- to 99-kilodalton outer membrane proteins of *Chlamydia pneumoniae*. *Infect. Immun.*, 67 (1999) 375-383; *C.A.*, 130 (1999) 218977.
- 2332 Koehne, B., Elli, G., Jennings, R.C., Wilhelm, C. and Trissl, H.-W.: Spectroscopic and molecular characterization of a long wavelength absorbing antenna of *Ostreobium* sp. *Biochim. Biophys. Acta*, 1412 (1999) 94-107.
- 2333 Kumar, L., Sridhara, S., Singh, B.P. and Gangal, S.V.: Characterization of cogon grass (*Imperata cylindrica*) pollen extract and preliminary analysis of grass group 1, 4 and 5 homologues using monoclonal antibodies to *Pheum pratense*. *Int. Arch. Allergy Immunol.*, 117 (1998) 174-179; *C.A.*, 130 (1999) 222032.
- 2334 Kuwabara, Ch., Arakawa, K. and Yoshida, Sh.: Abscisic acid-induced secretory proteins in suspension-cultured cells of winter wheat. *Plant Cell Physiol.*, 40 (1999) 184-191; *C.A.*, 130 (1999) 279271.

- 2335 Letocart, M., Boerlin, P., Boerlin-Petzold, F., Goudet, J., Baranton, G. and Perolat, P.: Genetic structure of the genus *Lepotospira* by multilocus enzyme electrophoresis. *Int. J. Syst. Bacteriol.*, 49 (1999) 231-238; *C.A.*, 130 (1999) 279133.
- 2336 Li, Y., Aoki, R. and Dolly, J.O.: Expression and characterisation of the heavy chain of tetanus toxin: reconstitution of the fully-recombinant dichain protein in active form. *J. Biochem. (Tokyo)*, 125 (1999) 1200-1208.
- 2337 Li, Z.S., Beveridge, T.J., Betts, J. and Clarke, A.J.: Partial characterization of a major autolysin from *Mycobacterium phlei*. *Microbiology (Reading)*, 145 (1999) 169-176; *C.A.*, 130 (1999) 219724.
- 2338 Lin, H.-H., He, J.-X., Liang, H.-G. and Du, L.-F.: Quantitative and quantitative differences in the light harvesting complexes of photosystem II (LHCI) between a chlorophyll-less barley mutant "NYB" and its wild type. *J. Plant Physiol.*, 154 (1999) 152-156; *C.A.*, 130 (1999) 194456.
- 2339 Oh, S.K., Kang, H., Shin, D.H., Yang, J., Chow, K., Yeang, H.Y., Wagner, B., Breiteneder, H. and Han, K.: Isolation, characterization and functional analysis of a novel cDNA clone encoding a small rubber particle protein from *Hevea brasiliensis*. *J. Biol. Chem.*, 274 (1999) 17132-17138.
- 2340 Park, G.-G., Kim, W.-D., Park, Y.-S., Gang, J.-B. and Kobayashi, H.: Purification and properties of sunflower seed α -galactosidase by affinity chromatography. *Sanop Misaengmul Hakhoechi*, 26 (1998) 316-322; *C.A.*, 130 (1999) 278436.
- 2341 Radic-Miehle, H., Saam, C., Huls, R., Kling, Ch.I. and Hesemann, C.U.: Characterization of spelt (*Triticum spelta* L.) forms by gel-electrophoretic analyses of seed storage proteins. III. Comparative analyses of spelt and Central European winter wheat (*Triticum aestivum* L.) cultivars by SDS-PAGE and acid-PAGE. *Theor. Appl. Genet.*, 97 (1998) 1340-1346; *C.A.*, 130 (1999) 249451.
- 2342 Rasooly, A. and Ito, Y.: Toroidal coil countercurrent chromatography separation and analysis of Staphylococcal enterotoxin A (SEA) in milk. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1285-1293.
- 2343 Rohde, B.H., Schmid, R. and Ullrich, M.S.: Thermoregulated expression and characterization of an NAD(P)H-dependent 2-cyclohexen-1-one reductase in the plant pathogenic bacterium *Pseudomonas syringae* pv. *glycinea*. *J. Bacteriol.*, 181 (1999) 814-822; *C.A.*, 130 (1999) 293693.
- 2344 Salzer, U., Kubicek, M. and Prohaska, R.: Isolation, molecular characterization, and tissue-specific expression of ECP-51 and ECP-54 (TIP49), two homologous, interacting erythroid cytosolic proteins. *Biochim. Biophys. Acta*, 1446 (1999) 365-370.
- 2345 Sato, H., Miyazaki, H., Sakakura, H., Suzuki, T., Saito, H. and Maehara, N.: Isolation and purification of a protective protein antigen of *Erysipelothrix rhusiopathiae*. *J. Vet. Med., Ser. B*, 46 (1999) 73-84; *C.A.*, 130 (1999) 266129.
- 2346 Schieltz, D.M.: Preparing 2-D protein extracts from yeast. *Methods Mol. Biol.*, 112 (1999) 31-34; *C.A.*, 130 (1999) 193754 - a review with 3 refs.
- 2347 Squeda, M.C., Oropeza, M. and de Garcia, E.: (Extracellular proteins secreted in the culture medium of embryogenic and non-embryogenic cell suspensions of sugarcane (*Saccharum* sp. L.) cv V78-1). *Acta Ceint. Venez.*, 49 (1998) 160-165; *C.A.*, 130 (1999) 294080.
- 2348 Tarkka, M., Niini, S.S. and Raudaskoski, M.: Developmentally regulated proteins during differentiation of root system and ectomycorrhiza in Scots pine (*Pinus sylvestris*) with *Suillus bovinus*. *Physiol. Plant.*, 104 (1998) 449-455; *C.A.*, 130 (1999) 194407.
- 2349 Thelen, J.J., Mierny, J.A. and Randall, D.D.: Molecular cloning and expression analysis of the mitochondrial pyruvate dehydrogenase from maize. *Plant Physiol.*, 119 (1999) 635-643; *C.A.*, 130 (1999) 292304.
- 2350 Tumaney, A.W. and Rajasekharan, R.: Synthesis of azidophospholipids and labeling of lysophosphatidylcholine acyltransferase from developing soybean cotyledons. *Biochim. Biophys. Acta*, 1439 (1999) 47-56.
- 2351 Uchiyama, H., Shinohara, Y., Tomioka, N. and Kusakabe, I.: Induction and enhancement of stress proteins in a trichloroethylene-degrading methanotrophic bacterium, *Methylocystis* sp. M. *FEMS Microbiol. Lett.*, 170 (1999) 125-130; *C.A.*, 130 (1999) 207055.
- 2352 VanBogelen, R.A. and Neidhardt, F.C.: Preparation of *Escherichia coli* samples for 2-D gel analysis. *Methods Mol. Biol.*, 112 (1999) 21-29; *C.A.*, 130 (1999) 193753 - a review with 8 refs.
- 2353 Verhagen, M.F.J.M., O'Rourke, T. and Adams, M.W.W.: The hyperthermophilic bacterium, *Thermotoga maritima*, contains an unusually complex iron-hydrogenase: amino acid sequence analyses versus biochemical characterization. *Biochim. Biophys. Acta*, 1412 (1999) 212-229.
- 2354 Wisniewski, J.R., Krohn, N.M., Heyduk, E., Grasser, K.D. and Heyduk, T.: MHG1 proteins from evolutionary distant organisms distort B-DNA conformation in similar way. *Biochim. Biophys. Acta*, 1447 (1999) 25-34.
- 2355 Wu, Y., Muench, D.G., Kim, Y.-T., Hwang, Y.-S. and Okita, Th.W.: Identification of polypeptides associated with an enriched cytoskeleton-protein body fraction from developing rice endosperm. *Plant Cell Physiol.*, 39 (1998) 1251-1257; *C.A.*, 130 (1999) 179934.
- 2356 Yamamoto, I., Takamatsu, K., Ohshima, Y., Ujiye, T. and Satoh, T.: Site-directed mutagenesis of the response regulator DmsR for the dmsCBA operon expression in *Rhodobacter sphaeroides* f. sp. *denitrificans*: an essential residue of proline-130 in the linker. *Biochim. Biophys. Acta*, 1447 (1999) 57-63.
- 2357 Yang, W., Jones, M.K., Fan, J., Hughes-Stamm, S.R. and McManus, D.P.: Characterisation of a family of *Schistosoma japonicum* proteins related to dynein light chains. *Biochim. Biophys. Acta*, 1432 (1999) 13-26.
- 2358 Yu, Q.: (Preparation of morchella liquid by submersed fermentation and analysis of its nutrient contents). *Weisheng Yanjiu*, 27 (1998) 351-353; *C.A.*, 130 (1999) 222376.
- 2359 Zhao, S., Zhao, Y. and Yang, Z.: Genetic analysis of ginseng germplasm by lactate polyacrylamide gel electrophoresis of seed protein. *J. Ginseng Res.*, 22 (1998) 168-172; *C.A.*, 130 (1999) 293499.

For additional information see *C.A.*:
130 (1999) 256635.

See also 2191, 2207, 2248, 2282, 2289, 2421, 2461, 2602.

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

- 2360 Affar, E.B., Duriez, P.J., Shah, R.G., Winstall, E., Germain, M., Boucher, C., Bourassa, S., Kirkland, J.B. and Poirier, G.G.: Immunological determination and size characterization of poly(ADP-ribose) synthesized *in vitro* and *in vivo*. *Biochim. Biophys. Acta*, 1428 (1999) 137-146.
- 2361 Altland, K., Winter, P. and Sauerborn, M.K.: Electrically neutral microheterogeneity of human plasma transthyretin (prealbumin) detected by isoelectric focusing in urea gradients. *Electrophoresis (Weinheim)*, 20 (1999) 1349-1364.
- 2362 Bhattacharjee, G., Grøn, H. and Pizzo, S.V.: Incorporation of non-proteolytic proteins by murine α_2 -macroglobulin. *Biochim. Biophys. Acta*, 1432 (1999) 49-56.
- 2363 Brennan, S.O., Fellowes, A.P. and George, P.M.: Albumin Banks Peninsula: a new termination variant characterised by electrospray mass spectrometry. *Biochim. Biophys. Acta*, 1433 (1999) 321-326.
- 2364 Caughey, D.J., Narhi, L.O., Kita, Y., Meng, S.-Y., Wen, D., Chen, W., Ratzkin, B.J., Fujimoto, J., Iwahara, T., Yamamoto, T. and Arakawa, T.: Fractionation of polyclonal antibodies to fragments of a neuroreceptor using three increasingly chaotropic solvents. *J. Chromatogr. B*, 728 (1999) 49-57.
- 2365 Chuang, V.T.G., Kuniyasu, A., Nakayama, H., Matsushita, Y., Hirono, S. and Otagiri, M.: Helix 6 of subdomain III A of human serum albumin is the region primarily photolabeled by ketoprofen, an arylpropionic acid SNAID containing a benzophenone moiety. *Biochim. Biophys. Acta*, 1434 (1999) 18-30.
- 2366 Debreselassie, D., Rajarathnam, E. and Fliegel, L.: Expression, purification and characterization of the carboxyl-terminal region of the Na⁺/H⁺ exchanger. *Biochem. Cell Biol.*, 76 (1999) 837-842.
- 2367 Imoto, M., Ishikawa, K., Yamamoto, K., Sinohara, H., Irimajiri, K., Kubo, N., Sakurabayashi, I., Horiuchi, A., Akiyama, T., Ohba, Y. and Furuta, I.: Occurrence of heavy chain of 7S IgM half-molecule whose NH₂-terminal sequence is identical with that of κ light chain sequence in patients with Waldenstrom macroglobulinemia. *Clin. Chim. Acta*, 282 (1999) 77-88.
- 2368 Inoue, T. and Ohkawa, K.: (Electrophoretic analysis on sugar chains of carbohydrate-deficient transferrin from patients with alcoholic liver disease). *Seibutsu Butsurei Kagaku*, 42 (1998) 239-243; *C.A.*, 130 (1999) 233529.
- 2369 Iwase, S., Ideguchi, H., Takao, M., Horiguchi-Yamada, J., Iwasaki, M., Takahara, Sh., Sekikawa, T., Mochizuki, S. and Yamada, H.: Band 3 Tokyo: Thr837→Ala837 substitution in erythrocyte band 3 protein associated with spherocytic hemolysis. *Acta Haematol.*, 100 (1999) 200-203; *C.A.*, 130 (1999) 265790.
- 2370 Ligi, F., Ciacci, C., Palma, F. and Palma, F.: Comparative study of the cytoplasmic domain of band 3 from human and rabbit erythrocyte membranes. *Comp. Biochem. Physiol., Part B: Biochem. Mol. Biol.*, 121B (1998) 265-271; *C.A.*, 130 (1999) 180441.
- 2371 Lorand, L., Velasco, P.T., Murthy, S.N.P., Lefebvre, Ph. and Green, D.: Autoimmune antibody in a hemorrhagic patient interacts with thrombin-activated factor XIII in a unique manner. *Blood*, 93 (1999) 909-917; *C.A.*, 130 (1999) 266256.
- 2372 Nagasaki, H., Watanabe, M., Komatsu, N., Kaneko, T., Dube, J.Y., Kajita, T., Saitoh, Y. and Ohta, Y.: Epitope analysis of a prostate-specific antigen (PSA) C-terminal-specific monoclonal antibody and new aspects for the discrepancy between equimolar and skewed PSA assays. *Clin. Chem. (Washington)*, 45 (1999) 486-496.
- 2373 Nezlín, R. and Lefkowitz, I.: Expressed immunoglobulin repertoire of LPS-stimulated splenocytes of unimmunized mice as studied by two-dimensional gel electrophoresis. *Mol. Immunol.*, 35 (1999) 1089-1096; *C.A.*, 130 (1999) 295296.
- 2374 Ni, B., Zhou, J.-X. and Dong, Y.-L.: (Purification, identification, and antisera of multicatalytic proteinase from rat skeletal muscle). *Zhongguo Shengwu Huaxue Yu Fenzi Shengwu Xuebao*, 14 (1998) 736-741; *C.A.*, 130 (1999) 233866.
- 2375 Qi, R., Ozaki, Y., Asazuma, N., Satoh, K., Yatomi, Y., Law, C.-L., Hato, T. and Nomura, S.: Fc γ RII tyrosine phosphorylation differs between Fc γ RII cross-linking and platelet-activating anti-platelet monoclonal antibodies. *Biochim. Biophys. Acta*, 1451 (1999) 353-363.
- 2376 Ramjeesingh, M., Huan, L.-J., Garami, E. and Bear, C.E.: Novel method for evaluation of the oligomeric structure of membrane proteins. *Biochem. J.*, 342 (1999) 119-123.
- 2377 Tsukagoshi, K., Hashimoto, M., Nakajima, R. and Kondo, K.: Basic study on electropherogram of bovine serum albumin denatured by heating. *Sci. Eng. Rev. Doshisha Univ.*, 39 (1998) 119-124; *C.A.*, 130 (1999) 193809.
- 2378 Warren, D.L., Morrissey, J.H. and Neuenchwander, P.F.: Proteolysis of blood coagulation factor VIII by the factor VIIa-tissue factor complex: generation of an inactive factor VIII cofactor. *Biochemistry*, 38 (1999) 6529-6536.
- 2379 Yamazaki, A., Winnik, F.M., Cornelius, R.M. and Brash, J.L.: Modification of liposomes with N-substituted polyacrylamides: identification of proteins adsorbed from plasma. *Biochim. Biophys. Acta*, 1421 (1999) 103-115.
- 2380 Zhang, J., Sugahara, K., Ushikoshi, I., Ushikoshi, S., Seto, K. and Kodama, H.: Effect of water extracts of *Rhizopus delemar* on the stimulus coupled responses of neutrophils and their modulation by various protein kinase inhibitors. *Clin. Chim. Acta*, 282 (1999) 89-100.
- 2381 Zhang, W.-M., Finne, P., Leinonen, J., Vesalainen, S., Nordling, S. and Stenman, U.-H.: Measurement of the complex between prostate-specific antigen and α_1 protease inhibitor in serum. *Clin. Chem. (Washington)*, 45 (1999) 814-821.

See also 2226, 2267, 2302, 2440, 2888, 2892.

19f. *Structural and muscle proteins*

- 2382 Bigard, A.X., Janmot, C., Sanchez, H., Serrurier, B., Pollet, S. and D'Albis, A.: Changes in myosin heavy chain profile of mature regenerated muscle with endurance training in rat. *Acta Physiol. Scand.*, 165 (1999) 185-192; *C.A.*, 130 (1999) 294531.
- 2383 Chan, D., Freddi, S., Weng, Y.M. and Bateman, J.F.: Interaction of collagen $\alpha_1(X)$ containing engineered NC1 mutations with normal $\beta_1(X0)$ *in vitro*. Implications for the molecular basis of Schmid metaphyseal chondrodysplasia. *J. Biol. Chem.*, 274 (1999) 13091-13097.

- 2384 Cizak, L., Krawczenko, A., Polzar, B., Mannherz, H.G. and Malicka-Blaszkiewicz, M.: Carp liver actin: isolation, polymerization and interaction with deoxyribonuclease I (DNase I). *Biochim. Biophys. Acta*, 1451 (1999) 141-152.
- 2385 Fujii, T. and Koizumi, Y.: Identification of the binding region of basic calponin on α and β tubulins. *J. Biochem. (Tokyo)*, 125 (1999) 869-875.
- 2386 Hattori, S., Adachi, E., Ebihara, T., Shirai, T., Someki, I. and Irie, S.: Alkali-treated collagen retained the triple helical conformation and the ligand activity for the cell adhesion via $\alpha 2\beta 1$ integrin. *J. Biochem. (Tokyo)*, 125 (1999) 676-684.
- 2387 Hughes, M.C., O'Neill, E.E., McSweeney, P.L.H. and Healy, A.: Proteolysis of bovine F-actin by cathepsin B. *Food Chem.*, 64 (1999) 525-530; *C.A.*, 130 (1999) 266539.
- 2388 Ishikawa, T. and Wakabayashi, T.: Calcium-induced changes in the location and conformation of troponin in skeletal muscle thin filaments. *J. Biochem. (Tokyo)*, 126 (1999) 200-211.
- 2389 Luk, Sh.C.W., Ngai, S.-M., Tsui, S.K.W., Fung, K.-P., Lee, Ch.-Y. and Waye, M.M.Y.: *In vivo* and *in vitro* association of 14-3-3 epsilon isoform with calmodulin: implication for signal transduction and cell proliferation. *J. Cell. Biochem.*, 73 (1999) 31-35; *C.A.*, 130 (1999) 292994.
- 2390 Morimoto, S., Harada, K. and Ohtsuki, I.: Roles of troponin isoforms in pH dependence of contraction in rabbit fast and slow skeletal and cardiac muscles. *J. Biochem. (Tokyo)*, 126 (1999) 121-129.
- 2391 Morimoto, S., Sato, O. and Ogawa, Y.: Effect of vanadate on force and myosin light chain phosphorylation in skinned aortic smooth muscle. *J. Biochem. (Tokyo)*, 126 (1999) 146-152.
- 2392 Neumann, J., Maas, R., Boknik, P., Jones, L.R., Zimmermann, N. and Scholz, H.: Pharmacological characterization of protein phosphatase activities in preparations from failing human hearts. *J. Pharmacol. Exp. Ther.*, 289 (1999) 188-193.
- 2393 Newman, D.J., Olabiran, Y., Bedzyk, W.D., Chance, S., Gorman, E.G. and Price, C.P.: Impact of antibody specificity and calibration material on the measure of agreement between methods for cardiac troponin I. *Clin. Chem. (Washington)*, 45 (1999) 822-828.
- 2394 Nificorovic, A., Radojic, M. and Milosavljevic, B.H.: Protein degradation in some irradiated foodstuff. In: Ribnikar, S. and Anic, S. (Editors), *Phys. Chem. '98, Int. Conf. Fundam. Appl. Aspects Phys. Chem., 4th*, Society of Physical Chemists of Serbia, Belgrade, 1998, pp. 316-318; *C.A.*, 130 (1999) 222288.
- 2395 Palmier, B., Vacher, M., Harbon, S. and Leiber, D.: A tyrosine kinase signaling pathway, regulated by calcium entry and dissociated from tyrosine phosphorylation of phospholipase C γ 1, is involved in inositol phosphate production by activated G protein-coupled receptors in myometrium. *J. Pharmacol. Exp. Ther.*, 289 (1999) 1022-1030.
- 2396 Piñeiro, C., Barros-Velázquez, J., Pérez-Martín, R.I., Martínez, I., Jacobsen, T., Rehbein, H., Kündiger, R., Mendes, R., Etienne, M., Jerome, M., Craig, A., Mackie, I.M. and Jessen, F.: Development of a sodium dodecyl sulfate-polyacrylamide gel electrophoresis reference method for the analysis and identification of fish species in raw and heat-processed samples: a collaborative study. *Electrophoresis (Weinheim)*, 20 (1999) 1425-1432.
- 2397 Punkt, K., Psinia, I., Welt, K., Barth, W. and Asmussen, G.: Effects on skeletal muscle fibers of diabetes nad *Gingko biloba* extract treatment. *Acta Histochem.*, 101 (1999) 53-69; *C.A.*, 130 (1999) 195236.
- 2398 Sakuma, K., Watanabe, K., Sano, M., Uramoto, I., Sakamoto, K. and Totsuka, T.: The adaptive response of MyoD family proteins in overloaded, regenerating and denervated rat muscles. *Biochim. Biophys. Acta*, 1428 (1999) 284-292.
- 2399 Shi, Q., Ling, M., Zhang, X., Zhang, M., Kadijevic, L., Liu, S. and Laurino, J.P.: Degradation of cardiac troponin I in serum complicates comparisons of cardiac troponin I assays. *Clin. Chem. (Washington)*, 45 (1999) 1018-1025.
- 2400 Thys, T.M., Blank, J.M. and Schachat, F.H.: Rostral-Caudal variation in troponin T and parvalbumin correlates with differences in relaxation rates of cod axial muscle. *J. Exp. Biol.*, 201 (1998) 2993-3001; *C.A.*, 130 (1999) 194645.
- 2401 Yokota, E., Muto, Sh. and Shimmen, T.: Inhibitory regulation of higher-plant myosin by Ca²⁺ ions. *Plant Physiol.*, 119 (1999) 231-239; *C.A.*, 130 (1999) 234856.

For additional information see *C.A.*:
130 (1999) 219119.

See also 2253, 2431, 2483, 2669.

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

- 2402 Bergman, A.-C., Alaiya, A.A., Wendler, W., Binetruy, B., Shohan, M., Sakaguchi, K., Bergman, T., Kronenwett, U., Auer, G., Appella, E., Joernvall, H. and Linder, S.: Protein kinase-dependent overexpression of the nuclear protein p19 in c-JUN and RAS transformed fibroblasts. *Cell. Mol. Life Sci.*, 55 (1999) 467-471; *C.A.*, 130 (1999) 294807.
- 2403 Gerner, Ch. and Sauermann, G.: Nuclear matrix proteins specific for subtypes of human hematopoietic cells. *J. Cell. Biochem.*, 72 (1999) 470-482; *C.A.*, 130 (1999) 279710.
- 2404 Gillock, E.T., An, K. and Consigli, R.A.: Truncation of the nuclear localization signal of polyomavirus VP1 results in a loss of DNA packaging when expressed in the baculovirus system. *Virus Res.*, 58 (1998) 149-160; *C.A.*, 130 (1999) 194127.
- 2405 Gohshi, T., Shimada, M., Kawahire, S., Imai, N., Ichimura, T., Omata, S. and Horigome, T.: Molecular cloning of mouse p47, a second group mammalian RuvB DNA helicase-like protein: homology with those from human and *Saccharomyces cerevisiae*. *J. Biochem. (Tokyo)*, 125 (1999) 939-946.
- 2406 Kölle, D., Brosch, G., Lechner, T., Pipal, A., Helliger, W., Taplick, J. and Loidl, P.: Different types of maize histone deacetylases are distinguished by a highly complex substrate and site specificity. *Biochemistry*, 38 (1999) 6769-6773.
- 2407 Lee, B.H., Murugasu-Oei, B. and Dick, T.: Upretulation of a histone-like protein in dormant *Mycobacterium smegmatis*. *Mol. Gen. Genet.*, 260 (1998) 475-479; *C.A.*, 130 (1999) 277482.
- 2408 Pironcheva, G., Russev, G., Miteva, K. and Zlatarev, S.: Identification of the proteins involved in the processing of histone 4 pre-mRNA. *Biomed. Lett.*, 58 (1998) 71-75; *C.A.*, 130 (1999) 206390.
- 2409 Takemura, M., Sato, K., Nishio, M., Akiyama, T., Umekawa, H. and Yoshida, S.: Nucleolar protein B23.1 binds to retinoblastoma protein and synergistically stimulates DNA polymerase α activity. *J. Biochem. (Tokyo)*, 125 (1999) 904-909.

- 2410 Treuner, K., Findeisen, M., Strausfeld, U. and Knippers, R.: Phosphorylation of replication protein A middle subunit (RPA32) leads to a disassembly of the RPA heterotrimer. *J. Biol. Chem.*, 274 (1999) 15556-15561.
- 2411 Yamada, T., Fukuda, R., Himeno, M. and Sugimoto, K.: Functional domain structure of human heterochromatin protein HP1^{Hsc}: Involvement of internal DNA-binding and C-terminal self-association domains in the formation of discrete dots in interphase nuclei. *J. Biochem. (Tokyo)*, 125 (1999) 832-837.
- 2412 Zhou, J. and Finch, P.W.: Identification of a novel transcriptional regulatory element within the promoter region of the keratinocyte growth factor gene that mediates inducibility to cyclic AMP. *Biochim. Biophys. Acta*, 1446 (1999) 71-81.
- For additional information see C.A.:
130 (1999) 278807.
- See also 2260.
- 19h. *Chromoproteins and metalloproteins*
- 2413 Cucchi, C. and Basaglia, F.: Tetramethylbenzidine staining procedure after starch gel electrophoresis of human Hb. *Comp. Haematol. Int.*, 8 (1998) 178-181; C.A., 130 (1999) 234207.
- 2414 Keller, H., Lieb, B., Altenhein, B., Gebauer, D., Richter, S., Stricker, S. and Markl, J.: Abalone (*Haliotis tuberculata*) hemocyanin type 1 (HtH1). Organization of the \approx 400 kDa subunit and amino acid sequence of its functional units *f*, *g* and *h*. *Eur. J. Biochem.*, 264 (1999) 27-38.
- 2415 Nakamura, M., Saeki, K. and Takahashi, Y.: Hyperproduction of recombinant ferredoxins in *Escherichia coli* by coexpression of the ORF1-ORF2-iscS-iscU-iscA-hscB-hscA-fdx-ORF3 gene cluster. *J. Biochem. (Tokyo)*, 126 (1999) 10-18.
- 2416 Simi, A. and Ingelman-Sundberg, M.: Post-translational inhibition of cytochrome P-450 2E1 expression by chlomethiazole in Fao hepatoma cells. *J. Pharmacol. Exp. Ther.*, 289 (1999) 847-852.
- 2417 Soares, R.P.P., Gontijo, N.F., Romanha, A.J., Diotaiuti, L. and Pereira, M.H.: Salivary heme proteins distinguish *Rhodnius prolixus* from *Rhodnius robustus* (Hemiptera: Reduviidae: Triatominae). *Acta Trop.*, 71 (1998) 285-291; C.A., 130 (1999) 220602.
- See also 2888.
- 19i. *Proteins of glands, gland products, various zymogens (incl. milk proteins)*
- 2418 Beeley, J.A. and Khoo, K.S.: Salivary proteins in rheumatoid arthritis and Sjögren's syndrome: one-dimensional and two-dimensional electrophoretic studies. *Electrophoresis (Weinheim)*, 20 (1999) 1652-1660.
- 2419 Ishidoh, K., Takeda-Ezaki, M., Watanabe, S., Sato, N., Aihara, M., Imagawa, K., Kikuchi, M. and Kominami, E.: Analysis of where and which types of proteinases participate in lysosomal proteinase processing using bafilomycin A1 and *Helicobacter pylori* Vac A toxin. *J. Biochem. (Tokyo)*, 125 (1999) 770-779.
- 2420 Molina, E., Amigo, L. and Ramos, M.: Detection of bovine milk proteins in soy milk by western blotting. *J. Food Prot.*, 61 (1998) 1591-1694; C.A., 130 (1999) 208930.
- 2421 Ogino, T., Kaji, T., Kawabata, M., Satoh, K., Tomoo, K., Ishida, T., Yamazaki, H., Ishidoh, K. and Kominami, E.: Function of the propeptide region in recombinant expression of active procathepsin L in *Escherichia coli*. *J. Biochem. (Tokyo)*, 126 (1999) 78-83.
- 2422 Rosenthal, J.A., Levandoski, M.M., Chang, B., Potts, J.F., Shi, Q. and Hawrot, E.: The functional role of positively charged amino acid side chains in α -bungarotoxin revealed by site-directed mutagenesis of a His-tagged recombinant α -bungarotoxin. *Biochemistry*, 38 (1999) 7847-7855.
- 2423 Saidi, N., Samel, M., Siigur, J. and Hensen, P.E.H.: Lebetase, an $\alpha(\beta)$ -fibrin(ogen)olytic metalloproteinase of *Vipera lebetina* snake venom, is inhibited by human α -macroglobulins. *Biochim. Biophys. Acta*, 1434 (1999) 94-102.
- 2424 Wang, G., Chen, N., Hui, H., Nie, X., Bei, Y., Liu, X., Yao, L. and Yang, H.: (Preparation and identification of mouse submandibular gland nerve growth factor). *Disi Junyi Daxue Xuebao*, 19 (1998) 646-648; C.A., 130 (1999) 2177243.
- 2425 Williams, K.M., Ekström, J. and Marshall, T.: High-resolution electrophoretic analysis of rat parotid salivary proteins. *Electrophoresis (Weinheim)*, 20 (1999) 1373-1381.
- For additional information see C.A.:
130 (1999) 248994, 265239.
- See also 2455, 2495, 2639, 2641.
- 19j. *Proteins of brain, cerebrospinal fluid and eye*
- 2426 Asherie, N., Pande, J., Lomakin, A., Ogun, O., Hanson, S.R.A., Smith, J.B. and Benedek, G.B.: Oligomerization and phase separation in globular protein solutions. *Biophys. Chem.*, 75 (1998) 213-227; C.A., 130 (1999) 178929.
- 2427 Bai, R., Ewell, J.B., Nguyen, N.Y. and Hamel, E.: Direct photoaffinity labeling of cysteine 211 or a near by amino acid residue of β -tubulin by guanosine 5'-diphosphate bound in the exchangeable site. *J. Biol. Chem.*, 274 (1999) 12710-12714.
- 2428 Banerjee, A.: A monoclonal antibody to α -tubulin: purification of functionally active α -tubulin isoforms. *Biochemistry*, 38 (1999) 5438-5446.
- 2429 Costa, M.C.R., Mani, F., Santoro, W., Jr., Espreafico, E.M. and Larson, R.E.: Brain myosin-V, a calmodulin-carrying myosin, binds to calmodulin-dependent protein kinase II and activates its kinase activity. *J. Biol. Chem.*, 274 (1999) 15811-15819.
- 2430 Funatsu, N., Miyata, S., Kumanogoh, H., Shigeta, M., Hamada, K., Endo, Y., Sokawa, Y. and Maekawa, S.: Characterization of a novel rat brain glycosylphosphatidylinositol-anchored protein (Kilon), a member of the IgLON cell adhesion molecule family. *J. Biol. Chem.*, 274 (1999) 8224-8230.
- 2431 Green, S.H., Glover, R.M., Krumm, P.A., Winters, T.R. and Atkins, D.L.: A soluble neuronal factor alters contractile function of ventricular myocytes without effect on troponin T isoform expression. *Cardiovasc. Res.*, 41 (1999) 200-211; C.A., 130 (1999) 218710.
- 2432 Grünewald, S., Huyben, K., de Jong, J.G.N., Smeitink, J.A.M., Rubio, E., Boers, G.H.J., Conradt, H.S., Wendel, U. and Wevers, R.A.: β -Trace protein in human cerebrospinal fluid: a diagnostic marker for N-glycosylation defects in brain. *Biochim. Biophys. Acta*, 1455 (1999) 54-60.

- 2433 Kleine, T.O.: Heterogeneous humoral immune responses in cerebrospinal fluid arising from inflammatory diseases of the human central nervous system. Detection of oligoclonal immunoglobulin bands after isoelectric focusing. *Anal. Chim. Acta*, 393 (1999) 83-93.
- 2434 Koike, H., Seki, H., Kouchi, Z., Ito, M., Kinouchi, T., Tomioka, S., Sorimachi, H., Saido, T.C., Maruyama, K., Suzuki, K. and Ishiura, S.: Thimet oligopeptidase cleaves the full-length Alzheimer amyloid precursor protein at a β -secretase cleavage site in COS cells. *J. Biochem. (Tokyo)*, 126 (1999) 235-242.
- 2435 Kojima, S., Nakayama, T., Kuwajima, G., Suzuki, H. and Sakata, T.: TrkB mutant lacking the amino-terminal half of the extracellular portion acts as a functional brain-derived neurotrophic factor receptor. *Biochim. Biophys. Acta*, 1420 (1999) 104-110.
- 2436 McLaughlin, R.E. and Denny, J.B.: Palmitoylation of GAP-43 by the ER-Golgi intermediate compartment and Golgi apparatus. *Biochim. Biophys. Acta*, 1451 (1999) 82-92.
- 2437 Middlemas, D.S., Kihl, B.K., Zhou, J. and Zhu, X.: Brain-derived neurotrophic factor promotes survival and chemoprotection of human neuroblastoma cells. *J. Biol. Chem.*, 274 (1999) 16451-16460.
- 2438 Sergeant, N., Watzet, A. and Delacourte, A.: Neurofibrillary degeneration in progressive supranuclear palsy and corticobasal degeneration: tau pathologies with exclusively "exon 10" isoforms. *J. Neurochem.*, 72 (1999) 1243-1249; *C.A.*, 130 (1999) 295036.
- 2439 Vawter, M.P., Hemperly, J.J., Hyde, Th.M., Bachus, S.E., Vander-Putten, D.M., Howard, A.L., Cannon-Spoor, H.E., McCoy, M.T., Webster, M.J., Kleinman, J.E. and Freed, W.J.: VASE-containing N-CAM isoforms are increased in the hippocampus in bipolar disorder but not schizophrenia. *Exp. Neurol.*, 154 (1998) 1-11; *C.A.*, 130 (1999) 221541.
- For additional information see *C.A.*:
130 (1999) 278747.
- See also 2288, 2295, 2448.
- 19k. *Proteins of neoplastic tissue and transformed cells*
- 2440 Aoyagi, Y., Isokawa, O., Suda, T., Watanabe, M., Suzuki, Y. and Asakura, H.: The fucosylation index of α -fetoprotein as a possible prognostic indicator for patients with hepatocellular carcinoma. *Cancer*, 83 (1998) 2076-2082; *C.A.*, 130 (1999) 180783.
- 2441 Ishisaka, R., Sato, N., Tanaka, K., Takeshige, T., Iwata, H., Klostergaard, J. and Utsumi, T.: A part of the transmembrane domain of pro-TNF can function as a cleavable signal sequence that generates a biologically active secretory form of TNF. *J. Biochem. (Tokyo)*, 126 (1999) 413-420.
- 2442 Malkas, L.H., Hickey, R.J., Sekowski, J.W. and Bechtel, P.E.: Altered DNA synthesome components as biomarkers for malignancy. *PCT Int. Appl. WO 9916469 A1* 8 Apr. 1999, 76 pp.; *C.A.*, 130 (1999) 249128.
- 2443 Miyata, S., Koshikawa, N., Higashi, S., Miyagi, Y., Nagashima, Y., Yanoma, S., Kato, Y., Yasumitsu, H. and Miyazaki, K.: Expression of trypsin in human cancer cell lines and cancer tissues and its tight binding to soluble form of Alzheimer amyloid precursor protein in culture. *J. Biochem. (Tokyo)*, 125 (1999) 1067-1076.
- 2444 Skaar, T.C., Prasad, S.C., Sharareh, Sh., Lippman, M.E., Brunner, N. and Clarke, R.: Two-dimensional gel electrophoresis analyses identify nucleophosmin as an estrogen regulated protein associated with acquired mestrogen-independence in human breast cancer cells. *J. Steroid Biochem. Mol. Biol.*, 67 (1998) 391-402; *C.A.*, 130 (1999) 265702.
- See also 2208, 2211, 2266.
- 19l. *Specific binding and receptor proteins*
- 2445 Adam-Stitah, S., Penna, L., Chambon, P. and Rochette-Egly, C.: Hyperphosphorylation of the retinoid X receptor α by activated c-Jun NH₂-terminal kinases. *J. Biol. Chem.*, 271 (1999) 28932-18941.
- 2446 Baldwin, G.S. and Rorison, K.A.: Structural requirements for the binding of non-steroidal anti-inflammatory drugs to the 78 kDa gastrin binding protein. *Biochim. Biophys. Acta*, 1428 (1999) 68-76.
- 2447 Battersby, J.E., Vanderlaan, M. and Jones, A.J.S.: Purification and quantitation of tumor necrosis factor receptor immunoadhesin using a combination of immunoaffinity and reversed-phase chromatography. *J. Chromatogr. B*, 728 (1999) 21-33.
- 2448 Bhullar, R.P., McCartney, D.G. and Kanfer, J.N.: Heterotrimeric and small molecules mass GTP-binding proteins of rat brain neuronal and glial nuclei. *J. Neurosci. Res.*, 55 (1999) 80-86; *C.A.*, 130 (1999) 180354.
- 2449 Biscardi, J.S., Maa, M., Tice, D.A., Cox, M.E., Leu, T. and Parsons, S.J.: c-Src-Mediated phosphorylation of the epidermal growth factor receptor on Tyr⁸⁴⁵ and Tyr¹¹⁰¹ is associated with modulation of receptor function. *J. Biol. Chem.*, 274 (1999) 8335-8343.
- 2450 D'Alessandro, A.M., D'Andrea, G., di Ciccio, L., Brisdelli, F., Rinaldi, A.C., Bozzi, A. and Oratore, A.: 3'-Azido-3'-deoxythymidine reduces the rate of transferrin receptor endocytosis in K562 cells. *Biochim. Biophys. Acta*, 1450 (1999) 232-241.
- 2451 Gadgil, H. and Jarrett, H.W.: Heparin elution of transcription factors from DNA-Sepharose columns. *J. Chromatogr. A*, 848 (1999) 131-138.
- 2452 Gardner, T.G. and Kearse, K.P.: Modification of the T cell antigen receptor (TCR) complex by UDP-glucose:glycoprotein glucosyltransferase. TCR folding is finalized convergent with formation of $\alpha\beta\gamma\delta$ complexes. *J. Biol. Chem.*, 274 (1999) 14094-14099.
- 2453 Goldsmith, P.K., Fan, G., Ray, K., Shiloach, J., McPhie, P., Rogers, K.V. and Spiegel, A.M.: Expression, purification and biochemical characterization of the amino-terminal extracellular domain of the human calcium receptor. *J. Biol. Chem.*, 274 (1999) 11303-11309.
- 2454 Grosvenor, W., Feigin, A.M., Speilman, A.I., Finger, Th.E., Wood, M.R., Hansen, A., Kalinoski, D.L., Teeter, J.H. and Brand, J.G.: The arginine taste receptor: physiology, biochemistry, and immunohistochemistry. *Ann. N.Y. Acad. Sci.*, 855 (1998) 134-142; *C.A.*, 130 (1999) 265103.
- 2455 Hirata, Y., Nakahata, N., Ohkura, M. and Ohizumi, Y.: Identification of 30 kDa protein for Ca²⁺ releasing action of myotoxin a with a mechanism common to DIDS in skeletal muscle sarcoplasmic reticulum. *Biochim. Biophys. Acta*, 1451 (1999) 132-140.

- 2456 Ingham, C.J.: Characterisation of the enzymatic and RNA-binding properties of the *Rhodobacter sphaeroides* 2.4.1. Rho homologue. *Biochim. Biophys. Acta*, 1446 (1999) 115-125.
- 2457 Justova, V. and Lacinova, Z.: (Binding proteins of IGF-I as indicators of the impaired GH-IGF I axis). *Sb. Lek.*, 99 (1998) 141-151; *C.A.*, 130 (1999) 180650 - a review with 32 refs.
- 2458 Kasai, S.: Occurrence of P-flavin binding protein in *Vibrio fischeri* and properties of the protein. *J. Biochem. (Tokyo)*, 126 (1999) 307-312.
- 2459 Kumar, R. and Prasad, R.: Purification and characterization of a major zinc binding protein from renal brush border membrane of rat. *Biochim. Biophys. Acta*, 1419 (1999) 23-32.
- 2460 Lee, K., Hausman, D.B. and Dean, R.G.: Expression of CCAAT/enhancer binding protein C/EBP α , β and δ in rat adipose stromal-vascular cells *in vitro*. *Biochim. Biophys. Acta*, 1450 (1999) 397-405.
- 2461 Lee, S.H., Kim, M.C., Heo, W.D., Kim, J.C., Chung, W.S., Park, C.Y., Park, H.C., Cheong, Y.H., Kim, C.Y., Lee, S.-H., Lee, K.J., Bahk, J.D., Lee, S.Y. and Cho, M.J.: Competitive binding of calmodulin isoforms to calmodulin-binding proteins: implication for the function of calmodulin isoforms in plants. *Biochim. Biophys. Acta*, 1433 (1999) 56-67.
- 2462 Mukhopadhyay, S., Ananthanarayanan, M., Stieger, B., Meier, P.J., Suchy, F.J. and Anwer, M.S.: Sodium taurocholate cotransporting polypeptide is a serine, threonine phosphoprotein and is dephosphorylated by cyclic adenosine monophosphate. *Hepatology*, 28 (1998) 1629-1636; *C.A.*, 130 (1999) 194776.
- 2463 Murayama, T., Oba, T., Katayama, E., Oyamada, H., Oguchi, K., Kobayashi, M., Otsuka, K. and Ogawa, Y.: Further characterization of the type 3 ryanodine receptor (RyR3) purified from rabbit diaphragm. *J. Biol. Chem.*, 274 (1999) 17297-17308.
- 2464 Nakamura, N. and Tanigawa, Y.: Biochemical analysis of the receptor for ubiquitin-like polypeptide. *J. Biol. Chem.*, 274 (1999) 18026-18032.
- 2465 Nakanishi, K., Yaoi, K., Shimada, N., Kadotani, T. and Sato, R.: *Bacillus thuringiensis* insecticidal Cry1Aa toxin binds to a highly conserved region of aminopeptidase N in the host insect leading to its evolutionary success. *Biochim. Biophys. Acta*, 1432 (1999) 57-63.
- 2466 Okamura, N., Kiuchi, S., Tamba, M., Kashima, T., Hiramoto, S., Baba, T., Dacheux, F., Dacheux, J.-L., Sugita, Y. and Jin, Y.-Z.: A porcine homolog of the major secretory protein of human epididymis, HE1, specifically binds cholesterol. *Biochim. Biophys. Acta*, 1438 (1999) 377-387.
- 2467 Pajor, A.M. and Sun, N.: Protein kinase C-mediated regulation of the renal Na⁺/dicarboxylate cotransporter, NaDC-1. *Biochim. Biophys. Acta*, 1420 (1999) 223-230.
- 2468 Piccart, M.J., Trivedi, S., Maaroufi, Y., Debbaudt, A., Veenstra, S. and Leclercq, G.: Evolution towards hormone independence of the MXT mouse mammary tumor is associated with a gradual change in its estrogen receptor molecular polymorphism. *Cancer Biochem. Biophys.*, 16 (1998) 169-182; *C.A.*, 130 (1999) 221300.
- 2469 Rorison, K.A., Neumann, G.M. and Baldwin, G.S.: Binding of pepsinogen to the 78 kDa gastrin binding protein. *Biochim. Biophys. Acta*, 1428 (1999) 21-28.
- 2470 Shang, Y., Baumrucker, C.R. and Green, M.H.: Signal relay by retinoic acid receptors α and β in the retinoic acid-induced expression of insulin-like growth factor-binding protein-3 in breast cancer cells. *J. Biol. Chem.*, 274 (1999) 18005-18010.
- 2471 Sondermann, P., Jacob, U., Kutscher, C. and Frey, J.: Characterization and crystallization of soluble human Fc γ receptor II (CD32) isoforms produced in insect cells. *Biochemistry*, 38 (1999) 8469-8477.
- 2472 Watanabe, N., Kawashima, H., Li, Y.-F. and Miyasaka, M.: Identification and characterization of ligands for L-selectin in the kidney. III. Characterization of L-selectin reactive heparan sulfate proteoglycans. *J. Biochem. (Tokyo)*, 125 (1999) 826-831.
- 2473 Zeng, F. and Wess, J.: Identification and molecular characterization of m3 muscarinic receptor dimers. *J. Biol. Chem.*, 274 (1999) 19487-19497.
- 2474 Zhang, J.-H., Hanesworth, J.M., Sardinia, M.F., Alt, J.A., Wright, J.W. and Harding, J.W.: Structural analysis of angiotensin IV receptor (AT₄) from selected bovine tissues. *J. Pharmacol. Exp. Ther.*, 289 (1999) 1075-1083.

For additional information see C.A.:
130 (1999) 265741, 279586.

See also 2200, 2295, 2303, 2326, 2364, 2385, 2389, 2390, 2484, 2488, 2491, 2619, 2635, 2669, 2735, 2812, 2819, 2845.

19m. Urinary proteins

- 2475 Kaplan, I.V. and Levinson, S.S.: Misleading urinary protein pattern in a patient with hypogammaglobulinemia: effects of mechanical concentration of urine. *Clin. Chem. (Washington)*, 45 (1999) 417-419.
- 2476 Marshall, T. and Williams, K.M.: Electrophoretic analysis of Bence Jones proteinuria. *Electrophoresis (Weinheim)*, 20 (1999) 1307-1324 - a review with 156 refs.
- 2477 Roach, B.M., Meinke, J.S., Sridhar, N. and Vladutiu, A.O.: Multiple narrow bands in urine protein electrophoresis. *Clin. Chem. (Washington)*, 45 (1999) 716-718.

See also 2211, 2367, 2892.

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

- 2478 Asquith, T.N., Gauggel, D.L., Esquer-Blasco, R., Anderson, N.L. and Isfort, R.J.: Confirmed identities of proteins from a two-dimensional map of Syrian hamster embryo cells. *Electrophoresis (Weinheim)*, 20 (1999) 1646-1651.
- 2479 Danilenko, D.M.D.M., Monstrestrique, S., Philo, J.S., Li, T., Hill, D., Speakman, J., Bahru, M., Zhang, M., Konishi, M., Itoh, N., Chirica, M., Delaney, J., Hernday, N., Martin, F., Hara, Sh., Talvenheimmo, J. et al.: Recombinant rat fibroblast growth factor-16: structure and biological activity. *Arch. Biochem. Biophys.*, 361 (1999) 34-46; *C.A.*, 130 (1999) 205273.
- 2480 Inal, J.M.: Schistosoma TOR (trispinning orphan receptor), a novel, antigenic surface receptor of the blood-dwelling, *Schistosoma* parasite. *Biochim. Biophys. Acta*, 1445 (1999) 283-298.
- 2481 Kalume, D.E., Rafn, K., Andersen, S.O., Norhoff, E. and Roepstorff, P.: Identification and sequencing of two cuticular proteins from the migratory locust (*Locusta migratoria*) using a combination of Edman degradation and mass spectrometric techniques. *Adv. Mass Spectrom.*, 14 (1998) C075010/1-C075010/17; *C.A.*, 130 (1999) 279423.

- 2482 Kovalev, L.I., Ershova, E.S., Obel'chuk, L.I., Tsomartova, D.A., Khasigov, P.Z., Severin, V.V., Ryaboshtanova, E.I., Il'inskii, I.M. and Shishkin, S.S.: Changes of α -B-crystallin in cardiac grafts. *Bull. Exp. Biol. Med.*, 125 (1998) 162-164; *C.A.*, 130 (1999) 180889.
- 2483 Lee, M., Christopherson, I.P., Lehman, J.M., Bennett, C.J. and Cheung, H.T.: Comparison of bone marrow extracellular matrices. *Biochim. Biophys. Acta*, 1428 (1999) 300-304.
- 2484 Liu, J., Chen, P., Wang, D. and Halpern, M.: Signal transduction in the vomeronasal organ of garter snakes: ligand-receptor binding-mediated protein phosphorylation. *Biochim. Biophys. Acta*, 1450 (1999) 320-330.
- 2485 Miceli, D.C., Llanos, R., Diaz, M.J. and Peralta, L.: Phosphorylation of endogenous and TEST-yolk buffer proteins by intact human sperm. *Zygote*, 6 (1998) 203-212; *C.A.*, 130 (1999) 220951.
- 2486 Nam, J.-H., Wuatt, L.S., Chae, S.-L., Cho, H.-W., Park, Y.-K. and Moss, B.: Protection against lethal Japanese encephalitis virus infection of mice by immunization with the highly attenuated MVA strain of vaccinia virus expressing JEV prM and E genes. *Vaccine*, 17 (1998) 261-268; *C.A.*, 130 (1999) 266068.
- 2487 Neumann, J., Bartel, S., Eschenhagen, Th., Haverich, A., Hirt, S., Karczewski, P., Krause, E.-G., Schmitz, W., Scholz, H., Stein, B. and Thoenes, M.: Dissociation of the effects of forskolin and dibutyl cAMP on force of contraction and phospholamban phosphorylation in human heart failure. *J. Cardiovasc. Pharmacol.*, 33 (1999) 157-162; *C.A.*, 130 (1999) 180914.
- 2488 Rodriguez, C. and Killian, G.: Identification of ampullary and isthmic oviductal fluid proteins that associate with the bovine sperm membrane. *Anim. Reprod. Sci.*, 54 (1998) 1-12; *C.A.*, 130 (1999) 220758.
- 2489 Sakahira, H., Enari, M. and Nagata, S.: Functional differences of two forms of the inhibitor of caspase-activated DNase, ICAD-L and ICAD-S. *J. Biol. Chem.*, 274 (1999) 15740-15744.
- 2490 Sugimoto, Y., Sanuki, S., Ohsako, S., Higashimoto, Y., Kondo, M., Kurawaki, J., Ibrahim, H.R., Aoki, T., Kusakabe, T. and Koga, K.: Ovalbumin in developing chicken eggs migrates from egg white to embryonic organs while changing its conformation and thermal stability. *J. Biol. Chem.*, 274 (1999) 11030-11037.
- 2491 Sui, G.-C., Mångs, H. and Wiman, B.: The role of His¹⁴³ for the pH-dependent stability of plasminogen activator inhibitor-1. *Biochim. Biophys. Acta*, 1434 (1999) 58-63.
- 2492 Toyama, M., Horiguchi, R., Sugimoto, T., Yamada, S., Ishikawa, K. and Tokumoto, T.: Characterization of active proteasome (26S proteasome) involved in *Bufo japonicus* oocyte maturation. *Biomed. Res.*, 19 (1998) 253-260; *C.A.*, 130 (1999) 278432.
- 2493 Wattiez, R., Hermans, C., Bernard, A., Lesur, O. and Falmagne, P.: Human bronchoalveolar lavage fluid: two-dimensional gel electrophoresis, amino acid microsequencing and identification of major proteins. *Electrophoresis (Weinheim)*, 20 (1999) 1634-1645.
- 2494 Yeh, M.-S., Chen, Y.-L. and Tsai, I.-H.: The hemolymph cottable proteins of tiger shrimp, *Penaeus monodon*, and related species. *Comp. Biochem. Physiol., Part B: Biochem. Mol. Biol.*, 121B (1998) 169-176; *C.A.*, 130 (1999) 180118.
- 2495 Yi, S.-X. and Gillott, C.: Purification and characterization of an oviposition-stimulating protein of the long hyaline tubules in the male migratory grasshopper, *Melanoplus sanguinipes*. *J. Insect Physiol.*, 45 (1999) 143-150; *C.A.*, 130 (1999) 278280.
- 2496 Zarnescu, O., Mester, R. and Buzgariu, W.: (Electrophoretic detection of vitelline proteins during oocyte development in *Rana ridibunda*). *Stud. Cercet. Biol., Ser. Biol. Anim.*, 50 (1998) 37-41; *C.A.*, 130 (1999) 180203.
- 2497 Zozulinska, D., Majchrzak, A., Sobieska, M., Wiktorowicz, K. and Wierusz-Wysocka, B.: Acute phase reactive proteins as indicators of inflammatory focuses in type 1 diabetic patients. *Diabetes Res.*, 33 (1998) 1-7; *C.A.*, 130 (1999) 280190.

For additional information see *C.A.*:
130 (1999) 278808.

See also 2252, 2443, 2625, 2775, 2782, 2893.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

20a. Oxidoreductases

- 2498 Akaba, S., Seo, M., Dohmae, N., Takio, K., Sekimoto, H., Kamiya, Y., Furuya, N., Komano, T. and Koshiha, T.: Production of homo- and hetero-dimeric isozymes from two aldehyde oxidase genes of *Arabidopsis thaliana*. *J. Biochem. (Tokyo)*, 126 (1999) 395-a401.
- 2499 Akaba, Sh., Leydecker, M.-Th., Moreaux, Th., Oritani, T. and Koshiha, T.: Aldehyde oxidase in wild type and aba1 mutant leaves of *Nicotiana glumbaginifolia*. *Plant Cell Physiol.*, 39 (1998) 1281-1286; *C.A.*, 130 (1999) 179936.
- 2500 Barron, M.C. and de Mejia, E.G.: Comparative study of enzymes related to proline metabolism in tepary bean (*Phaseolus acutifolius*) and common bean (*Phaseolus vulgaris*) under drought and irrigated conditions, and various urea concentrations. *Plant Food Hum. Nutr. (Dordrecht)*, 52 (1998) 119-132; *C.A.*, 130 (1999) 207408.
- 2501 Bodker, L., Kjoller, R. and Rosendahl, S.: Effect of phosphate and the arbuscular mycorrhizal fungus *Glomus intraradices* on disease severity of root rot of peas (*Pisum sativum*) caused by *Aphanomyces euteiches*. *Mycorrhiza*, 8 (1998) 169-174; *C.A.*, 130 (1999) 181943.
- 2502 Colrat, S., Deswarte, C., Latche, A., Klaebe, A., Bouzyen, M., Fallot, J. and Roustan, J.P.: Enzymic detoxification of eutypine, a toxin from *Eutypa lata*, by *Vitis vinifera* cells. Partial purification of an NADPH-dependent aldehyde reductase. *Planta*, 207 (1999) 544-550; *C.A.*, 130 (1999) 180058.
- 2503 Fischer, H., Becker, J.C., Boknik, P., Huber, V., Lüss, H., Neumann, J., Schmitz, W., Domschke, W., Stachura, J. and Konturek, J.W.: Expression of constitutive nitric oxide synthase in rat and human gastrointestinal tract. *Biochim. Biophys. Acta*, 1450 (1999) 414-422.
- 2504 Lee, D.-J. and Kim, S.-S.: The regulation of 5' upstream regions of a Korean radish cationic peroxidase gene by gibberellic acid and abscisic acid. *Plant Sci. (Shannon)*, 139 (1998) 105-115; *C.A.*, 130 (1999) 178201.
- 2505 Ludikhuyze, L.R., Indrawati, van den Broeck, I., Weemaes, C.A. and Hendrickx, M.E.: High pressure and thermal denaturation kinetics of soybean lipoxygenase: a study based on gel electrophoresis. *Lebensm.-Wiss. Technol.*, 31 (1998) 680-686; *C.A.*, 130 (1999) 295798.

- 2506 Madi, L. and Katan, J.: Penicillium Janczewskii and its metabolites, applied to leaves, elicit systemic acquired resistance to stem rot caused by *Rhizoctonia solani*. *Physiol. Mol. Plant Pathol.*, 53 (1998) 163-175; *C.A.*, 130 (1999) 220493.
- 2507 Melo, A.M.P., Duarte, M. and Videira, A.: Primary structure and characterisation of a 64 kDa NADH dehydrogenase from the inner membrane of *Neurospora crassa* mitochondria. *Biochim. Biophys. Acta*, 1412 (1999) 282-287.
- 2508 Mueller, J. and Rydström, J.: The membrane topology of proton-pumping *Escherichia coli* transhydrogenase determined by cysteine labeling. *J. Biol. Chem.*, 274 (1999) 19072-119080.
- 2509 Morrison, S.C., Wood, D.A. and Wood, P.M.: Characterization of a glucose 3-dehydrogenase from the cultivated mushroom (*Agaricus bisporus*). *Appl. Microbiol. Biotechnol.*, 51 (1999) 58-64; *C.A.*, 130 (1999) 278431.
- 2510 Müller-Enoch, D.: Investigations on the role of cytochrome bs and divalent cations in the maximal nifedipine oxidase activity of human liver. *Arzneim.-Forsch.*, 49 (1999) 470-475.
- 2511 Pereira, M.M., Santana, M., Soares, C.M., Mendes, J., Carita, J.N., Fernandes, A.S., Saraste, M., Carrondo, M.A. and Teixeira, M.: The *caa3* terminal oxidase of the thermophilic bacterium *Rhodothermus marinus*: a HiPIP: oxygen oxidoreductase lacking the key glutamate of the D-channel. *Biochim. Biophys. Acta*, 1413 (1999) 1-13.
- 2512 Smilda, T., Jekel, P.A., Bruining, M.A.M. and Beintema, J.J.: Binding of inhibiting adducts of ketones and NAD⁺ to alcohol dehydrogenase from *Drosophila melanogaster*. *Bioorg. Chem.*, 26 (1998) 233-243; *C.A.*, 130 (1999) 293140.
- 2513 Sun, L., Sun, T. and Lavker, R.M.: Identification of a cytosolic NADP⁺-dependent isocitrate dehydrogenase that is preferentially expressed in bovine corneal epithelium. A corneal epithelial crystallin. *J. Biol. Chem.*, 274 (1999) 17334-17341.
- 2514 Suto, R.K., Whalen, M.A. and Finke, R.G.: Adenosylcobalamin-dependent ribonuclease triphosphate reductase from *Lactobacillus leichmannii*. Rapid, improved purification involving dGTP-based affinity chromatography plus biophysical characterization studies demonstrating enhanced "crystallographic level" purity. *Prepar. Biochem. Biotechnol.*, 29 (1999) 273-309.
- 2515 Toyofuku, K., Wada, I., Hirotsuki, K., Park, J.S., Hori, Y. and Jimbow, K.: Promotion of tyrosinase folding in COS 7 cells by calnexin. *J. Biochem. (Tokyo)*, 125 (1999) 82-89.
- 2516 Voegelé, R.T., Mitsch, M.J. and Finan, T.M.: Characterization of two members of a novel malic enzyme class. *Biochim. Biophys. Acta*, 1432 (1999) 275-285.
- 2517 Wada, M., Kawabata, H., Kataoka, M., Yasohara, Y., Kizaki, N., Hasegawa, J. and Shimizu, S.: Purification and characterization of an aldehyde reductase from *Candida magnoliae*. *J. Mol. Catal. B: Enzym.*, 6 (1999) 333-339; *C.A.*, 130 (1999) 293092.
- 2518 Yamamura, A., Sakaguchi, T., Murakami, Y., Yokoyama, K. and Tamiya, E.: Purification and characterization of cold-active L-glutamate dehydrogenase independent of NAD(P) and oxygen. *J. Biochem. (Tokyo)*, 125 (1999) 760-769.
- 2519 Yamano, S., Sako, Y., Nomura, N. and Maruyama, T.: A cambialistic SOD in a strictly aerobic hyperthermophilic archaeon, *Aeropyrum pernix*. *J. Biochem. (Tokyo)*, 126 (1999) 218-225.
- 2520 Yumoto, I., Iwata, H., Sawabe, T., Ueno, K., Ichise, N., Matsuyama, H., Okuyama, H. and Kawasaki, K.: Characterization of a facultatively psychrophilic bacterium, *Vibrio rumoiensis* sp. nov., that exhibits high catalase activity. *Appl. Environ. Microbiol.*, 65 (1999) 67-72; *C.A.*, 130 (1999) 207087.
- 2521 Zhang, X., van Leeuwen, J., Wichers, H.J. and Flurkey, W.H.: Characterization of tyrosinase from the cap flesh of portabella mushrooms. *J. Agric. Food Chem.*, 47 (1999) 374-378.

For additional information see *C.A.*:
130 (1999) 293977.

See also 2304, 2502, 2631.

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

- 2522 Abe, S., Gunji, H., Kunii, S., Kuraya, M., Fujita, T. and Hiraiwa, K.: Semen specific γ -glutamyltransferase carries ABH antigens: a sandwich ELISA for simultaneous semen detection and its ABO blood typing. *Clin. Chim. Acta*, 283 (1999) 183-194.
- 2523 Armisen, P., Mateo, C., Cortés, E., Barredo, J.L., Salto, F., Diez, B., Rodés, L., García, J.L., Fernández-Lafuente, R. and Guisán, J.M.: Selective adsorption of poly-His tagged glutaryl acylase on tailor-made metal chelate supports. *J. Chromatogr. A*, 848 (1999) 61-70.
- 2524 Barbour, S.E., Kapur, A. and Deal, C.L.: Regulation of phosphatidylcholine homeostasis by calcium-independent phospholipase A₂. *Biochim. Biophys. Acta*, 1439 (1999) 77-88.
- 2525 Bhat, B.G., Wang, P., Kim, J.-H., Black, T.M., Lewin, T.M., Fiedorek, F.T., Jr. and Coleman, R.A.: Rat sn-glycerol-3-phosphate acyltransferase: molecular cloning and characterization of the cDNA and expressed protein. *Biochim. Biophys. Acta*, 1439 (1999) 415-423.
- 2526 Endo, S., Ishiguro, S.-i. and Tamai, M.: Possible mechanism for the decrease of mitochondrial aspartate aminotransferase activity in ischemic and hypoxic rat retinas. *Biochim. Biophys. Acta*, 1450 (1999) 385-396.
- 2527 Hitomi, K., Kanehiro, S., Ikura, K. and Maki, M.: Characterization of recombinant mouse epidermal-type transglutaminase (TGase 3): regulation of its activity by proteolysis and guanidine nucleotides. *J. Biochem. (Tokyo)*, 125 (1999) 1048-1054.
- 2528 Ikushiro, S.-i., Emi, Y., Kimura, S. and Iyanagi, T.: Chemical modification of rat hepatic microsomes with N-ethylmaleimide results in inactivation of both UDP-N-acetylglucosamine-dependent stimulation of glucuronidation and UDP-glucuronic acid uptake. *Biochim. Biophys. Acta*, 1428 (1999) 388-396.
- 2529 Kimura, H., Suetake, I. and Tajima, S.: *Xenopus* maintenance-type DNA methyltransferase is accumulated and translocated into germinal vesicles of oocytes. *J. Biochem. (Tokyo)*, 125 (1999) 1175-1182.
- 2530 Konishi, N., Torii, Y., Yamamoto, T., Miyagi, A., Ohta, H., Fukui, K., Hanamoto, S., Matsuno, H., Komatsu, H., Kodama, T. and Katayama, E.: Structure and enzymatic properties of genetically truncated forms of the water-insoluble glucan-synthesizing glucosyltransferase from *Streptococcus sobrinus*. *J. Biochem. (Tokyo)*, 126 (1999) 287-295.
- 2531 Lecomte, I. and Le Floch, F.: Adenine phosphoribosyltransferase of peach tree leaves. Purification and properties. *J. Plant Physiol.*, 154 (1999) 289-295; *C.A.*, 130 (1999) 263910.

- 2532 Ozawa, S., Shimizu, M., Katoh, T., Miyajima, A., Ohno, Y., Matsumoto, Y., Fukuoka, M., Tang, Y.-M., Lang, N.P. and Kadlubar, F.F.: Sulfating-activity and stability of cDNA-expressed allozymes of human phenol sulfotransferase, ST1A3*1 (²¹³Arg) and ST1A3*2 (²¹³His), both of which exist in Japanese as well as Caucasians. *J. Biochem. (Tokyo)*, 126 (1999) 271-277.
- 2533 Revers, L., Bill, R.M., Wilson, I.B.H., Watt, G.M. and Flitsch, S.L.: Development of recombinant, immobilised β -1,4-mannosyltransferase for use as an efficient tool in the chemoenzymatic synthesis of N-linked oligosaccharides. *Biochim. Biophys. Acta*, 1428 (1999) 88-98.
- 2534 Shin, B.-S., Choi, S.-K. and Park, S.-H.: Regulation of the *Bacillus subtilis* phosphotransacetylase gene. *J. Biochem. (Tokyo)*, 126 (1999) 333-339.
- 2535 Yao, D.-F., Huang, Z.-W., Chen, S.-Z., Huang, J.-F., Lu, J.-X., Xiao, M.-B. and Meng, X.-Y.: Diagnosis of hepatocellular carcinoma by quantitative detection of hepatoma-specific bands of serum γ -glutamyltransferase. *Am. J. Clin. Pathol.*, 110 (1998) 743-749; *C.A.*, 130 (1999) 193837.
- For additional information see *C.A.*:
130 (1999) 279696.
- See also 2798.
- 20c. *Transferases transferring phosphorus containing groups (E.C. 2.7.-.-)*
- 2536 Amé, J.-Ch., Rolli, V., Schreiber, V., Neidergang, C., Apiou, F., Decker, P., Muller, S., Höger, T., Ménissier-de Murcia, J. and de Murcia, G.: PARP-2, a novel mammalian DNA damage-dependent poly(ADP-ribose) polymerase. *J. Biol. Chem.*, 274 (1999) 17860-17868.
- 2537 Barinova, A.A., Nakajima, M. and Fujio, Y.: Polymorphism of a null allele for AK and MDH isoenzymes in the guppy *Poecilia reticulata*, with a partial sex-linked inheritance. *Tohoku J. Agric. Res.*, 49 (1998) 1-9; *C.A.*, 130 (1999) 194597.
- 2538 David, S.S.M. and Haley, B.E.: ATP nucleotidylation of creatine kinase. *Biochemistry*, 38 (1999) 8492-8500.
- 2539 De Wit, R., Boonstra, J., Verkleij, A.J. and Post, J.A.: Large scale screening assay for the phosphorylation of mitogen-activated protein kinase in cells. *J. Biomol. Screening*, 3 (1998) 277-284; *C.A.*, 130 (1999) 278372.
- 2540 Farmer, P.K. and Choi, J.H.: Calcium and phospholipid activation of a recombinant calcium-dependent protein kinase (DcCPK1) from carrot (*Daucus carota* L.) *Biochim. Biophys. Acta*, 1434 (1999) 6-17.
- 2541 Jean, M.E.J., Noroozi, M., Kelly, I., Burns, J., Talwar, D., Sattar, N. and Crozier, A.: Dietary flavonols protect diabetic human lymphocytes against oxidative damage to DNA. *Diabetes*, 48 (1999) 176-181; *C.A.*, 130 (1999) 181847.
- 2542 Krasil'nikov, M.A., Shatskaya, V.A., Stavrovskaya, A.A., Erohina, M., Gershtein, E.S. and Adler, V.V.: The role of phosphatidylinositol 3-kinase in the regulation of cell response to steroid hormones. *Biochim. Biophys. Acta*, 1450 (1999) 434-443.
- 2543 Krugmann, S., Hawkins, P.T., Pryer, N. and Braselmann, S.: Characterizing the interactions between the two subunits of the p¹⁰¹/p¹¹⁰ γ phosphoinositide 3-kinase and their role in the activation of this enzyme by G $\beta\gamma$ subunits. *J. Biol. Chem.*, 274 (1999) 17152-17158.
- 2544 Miyata, Y., Adachi, S., Mizuno, H. and Nishida, E.: A strategy to make constitutively active MAP kinase by fusing with constitutively active MAP kinase kinase. *Biochim. Biophys. Acta*, 1451 (1999) 334-342.
- 2545 Mounsey, J.P., Lu, K.P., Patel, M.K., Chen, Z.-h., Horne, L.T., John, J.E., III, Means, A.R., Jones, L.R. and Moorman, J.R.: Modulation of Xenopus oocyte-expressed phospholemman-induced ion currents by co-expression of protein kinases. *Biochim. Biophys. Acta*, 1451 (1999) 305-318.
- 2546 Roy, K., Mandal, A.K., Sikdar, R., Majumdar, S., Ono, Y. and Sen, P.C.: Unsaturated fatty acid-activated protein kinase (PKx) from goat testis cytosol. *Biochim. Biophys. Acta*, 1434 (1999) 161-169.
- 2547 Sartori, M., Ceolotto, G. and Semplicini, A.: MAPKinase and regulation of the sodium-proton exchanger in human red blood cell. *Biochim. Biophys. Acta*, 1421 (1999) 140-148.
- 2548 Tozawa, T. and Hashimoto, M.: (Effect of macro-creatine kinase in serum on dry chemistry methods results for total creatine kinase activity). *Rinsho Byori*, 47 (1999) 149-154; *C.A.*, 130 (1999) 206552.
- 2549 Zhou, M., Huang, Y. and Liu, Y.: (A new fluorescent scanning technique in quantitative determination of isoenzymes of creatine kinase). *Hunan Yike Daxue Xuebao*, 23 (1998) 505-507; *C.A.*, 130 (1999) 248585.
- 20d. *Hydrolases, acting on ester bonds (E.C. 3.1.-.-)*
- 2550 Andoh, K., Jin-Hua, P., Terashima, K., Nakamura, H. and Sano, K.: Genomic structure and promoter analysis of the ecto-phosphodiesterase I gene (PDNP3) expressed in glial cells. *Biochim. Biophys. Acta*, 1446 (1999) 213-224.
- 2551 Battinelli, L., Castagnola, M., Cernia, E., Delbo, M., Padula, F., Pala, A. and Soro, S.: A three-steps chromatographic procedure and electrophoretic characterization of an active isoform of *Candida rugosa* lipases. *Int. J. Bio-Chromatogr.*, 4 (1998) 125-137; *C.A.*, 130 (1999) 293117.
- 2552 Diczfalusy, M.A., Andersson, U., Björkhem, I., Einarsson, C. and Alexson, S.E.H.: Microsomal long-chain acyl-CoA thioesterase (carboxylesterase ES-4) is regulated by thyroxine. *Biochim. Biophys. Acta*, 1439 (1999) 40-46.
- 2553 Felten, C., Quan, C.P., Chen, A.B., Canova-Davis, E., Mc Nerney, T., Goetzinger, W.K. and Karger, B.L.: Use of acidic and basic pH and calcium ion addition in the capillary zone electrophoretic characterization of recombinant human deoxyribonuclease, a complex phosphoglycoprotein. *J. Chromatogr. A*, 853 (1999) 295-308.
- 2554 Hernández-Hernández, A., Llanillo, M., Rodríguez, M.C., Gómez, F. and Sánchez-Yagüe, J.: Amphiphilic and hydrophilic nature of sheep and human platelet phosphotyrosine phosphatase forms. *Biochim. Biophys. Acta*, 1419 (1999) 195-206.
- 2555 Lee, Y.H., Kim, S.-Y., Kim, J.-R., Kim, K.Y., Kim, M.J., Ryu, S.H., Suh, P.-G. and Kim, J.-H.: Overexpression of phospholipase C- γ 1 suppresses UVC-induced apoptosis through inhibition of c-fos accumulation and c-Jun N-terminal kinase activation in PC12 cells. *Biochim. Biophys. Acta*, 1440 (1999) 235-243.
- 2556 Liyanage, A.S.U., Manawaprema, M.M.C. and Mendis, M.H.: Differentiation of A & B genome of banana and plantain (*Musa* spp.) by esterase enzyme. *J. Natl. Sci. Council. Sri Lanka*, 26 (1998) 125-131; *C.A.*, 130 (1999) 180014.

- 2557 Markova, M., Vodenicharova, M., Stoilova, Ts. and Cholakova, N.: Application of seed esterase isoenzymes in testing hybridity of tomato. *Biol. Plant.*, 41 (1998) 265-269; *C.A.*, 130 (1999) 194273.
- 2558 Moriyama, T., Urade, R. and Kito, M.: Purification and characterization of diacylglycerol lipase from human platelets. *J. Biochem. (Tokyo)*, 125 (1999) 1077-1085.
- 2559 Poupon, V., Bègue, B., Gagnon, J., Dautry-Varsat, A., Cerf-Benussan, N. and Benmerah, A.: Molecular cloning and characterization of MT-ACT48, a novel mitochondrial acyl-CoA thioesterase. *J. Biol. Chem.*, 274 (1999) 19188-19194.
- 2560 Roknabadi, S.M., Bose, S.K. and Taneja, V.: A histidine thiol 100 kDa, tetrameric acid phosphatase from lentil, *Lens esculenta*, seeds with the characteristics of protein tyrosine phosphatases. *Biochim. Biophys. Acta*, 1433 (1999) 272-280.
- 2561 Tanaka, H., Mierau, I. and Ito, F.: Purification and characterization of bovine pancreatic bile salt-activated lipase. *J. Biochem. (Tokyo)*, 125 (1999) 883-890.
- 2562 Uchiyama, S.-i., Miyazaki, Y., Amakasu, Y., Kuwata, H., Nakatani, Y., Atsumi, G.-i., Murakami, M. and Kudo, I.: Characterization of heparin low-affinity phospholipase A₁ present in brain and testicular tissue. *J. Biochem. (Tokyo)*, 125 (1999) 1001-1010.
- See also 2524, 2622.
- 20e. *Hydrolases, acting on glycosyl compounds (E.C. 3.2.-.-)*
- 2563 Attanasio, F., Bruschi, M., Candiano, G., Galletto, R., Musante, L., Schülein, M. and Rialdi, G.: Analytical titration curves of glycosyl hydrolase Cel45 by combined isoelectric focusing - electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1403-1411.
- 2564 Carrio, M.M., Corchero, J.L. and Villaverde, A.: Proteolytic digestion of bacterial inclusion body proteins during dynamic transition between soluble and insoluble forms. *Biochim. Biophys. Acta*, 1434 (1999) 170-176.
- 2565 Connerton, I., Cummings, N., Harris, G.W., Debeire, P. and Breton, C.: A single domain thermophilic xylanase can bind insoluble xylan: evidence for surface aromatic clusters. *Biochim. Biophys. Acta*, 1433 (1999) 110-121.
- 2566 He, X., Miranda, S.R.P., Xiong, X., Dagan, A., Gatt, S. and Schuchman, E.H.: Characterization of human acid sphingomyelinase purified from the media of overexpressing Chinese hamster ovary cells. *Biochim. Biophys. Acta*, 1432 (1999) 251-264.
- 2567 Jin, Y.-Z., Dacheux, F., Dacheux, J.-L., Bannai, S., Sugita Y. and Okamura, N.: Purification and properties of major α -D-mannosidase in the luminal fluid of porcine epididymis. *Biochim. Biophys. Acta*, 1432 (1999) 382-392.
- 2568 Kondo, E., Horii, A. and Fukushige, S.: The human PMS2L proteins do not interact with hMLH1, a major DNA mismatch repair protein. *J. Biochem. (Tokyo)*, 125 (1999) 818-825.
- 2569 Percin, E.F. and Goze, A.I.: A new phenotype in the phosphoglucomutase 1 (PGM1) system, PGM1*W32. *Turk. J. Med. Sci.*, 28 (1998) 605-608; *C.A.*, 130 (1999) 279734.
- 2570 Sandhya, S. and Schweder, T.: Induction and analysis of glucose starvation proteins by *Bacillus subtilis*. *J. Sci. Ind. Res.*, 57 (1998) 563-566; *C.A.*, 130 (1999) 192608.
- 2571 Takashima, S., Nakamura, A., Hidaka, M., Masaki, H. and Uozumi, T.: Molecular cloning and expression of the novel fungal β -glucosidase genes from *Humicola grisea* and *Trichoderma reesei*. *J. Biochem. (Tokyo)*, 125 (1999) 728-736.
- 2572 Yamamoto, K., Tanaka, T., Fujimori, K., Kang, Ch.-Sh., Ebihara, H., Kanamori, J. and Kadowaki, S., Tochikura, T. and Kumagai, H.: Characterization of *Bacillus* sp. endo- β -N-acetylglucosaminidase and its application to deglycosylation of hen ovomucoid. *Biotechnol. Appl. Biochem.*, 28 (1998) 235-242; *C.A.*, 130 (1999) 179171.
- See also 2340.
- 20f. *Other hydrolases*
- 2573 Arnold, I., Pfeiffer, K., Neupert, W., Stuart, R.A. and Schagger, H.: Yeast mitochondrial F1F0-ATP synthase exists as a dimer: identification of three dimer-specific subunits. *EMBO J.*, 17 (1998) 7170-7178; *C.A.*, 130 (1999) 206662.
- 2574 Bottles, K.D., Bullen, E.C., Updike, D.L., Vu, T.-K.H., Phelps, E., Grammas, P. and Howard, E.W.: Gelatinase A expression in endothelial cells is regulated by at least two cis-acting promoter elements. *Biochim. Biophys. Acta*, 1428 (1999) 147-160.
- 2575 Dahlen, J.R., Foster, D.C. and Kisiel, W.: Inhibition of neutrophil elastase by recombinant human proteinase inhibitor 9. *Biochim. Biophys. Acta*, 1451 (1999) 233-241.
- 2576 Fox, J., Li, Y.-T., Dawson, G., Alleman, A., Johnsrude, J., Schumacher, J. and Homer, B.: Naturally occurring GM2 gangliosidosis in two Muntjak deer with pathological and biochemical features of human classical Tay-Sachs disease (type B GM2 gangliosidosis). *Acta Neuropathol.*, 97 (1999) 57-62; *C.A.*, 130 (1999) 280283.
- 2577 Fricke, B., Parchmann, O., Kruse, K., Rücknagel, P., Schierhorn, A. and Menge, S.: Characterization and purification of an outer membrane metalloproteinase from *Pseudomonas aeruginosa* with fibrinolytic activity. *Biochim. Biophys. Acta*, 1454 (1999) 236-250.
- 2578 Fujisawa, T., Hattori, T., Takahashi, K., Kuboki, T., Yamashita, A. and Takigawa, M.: Cyclic mechanical stress induces extracellular matrix degradation in cultured chondrocytes via gene expression of matrix metalloproteinases and interleukin-1. *J. Biochem. (Tokyo)*, 125 (1999) 966-975.
- 2579 Gebauer, W. and Harris, J.R.: Controlled cleavage of KLH1 and KLH2 by the V8 protease from *Staphylococcus aureus*. Reassociation, electrophoretic and transmission electron microscopy study of peptide fragments. *Eur. J. Biochem.*, 262 (1999) 166-175.
- 2580 Goldshleger, R. and Karlsh, S.J.D.: The energy transduction mechanism of Na,K-ATPase studied with iron-catalyzed oxidative cleavage. *J. Biol. Chem.*, 274 (1999) 16213-16221.
- 2581 Harrison, M.D., Meier, S. and Dameron, C.T.: Characterisation of copper-binding to the second sub-domain of the Menkes protein ATPase (MNR2). *Biochim. Biophys. Acta*, 1453 (1999) 254-260.
- 2582 Hasper, A., Soteropoulos, P. and Perlin, D.S.: Modification of the N-terminal polyserine cluster alters stability of the plasma membrane H⁺-ATPase from *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta*, 1420 (1999) 214-222.

- 2583 Hiraishi, H., Yokoi, F. and Kumon, A.: Bovine liver phosphoamidase as a protein histidine/lysine phosphatase. *J. Biochem. (Tokyo)*, 126 (1999) 368-374.
- 2584 Kanagawa, M., Kaya, S., Umezumi, H., Watanabe, S., Togawa, K., Shimada, A., Imagawa, T., Mårdh, S. and Taniguchi, K.: Direct evidence for *in vivo* reversible tyrosine phosphorylation of the N-terminal domain of the H/K-ATPase α -subunit in mammalian stomach cells. *J. Biochem. (Tokyo)*, 126 (1999) 266-270.
- 2585 Kasche, V., Lummer, K., Nurk, A., Piotraschke, E., Rieks, A., Stoeva, S. and Voelter, W.: Intramolecular autoproteolysis initiates the maturation of penicillin amidase from *Escherichia coli*. *Biochim. Biophys. Acta*, 1433 (1999) 76-86.
- 2586 Katayama, K., Ueda, N., Katoh, I. and Yamamoto, S.: Equilibrium in the hydrolysis and synthesis of cannabimimetic anandamide demonstrated by a purified enzyme. *Biochim. Biophys. Acta*, 1440 (1999) 205-214.
- 2587 Kawai, E., Idei, A., Kumura, H., Shimazaki, K.-i., Akatsuka, H. and Omori, K.: The ABC-exporter genes involved in the lipase secretion are clustered with the genes for lipase, alkaline protease, and serine protease homologues in *Pseudomonas fluorescens* no. 33. *Biochim. Biophys. Acta*, 1446 (1999) 377-382.
- 2588 Lin, S., Thomas, M., Mark, S., Anderson, V. and Bonomo, R.A.: OHIO-1 β -lactamase mutants: the Arg²⁴⁴Ser mutant and resistance to β -lactams and β -lactamase inhibitors. *Biochim. Biophys. Acta*, 1432 (1999) 125-136.
- 2589 Martin, D.W. and Sachs, J.R.: Preparation of Na⁺,K⁺-ATPase with near maximal specific activity and phosphorylation capacity: evidence that the reaction mechanism involves all of the sites. *Biochemistry*, 38 (1999) 7485-7497. C.A.,
- 2590 Matsushima, M., Ichinose, M., Yahagi, N., Tsukada-Kato, S., Miki, K., Omata, M., Kim, Y.-T., Ito, H., Takahashi, T., Sakurai, Y., Tsuchiya, Y., Athauda, S.B.P., Inoue, H. and Takahashi, K.: Purification and further characterization of enteropeptidase from porcine duodenum. *J. Biochem. (Tokyo)*, 125 (1999) 947-951.
- 2591 Nirasawa, S., Nakajima, Y., Zhang, Z.-z., Yoshida, M. and Hayashi, K.: Molecular cloning and expression in *Escherichia coli* of the extracellular endoprotease of *Aeromonas caviae* T-64, a pro-aminopeptidase processing enzyme. *Biochim. Biophys. Acta*, 1433 (1999) 335-342.
- 2592 Ohkubo, K., Baraniuk, J.N., Hohman, R., Merida, M., Hersh, L.B. and Kaliner, M.A.: Aminopeptidase activity in human nasal mucosa. *J. Allergy Clin. Immunol.*, 102 (1998) 741-750; C.A., 130 (1999) 180339.
- 2593 Plantner, J.J., Jiang, C. and Smine, A.: Increase in interphotoreceptor matrix gelatinase A (MMP-2) associated with age-related macular degeneration. *Exp. Eye Res.*, 67 (1998) 637-645; C.A., 130 (1999) 280246.
- 2594 Raphael, V., Giardina, T., Guevel, L., Perrier, J., Dupuis, L., Guo, X.-J. and Puigserver, A.: Cloning, sequencing and further characterization of acylpeptide hydrolase from porcine intestinal mucosa. *Biochim. Biophys. Acta*, 1432 (1999) 371-381.
- 2595 Satoh, T., Oshida, N., Ono, M., Hattori, M., Ohta, T., Watanabe, M., Shinoda, H., Takahashi, Y., Lee, J.-S. and Samejima, T.: Deletion of Ala144-Lys145 in *Thermus thermophilus* inorganic pyrophosphatase suppresses therma aggregation. *J. Biochem. (Tokyo)*, 125 (1999) 858-863.
- 2596 Schrimpf, S.P., Hellman, U., Carlsson, L., Larsson, A., Ronquist, G. and Nilsson, B.O.: Identification of dipeptidyl peptidase IV as the antigen of a monoclonal anti-prostasome antibody. *Prostate*, 38 (1999) 35-39; C.A., 130 (1999) 220765.
- 2597 Walther-Rasmussen, J., Johnsen, A.H. and Hoiby, N.: Terminal truncations in Amp C β -lactamase from a clinical isolate of *Pseudomonas aeruginosa*. *Eur. J. Biochem.*, 263 (1999) 478-485.
- 2598 Wang, X., Liu, Y., Wang, L., Zhang, H. and Zhang, J.: (Purification of aminoacylase of *Aspergillus oryzae* and resolution of D,L-alanine with the immobilized enzyme). *Jilin Daxue Ziran Kexue Xuebao*, (1998) 81-84; C.A., 130 (1999) 206596.
- 2599 Yasothornsrikul, A., Aaron, W., Toneff, T. and Hook, V.Y.H.: Evidence for the proenkephalin processing enzyme prohormone thiol protease (PTP) as a multicatalytic cysteine protease complex: activation by glutathione localized to secretory vesicles. *Biochemistry*, 38 (1999) 7421-7430.
- 2600 Yonezawa, H., Uchikoba, T., Arima, K., Shimada, M. and Kaneda, M.: Amino acid sequence and some properties of phytoleucine R, a cysteine protease from full-growth fruits of pokeweed, *Phytolacca americana*. *J. Biochem. (Tokyo)*, 126 (1999) 26-33.
- See also 2330, 2419, 2421, 2423.
- 20g. Lyases
- 2601 Deswal, R. and Sopory, S.K.: Glyoxalase I from *Brassica juncea* is a calmodulin stimulated protein. *Biochim. Biophys. Acta*, 1450 (1999) 460-467.
- 2602 Nojiri, M., Yohda, M., Odaka, M., Matsushita, Y., Tsujimura, M., Yoshida, T., Dohmae, N., Takio, K. and Endo, I.: Functional expression of nitrile hydratase in *Escherichia coli*: requirement of a nitrile hydratase activator and post-translational modification of a ligand cysteine. *J. Biochem. (Tokyo)*, 125 (1999) 696-704.
- 20h. Isomerases
- 2603 Mueller, S.O. and Stopper, H.: Characterization of the genotoxicity of anthraquinones in mammalian cells. *Biochim. Biophys. Acta*, 1428 (1999) 406-414.
- 2604 Watanabe, K., Kurihara, K. and Suzuki, T.: Purification and characterization of membrane-bound prostaglandin E synthase from bovine heart. *Biochim. Biophys. Acta*, 1439 (1999) 406-414.
- 20i. Ligases
- 2605 Brannigan, J.A., Ashford, S.R., Doherty, A.J., Timson, D.J. and Wigley, D.B.: Nucleotide sequence, heterologous expression and novel purification of DNA ligase from *Bacillus stearothermophilus*. *Biochim. Biophys. Acta*, 1432 (1999) 413-418.
- 2606 Park, T., Ostrander, D.B., Pappas, A. and Carman, G.M.: Identification of Ser⁴²⁴ as the protein kinase A phosphorylation site in CTP synthetase from *Saccharomyces cerevisiae*. *Biochemistry*, 38 (1999) 8839-8848.
- 20j. Complex mixtures and incompletely identified enzymes
- 2607 Barinova, A.A., Nakajima, M. and Fujio, Y.: Genetic variability and differentiation of both cultured strains and natural populations in the guppy *Poecilia reticulata*. *Fish. Sci.*, 64 (1998) 898-902; C.A., 130 (1999) 194606.

- 2608 Billinghamurst, Z., Douglas, A.E. and Trapido-Rosenthal, H.G.: On the genetic diversity of the symbiosis between the coral *Montastraea cavernosa* and zooxanthellae in Bermuda. In: Lessios, H.A. and Macintyre, I.G. (Editors), *Proc. Int. Coral Reef Symp., 8th*, Vol. 2, Smithsonian Tropical Research Institute, Balboa, 1997, pp. 1291-1294; C.A., 130 (1999) 194593.
- 2609 Büttcher, V., Quanz, M. and Willmitzer, L.: Molecular cloning, functional expression and purification of a glucan branching enzyme from *Neisseria denitrificans*. *Biochim. Biophys. Acta*, 1432 (1999) 406-412.
- 2610 Carvalho, G.R.: Molecular ecology: Origins and approach. *NATO Sci. Ser., Ser. A*, 306 (1998) 1-23; C.A., 130 (1999) 206318 - a review with many refs.
- 2611 Huikeshoven, H. and Cotterill, S.: Cloning and characterisation of the gene for the large subunit of the DNA primase from *Drosophila melanogaster*. *Biochim. Biophys. Acta*, 1445 (1999) 359-362.
- 2612 Lairini, Kh. and Ruiz-Rubio, M.: Detoxification of α -tomatine by *Fusarium solani*. *Mycol. Res.*, 102 (1998) 1375-1380; C.A., 130 (1999) 193454.
- 2613 Ono, H., Sawada, K., Khunajakr, N., Tao, T., Yamamoto, M., Hiramoto, M., Shinmyo, A., Takano, M. and Murooka, Y.: Characterization of biosynthetic enzymes for ectoine as a compatible solute in a moderately halophilic eubacterium, *Halomonas elongata*. *J. Bacteriol.*, 181 (1999) 91-99; C.A., 130 (1999) 179205.
- 2614 Qu, X.-W., Wang, H., Rozenfeld, R.A., Huang, W. and Hsueh, W.: Type I nitric oxide synthase (NOS) is the predominant NOS in rat small intestine. Regulation by platelet-activating factor. *Biochim. Biophys. Acta*, 1451 (1999) 211-217.
- 2615 Zhang, X., Huang, H. and Chen, Y.: (Hybrid cells formed by fusion of murine myeloma cells and lymphocytes of Taiju pig). *Nanjing Shida Xuebao, Ziran Kexueban*, 21 (1998) 76-87; C.A., 130 (1999) 179086.
- For additional information see C.A.:
130 (1999) 207518, 279046, 279349, 279491.
- See also 2337, 2456, 2500, 2863.
21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS
- 21a. Purines, pyrimidines, nucleosides, nucleotides
- 2616 Kirchner, R., Vogtherr, M., Limmer, S. and Sprinzl, M.: Secondary structure dimorphism and interconversion between hairpin and duplex form of oligoribonucleotides. *Antisense Nucleic Acid Drug Dev.*, 8 (1998) 507-516; C.A., 130 (1999) 263638.
- 2617 Krawczak, M.: Informativity assessment for biallelic single nucleotide polymorphisms. *Electrophoresis (Weinheim)*, 20 (1999) 1676-1681.
- 2618 Miyakawa, H., Rim, J.S., Handler, J.S. and Kwon, H.M.: Identification of the second tonicity-responsive enhancer for the betaine transporter (BGT1) gene. *Biochim. Biophys. Acta*, 1446 (1999) 359-364.
- 2619 Tomonari, A., Yoshimoto, K., Mizusawa, N., Iwahana, H. and Itakura, M.: Differential regulation of the human insulin gene transcription by GG1 and GG2 elements with GG- and C1-binding factors. *Biochim. Biophys. Acta*, 1446 (1999) 233-242.
- 2620 Trappe, R., Doenecke, D. and Albig, W.: The expression of human H2A-H2B histone gene pairs is regulated by multiple sequence elements in their joint promoters. *Biochim. Biophys. Acta*, 1446 (1999) 341-351.
- 2621 Watanabe, N., Sawai, H., Endo, K., Shinozuka, K., Ozaki, H., Tanada, Sh., Murata, H. and Sasaki, Y.: Labeling of phosphorothioate antisense oligonucleotides with yttrium-90. *Nucl. Med. Biol.*, 26 (1999) 239-243; C.A., 130 (1999) 267699.
- See also 2673, 2759.
- 21b. Nucleic acids, RNA
- 2622 Aoki, N., Kawamura, M., Yamaguchi-Aoki, Y., Ohira, S. and Matsuda, T.: Down-regulation of protein tyrosine phosphatase gene expression in lactating mouse mammary gland. *J. Biochem. (Tokyo)*, 125 (1999) 669-675.
- 2623 Brosché, M. and Strid, Å.: The mRNA-binding ribosomal protein S26 as a molecular marker in plants: molecular cloning, sequencing and differential gene expression during environmental stress. *Biochim. Biophys. Acta*, 1445 (1999) 342-344.
- 2624 Chang, B.-E., Lin, C.-Y. and Kuo, C.-M.: Molecular cloning of a cold-shock domain protein, zFY1, in zebrafish embryo. *Biochim. Biophys. Acta*, 1433 (1999) 343-349.
- 2625 Cudry, S., Froissart, R., Bouton, O., Maire, I. and Bozon, D.: The 2.1-, 5.4- and 5.7-kb transcripts of the IDS gene are generated by different polyadenylation signals. *Biochim. Biophys. Acta*, 1447 (1999) 35-42.
- 2626 Davies, G.F., Khandelwal, R.L. and Roesler, W.J.: Troglitazone inhibits expression of the phosphoenolpyruvate carboxykinase gene by an insulin-independent mechanism. *Biochim. Biophys. Acta*, 1451 (1999) 122-131.
- 2627 Ding, S., Kuroki, S., Kameyama, A., Yoshimura, A. and Kameyama, M.: Cloning and expression of the Ca²⁺ channel α_{1c} and β_{2a} subunits from guinea pig heart. *J. Biochem. (Tokyo)*, 125 (1999) 750-759.
- 2628 Fujiwara, M., Tagashira, S., Harada, H., Ogawa, S., Katsumata, T., Nakatsuka, M., Komori, T. and Takada, H.: Isolation and characterization of the distal promoter region of mouse Cbfa1. *Biochim. Biophys. Acta*, 1446 (1999) 265-272.
- 2629 Gagnon, F., Orlov, S.N., Champagne, M.J., Tremblay, J. and Hamet, P.: Heat stress preconditioning does not protect renal epithelial Na⁺,K⁺,Cl⁻ and Na⁺,Pi cotransporters from their modulation by severe heat stress. *Biochim. Biophys. Acta*, 1421 (1999) 163-174.
- 2630 Hämäläinen, M.M., Eskola, J.U., Hellman, J. and Pulkki, K.: Major interference from leukocytes in reverse transcription-PCR identified as neurotoxin ribonuclease from eosinophils: detection of residual chronic myelogenous leukemia from cell lysates by use of an eosinophil-depleted cell preparation. *Clin. Chem. (Washington)*, 45 (1999) 465-471.

- 2631 Hamaoka, R., Fujii, J., Miyagawa, J.-i., Takahashi, M., Kishimoto, M., Moriwaki, M., Yamamoto, K., Kajimoto, Y., Yamasaki, Y., Hanafusa, T., Matsuzawa, Y. and Taniguchi, N.: Overexpression of the aldose reductase gene induces apoptosis in pancreatic β -cells by causing a redox imbalance. *J. Biochem. (Tokyo)*, 126 (1999) 41-47.
- 2632 Hasegawa, T. and Isoe, K.-i.: Evidence for the interaction between Translin and GADD34 in mammalian cells. *Biochim. Biophys. Acta*, 1428 (1999) 161-168.
- 2633 Hattori, A., Matsumoto, H., Mizutani, S. and Tsujimoto, M.: Molecular cloning of adipocyte-derived leucine aminopeptidase highly related to placental leucine aminopeptidase/oxytocinase. *J. Biochem. (Tokyo)*, 125 (1999) 931-938.
- 2634 Hine, C., Enyoji, K.-i., Kokame, K., Nakamura, S., Takei, A., Kamikubo, Y.-i., Sueishi, K. and Kato, H.: Monkey hepatocytes efficiently express tissue factor pathway inhibitor (TFPI), in contrast with human and rat hepatocytes. *J. Biochem. (Tokyo)*, 125 (1999) 1039-1047.
- 2635 Ishida, N., Yoshioka, S., Chiba, Y., Takeuchi, M. and Kawakita, M.: Molecular cloning and functional expression of the human Golgi UDP-N-acetylglucosamine transporter. *J. Biochem. (Tokyo)*, 126 (1999) 68-77.
- 2636 Ito, H., Akiyama, H., Shigeno, C. and Nakamura, T.: Bone morphogenetic protein-6 and parathyroid hormone-related protein coordinately regulate the hypertrophic conversion in mouse clonal chondrogenic EC cells, ATDC5. *Biochim. Biophys. Acta*, 1451 (1999) 263-270.
- 2637 Iyer, S.N., Gurujeyalakshmi, G. and Giri, S.N.: Effects of pirfenidone on procollagen gene expression at the transcriptional level in bleomycin hamster model of lung fibrosis. *J. Pharmacol. Exp. Ther.*, 289 (1999) 211-218.
- 2638 Kageyama, N., Natsuka, S. and Hase, S.: Molecular cloning and characterization of two zebrafish $\alpha(1,3)$ fucosyltransferase genes developmentally regulated in embryogenesis. *J. Biochem. (Tokyo)*, 125 (1999) 838-845.
- 2639 Katakura, Y., Ametani, A., Totsuka, M., Nagafuchi, S.-y. and Kaminogawa, S.: Accelerated secretion of mutant β -lactoglobulin in *Saccharomyces cerevisiae* resulting from a single amino acid substitution. *Biochim. Biophys. Acta*, 1432 (1999) 302-312.
- 2640 Khrebtukova, I., Kuklin, A., Woychik, R.P. and Michaud, E.J.: Alternative processing of the human and mouse Raly genes. *Biochim. Biophys. Acta*, 1447 (1999) 107-112.
- 2641 Kim, S.J., Sohn, B.H., Jeong, S., Pak, K.-W., Park, J.-S., Park, I.-Y., Lee, T.-H., Choi, Y.-H., Lee, C.-S., Han, Y.-M., Yu, D.-Y. and Lee, K.-K.: High-level expression of human lactoferrin in milk of transgenic mice using genomic lactoferrin sequence. *J. Biochem. (Tokyo)*, 126 (1999) 320-325.
- 2642 Kimura, N., Ueno, M., Nakashima, K. and Taga, T.: A brain region-specific gene product Lhx6.1 interacts with Ldb1 through tandem LIM-domains. *J. Biochem. (Tokyo)*, 126 (1999) 180-187.
- 2643 Kitani, T., Ishida, A., Okuno, S., Takeuchi, M., Kameshita, I. and Fujisawa, H.: Molecular cloning of Ca^{2+} /calmodulin-dependent protein kinase phosphatase. *J. Biochem. (Tokyo)*, 125 (1999) 1022-1028.
- 2644 Kluge, C., Golladack, D. and Dietz, K.-J.: Subunit D of the vacuolar H^{+} -ATPase of *Arabidopsis thaliana*. *Biochim. Biophys. Acta*, 1419 (1999) 105-110.
- 2645 Kobayashi, M., Sakuradani, E. and Shimizu, S.: Genetic analysis of cytochrome b_5 from arachidonic acid-producing fungus, *Mortierella alpina* 1S-4: cloning, RNA editing and expression of the gene in *Escherichia coli*, and purification and characterization of the gene product. *J. Biochem. (Tokyo)*, 125 (1999) 1094-1103.
- 2646 Koo, D.J., Zhou, M., Jackman, D., Cioffi, W.G., Bland, K.I., Chaudry, I.H. and Wang, P.: Is gut the major source of proinflammatory cytokine release during polymicrobial sepsis? *Biochim. Biophys. Acta*, 1454 (1999) 289-295.
- 2647 Kulseth, M.A., Kolset, S.O. and Ranheim, T.: Stimulation of serglycin and CD44 mRNA expression in endothelial cells exposed to TNF- α and IL-1 α . *Biochim. Biophys. Acta*, 1428 (1999) 225-232.
- 2648 Law, P.-Y. and Loh, H.H.: Regulation of opioid receptor activities. *J. Pharmacol. Exp. Ther.*, 289 (1999) 607-624.
- 2649 Lazarov, M.E., Martin, M.M., Willardson, B.M. and Elton, T.S.: Human phosphoducin-like protein (hPhLP) messenger RNA stability is regulated by *cis*-acting instability elements present in the 3'-untranslated region. *Biochim. Biophys. Acta*, 1446 (1999) 253-264.
- 2650 Lebeda, R.A., Johnson, S.K. and Haun, R.S.: Transcriptional regulation of the human ADP-ribosylation factor 5 (ARF5) gene. *Biochim. Biophys. Acta*, 1445 (1999) 314-320.
- 2651 Lee, S.H. and DeJong, J.: Microsomal GST-I: genomic organization, expression, and alternative splicing of the human gene. *Biochim. Biophys. Acta*, 1446 (1999) 389-396.
- 2652 Macas, J., Lambert, G.M., Dolezel, D. and Galbraith, D.W.: Nuclear expressed sequence tag (NEST) analysis: a novel means to study transcription through amplification of nuclear RNA. *Cytometry*, 33 (1998) 460-468; *C.A.*, 130 (1999) 218910.
- 2653 Manzano, V.M., Puyol, M.R., Puyol, D.R. and Cazana, F.J.L.: Tretinoin prevents age-related renal changes and stimulates antioxidant defenses in cultured renal mesangial cells. *J. Pharmacol. Exp. Ther.*, 289 (1999) 123-132.
- 2654 Masaki, T., Yoshimatsu, H., Chiba, S., Kurokawa, M. and Sakata, T.: Up-regulation of uterine UCP2 and UCP3 in pregnant rats. *Biochim. Biophys. Acta*, 1440 (1999) 81-88.
- 2655 Matsui, M., Breau, W.C., Iwasaki, S., Hagiwara, S., Tamai, Y., Mori, C., Bloom, M.L., Jerry, M.B., Eddy, E.M. and Taketo, M.M.: Retrovirus integration site Mintb encoding the mouse homolog of hnRNP U. *J. Biochem. (Tokyo)*, 125 (1999) 1104-1114.
- 2656 Miranda-Vizuete, A., Damdimopoulos, A.E. and Spyrou, G.: cDNA cloning, expression and chromosomal localization of the mouse mitochondrial thioredoxin reductase gene. *Biochim. Biophys. Acta*, 1447 (1999) 113-118.
- 2657 Mochizuki, R., Ishizuka, Y., Yanai, K., Koga, Y. and Fukamizu, A.: Molecular cloning and expression of human neurochondrin-1 and -2. *Biochim. Biophys. Acta*, 1446 (1999) 397-402.
- 2658 Navarro, E., Espinosa, L., Adell, T., Torà, M., Berrozpe, G. and Real, F.X.: Expressed sequence tag (EST) phenotyping of HT-29 cells: cloning of ser/thr protein kinase EMK1, kinesin KIF3B, and of transcripts that include Alu repeated elements. *Biochim. Biophys. Acta*, 1450 (1999) 254-264.
- 2659 Navarro, J.-A., Daros, J.-A. and Flores, R.: Complexes containing both polarity strands of avocado sunblotch viroid: identification in chloroplasts and characterization. *Virology*, 253 (1999) 77-85; *C.A.*, 130 (1999) 234837.

- 2660 Neame, P.J., Tapp, H. and Grimm, D.R.: The cartilage-derived, C-type lectin (CLECSF1): structure of the gene and chromosomal location. *Biochim. Biophys. Acta*, 1446 (1999) 193-202.
- 2661 Niere, M., Meisslitzer, C., Dettloff, M., Weise, C., Ziegler, M. and Wiesner, A.: Insect immune activation by recombinant *Galleria mellonella* apolipoprotein III. *Biochim. Biophys. Acta*, 1433 (1999) 16-26.
- 2662 Noack, D., Heyworth, P.G., Curnutte, J.T., Rae, J. and Cross, A.R.: A novel mutation in the CYBB gene resulting in an unexpected pattern of exon skipping and chronic granulomatous disease. *Biochim. Biophys. Acta*, 1454 (1999) 270-274.
- 2663 Ofman, R., Hogenhout, E.M. and Wanders, R.J.A.: Identification and characterization of the mouse cDNA encoding acyl-CoA: dihydroxyacetone phosphate acyltransferase. *Biochim. Biophys. Acta*, 1439 (1999) 89-94.
- 2664 Ohmiya, R., Kato, C., Yamada, H., Aiba, H. and Mizuno, T.: A fission yeast gene (*prp1+*) that encodes a response regulator implicated in oxidative stress response. *J. Biochem. (Tokyo)*, 125 (1999) 1061-1066.
- 2665 Orfeo, T., Chen, L., Huang, W., Ward, G. and Bateman, E.: Distamycin A selectively inhibits *Acanthamoeba* RNA synthesis and differentiation. *Biochim. Biophys. Acta*, 1446 (1999) 273-285.
- 2666 Petretti, T., Schulze, B., Schlag, P.M. and Kemmner, W.: Altered mRNA expression of glycosyltransferases in human gastric carcinomas. *Biochim. Biophys. Acta*, 1428 (1999) 209-218.
- 2667 Puls, K.L., Ni, J., Liu, D., Morahan, G. and Wright, M.D.: The molecular characterisation of a novel tetraspanin protein, TM4-B. *Biochim. Biophys. Acta*, 1447 (1999) 93-99.
- 2668 Saeki, T., Matoba, K., Furukawa, H., Kirifujii, K., Kanamoto, R. and Iwami, K.: Characterization, cDNA cloning, and functional expression of mouse ileal sodium-dependent bile acid transporter. *J. Biochem. (Tokyo)*, 125 (1999) 846-851.
- 2669 Shadidy, M., Caubit, X., Olsen, R., Seternes, O.M., Moens, U. and Krauss, S.: Biochemical analysis of mouse FKBP60, a novel member of the FKBP family. *Biochim. Biophys. Acta*, 1446 (1999) 295-307.
- 2670 Söderström, M., Salminen, H., Glumoff, V., Kirschke, H., Aro, H. and Vuorio, E.: Cathepsin expression during skeletal development. *Biochim. Biophys. Acta*, 1446 (1999) 35-46.
- 2671 Telford, E.A.R., Moynihan, L.M., Markham, A.F. and Lench, N.J.: Isolation and characterisation of a cDNA encoding the precursor for a novel member of the Acyl-CoA dehydrogenase gene family. *Biochim. Biophys. Acta*, 1446 (1999) 371-376.
- 2672 Tinel, M., Elkahwaji, J., Robin, M.A., Fardel, N., Descatoire, V., Haouzi, D., Berson, A. and Pessayre, D.: Interleukin-2 overexpresses c-myc and down-regulates cytochrome P-450 in rat hepatocytes. *J. Pharmacol. Exp. Ther.*, 289 (1999) 649-655.
- 2673 Tnani, M. and Bayard, B.A.: Evidence for IRF-1-dependent gene expression deficiency in interferon unresponsive HepG2 cells. *Biochim. Biophys. Acta*, 1451 (1999) 59-72.
- 2674 Tohkin, M., Kurose, K., Isozaki, E. and Fukuhara, M.: Molecular cloning, heterologous expression, and characterization of a novel member of CYP2A in the Syrian hamster. *Biochim. Biophys. Acta*, 1446 (1999) 438-442.
- 2675 Wang, B., Kishihara, K., Zhang, D., Sakamoto, T. and Nomoto, K.: Transcriptional regulation of a receptor protein tyrosine phosphatase gene hPTP-J by PKC-mediated signaling pathways in Jurkat and Molt-4 T lymphoma cells. *Biochim. Biophys. Acta*, 1450 (1999) 331-340.
- 2676 Wyszko, E., Fuerste, J.-P., Barciszewska, M., Szymanski, M., Adamiak, R., Erdmann, V.A. and Barciszewski, J.: Preparation of HIV TAR RNA with RNA scissors. *J. Biochem. (Tokyo)*, 126 (1999) 326-332.
- 2677 Zacharias, D.A. and Kappen, C.: Developmental expression of the four plasma membrane calcium ATPase (*Pmca*) genes in the mouse. *Biochim. Biophys. Acta*, 1428 (1999) 397-405.
- 2678 Zhu, J., Nathan, C. and Ding, A.: Suppression of macrophage responses to bacterial lipopolysaccharide by a non-secretory form of secretory leukocyte protease inhibitor. *Biochim. Biophys. Acta*, 1451 (1999) 219-223.

For additional information see C.A.:

130 (1999) 293829.

See also 2269, 2318, 2344, 2416, 2466, 2698, 2719, 2736, 2806, 2812, 2847, 2850, 2856, 2874.

21c. Nucleic acids, DNA

- 2679 Alroy, I., Soussan, L., Seger, R. and Yarden, Y.: Noy differentiation factor stimulates phosphorylation and activation of the Sp1 transcription factor. *Mol. Cell. Biol.*, 19 (1999) 1961-1972; C.A., 130 (1999) 292064.
- 2680 Amils, R., Irazabal, N., Moreira, D., Abad, J.P. and Marin, I.: Genomic organization analysis of acidophilic chemolithotrophic bacteria using pulsed field gel electrophoretic techniques. *Biochimie*, 80 (1998) 911-921; C.A., 130 (1999) 262810.
- 2681 Appleby, R.D., Porteous, W.K., Hughes, G., James, A.M., Shannon, D., Wei, Y.-H. and Murphy, M.P.: Quantitation and origin of the mitochondrial membrane potential in human cells lacking mitochondrial DNA. *Eur. J. Biochem.*, 262 (1999) 108-116.
- 2682 Asad, S.F., Singh, S., Ahmad, A. and Hadi, S.M.: Bilirubin-Cu(II) complex degrades DNA. *Biochim. Biophys. Acta*, 1428 (1999) 201-208.
- 2683 Backett, S., Kunnimalaiyaan, M., Borner, Th. and Nielsen, B.L.: *In vitro* replication of mitochondrial plasmid mp1 from the higher plant *Chenopodium album* (L.): a remnant of bacteria rolling circle and conjugative plasmids? *J. Mol. Biol.*, 284 (1998) 1005-1015; C.A., 130 (1999) 192675.
- 2684 Bandyopadhyay, S.K., Kataria, R.S. and Tiwari, A.K.: Detection of bluetongue virus genome segment 6 sequences by RT-PCR. *Indian J. Exp. Biol.*, 36 (1998) 1034-1037; C.A., 130 (1999) 292144.
- 2685 Behr, S., Mätzig, M., Levin, A., Eickhoff, H. and Heller, C.: A fully automated multicapillary electrophoresis device for DNA analysis. *Electrophoresis (Weinheim)*, 20 (1999) 1492-1507.
- 2686 Bottero, M.T., Civera, T., Turi, R.M. and Rosati, S.: (Polymerase chain reaction (PCR) in control of food adulteration by species substitution in products treated at high temperatures). *Ind. Aliment. (Pinerolo)*, 38 (1999) 18-20; C.A., 130 (1999) 195906.
- 2687 Burger, J., Hummel, S., Herrmann, B. and Henke, W.: DNA preservation: a microsatellite-DNA study on ancient skeletal remains. *Electrophoresis (Weinheim)*, 20 (1999) 1722-1728.
- 2688 Cespedes, A., Garcia, T., Carrera, E., Gonzalez, I., Fernandez, A., Hernandez, P.E. and Martin, R.: Identification of sole (*Solea solea*) and Greenland halibut (*Reinhardtius hippoglossoides*) by PCR amplification of the 5S rDNA gene. *J. Agric. Food Chem.*, 47 (1999) 1046-1050.

- 2689 Chakraborty, R., Stivers, D.N., Su, B., Zhong, Y. and Budowle, B.: The utility of short tandem repeat loci beyond human identification: implications for development of new DNA typing systems. *Electrophoresis (Weinheim)*, 20 (1999) 1682-1696 - a review with 29 refs.
- 2690 Chapman, G.A., Kay, J. and Kille, P.: Structural and functional analysis of the rat metallothionein III genomic locus. *Biochim. Biophys. Acta*, 1445 (1999) 321-329.
- 2691 Charles, H. and Ishikawa, H.: Physical and genetic map of the genome of buchnera, the primary endosymbiot of the peak aphid *Acyrtosiphon pisum*. *J. Mol. Evol.*, 48 (1999) 142-150; *C.A.*, 130 (1999) 292239.
- 2692 Chen, L.C., Chen, Y.R., Huang, J.W. and Wang, C.H.: (The analysis of plasmid-like DNAs in isolates of pencycuron fungicide-resistant and -sensitive *Rhizoctonia solani*). *Zhiwu Baohu Xuehui Huikan*, 40 (1998) 339-349; *C.A.*, 130 (1999) 194431.
- 2693 Choi, J.S., Lee, E.J., Choi, Y.H., Jeong, Y.J. and Park, J.S.: Poly(ethylene glycol)-block-poly(L-lysine) dendrimer: novel linear polymer/dendrimer block copolymer forming a spherical water-soluble polyionic complex with DNA. *Bioconjugate Chem.*, 10 (1999) 62-65; *C.A.*, 130 (1999) 193251.
- 2694 Ciaccio, P.J., Gicquel, E., O'Neill, P.J., Scribner, H.E. and Vandenberghe, Y.L.: Investigation of the positive response of ethyl acrylate in the mouse lymphoma genotoxicity assay. *Toxicol. Sci.*, 46 (1998) 324-332; *C.A.*, 130 (1999) 277900.
- 2695 Collins, A.R., Olmedilla, B., Southon, S., Granado, F. and Duthie, S.J.: Serum carotenoids and oxidative DNA damage in human lymphocytes. *Carcinogenesis*, 19 (1998) 2159-2162; *C.A.*, 130 (1999) 209159.
- 2696 Davidson, H., Doherty, A., Stevenson, B., Boyd, A.C. and Porteous, D.J.: Elimination of contaminant *Escherichia coli* chromosomal DNA from preparations of P1 artificial chromosome recombinants facilitates directed subcloning. *Electrophoresis (Weinheim)*, 20 (1999) 1469-1475.
- 2697 Davies, S., Eizenman, M., Pasupathy, S., Muller, W. and Slater, G.: Models of local behavior of DNA electrophoresis peak parameters. *Electrophoresis (Weinheim)*, 20 (1999) 1443-1454.
- 2698 Felden, B., Gesteland, R.F. and Atkins, J.F.: Eubacterial tmRNAs: everywhere except the alpha-Proteobacteria? *Biochim. Biophys. Acta*, 1446 (1999) 145-148.
- 2699 Fukuda, A., Nakamura, A. and Tanaka, Y.: Molecular cloning and expression of the Na⁺/H⁺ exchanger gene in *Oryza sativa*. *Biochim. Biophys. Acta*, 1446 (1999) 149-155.
- 2700 Fukuda, H. and Iritani, N.: Regulation of ATP citrate-lyase gene expression in hepatocytes and adipocytes in normal and genetically obese rats. *J. Biochem. (Tokyo)*, 126 (1999) 437-444.
- 2701 Garganta, F., Krause, G. and Scherer, G.: Rapid characterization of mutations in amplified human hprt cDNA by polyacrylamide gel electrophoresis. *Mutat. Res.*, 406 (1998) 33-43; *C.A.*, 130 (1999) 262765.
- 2702 Gasser, R.B., Woods, W.G., Blotkamp, C., Verweij, J., Storey, P.A. and Polderman, A.M.: Screening for nucleotide variations in ribosomal DNA arrays of *Oesophagostomum bifurcum* by polymerase chain reaction-coupled single-strand conformation polymorphism. *Electrophoresis (Weinheim)*, 20 (1999) 1486-1491.
- 2703 Gurrierei, S., Smith, S.B. and Bustamante, C.: Trapping of megabase-sized DNA molecules during agarose gel electrophoresis. *Proc. Natl. Acad. Sci. U.S.A.*, 96 (1999) 453-458; *C.A.*, 130 (1999) 264303.
- 2704 Huang, R.-W., Tang, J.-M., Lin, D.-J., Lin, G.Z., Xia, Z.-J. and Li, M.-Q.: (Apoptosis induction in HL-60 cells by cyclosporine A). *Zhongguo Bingli Shengli Zazhi*, 14 (1998) 496-499; *C.A.*, 130 (1999) 232131.
- 2705 Hummel, S., Schultes, T., Bramanti, B. and Herrmann, B.: Ancient DNA profiling by megaplex applications. *Electrophoresis (Weinheim)*, 20 (1999) 1717-1721.
- 2706 Jain, P.T., Seth, P. and Gewirtz, D.A.: Estradiol enhances liposome-mediated uptake, preferential nuclear accumulation and functional expression of exogenous genes in MDA-MB231 breast tumor cells. *Biochim. Biophys. Acta*, 1451 (1999) 224-232.
- 2707 Jeffreys, A.J., Barber, R., Bois, P., Buard, J., Dubrova, Y.E., Grant, G., Hollies, C.R.H., May, C.A., Neumann, R., Panayi, M., Ritchie, A.E., Shone, A.C., Signer, E., Stead, J.D.H. and Tamaki, K.: Human minisatellites, repeat DNA instability and meiotic recombination. *Electrophoresis (Weinheim)*, 20 (1999) 1665-1675 - a review with 38 refs.
- 2708 Jiang, M., Aittomaki, K., Nilsson, Ch., Pakarinen, P., Iitia, A., Torresani, T., Simonsen, H., Goh, V., Pettersson, K., de laChapelle, A. and Huhtaniemi, I.: The frequency of an inactivating point mutation (566C→T) of the human follicle-stimulating hormone receptor gene in four populations using allele-specific hybridization and time-resolved fluorometry. *J. Clin. Endocrinol. Metab.*, 83 (1998) 4338-4343; *C.A.*, 130 (1999) 180967.
- 2709 Kai, Y., Miyako, K., Muta, T., Umeda, S., Irie, T., Hamasaki, N., Takeshige, K. and Kang, D.: Mitochondrial DNA replication in human T lymphocytes is regulated primarily at the H-strand termination site. *Biochim. Biophys. Acta*, 1446 (1999) 126-134.
- 2710 Kaneda, K., Kashii, S., Kurosawa, T., Kaneko, Sh., Akaike, A., Honda, Y., Minami, M. and Satoh, M.: Apoptotic DNA fragmentation and upregulation of Bax induced by transient ischemia of the rat retina. *Brain Res.*, 815 (1999) 11-20; *C.A.*, 130 (1999) 221528.
- 2711 Katz, S.G., Schneider, S.S., Bartuski, A., Trask, B.J., Massa, H., Overhauser, J., Lalande, M., Landsorp, P.M. and Silverman, G.A.: An 18q- syndrome breakpoint residues between the duplicated serpins SCCA1 and SCCA2 and arises via a cryptic rearrangement with satellite III DNA. *Hum. Mol. Genet.*, 8 (1999) 87-92; *C.A.*, 130 (1999) 292246.
- 2712 Kawai, T., Tsukamoto, T., Asao, Ts., Nishioka, M., Yoshioka, M., Yamada, R. and Shibata, T.: (An epidemiological analysis of a food-borne outbreak caused by *Clostridium perfringens* using pulsed-field gel electrophoresis). *Osaka-furitsu Koshu Eisei Kenkyusho Kenkyu Hokoku*, 36 (1998) 191-194; *C.A.*, 130 (1999) 266467.
- 2713 Kawamukai, M.: Isolation of a novel gene, moc2, encoding a putative RNA helicase as a suppressor of sterile strains in *Schizosaccharomyces pombe*. *Biochim. Biophys. Acta*, 1446 (1999) 93-101.
- 2714 Kawazoe, N., Aiuchi, T., Masuda, Y., Nakajo, S. and Nakaya, K.: Induction of apoptosis by bufalin in human tumor cells is associated with a change of intracellular concentration of Na⁺ ions. *J. Biochem. (Tokyo)*, 126 (1999) 278-286.
- 2715 Kenzelmann, M. and Muhlemann, K.: Substantially enhanced cloning efficiency of SAGE (Serial Analysis of Gene Expression) by adding a heating step to the original protocol. *Nucleic Acids Res.*, 27 (1999) 917-918; *C.A.*, 130 (1999) 292196.

- 2716 Lee, K., Chong, Y., Erdenechemeg, L., Song, K.S. and Shin, K.H.: Incidence, epidemiology and evolution of reduced susceptibility to ciprofloxacin in *Neisseria gonorrhoeae* in Korea. *Clin. Microbiol. Infect.*, 4 (1998) 627-633; C.A., 130 (1999) 194174.
- 2717 Lessard, P., Bouly, J.-P., Jouannic, S., Kreis, M. and Thomas, M.: Identification of cdc2cAt: a new cyclin-dependent kinase expressed in *Arabidopsis thaliana* flowers. *Biochim. Biophys. Acta*, 1445 (1999) 351-358.
- 2718 Li, S., Zhu, S. and Wang, H.: (Polymorphism of DNA microsatellites KG8 and CW2). *Beijing Yike Daxue Xuebao*, 30 (1998) 213-215; C.A., 130 (1999) 218950.
- 2719 Linden, H.: Carotenoid hydroxylase from *Haematococcus pluvialis*: cDNA sequence, regulation and functional complementation. *Biochim. Biophys. Acta*, 1446 (1999) 203-212.
- 2720 Liu, J. and Kagan, J.: Method to distinguish between the MMAC1/PTEN gene and its pseudogene in RT-PCR analysis of point mutations. *BioTechniques*, 26 (1999) 19-24; C.A., 130 (1999) 247551.
- 2721 Liu, T., Stathopoulos, P., Londblom, P., Rubio, C., Arver, B.W., Iselius, L., Holmberg, E., Gronberg, H. and Lindblom, A.: MSH2 codon 322 Gly to Asp seems not to confer an increased risk for colorectal cancer susceptibility. *Eur. J. Cancer*, 34 (1998) 1981; C.A., 130 (1999) 208078.
- 2722 Matsushita, O., Jung, Ch.-M., Katayama, S., Minami, J., Takahashi, Y. and Okabe, A.: Gene duplication and multiplicity of collagenases in *Clostridium histolyticum*. *J. Bacteriol.*, 181 (1999) 923-933; C.A., 130 (1999) 292284.
- 2723 McCall, M.N. and Hodgkin, P.D.: Switch recombination and germ-line transcription are division-regulated events in B lymphocytes. *Biochim. Biophys. Acta*, 1447 (1999) 43-50.
- 2724 Mendiola-Cruz, M.T. and Morales-Ramirez, P.: Repair kinetics of gamma-ray induced DNA damage determined by the single cell gel electrophoresis assay in murine leukocytes *in vivo*. *Mutat. Res.*, 433 (1999) 45-52. C.A., 130 (1999) 278629.
- 2725 Mok, K.W.C., Lam, A.M.I. and Cullis, P.R.: Stabilized plasmid-lipid particles: factors influencing plasmid entrapment and transfection properties. *Biochim. Biophys. Acta*, 1419 (1999) 137-150.
- 2726 Morris, E.J., Dreixler, J.C., Cheng, K.Y., Wilson, P.M., Gin, R.M. and Geller, H.M.: Optimization of single-cell gel electrophoresis (SCGE) for quantitative analysis of neuronal DNA damage. *BioTechniques*, 26 (1999) 282-289; C.A., 130 (1999) 293504.
- 2727 Nakamura, M., Konishi, N., Inui, T., Hiasa, Y., Nagai, H., Tsunoda, Sh., Nakase, H., Tsuzuki, T., Aoki, H., Sakitani, H., Aoyama, N. and Sakaki, T.: Genetic variations in recurrent astrocytic tumors detected by restriction landmark genomic scanning. *Brain Tumor Pathol.*, 15 (1998) 1-6; C.A., 130 (1999) 208079.
- 2728 Ovchinnikov, I., Buzhilova, A., Mednikova, M., Goodwin, W. and Curry, G.: Ethnic affinities of the ancient human Jeti-Asar population by mitochondrial DNA analysis. *Electrophoresis (Weinheim)*, 20 (1999) 1729-1732.
- 2729 Pery, D.J. and Bousquet, J.: Sequence-tagged-site (STS) markers of arbitrary genes: the utility of black spruce-derived STS primers in other conifers. *Theor. Appl. Genet.*, 97 (1998) 735-743; C.A., 130 (1999) 180022.
- 2730 Protozanova, E. and Macgregor, R.B., Jr.: Analysis of the electrophoretic migration of DNA frayed wires. *Biophys. Chem.*, 75 (1998) 249-257; C.A., 130 (1999) 193249.
- 2731 Quintanar, A., Jallu, V., Legros, Y. and Kaplan, C.: Human platelet antigen genotyping using a fluorescent SSCP technique with an automatic sequencer. *Br. J. Haematol.*, 103 (1998) 437-444; C.A., 130 (1999) 205614.
- 2732 Ramage, C.P., Low, J.Ch., McLaughlin, J. and Donachie, W.: Characterization of *Listeria ivanovii* isolates from the UK using pulsed-field gel electrophoresis. *FEMS Microbiol. Lett.*, 170 (1999) 349-353; C.A., 130 (1999) 234601.
- 2733 Reimer, D.L., Kong, S., Monck, M., Wyles, J., Tam, P., Wasan, E.K. and Bally, M.B.: Liposomal lipid and plasmid DNA delivery to B16/BL6 tumors after intraperitoneal administration of cationic liposome DNA aggregates. *J. Pharmacol. Exp. Ther.*, 289 (1999) 807-815.
- 2734 Rossi, F., Torriani, S. and Dellaglio, F.: Identification and clustering of dairy propionibacteria by RAPD-PCR and CGE-REA methods. *J. Appl. Microbiol.*, 85 (1998) 956-964; C.A., 130 (1999) 262717.
- 2735 Schmitz, T.P., Süsens, U. and Borgmeyer, U.: DNA binding, protein interaction and differential expression of the human germ cell nuclear factor. *Biochim. Biophys. Acta*, 1446 (1999) 173-180.
- 2736 Schöneberg, T., Schulz, A., Grosse, R., Schade, R., Henklein, P., Schultz, G. and Gudermann, T.: A novel subgroup of class I G-protein-coupled receptors. *Biochim. Biophys. Acta*, 1446 (1999) 57-70.
- 2737 Shubsda, M., Goodisman, J. and Dabrowiak, J.C.: Characterization of hairpin-duplex interconversion of DNA using polyacrylamide gel electrophoresis. *Biophys. Chem.*, 76 (1999) 95-115; C.A., 130 (1999) 278153.
- 2738 Starchev, K., Sturm, J. and Weill, G.: Dynamics of DNA in polyacrylamide solutions. An electrical birefringence study. *Macromolecules*, 32 (1999) 348-352; C.A., 130 (1999) 193872.
- 2739 Sun, L., Yu, L. and Chen, C.: Presence, isolation and characterization of yolk DNA from chicken eggs. *Sci. China, Ser. C: Life Sci.*, 41 (1998) 251-257; C.A., 130 (1999) 292155.
- 2740 Taga, M., Murata, M. and Saito, H.: Comparison of different karyotyping methods in filamentous Ascomycetes - a case study of *Nectria haematococca*. *Mycol. Res.*, 102 (1998) 1355-1364; C.A., 130 (1999) 192446.
- 2741 Takahashi, H., Nirasawa, K., Nagamine, Y., Tsudzuki, M. and Yamamoto, Y.: Genetic relationships among Japanese native breeds of chicken based on microsatellite DNA polymorphisms. *J. Hered.*, 89 (1998) 543-546; C.A., 130 (1999) 220607.
- 2742 Takeda, K. and Suzuki, N.: Genomic structure and expression of the medaka fish homolog of the mammalian guanylyl cyclase B. *J. Biochem. (Tokyo)*, 126 (1999) 104-114.
- 2743 Takemon, Y., Kanayama, H., Tanida, K., Baik, S.H., Ishigami, M. and Kato, M.: Rapid analysis on sub populations of a mayfly species, *Epeorus ikanonis* (Heptageniidae: Ephemeroptera). *Viva Origino*, 26 (1998) 283-292; C.A., 130 (1999) 220612.
- 2744 Tanaka, H., Tanaka, K., Murakami, H. and Okayama, H.: Fission yeast Cdc24 is a replication factor C- and proliferating cell nuclear antigen-interacting factor essential for S-phase completion. *Mol. Cell. Biol.*, 19 (1999) 1038-1048; C.A., 130 (1999) 277580.
- 2745 Tanaka, K., Kajiyama, N., Ishikura, K., Waga, S., Kikuchi, A., Ohtomo, K., Takagi, T. and Mizuno, S.: Determination of the site of disulfide linkage between heavy and light chains of silk fibroin produced by *Bombyx mori*. *Biochim. Biophys. Acta*, 1432 (1999) 92-103.

- 2746 Tensen, C.P., Flier, J., Rampersad, S.S., Sampat-Sardjoeppersad, S., Scheper, R.J., Boersma, D.M. and Willemze, R.: Genomic organization, sequence and transcriptional regulation of the human CXCL 11 gene. *Biochim. Biophys. Acta*, 1446 (1999) 167-172.
- 2747 Ulgiati, D., Townend, D.C., Christiansen, F.T. and Abraham, L.J.: New Australian aboriginal complotypes characterized by increased C4 gene copy number. *Exp. Clin. Immunogenet.*, 15 (1998) 134-143; *C.A.*, 130 (1999) 192508.
- 2748 Vos, M., Warren, R.M., van Rensburg, C.J., Hauman, J.H., Eppelen, J.T. and van Helden, P.D.: Rapid genomic diversification of *Helicobacter pylori*. *Electrophoresis (Weinheim)*, 20 (1999) 1476-1485.
- 2749 Wang, H. and Gong, Z.: Characterization of two zebrafish cDNA clones encoding egg envelope proteins ZP2 and ZP3. *Biochim. Biophys. Acta*, 1446 (1999) 156-160.
- 2750 Wang, H., Miao, S., Chen, D., Wang, L. and Koide, S.S.: Assignment of chromosomal locus and evidence for alternatively spliced mRNAs of a human sperm membrane protein (hSMP-1). *Biochim. Biophys. Acta*, 1447 (1999) 119-124.
- 2751 Xu, M., Huang, N., Xiao, Z. and Lu, Z.: Photoexcited TiO₂ nanoparticles through •OH radicals induced malignant cells to necrosis. *Supramol. Sci.*, 5 (1998) 449-451; *C.A.*, 130 (1999) 179402.
- 2752 Xu, M., Ma, J., Gu, J. and Lu, Z.: Photocatalytic TiO₂ nanoparticles damage to cellular membranes and genetic supra-molecules. *Supramol. Sci.*, 5 (1998) 511-513; *C.A.*, 130 (1999) 179403.
- 2753 Yang, C.-F., Shen, H.-M. and Ong, C.-N.: Protective effect of ebselen against hydrogen peroxide induced cytotoxicity and DNA damage in HepG2 cells. *Biochem. Pharmacol.*, 57 (1999) 273-279. *C.A.*, 130 (1999) 205094.
- 2754 Ye, F. and Wang, J.: (Mutation analysis of p16 gene in acute lymphoblastic leukemias). *Zhonghua Yixue Jianshan Zazhi*, 21 (1998) 266-268; *C.A.*, 130 (1999) 178100.
- 2755 Yoder, D.W., Nampaisansuk, M., Pirtle, I.L., Chapman, K.D. and Pirtle, R.M.: Molecular cloning and nucleotide sequence of a gene encoding a cotton palmitoyl-acyl carrier protein thioesterase. *Biochim. Biophys. Acta*, 1446 (1999) 403-413.
- 2756 Zhang, J., Yu, J., Feng, Y., Cheng, Z., Wu, Y., Li, W., Sun, Y. and Lu, G.: (Effects of inhibin a fragments, tyrosine, oxytocin, PGF2a and estrogen on apoptosis in rat corpus luteal cells). *Shengzhi Yu Biyun*, 18 (1998) 274-281; *C.A.*, 130 (1999) 192043.
- 2757 Zhang, Y., Merighi, M., Bazzi, C. and Geider, K.: Genomic analysis by pulsed-field gel electrophoresis of *Erwinia amylovora* strains from the Mediterranean region including Italy. *J. Plant Pathol.*, 80 (1998) 225-232. *C.A.*, 130 (1999) 264746.
- 2758 Zsolnai, A. and Orbán, L.: Accelerated separation of random complex DNA patterns in gels: comparing the performance of discontinuous and continuous buffers. *Electrophoresis (Weinheim)*, 20 (1999) 1462-1468.
- For additional information see *C.A.*:
130 (1999) 234092, 234544, 248985, 249045, 259639, 265334, 276307, 277645, 279492, 293814.
- See also 2480, 2610, 2644, 2653, 2874, 2875.
- 21d. *Structural studies on RNA and RNA mapping*
- 2759 Cannistraro, V.J. and Kennell, D.: The reaction mechanism of ribonuclease II and its interaction with nucleic acid secondary structures. *Biochim. Biophys. Acta*, 1433 (1999) 170-187.
- 2760 Kwon, H.-J. and Kim, D.-S.: A Mg²⁺-dependent endonuclease is responsible for internucleosomal DNA fragmentation in human B lymphoblastic IM9 cells. *Biochem. Mol. Biol. Int.*, 46 (1998) 1259-1268. *C.A.*, 130 (1999) 207804.
- 2761 Myint, Z., Inazu, T., Tanaka, T., Yamamoto, A., Isobe, Y., Inoue, Y., Kuriyama, M. and Noguchi, T.: Genomic organization and promoter analysis of a mouse homeobox gene, Hex. *J. Biochem. (Tokyo)*, 125 (1999) 795-802.
- 2762 Nozawa, K., Kurumiya, Y., Yamamoto, A., Isobe, Y., Suzuki, M. and Yoshida, S.: Up-regulation of telomerase in primary cultured rat hepatocytes. *J. Biochem. (Tokyo)*, 126 (1999) 361-367.
- 2763 Rebane, A. and Metspalu, A.: U82, a novel snoRNA identified from the fifth intron of human and mouse nucleolin gene. *Biochim. Biophys. Acta*, 1446 (1999) 426-430.
- 2764 Rheault, P., Charbonneau, A. and Luu-The, V.: Structure and activity of the murine type 5 17β-hydroxysteroid dehydrogenase gene. *Biochim. Biophys. Acta*, 1447 (1999) 17-24.
- See also 2534, 2863, 2865, 2875.
- 21e. *Structural studies on DNA and DNA mapping*
- 2765 Battu, S., Rigaud, M. and Beneytout, J.L.: Resistance to apoptosis and cyclooxygenase-2 expression in a human adenocarcinoma cell line HT29 CL19A. *Anticancer Res.*, 18 (1998) 3579-3583; *C.A.*, 130 (1999) 221269.
- 2766 Bergquist, M., Brattstrom, D., Stalberg, M., Vaghef, H., Brodin, O. and Hellman, B.: Evaluation of radiation-induced DNA damage and DNA repair in human lung cancer cell lines with different radiosensitivity using alkaline and neutral single cell gel electrophoresis. *Cancer Lett.*, 133 (1998) 9-18; *C.A.*, 130 (1999) 193706.
- 2767 Bogliolo, M., Izzotti, A., de Flora, S., Carli, C., Abbondandolo, A. and Degan, P.: Detection of the "4977 bp" mitochondrial DNA deletion in human atherosclerotic lesions. *Mutagenesis*, 14 (1999) 77-82; *C.A.*, 130 (1999) 280150.
- 2768 Borgnetto, M.E., Tinelli, S., Carminati, L. and Capranico, G.: Genomic sites of topoisomerase II activity determined by comparing DNA breakage enhanced by three distinct poisons. *J. Mol. Biol.*, 285 (1999) 545-554; *C.A.*, 130 (1999) 278453.
- 2769 Bucio, L., Garcia, C., Souza, V., Hernandez, E., Gonzalez, C., Betancourt, M., Gutierrez-Ruiz, M.C.: Uptake, cellular distribution and DNA damage produced by mercuric chloride in a human fetal hepatic cell line. *Mutat. Res.*, 423 (1999) 65-72; *C.A.*, 130 (1999) 277882.
- 2770 Cissell, M.A. and Chalkley, R.: Characterization of a kidney-specific pattern of chromatin structure in the rat phosphoenolpyruvate carboxykinase gene. *Biochim. Biophys. Acta*, 1445 (1999) 299-313.
- 2771 Coulthart, M.B., Johnson, W.M. and Ashton, F.E.: Pulsed-field gel electrophoresis for genomic fingerprinting of pathogenic bacteria. In: Tietz, D. (Editor), *Nucleic Acid Electrophor.*, Springer, Berlin, 1998, pp. 129-151; *C.A.*, 130 (1999) 248987.

- 2772 Cunningham, J., Harley, E.H. and O'Ryan, C.: Isolation and characterization of microsatellite loci in black rhinoceros (*Diceros bicornis*). *Electrophoresis (Weinheim)*, 20 (1999) 1778-1780.
- 2773 David-Cordonnier, M.-H., Hamdane, M. and D'Halluin, J.-C.: c-Myb protein binds to the EP element of the HBV enhancer and regulates transcription in synergy with NF-M. *Biochim. Biophys. Acta*, 1446 (1999) 82-92.
- 2774 Duthie, S. and Dobson, V.L.: Dietary flavonoids protect human colonocyte DNA from oxidative attack *in vitro*. *Eur. J. Nutr.*, 38 (1999) 28-34; C.A., 130 (1999) 209164.
- 2775 Eason, D.D., Shepherd, A.T. and Blanck, G.: Interferon regulatory factor 1 tryptophan 11 to arginine point mutation abolishes DNA binding. *Biochim. Biophys. Acta*, 1446 (1999) 140-144.
- 2776 El-Gohary, M., Awara, W.M., Nassar, S. and Hawas, S.: Deltamethrin-induced testicular apoptosis in rats: the protective effect of nitric oxide synthase inhibitor. *Toxicology*, 132 (1999) 1-8; C.A., 130 (1999) 292612.
- 2777 Fajkus, J., Nicklas, J.A. and Hancock, R.: DNA loop domains in a 1.4-Mb region around the human hprt gene mapped by cleavage mediated by nuclear matrix-associated topoisomerase II. *Mol. Gen. Genet.*, 260 (1998) 410-416; C.A., 130 (1999) 262971.
- 2778 Fei, Y., Matragoon, S., Smith, S.B., Overbeek, P.A., Chen, S., Zack, D.J. and Liou, G.I.: Functional dissection of the promoter of the interphotoreceptor retinoid-binding protein gene: the cone-rod-homeobox element is essential for photoreceptor-specific expression *in vivo*. *J. Biochem. (Tokyo)*, 125 (1999) 1189-1199.
- 2779 Folkes, L.K., Dennis, M.F., Stratford, M.R.L., Candeias, L.P. and Wardman, P.: Peroxidase-catalyzed effects of indole-3-acetic acid and analogs on lipid membranes, DNA, and mammalian cells *in vitro*. *Biochem. Pharmacol.*, 57 (1999) 375-382; C.A., 130 (1999) 261587.
- 2780 Galloway, D.C., Blake, D.G. and McLellan, L.I.: Regulation of γ -glutamylcysteine synthetase regulatory subunit (GLCLR) gene expression: identification of the major transcriptional start site in HT29 cells. *Biochim. Biophys. Acta*, 1446 (1999) 47-56.
- 2781 Immel, U.-D., Hummel, S. and Herrmann, B.: DNA profiling of orangutan (*Pongo pygmaeus*) feces to prove descent and identity in wildlife animals. *Electrophoresis (Weinheim)*, 20 (1999) 1768-1770.
- 2782 Iwamuro, S., Saeki, M. and Kato, S.: Multi-ubiquitination of a nascent membrane protein produced in a rabbit reticulocyte lysate. *J. Biochem. (Tokyo)*, 126 (1999) 48-53.
- 2783 Jeon, H., Kim, S.S., Kim, Y.S., Park, Y.S., Kim, Y.H., Choi, S.J., Kim, S.K. and Kim, T.U.: Cytotoxic and apoptotic activities of echinomycin derivative (echinomycin-7) on P388 murine leukemia cells. *J. Biol. Mol. Biol.*, 31 (1998) 560-564; C.A., 130 (1999) 177224.
- 2784 Kashpur, V.A., Dubovitskaya, V., Krasnitskaya, A.A. and Maleev, V.Ya.: (Influence of γ -radiation on state of DNA ion-hydration shell). *Visn. Khark. Univ.*, 410 (1998) 111-115; C.A., 130 (1999) 193661.
- 2785 Khetawat, G., Bhadra, R.K., Nandi, S. and Das, J.: Resurgent *Vibrio cholerae* O139: rearrangement of cholera toxin genetic elements and amplification of *rrn* operon. *Infect. Immun.*, 67 (1999) 148-154; C.A., 130 (1999) 205780.
- 2786 Kimura, H., Minakami, H., Sekiguchi, I., Otsuki, K. and Shoji, A.: Phorbol ester facilitates apoptosis in murine fibroblasts pretreated by mild ultraviolet radiation. *J. Biochem. (Tokyo)*, 126 (1999) 340-346.
- 2787 Kohli, V., Madden, J.F., Bentley, R.C. and Clavien, P.-A.: Calpain mediates ischemic injury of the liver through modulation of apoptosis and necrosis. *Gastroenterology*, 116 (1999) 168-178; C.A., 130 (1999) 265802.
- 2788 Kraev, A.: Denaturing electrophoresis in DNA sequencing: a brief history and current protocols. In: Tietz, D. (Editor), *Nucleic Acid Electrophor.*, Springer, Berlin, 1998, pp. 54-98; C.A., 130 (1999) 248986.
- 2789 Krasnitskaya, A.A., Gasan, A.I. and Virnik, K.M.: (Effect of γ -radiation on structural state of DNA irradiated at various humidity levels). *Visn. Khark. Univ.*, 410 (1998) 116-123; C.A., 130 (1999) 193662.
- 2790 Kunstmann, E., Epplen, C., Elitok, E., Harder, M., Suerbaum, S., Peitz, U., Schmiegel, W. and Epplen, J.T.: *Neisseria pylori* infection and polymorphisms in the tumor necrosis factor region. *Electrophoresis (Weinheim)*, 20 (1999) 1756-1761.
- 2791 Kurita-Ochiai, T., Fukushima, K. and Ochiai, K.: Lipopolysaccharide stimulates butyric acid-induced apoptosis in human peripheral blood mononuclear cells. *Infect. Immun.*, 67 (1999) 22-29; C.A., 130 (1999) 195639.
- 2792 Kusukawa, N., Ostrovsky, M.V. and Garner, M.M.: Effect of gelation conditions on the gel structure and resolving power of agarose-based DNA sequencing gels. *Electrophoresis (Weinheim)*, 20 (1999) 1455-1461.
- 2793 Lengyel, T. and Guttman, A.: Effect of linear polymer additives on the electroosmotic characteristics of agarose gels in ultrathin-layer electrophoresis. *J. Chromatogr. A*, 853 (1999) 511-518.
- 2794 Lengyel, T., Sasvari-Szekely, M. and Guttman, A.: High-throughput genotyping of factor V Leiden mutation by ultrathin-layer agarose gel electrophoresis. *J. Chromatogr. A*, 853 (1999) 519-525.
- 2795 Leung, F.C.: New applications of low-Cot DNA as a DNA fingerprint probe. *Electrophoresis (Weinheim)*, 20 (1999) 1762-1767.
- 2796 Li, L. and Speed, T.P.: An estimate of the crosstalk matrix in four-dye fluorescence-based DNA sequencing. *Electrophoresis (Weinheim)*, 20 (1999) 1433-1442.
- 2797 Li, R., Hodny, Z., Zaid, A., Barath, P. and Nelson, B.D.: AP-2 enhances Sp1-dependent activation of the growth-regulated human ATP/ADP translocator. *J. Biochem. (Tokyo)*, 126 (1999) 130-136.
- 2798 Lopez, O.J. and Nelson, R.M.: DNA methyltransferase use in genotyping. PCT Int. Appl. WO 9910540 A1 4 Mar 1999, 63 pp.; C.A., 130 (1999) 205917.
- 2799 Mahadeva, H., Starkey, M.P., Sheikh, F.N., Mundy, Ch.R. and Samani, N.J.: A simple and efficient method for the isolation of differentially expressed genes. *J. Mol. Biol.*, 284 (1998) 1391-1398; C.A., 130 (1999) 205681.

- 2800 Meyer, W., Marszewska, K., Amirmostofian, M., Igreja, R.P., Hardtke, C., Methling, K., Viviani, M.A., Chindamporn, A., Sukroongreung, S., John, M.A., Ellis, D.H. and Sorrell, T.C.: Molecular typing of global isolates of *Cryptococcus neoformans* var. *neoformans* by polymerase chain reaction fingerprinting and randomly amplified polymorphic DNA a pilot study to standardize techniques on which to base a detailed epidemiological survey. *Electrophoresis (Weinheim)*, 20 (1999) 1790-1799.
- 2801 Monani, U.R., McPherson, J.D. and Burhes, A.H.M.: Promoter analysis of the human centromeric and telomeric survival motor neuron genes (SMN^C and SMN^T). *Biochim. Biophys. Acta*, 1445 (1999) 330-336.
- 2802 Nadig, S.G., Lee, K.L. and Adams, S.M.: Evaluating alterations of genetic diversity in sunfish populations exposed to contaminants using RAPD assay. *Aquat. Toxicol.*, 43 (1998) 163-178; *C.A.*, 130 (1999) 192851.
- 2803 Niess, A.M., Fehrenbach, E., Veiheilmann, S., Passek, F., Roecker, K., Northoff, H. and Dickhuth, H.-H.: (Exercise induced DNA effects and expression of heme oxygenase in leukocytes). *Dtsch. Z. Sportmed.*, 49 (1998) 103-106; *C.A.*, 130 (1999) 194870.
- 2804 Nuc, P., Nuc, K. and Slomski, R.: (DNA sequencing - theory, practice, problems). *Postepy Biol. Komorki*, 25 (1998) 219-237; *C.A.*, 130 (1999) 177957 - a review with 51 refs.
- 2805 Nxomani, C., Ribbink, A. and Kirby, R.: DNA profiling of *Tilapia guinasana*, a species endemic to a single sinkhole, to determine the genetic divergence between color forms. *Electrophoresis (Weinheim)*, 20 (1999) 1781-1785.
- 2806 Ozeki, A. and Tsukamoto, I.: Retinoic acid repressed the expression of c-fos and c-jun and induced apoptosis in regenerating rat liver after partial hepatectomy. *Biochim. Biophys. Acta*, 1450 (1999) 308-319.
- 2807 Peng, L., Bradley, C.J. and Wiley, J.S.: (Study on apoptosis of leukemic lymphocytes mediated by purinergic P2z receptors). *Zhonghua Xueyexue Zazhi*, 19 (1998) 398-401; *C.A.*, 130 (1999) 180750.
- 2808 Richner, S., Meiring, J. and Kirby, R.: DNA profiling of *Mycobacterium tuberculosis* from the Eastern Cape Province of South Africa and the detection of a high level of genetic diversity. *Electrophoresis (Weinheim)*, 20 (1999) 1800-1806.
- 2809 Rudant, E., Bouvet, Ph., Courvalin, P. and Lambert, Th.: Phylogenetic analysis of proteolytic *Acinetobacter* strains based on the sequence of genes encoding aminoglycoside 6'-N-acetyltransferases. *Syst. Appl. Microbiol.*, 22 (1999) 59-67; *C.A.*, 130 (1999) 293826.
- 2810 Sala, A., Penacino, G., Carnese, R. and Corach, D.: Reference database of hypervariable genetic markers of Argentina: application for molecular anthropology and forensic casework. *Electrophoresis (Weinheim)*, 20 (1999) 1733-1739.
- 2811 Sanchez, M., Bruguera, M., Bosch, J., Rodes, J., Ballesta, F. and Oliva, R.: Prevalence of the Cys282Tyr and His63Asp HFE gene mutations in Spanish patients with hereditary hemochromatosis and in controls. *J. Hepatol.*, 29 (1998) 725-728. *C.A.*, 130 (1999) 181084.
- 2812 Sastre, L.: Isolation and characterization of the gene coding for *Artemia franciscana* TATA-binding protein: expression in cryptobiotic and developing embryos. *Biochim. Biophys. Acta*, 1445 (1999) 271-282.
- 2813 Schmerer, W.M., Hummel, S. and Herrmann, B.: Optimized DNA extraction to improve reproducibility of short tandem repeat genotyping with highly degraded DNA as target. *Electrophoresis (Weinheim)*, 20 (1999) 1712-1716.
- 2814 Shen, H., Zou, P., Yang, Y., Zou, L. and Shen, B.: (Distribution of three STR loci in Dai ethnic group in China). *Zhonghua Yixue Yichuanxue Zazhi*, 15 (1998) 357-359; *C.A.*, 130 (1999) 180435.
- 2815 Shen, Y., Xu, Q., Han, F., Ding, K., Song, F., Fan, Y., Zhu, N., Wu, G. and Lin, B.: Application of capillary nongel sieving electrophoresis for gene analysis. *Electrophoresis (Weinheim)*, 20 (1999) 1822-1828.
- 2816 Silva, F., Gusmão, L. and Amorim, A.: Segregation analysis of tetra- and pentanucleotide short tandem repeat polymorphisms: deviation from Mendelian expectations. *Electrophoresis (Weinheim)*, 20 (1999) 1697-1701.
- 2817 Suenobu, N., Shchiri, M., Iwashina, M., Marumo, F. and Hirata, Y.: Natriuretic peptides and nitric oxide induce endothelial apoptosis via a cGMP-dependent mechanism. *Arterioscler., Thromb., Vasc. Biol.*, 19 (1999) 140-146; *C.A.*, 130 (1999) 291999.
- 2818 Takeuchi, S., Teshigawara, K. and Takahashi, S.: Molecular cloning and characterization of the chicken pro-opiomelanocortin (POMC) gene. *Biochim. Biophys. Acta*, 1450 (1999) 452-459.
- 2819 Takimoto, M., Mao, P., Wei, G., Yamazaki, H., Miura, T., Johnson, A.C. and Kuzumaki, N.: Molecular analysis of the GCF gene identifies revisions to the cDNA and amino acid sequences. *Biochim. Biophys. Acta*, 1447 (1999) 125-131.
- 2820 Temple, M.D., Cairns, M.J., Kim, A. and Murray, V.: Protein-DNA footprinting of the human ϵ -globin promoter in human intact cells using nitrogen mustard analogues and other DNA-damaging agents. *Biochim. Biophys. Acta*, 1445 (1999) 245-256.
- 2821 Thangaraj, K., Ramana, G.V. and Singh, L.: Y-Chromosome and mitochondrial DNA polymorphisms in Indian populations. *Electrophoresis (Weinheim)*, 20 (1999) 1743-1747.
- 2822 Tone, M., Nolan, K.F., Walsh, L.A., Tone, Y., Thompson, S.A.J. and Waldmann, H.: Structure and chromosomal location of mouse and human CD52 genes. *Biochim. Biophys. Acta*, 1446 (1999) 334-340.
- 2823 Trefilov, A., Krawczak, M., Berard, J. and Schmidtke, J.: DNA sequence polymorphisms in genes involved in the regulation of dopamine and serotonin metabolism in rhesus macaques. *Electrophoresis (Weinheim)*, 20 (1999) 1771-1777.
- 2824 Turner, B.S., Bhaskar, K.R., Hadzopoulou-Cladaras, M. and LaMont, J.T.: Cysteine-rich regions of pig gastric mucin contain von Willebrand factor and cystine knot domains at the carboxyl terminal. *Biochim. Biophys. Acta*, 1447 (1999) 77-92.
- 2825 Uhlmann, K., Marciznek, K., Hampe, J., Thiel, G. and Nürnberg, P.: Changes in methylation patterns identified by two-dimensional DNA fingerprinting. *Electrophoresis (Weinheim)*, 20 (1999) 1748-1755.
- 2826 Verma, S.K., Khanna, V. and Singh, N.: Random amplified polymorphic DNA analysis of Indian scented basmati rice (*Oryza sativa* L.) germplasm for identification of variability and duplicate accessions, if any. *Electrophoresis (Weinheim)*, 20 (1999) 1786-1789.

- 2827 Wang, Q., Fang, J., Zhang, X. and Liu, S.: (The separate or combined effect of cigarette smoking and chrysotile on DNA strand breaks in human embryo lung cells). *Zhonghua Laodong Weisheng Zhiyebing Zazhi*, 16 (1998) 273-276; C.A., 130 (1999) 206164.
- 2828 Warren, R., Richardson, M., van der Spuy, G., Victor, T., Sampson, S., Beyers, N. and van Helden, P.: DNA fingerprinting and molecular epidemiology of tuberculosis: use and interpretation in an epidemic setting. *Electrophoresis (Weinheim)*, 20 (1999) 1807-1812.
- 2829 Weinman, E.J., Steplock, D., Zhang, X., Akhter, S. and Shenolikar, S.: Molecular cloning of the cDNA and promoter sequences for the mouse sodium-hydrogen exchanger regulatory factor. *Biochim. Biophys. Acta*, 1447 (1999) 71-76.
- 2830 You, J., Kamihira, M. and Iijima, S.: Enhancement of transfection efficiency by protamine in DDAB lipid vesicle-mediated gene transfer. *J. Biochem. (Tokyo)*, 125 (1999) 1160-1167.
- 2831 Yuan, D., Ma, X. and Ma, J.: Recognition of multiple patterns of DNA sites by *Drosophila* homeodomain protein Bicoid. *J. Biochem. (Tokyo)*, 125 (1999) 809-817.
- 2832 Zhu, P., Wang, L., Fu, Y., Liu, Y., Xue, H. and Yu, J.: (Location of allele loss in hematological malignant diseases by DNA microsatellites). *Beijing Yike Daxue Xuebao*, 30 (1998) 298-301; C.A., 130 (1999) 218951.
- For additional information see C.A.:
130 (1999) 247826, 262739, 262752, 264745, 265655, 266313, 276306, 277174, 277717, 279021, 279128, 293297, 293852.
- See also 2480, 2555, 2688, 2690, 2742, 2833, 2847, 2853, 2858, 2860.
- 21f. *Complex mixtures of nucleic acids, their fragments and PCR products*
- 2833 Baretino, D., Pombo, P.M.G., Espliguero, G. and Rodríguez-Peña, A.: The mouse neurotrophin receptor *trkB* gene is transcribed from two different promoters. *Biochim. Biophys. Acta*, 1446 (1999) 24-34.
- 2834 Barret, P., Delourme, R., Foisset, N. and Renard, M.: Development of a SCAR (sequence characterized amplified region) marker for molecular tagging of the dwarf BREIZH (Bzh) gene in *Brassica napus* L. *Theor. Appl. Genet.*, 97 (1998) 828-833; C.A., 130 (1999) 192526.
- 2835 Bradeen, J.M. and Simon, P.W.: Conversion of an AFLP fragment linked to the carrot Y2 locus to a simple, codominant, PCR-based marker form. *Theor. Appl. Genet.*, 97 (1998) 960-967; C.A., 130 (1999) 192433.
- 2836 Chen, Z., Dong, Y. and Cui, W.: Detection and identification of enteroviruses RNA by using polymerase chain reaction. *J. Tongji Med. Univ.*, 18 (1998) 156-160; C.A., 130 (1999) 205608.
- 2837 Choi, J.W. and Jung, S.E.: Lovastatin-induced proliferation inhibition and apoptosis in C6 glial cells. *J. Pharmacol. Exp. Ther.*, 289 (1999) 572-579.
- 2838 Dusabenyagasani, M., Lecours, N. and Hamelin, R.C.: Sequence-tagget sites (STS) for studies of molecular epidemiology of *Scleroderris canker* of conifers. *Theor. Appl. Genet.*, 97 (1998) 789-796; C.A., 130 (1999) 179797.
- 2839 Eli, P., Ariyama, T., Nishigaki, K. and Husimi, Y.: Characterization of imidazole as a DNA denaturant by using TGGE of PCR products from a random pool of DNA. *J. Biochem. (Tokyo)*, 125 (1999) 790-794.
- 2840 Esterbauer, H., Hell, E., Krempler, F. and Patsch, W.: Allele-specific differences in apolipoprotein C-III mRNA expression in human liver. *Clin. Chem. (Washington)*, 45 (1999) 331-339.
- 2841 Gazagne, L., Delmas, C., Bingen, E. and Dabernat, H.: Molecular epidemiology of ampicillin-resistant non- β -lactamase-producing *Haemophilus influenzae*. *J. Clin. Microbiol.*, 36 (1998) 3629-3635. C.A., 130 (1999) 179809.
- 2842 Goodwin, W., Linacre, A. and Vanezis, P.: The use of mitochondrial DNA and short tandem repeat typing in the identification of air crash victims. *Electrophoresis (Weinheim)*, 20 (1999) 1707-1711.
- 2843 Griffioen, P.H., Zwang, L., van Schaik, R.H.N., Engel, H., Lindemans, J. and Cobbaert, C.M.: Optimization of apolipoprotein(a) genotyping with pulsed field gel electrophoresis. *Clin. Chem. (Washington)*, 45 (1999) 771-776.
- 2844 Han, F., Yan, X., Xiao, L. and Su, X.: (Rapid detection of blood HBV DNA using probe hybridization color development in PCR product). *Disi Junyi Daxue Xuebao*, 19 (1998) 479-480; C.A., 130 (1999) 177984.
- 2845 Jaster, R., Baek, K.-H. and D'Andrea, A.D.: Analysis of *cis*-acting sequences and *trans*-acting factors regulating the interleukin-3 response element of the DUB-1 gene. *Biochim. Biophys. Acta*, 1446 (1999) 308-316.
- 2846 Jiddou, R.R., Wei, W.-L., Sane, K.S. and Killeen, A.A.: Single-nucleotide polymorphism in intron 2 of CYP21P: evidence for a higher rate of mutation at CpG dinucleotides in the functional steroid 21-hydroxylase gene and application to segregation analysis in congenital adrenal hyperplasia. *Clin. Chem. (Washington)*, 45 (1999) 625-629.
- 2847 Joo, N.S., Clarke, L.L., Han, B.H., Forte, L.R. and Kim, H.D.: Cloning of CLC-2 chloride channel from murine duodenum and its presence in CFTR knockout mice. *Biochim. Biophys. Acta*, 1446 (1999) 431-437.
- 2848 Karges, W., Maier, S., Wissmann, A., Dralle, H., Dosch, H.M. and Boehm, B.O.: Primary structure, gene expression and chromosomal mapping of rodent homologs of the Men1 tumor suppressor gene. *Biochim. Biophys. Acta*, 1446 (1999) 286-294.
- 2849 Kibel, A.S., Isaacs, S.D., Isaacs, W.B. and Bova, G.S.: Vitamin D receptor polymorphisms and lethal prostate cancer. *J. Urol. (Baltimore)*, 160 (1998) 1405-1409; C.A., 130 (1999) 208154.
- 2850 King, K.W., Sheppard, F.C., Westwater, C., Stern, P.L. and Myers, K.A.: Organisation of the mouse and human 5T4 oncofoetal leucine-rich glycoprotein genes and expression in foetal and adult murine tissues. *Biochim. Biophys. Acta*, 1445 (1999) 257-270.
- 2851 Kyas, A., Maueler, W. and Epplen, J.: Polyacrylamide gel electrophoresis of DNA/protein complexes. In: Tietz, D. (Editor), *Nucleic Acid Electrophor.*, Springer, Berlin, 1998, pp. 292-310; C.A., 130 (1999) 248991.
- 2852 Le Bricon, T., Stoichkov, K., Letellier, S., Guibal, F., Spy, J., Garnier, J.-P. and Bousquet, B.: Simultaneous analysis of tyrosinase mRNA and markers of tyrosinase activity in the blood of patients with metastatic melanoma. *Clin. Chim. Acta*, 282 (1999) 101-113.

- 2853 Liu, J., Zhang, Y., Wang, H., Huang, Q., Cao, W., Wang, X., Shao, H., Wang, Z., Chen, Z. and Huang, W.: (A novel missense in B domain of factor VIII causes severe hemophilia A). *Zhonghua Xueyexue Zazhi*, 19 (1998) 458-460; *C.A.*, 130 (1999) 195204.
- 2854 Loitsch, S.M., Kippenberger, S., Dauletbaev, N., Wagner, T.O.F. and Bargon, J.: Reverse transcription-competitive multiplex PCR improves quantification of mRNA in clinical samples - Application to the low abundance CFTR mRNA. *Clin. Chem. (Washington)*, 45 (1999) 619-624.
- 2855 Marino, A., Rodrig, Y., Métioui, M., Lagneaux, L., Alzola, E., Fernández, M., Fogarty, D.J., Matute, C., Moran, A. and Dehaye, J.P.: Regulation by P2 agonists of the intracellular calcium concentration in epithelial cells freshly isolated from rat trachea. *Biochim. Biophys. Acta*, 1439 (1999) 395-405.
- 2856 Martin, C., Chapman, K.E., Thornton, S. and Ashley, R.H.: Changes in the expression of myometrial ryanodine receptor mRNAs during human pregnancy. *Biochim. Biophys. Acta*, 1451 (1999) 343-352.
- 2857 Matsunaga, T., Chikuni, K., Tanabe, R., Muroya, S., Shibata, K., Yamada, J. and Shinmura, Y.: A quick and simple method for the identification of meat species and meat products by PCR assay. *Meat Sci.*, 51 (1998) 143-148; *C.A.*, 130 (1999) 277357.
- 2858 Meixner, A., Wiche, G. and Propst, F.: Analysis of the mouse MAP1B gene identifies a highly conserved 4.3 kb 3' untranslated region and provides evidence against the proposed structure of DBI-1 cDNA. *Biochim. Biophys. Acta*, 1445 (1999) 345-350.
- 2859 Miyake, H., Nagashima, K., Onigata, K., Nagashima, T., Takano, Y. and Morikawa, A.: Allelic variations of the D2 dopamine receptor gene in children with idiopathic short stature. *J. Hum. Genet.*, 44 (1999) 26-29; *C.A.*, 130 (1999) 295076.
- 2860 Nakajima, M., Yokoi, T., Mizutani, M., Kinoshita, M., Funayama, M. and Kamataki, T.: Genetic polymorphism in the 5'-flanking region of human CYP1A2 gene: effect on the CYP1A2 inducibility in humans. *J. Biochem. (Tokyo)*, 125 (1999) 803-808.
- 2861 Nunoya, K.-I., Yokoi, T., Kimura, K., Kainuma, T., Satoh, K., Kinoshita, M. and Kamataki, T.: A new CYP2A6 gene deletion responsible for the *in vivo* polymorphic metabolism of (+)-cis-3,5-dimethyl-2-(3-pyridyl)thiazolidin-4-one hydrochloride in humans. *J. Pharmacol. Exp. Ther.*, 289 (1999) 437-442.
- 2862 Nunoya, K.-i., Yokoi, T., Takahashi, Y., Kimura, K., Kinoshita, M. and Kamataki, T.: Homologous unequal cross-over within the human CYP2A gene cluster as a mechanism for the deletion of the entire CYP2A6 gene associated with the poor metabolizer phenotype. *J. Biochem. (Tokyo)*, 126 (1999) 402-407.
- 2863 Orzechowski, H.-D., Richter, C.-M., Funke-Kaiser, H., Lemmer, J., Theis, S. and Paul, M.: Cloning and functional characterization of the bovine endothelin-converting enzyme-1a promoter. *Biochim. Biophys. Acta*, 1446 (1999) 352-358.
- 2864 Pawlowski, R., Branicki, W. and Kupiec, T.: Y-Chromosomal polymorphic loci DYS19, DYS390, DYS393 in a population sample from northern Poland. *Electrophoresis (Weinheim)*, 20 (1999) 1702-1706.
- 2865 Raffaniello, R.D., Lin, J., Schwimmer, R. and Ojikian, G.K.: Expression and localization of Rab3D in rat parotid gland. *Biochim. Biophys. Acta*, 1450 (1999) 352-363.
- 2866 Rouzaut, A., Subirá, M.L., de Miguel, C., Domingo-de-Miguel, E., González, A., Santiago, E. and López-Moratalla, N.: Co-expression of inducible nitric oxide synthase and arginases in different human monocyte subsets. Apoptosis regulated by endogenous NO. *Biochim. Biophys. Acta*, 1451 (1999) 319-333.
- 2867 Saito, K., Kobayashi, D., Sasaki, M., Araake, H., Kida, T., Yagihashi, A., Yajima, T., Kameshima, H. and Watanabe, N.: Detection of human serum tumor necrosis factor- α in healthy donors, using a highly sensitive immuno-PCR assay. *Clin. Chem. (Washington)*, 45 (1999) 665-669.
- 2868 Slateva, K., Camps, M.A. and Blasczyk, R.: Fluorotyping of HLA-A by sequence-specific priming and fluorogenic probing. *Tissue Antigens*, 52 (1998) 462-472; *C.A.*, 130 (1999) 205607.
- 2869 Soloviev, M.M., Ciruela, F., Chan, W.Y. and McIlhinney, R.A.J.: Identification, cloning and analysis of expression of a new alternatively spliced form of the metabotropic glutamate receptor mGluR1 mRNA. *Biochim. Biophys. Acta*, 1446 (1999) 161-166.
- 2870 Stott, M.K., Fellowes, A.P., Upton, J.D., Burt, M.J. and George, P.M.: Simple multiplex PCR for the simultaneous detection of the C282Y and H63D hemochromatosis (HFE) gene mutations. *Clin. Chem. (Washington)*, 45 (1999) 426-428.
- 2871 Suzuki, Y., Someki, I., Adachi, E., Irie, S. and Hattori, S.: Interaction of collagen molecules from the aspect of fibril formation: acid-soluble, alkali-treated, and MMP1-digested fragments of type I collagen. *J. Biochem. (Tokyo)*, 126 (1999) 54-67.
- 2872 Tacyildiz, N., Cavdar, A.O., Ertem, U., Oksal, A., Kutluay, L., Uluoglu, O. and Lin, J.-C.: Unusually high frequency of a 69-bp deletion within the carboxy terminus of the LMP-1 oncogene of Epstein-Barr virus detected in Burkitt's lymphoma of Turkish children. *Leukemia*, 12 (1998) 1796-1805; *C.A.*, 130 (1999) 205721.
- 2873 Takahashi, S., Geenen, D., Nieves, E. and Iwazumi, T.: Collagenase degrades collagen *in vivo* in the ischemic heart. *Biochim. Biophys. Acta*, 1428 (1999) 251-259.
- 2874 Ten Dam, G.B., Wieringa, B. and Poels, L.G.: Alternative splicing of CD45 pre-mRNA is uniquely obedient to conditions in lymphoid cells. *Biochim. Biophys. Acta*, 1446 (1999) 317-333.
- 2875 Torres, L., García-Trevijano, E.R., Rodríguez, J.A., Carretero, M.V., Bustos, M., Fernández, E., Eguinoa, E., Mato, J.M. and Avila, M.A.: Induction of TIMP-1 expression in rat hepatic stellate cells and hepatocytes: a new role for homocysteine in liver fibrosis. *Biochim. Biophys. Acta*, 1455 (1999) 12-22.
- 2876 Ward, J.L. and Tse, C.M.: Nucleoside transport in human colonic epithelial cell lines: evidence for two Na⁺-independent transport systems in T84 and Caco-2 cells. *Biochim. Biophys. Acta*, 1419 (1999) 15-22.
- 2877 Yamaguchi, M., Kumada, K., Lee, E.Y. and Sharefkin, J.B.: Elimination of false positive signals for von Willebrand factor mRNA detected by reverse transcription/PCR methods required an oligonucleotide probe distinct from the PCR primer sequences: an example of a common avoidable pitfall of PCR technique. *Showa Univ. J. Med. Sci.*, 10 (1998) 7-13; *C.A.*, 130 (1999) 205615.
- 2878 Yang, Z., Yang, R., Du, Q., Guo, Z., Zhang, M., Wang, X. and Yang, M.: (Detection of *Mycobacterium tuberculosis* by using polymerase chain reaction and microwell plate hybridization). *Zhonghua Yixue Jiannan Zazhi*, 21 (1998) 285-287; *C.A.*, 130 (1999) 179550.

- 2879 Zheng, X.-L., Gui, Y., Sharkey, K.A. and Hollenberg, M.D.: Differential induction of nitric oxide synthase in rat gastric and vascular smooth muscle tissue: distinct tissue distribution and distinctive signaling pathways. *J. Pharmacol. Exp. Ther.*, 289 (1999) 632-640.

For additional information see C.A.:

130 (1999) 205569, 207736, 247839, 264712, 286544, 295074.

- See also 2272, 2303, 2416, 2550, 2568, 2627, 2630, 2650, 2684, 2686, 2702, 2720, 2723, 2734, 2736, 2741, 2767, 2800, 2815, 2818, 2832, 2886, 2887, 2889, 2890, 2891, 2894, 2895, 2896.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23d. Pyridine derivatives

See 2237.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

See 2239, 2247.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26c. Coordination compounds

- 2880 Bumbalova, A., Havranek, E., Ja' Afreh, J., Kettmann, V., Svetlik, J. and Stroffekova, O.: (A study of labeling conditions of derivatives of (2RS,4R)-4-thiazolidinecarboxylic acid with technetium-99m). *Ceska Slov. Farm.*, 48 (1999) 21-26; C.A., 130 (1999) 267370.

- 2881 Pillai, M.R.A., Samuel, G., Banerjee, S., Mathew, B., Sarma, H.D. and Jurisson, S.: Technetium-99m complexes of polydentate amine-pyrrole and amine-thiophene ligands. *Nucl. Med. Biol.*, 26 (1998) 69-77; C.A., 130 (1999) 275609.

28. ANTIBIOTICS

- 2882 Matsusaki, H., Sonomoto, K. and Ishizaki, A.: Characterization of lantibiotic nisin A produced by *Lactococcus lactis* IO-1. *J. Fac. Agric., Kyushu Univ.*, 43 (1998) 181-193; C.A., 130 (1999) 194042.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 2883 Nabi, S.A. and Gupta, A.: Paper electrophoretic separations of some common pesticides: determination of monocrotophos, rogor and malathion in soil samples. *J. Environ. Sci. Health, Part B*, B34 (1999) 239-254; C.A., 130 (1999) 292718.

- 2884 Sherma, J.: Pesticide residue analysis: 1997-1998. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 561-574 - a review with 231 refs.

30. SYNTHETIC AND NATURAL DYES

30b. Chloroplast and other natural pigments

- 2885 Saiz-jimenez, C., Trubetskaya, E., Trubetskoj, A. and Hermosin, B.: Polyacrylamide gel electrophoresis of soil humic acids, lignins, model phenolic polymers and fungal melanins. *Commun. Soil Sci. Plant Anal.*, 30 (1999) 345-352; C.A., 130 (1999) 281309.

32. DRUG ANALYSIS

32g. Other drug categories

See 2203.

32h. Toxicological and forensic applications

See 2336, 2368, 2422, 2455, 2502, 2689, 2842, 2864.

32i. Plant extracts

See 2359.

33. CLINICO-CHEMICAL APPLICATIONS

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

- 2886 Alvarez, L., Oriola, J., Jo, J., Ferro, T., Pons, F., Peris, P., Guanabens, N., Duran, M., Monegal, A., de Osaba, M.J.M., Rivera-Filat, F. and Ballesta, A.M.: Collagen type I $\alpha 1$ gene Sp1 polymorphism in premenopausal women with primary osteoporosis: improved detection of Sp1 binding site polymorphism in the collagen type 1 gene. *Clin. Chem. (Washington)*, 45 (1999) 904-906.

- 2887 Asanuma, K., Yagihashi, A., Uehara, N., Kida, T. and Watanabe, N.: Three point mutations of human butyrylcholinesterase in a Japanese family and the alterations of three-dimensional structure. *Clin. Chim. Acta*, 283 (1999) 33-42.

- 2888 Campbell, M., Henthorn, J.S. and Davies, S.C.: Evaluation of cation-exchange HPLC compared with isoelectric focusing for neonatal hemoglobinopathy screening. *Clin. Chem. (Washington)*, 45 (1999) 969-975.

- 2889 Castaldo, G., Fuccio, A., Cazeneuve, C., Picci, L., Salvatore, D., Raia, V., Scarpa, M., Goossens, M. and Salvatore, F.: Detection of five rare cystic fibrosis mutations peculiar to Southern Italy: Implications in screening for the disease and phenotype characterization for patients with homozygote mutations. *Clin. Chem. (Washington)*, 45 (1999) 957-962.
- 2890 El-Awady, M.K., Ismail, S.M., El-Sagheer, M., Sabour, Y.A., Amr, K.S. and Zaki, E.A.: Assay for hepatitis C virus in peripheral blood mononuclear cells enhances sensitivity of diagnosis and monitoring of HCV-associated hepatitis. *Clin. Chim. Acta*, 283 (1999) 1-14.
- 2891 Fisher, E., Scharnagl, H., Hoffmann, M.M., Kusterer, K., Wittmann, D., Wieland, H., Gross, W. and März, W.: Mutations in the apolipoprotein (apo) B-100 receptor-binding region: Detection of apo B-100 (Arg³⁵⁰⁰→Trp) associated with two new haplotypes and evidence that apo B-100 (Glu³⁴⁰⁵→Gln) diminishes receptor-mediated uptake of LDL. *Clin. Chem. (Washington)*, 45 (1999) 1026-1038.
- 2892 Hoang, M.P., Baskin, L.B. and Wians, F.H., Jr.: Bisalbuminuria in an adult with bisalbuminemia and nephrotic syndrome. *Clin. Chim. Acta*, 284 (1999) 101-107.
- 2893 Mantle, D., Falkous, G. and Walker, D.: Quantification of protease activities in synovial fluid from rheumatoid and osteoarthritis cases: comparison with antioxidant and free radical damage markers. *Clin. Chim. Acta*, 284 (1999) 45-48.
- 2894 Rieger, S., Riemer, H. and Mannhalter, C.: Multiplex PCR assay for the detection of genetic variants of α_1 -antitrypsin. *Clin. Chem. (Washington)*, 45 (1999) 688-690.
- 2895 Russeva, M.G., Janakiev, P.J., Kirov, S.A., Paskaleva, I.D., Kremensky, I.M., Penner, J.A., Hassouna, H.S. and Ganey, V.S.: A simple method for detection of factor V R506Q (Leiden) mutation in dried blood spots. *Clin. Chim. Acta*, 284 (1999) 89-92.
- 2896 Tong, D., Stimpfl, M., Reinthaller, A., Vavra, N., Müllauer-Ertl, S., Leodolter, S. and Zeillinger, R.: BRCA1 gene mutations in sporadic ovarian carcinomas: detection by PCR and reverse allele-specific oligonucleotide hybridization. *Clin. Chem. (Washington)*, 45 (1999) 976-981.
- See also 2226, 2236, 2367, 2372, 2399, 2475, 2477, 2522, 2630, 2840, 2843, 2846, 2852, 2854, 2867, 2870.
34. FOOD ANALYSIS
- 34b. *Complex mixtures (single compounds by cross-reference only)*
See 2342, 2396.
35. ENVIRONMENTAL ANALYSIS
- 35a. *General papers and reviews*
See 2899.
- 35c. *Water pollution (complex mixtures; single compounds by cross-reference only)*
See 2319.
- 35d. *Soil pollution (complex mixtures; single compounds by cross-reference only)*
See 2883.
37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES
- 2897 Lin, E., Liu, S.-R. and Lin, A.: Biochemical analysis of a 5S rRNA-associated sub-particle from trypsinized eukaryotic ribosomes. *J. Biochem. (Tokyo)*, 125 (1999) 1029-1033.
38. INORGANIC COMPOUNDS
- 38a. *Cations*
- 2898 Dzioba, R., Udaquiola, S., Sarquis, P. and Ferretti, R.: (Selection of an appropriate environment for electrophoretic separation of insoluble and slightly soluble minerals). *Inf. Technol.*, 10 (1999) 273-278; *C.A.*, 130 (1999) 211371.
- 2899 Lustig, S., de Kimpe, J., Cornelis, R., Schramel, P. and Michalke, B.: Platinum speciation in clinical and environmental samples: scrutiny of data obtained by using electrophoresis techniques (flatbed and capillary). *Electrophoresis (Weinheim)*, 20 (1999) 1627-1633.

Capillary Electrophoresis and Electrokinetic Chromatography

1. REVIEWS AND BOOKS

1324 Smyth, W.F.: The use of electrospray mass spectrometry in the detection and determination of molecules of biological significance. *TrAC*, 18 (1999) 335-346.

1325 Xu, Y.: Capillary electrophoresis. *Anal. Chem.*, 71 (1999) 309R-313R - a review with 174 refs.

See also 1375, 1377, 1385, 1391, 1394, 1400, 1409, 1411, 1414, 1415, 1434, 1493, 1570, 1588, 1622, 1623, 1643, 1644.

2. FUNDAMENTALS, THEORY AND GENERAL

2a. General

1326 Altria, K.D. and Campi, F.: Ten ways to spoil a CE separation. *LC-GC Int.*, 12 (1999) 358-363.

1327 Andreev, V.P. and Pliss, N.S.: Computer simulation of electroinjection analysis and electrophoretically mediated microanalysis. Commensurable concentrations of sample and reagent. *J. Chromatogr. A*, 845 (1999) 227-236.

1328 Chen, Y. and Zhu, Y.: Theoretical examination of electroosmosis control with external radial electric field in capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1817-1821.

1329 Dasgupta, P.K. and Kar, S.: Effects of separation potential, hydrostatic pressure and auxiliary electroosmotic pumping on a suppressed conductometric capillary electrophoresis separation system. *Anal. Chim. Acta*, 394 (1999) 1-12.

1330 Desphande, M., Ghaddar, Ch., Gilbert, J.R., St. John, P.M., Woudenberg, T., Connell, C., Molho, J., Herr, A., Mungal, G. and Kenny, T.: Numerical framework for the modeling of electrokinetic flows. *Proc. SPIE-Int. Soc. Opt. Eng.*, 3515 (1998) 217-227; *C.A.*, 130 (1999) 302166.

1331 Dworschak, A. and Pyell, U.: Widening of the elution window in micellar electrokinetic chromatography with cationic surfactants. I. Selection of surfactant, variation of pH and addition of organic modifiers or inorganic metal salts. *J. Chromatogr. A*, 848 (1999) 387-400.

1332 Faller, T. and Engelhardt, H.: How to achieve higher repeatability and reproducibility in capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 83-94.

1333 Farková, M., Peña-Méndez, E. and Havel, J.: Use of artificial neural networks in capillary zone electrophoresis. *J. Chromatogr. A*, 848 (1999) 365-374.

1334 Gebauer, P., Pantuckova, P. and Bocek, P.: Analytical expediency of acidic and alkaline background electrolytes in capillary zone electrophoresis: role of system zones in single-co-ion systems. *Anal. Chem.*, 71 (1999) 3374-3381.

1335 Idei, M., Györfy, E., Kiss, É., Örfi, L., Seprödi, J., Tamás, B., Hollósy, F., Mészáros, G. and Kéri, G.: A novel normalized retention factor in micellar electrokinetic chromatography. *Electrophoresis (Weinheim)*, 20 (1999) 1561-1567.

1336 Li, S., Sun, L., Chung, Y. and Weber, S.G.: Artificial receptor-facilitated solid-phase microextraction of barbiturates. *Anal. Chem.*, 71 (1999) 2146-2151.

1337 Liu, Z., Zou, H., Ye, M., Ni, J. and Zhang, Y.: (Effects of temperature and buffer on the migration time window of micellar electrokinetic capillary chromatography). *Sepu*, 17 (1999) 147-152; *C.A.*, 130 (1999) 305807.

1338 Mao, Q. and Pawliszyn, J.: Effect of salt concentration on separation patterns in static capillary isoelectric focusing with imaging detection. *J. Chromatogr. B*, 729 (1999) 355-359.

1339 Motomizu, S. and Takayanagi, T.: Electrophoretic mobility study on ion-ion interactions in an aqueous solution. *J. Chromatogr. A*, 853 (1999) 63-69.

1340 Nakagawa, M., Lin, J.-M., Nakagama, T., Uchiyama, K. and Hobo, T.: (Separation of hydrophobic compounds by nonaqueous micellar electrokinetic chromatography using formamide solvent). *Bunseki Kagaku*, 48 (1999) 239-244; *C.A.*, 130 (1999) 245892.

1341 Palmer, J., Munro, N.J. and Landers, J.P.: A universal concept for stacking neutral analytes in micellar capillary electrophoresis. *Anal. Chem.*, 71 (1999) 1679-1687.

1342 Ren, F. and Song, G.: (Optimization of sample introduction conditions with electric migration in high performance capillary electrophoresis). *Jishou Daxue Xuebao, Ziran Kexueban*, 19 (1998) 61-64; *C.A.*, 130 (1999) 290857.

1343 Rozing, G.P.: Importance of a clean column end for CE and CEC capillaries. *Am. Lab. (Shelton)*, 30 (1998) 33; *C.A.*, 130 (1999) 261189.

1344 Valko, I.E., Siren, H. and Riekkola, M.-L.: Characteristics of electroosmotic flow in capillary electrophoresis in water and in organic solvents without added ionic species. *J. Microcolumn Sep.*, 11 (1999) 199-208; *C.A.*, 130 (1999) 242691.

1345 Wang, Y. and Dubin, P.L.: Capillary modification by noncovalent polyaction adsorption: effects of polymer molecular weight and adsorption ionic strength. *Anal. Chem.*, 71 (1999) 3463-3468.

1346 Zhang, W., Zhang, Y., Xu, G. and Zhang, Y.: (Effect of organic modifier on the capacity factor of the solute in the micellar electrokinetic capillary chromatography). *Sepu*, 17 (1999) 119-122; *C.A.*, 130 (1999) 305804.

1347 Zheng, S., Zinchenko, A.Z. and Davis, R.H.: Electrophoretic motion of two interacting particles. *J. Colloid Interface Sci.*, 209 (1999) 282-301; *C.A.*, 130 (1999) 214057.

For additional information see *C.A.*:

130 (1999) 231410, 264170.

See also 1350, 1388, 1397, 1423, 1424, 1599.

2b. *Thermodynamics and theoretical relationships*

- 1348 Beckers, J.L.: Transfer ratio in indirect UV detection in capillary zone electrophoresis. A mathematical approach. *J. Chromatogr. A*, 844 (1999) 321-331.
- 1349 Guillaume, Y.C. and Peyrin, E.: Symmetry breaking during the formation of β -cyclodextrin-imidazole inclusion compounds: capillary electrophoresis study. *Anal. Chem.*, 71 (1999) 2046-2052.

For additional information see C.A.:
130 (1999) 254275.

See also 1334, 1335, 1345, 1363, 1397.

2c. *Relationship between structure and electrophoretic behaviour*

See 1580.

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

- 1350 Stoyanov, A.V. and Righetti, P.G.: Dissociation of polyvalent electrolytes. *J. Chromatogr. A*, 853 (1999) 35-44.
- 1351 Takayanagi, T. and Motomizu, S.: Equilibrium analysis of reactions between aromatic anions and nonionic surfactant micelles by capillary zone electrophoresis. *J. Chromatogr. A*, 853 (1999) 55-61.

See also 1349, 1438, 1495.

3. GENERAL TECHNIQUES

3a. *Apparatus and accessories*

- 1352 Bings, N.H., Wang, C., Skinner, C.D., Colyer, C.L., Thibault, P. and Harrison, D.J.: Microfluidic devices connected to fused-silica capillaries with minimal dead volume. *Anal. Chem.*, 71 (1999) 3292-3296.
- 1353 Kappes, T., Schnierle, P. and Hauser, P.C.: Field-portable capillary electrophoresis instrument with potentiometric and amperometric detection. *Anal. Chim. Acta*, 393 (1999) 77-82.
- 1354 Majors, R.E.: New chromatography columns and accessories at the 1999 Pittsburgh Conference, Part II. *LC-GC Int.*, 12 (1999) 411-420.
- 1355 Xiang, R., Wang, Y. and Luo, G.: (Development of integrated capillary electrophoresis chips technology). *Fenxi Huaxue*, 27 (1999) 104-110; *C.A.*, 130 (1999) 278713.

For additional information see C.A.:
130 (1999) 220149, 290869, 293600, 293607.

See also 1367, 1376, 1536.

3b. *Detectors and detection procedures*

- 1356 Bottani, S., Rebscher, H., Siebert, R. and Valentin, L.: Post-capillary laser-induced fluorescence detection without sheath-flow. *J. Chromatogr. A*, 844 (1999) 433-438.

- 1357 Chen, D.-c., Chang, S.-S. and Chen, C.-h.: Parallel-opposed dual-electrode detector with recycling amperometric enhancement for capillary electrophoresis. *Anal. Chem.*, 71 (1999) 3200-3205.
- 1358 Crabtree, H.J., Kopp, M.U. and Manz, A.: Shah convolution Fourier transform detection. *Anal. Chem.*, 71 (1999) 2130-2138.
- 1359 Kaniansky, D., Zelenská, V., Masár, M., Iványi, F. and Gazdíkóvá, S.: Contactless conductivity detection in capillary zone electrophoresis. *J. Chromatogr. A*, 844 (1999) 349-359.
- 1360 Kapper, T. and Hauser, P.C.: Simplified amperometric detection for capillary electrophoresis. *Analyst (Cambridge)*, 124 (1999) 1035-1039.
- 1361 Lin, J.-M., Goto, H. and Yamada, M.: On-line chemiluminescence detection for capillary electrophoresis based on the reaction of barium peroxide with luminescence reagents. *J. Chromatogr. A*, 844 (1999) 341-348.

For additional information see C.A.:
130 (1999) 303768.

See also 1348, 1383, 1393, 1396, 1413, 1428, 1430, 1445, 1450, 1452, 1465, 1478, 1497, 1540, 1567, 1581, 1598, 1609, 1626, 1647.

3c. *Stabilization media for electrophoresis*

- 1362 Belder, D., Elke, K. and Husmann, H.: Use of coated capillaries for nonaqueous capillary electrophoresis. *J. Microcolumn Sep.*, 11 (1999) 209-213; *C.A.*, 130 (1999) 293506.
- 1363 Chorro, M., Chorro, C., Dolladille, O., Partyka, S. and Zana, R.: Adsorption mechanism of conventional and dimeric cationic surfactants on silica surface: effect of the state of the surface. *J. Colloid Interface Sci.*, 210 (1999) 134-143; *C.A.*, 130 (1999) 214079.
- 1364 Katayama, H., Ishihama, Y., Kajima, T. and Asakawa, N.: (Stable capillary coating with successive multiple ionic-polymer layers for capillary electrophoresis). *Chromatography*, 19 (1998) 244-245; *C.A.*, 130 (1999) 278809.
- 1365 Lin, C.-E., Wang, T.-Z., Chiu, T.-C. and Hsueh, C.-C.: Determination of the critical micelle concentration of cationic surfactants by capillary electrophoresis. *J. High Resolut. Chromatogr.*, 22 (1999) 265-270.
- 1366 Maichel, B., Potocek, B., Gas, B. and Kenndler, E.: Capillary electrokinetic chromatography with polyethyleneimine as replaceable cationic pseudostationary phase. Influence of methanol and acetonitrile on separation selectivity. *J. Chromatogr. A*, 853 (1999) 121-129.
- 1367 Majors, R.E.: New chromatography columns and accessories at the 1999 Pittsburgh conference, Part 1. *LC-GC Int.*, 12 (1999) 344-357.
- 1368 Palmer, Ch.P. and Tellman, K.T.: Poly(sodium 10-undecylenate) as a pseudo-stationary phase for micellar electrokinetic chromatography: effects of polymerization initiator. *J. Microcolumn Sep.*, 11 (1999) 185-191; *C.A.*, 130 (1999) 231624.
- 1369 Pesek, J.J., Matyska, M.T. and Cho, S.: Open tubular capillary electrochromatography in etched, chemically modified 20 μ m I.D. capillaries. *J. Chromatogr. A*, 845 (1999) 237-246.

For additional information see C.A.:
130 (1999) 261191, 275933.

See also 1371, 1372, 1395, 1400, 1404, 1408, 1533, 1583, 1639.

3e. Preparative scale electrophoresis

1370 Hoffmann, P., Wagner, H., Weber, G., Lanz, M., Caslavská, J. and Thormann, W.: Separation and purification of methadone enantiomers by continuous- and interval-flow electrophoresis. *Anal. Chem.*, 71 (1999) 1840-1850.

3f. Programmed voltage and buffer gradients

1371 Bossi, A., Olivieri, E., Castelletti, L., Gelfi, C., Hamdan, M. and Righetti, P.G.: General experimental aspects of the use of isoelectric buffers in capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 71-82.

See also 1337, 1340, 1533.

4. SPECIAL TECHNIQUES

4a. Automation

See 1388, 1398, 1481.

4b. Computerization and modelling

1372 Breadmore, M.C., Macka, M. and Haddad, P.R.: Theoretical migration model for micellar capillary electrophoresis and its application to the separation of anionic metal complexes of HEDTC and CDTA. *Anal. Chem.*, 71 (1999) 1826-1833.

See also 1333, 1349, 1492.

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

1373 Chan, Y.Y. and Chan, W.T.: Interface for capillary electrophoresis coupled with inductively coupled plasma atomic emission spectrometry. *J. Chromatogr. A*, 853 (1999) 141-149.

1374 Chen, H.-W. and Fang, Z.-L.: Combination of flow injection with capillary electrophoresis. Part 5. Automated preconcentration and determination of pseudoephedrine in human plasma. *Anal. Chim. Acta*, 394 (1999) 13-22.

1375 Ding, J. and Vouros, P.: Advances in CE/MS. Recent developments in interfaces and applications. *Anal. Chem.*, 71 (1999) 378A-385A - a review with 47 refs.

1376 Games, D.E., Craze, A.S. and Hutton, K.A.: Development of CE-MS and capillary LC-MS interfaces for atmospheric pressure chemical ionization. *Adv. Mass Spectrom.*, 14 (1998) D012740/1-D012740/9; C.A., 130 (1999) 200998.

1377 Gfrörer, P., Schweitz, J., Pusecker, K. and Bayer, E.: On-line coupling of capillary separation techniques with ¹H NMR. *Anal. Chem.*, 71 (1999) 315A-321A - a review with 29 refs.

1378 Hirabayashi, Y., Hirabayashi, A. and Koizumi, H.: A sonic spray interface for capillary electrophoresis/mass spectrometry. *Rapid Commun. Mass Spectrom.*, 13 (1999) 712-715; C.A., 130 (1999) 290828.

1379 Hsieh, F., Baronas, E., Muir, C. and Martin, S.A.: A novel nano-spray capillary zone electrophoresis/mass spectrometry interface. *Rapid Commun. Mass Spectrom.*, 13 (1999) 67-72; C.A., 130 (1999) 234311.

1380 Huber, C.G., Premstaller, A. and Kleindienst, G.: Evaluation of volatile eluents and electrolytes for high-performance liquid chromatography-electrospray ionization mass spectrometry and capillary electrophoresis-electrospray ionization mass spectrometry of proteins. II. Capillary electrophoresis. *J. Chromatogr. A*, 749 (1999) 175-189.

1381 Jarvis, S.A., Bateman, R.H., Carruthers, R., Coorbar, P. and Grren, M.: A new atmospheric pressure ionization orthogonal acceleration time of flight mass spectrometer. *Adv. Mass Spectrom.*, 14 (1998) B044120/1-B044120/7; C.A., 130 (1999) 248855.

1382 Jin, X., Kim, J., Parus, S., Lubman, D.M. and Zand, R.: On-line capillary electrophoresis/microelectrospray ionization-tandem mass spectrometry using an ion trap storage/time-of-flight mass spectrometer with SWIFT technology. *Anal. Chem.*, 71 (1999) 3591-3597.

1383 Lazar, I.M., Rockwood, A.L., Lee, E.D., Sin, J.C.H. and Lee, M.L.: High-speed TOFMS detection for capillary electrophoresis. *Anal. Chem.*, 71 (1999) 2578-2581.

1384 Olson, D.L., Lacey, M.E., Webb, A.G. and Sweedler, J.V.: Nanoliter-volume ¹H NMR detection using periodic stopped-flow capillary electrophoresis. *Anal. Chem.*, 71 (1999) 3070-3076.

1385 Ozaki, H., Otsuka, K. and Terabe, Sh.: (Capillary electrophoresis/mass spectrometry). *Bunseki*, (1999) 161-170; C.A., 130 (1999) 275951 - a review with 67 refs.

1386 Schaumlöffel, D. and Prange, A.: A new interface for combining capillary electrophoresis with inductively coupled plasma-mass spectrometry. *Fresenius J. Anal. Chem.*, 364 (1999) 452-456.

For additional information see C.A.:
130 (1999) 275942.

See also 1324, 1387, 1398, 1409, 1413, 1421, 1425, 1448, 1479, 1481, 1484, 1486, 1491, 1493, 1496, 1509, 1510, 1523, 1545, 1616, 1647.

4d. Affinity electrophoresis

1387 Fang, M., Sheng, L., Han, H., Yu, X., Zhao, R., Zang, B. and Liu, G.: Affinity capillary electrophoresis coupled with on-line microdialysis by attachable electrode. *Electrophoresis (Weinheim)*, 20 (1999) 1846-1849.

See also 1441, 1497, 1584, 1613.

4e. Capillary electrochromatography

1388 Alexander, J.N., IV, Poli, J.B. and Markides, K.E.: Evaluation of automated isocratic and gradient nano-liquid chromatography and capillary electrochromatography. *Anal. Chem.*, 71 (1999) 2398-2409.

- 1389 Cahours, X., Morin, P. and Dreux, M.: Influence of ionic strength and organic modifier on performance in capillary electrochromatography on phenyl silica stationary phase. *J. Chromatogr. A*, 845 (1999) 203-216.
- 1390 Cikalo, M.G., Bartle, K.D. and Myers, P.: Behavior of cation-exchange materials in capillary electrochromatography. *Anal. Chem.*, 71 (1999) 1820-1825.
- 1391 Dorsey, J.G.: Electrochromatography: The hope and the promise. *Microchem. J.*, 61 (1999) 6-11; *C.A.*, 130 (1999) 231589 - a review with 22 refs.
- 1392 Fujimoto, C.: Packing materials and separation efficiencies in capillary electrochromatography. *TrAC*, 18 (1999) 291-301.
- 1393 Guo, W., Koropchak, J.A. and Yan, C.: Sensitive, universal detection for capillary electrochromatography using condensation nucleation light scattering detection. *J. Chromatogr. A*, 849 (1999) 587-597.
- 1394 Hjerten, S.: Standard and capillary chromatography, including electrochromatography, on continuous polymer beds (monoliths), based on water-soluble monomers. *Ind. Eng. Chem. Res.*, 38 (1999) 1205-1214; *C.A.*, 130 (1999) 211182 - a review with 58 refs.
- 1395 Hosoya, K., Ohta, H., Yoshizako, K., Kimata, K., Ikegami, T. and Tanaka, N.: Preparation of uniformly sized polymeric separation media potentially suitable for small-scale high-performance liquid chromatography and/or capillary electrochromatography. *J. Chromatogr. A*, 853 (1999) 11-20.
- 1396 Qi, M., Li, X.-F., Stathakis, C. and Dovichi, N.J.: Capillary electrochromatography with thermo-optical absorbance detection for the analysis of phenylthiohydantoin-amino acids. *J. Chromatogr. A*, 853 (1999) 131-140.
- 1397 Rathore, A.S., Wen, E. and Horváth, C.: Electroosmotic mobility and conductivity in columns for capillary electrochromatography. *Anal. Chem.*, 71 (1999) 2633-2641.
- 1398 Spikmans, V., Lane, S.J., Thaden, U.R. and van der Greef, J.: Automated capillary electrochromatography tandem mass spectrometry using mixed mode reversed-phase ion-exchange chromatography columns. *Rapid Commun. Mass Spectrom.*, 13 (1999) 141-149; *C.A.*, 130 (1999) 259059.
- 1399 Stol, R., Kok, W.T. and Poppe, H.: Capillary electrochromatography with macroporous particles. *J. Chromatogr. A*, 853 (1999) 45-54.
- 1400 Takeuchi, T. and Haginaka, J.: Separation and sensing based on molecular recognition using molecularly imprinted polymers. *J. Chromatogr. B*, 728 (1999) 1-20 - a review with 145 refs.
- 1401 Unger, K.K., Lüdtkke, S. and Grün, M.: Advances in electrochromatography - challenges and opportunities for miniaturized separation systems in high-throughput screening. *LC-GC Int.*, 12 (1999) 370-374.
- 1402 Walhagen, K., Unger, K.K., Olsson, A.M. and Hearn, M.T.W.: Separation of selected peptides by capillary electroosmotic chromatography using 3 μm reversed-phase bonded silica and mixed-mode phases. *J. Chromatogr. A*, 853 (1999) 263-275.
- 1403 Xu, W. and Regnier, F.E.: Electrokinetically-driven cation-exchange chromatography of proteins and its comparison with pressure-driven high-performance liquid chromatography. *J. Chromatogr. A*, 853 (1999) 243-256.
- 1404 Zhang, M., Yang, C. and El Rassi, Z.: Capillary electrochromatography with novel stationary phases. 3. Retention behavior of small and large nucleic acids on octadecyl-sulfonated-silica. *Anal. Chem.*, 71 (1999) 3277-3282.
- See also 1343, 1354, 1369, 1381, 1408, 1409, 1419, 1430, 1483, 1484, 1563.
- 4f. *Capillary isotachopheresis and sample stacking*
- 1405 Carabias-Martínez, R., Rodríguez-Gonzalo, E., Domínguez-Alvarez, J. and Hernández-Méndez, J.: Cloud point extraction as a preconcentration step prior to capillary electrophoresis. *Anal. Chem.*, 71 (1999) 2468-2474.
- 1406 Jönsson, J.A. and Mathiasson, L.: Liquid membrane extraction in analytical sample preparation. II. Applications. *TrAC*, 18 (1999) 325-334.
- 1407 Wey, A.B., Zhang, C.-X. and Thormann, W.: Head-column field-amplified sample stacking in binary system capillary electrophoresis. Preparation of extracts for determination of opioids in microliter amounts of body fluids. *J. Chromatogr. A*, 853 (1999) 95-106.
- See also 1423, 1427, 1455, 1486, 1571, 1590, 1591.
- 4g. *Enantiomers, separation*
- 1408 Carter-Finch, A.S. and Smith, N.W.: Enantiomeric separations by capillary electrochromatography using a macrocyclic antibiotic chiral stationary phase. *J. Chromatogr. A*, 848 (1999) 375-385.
- 1409 Chankvetadze, B.: Recent trends in enantioseparations using capillary electromigration techniques. *TrAC*, 18 (1999) 485-498.
- 1410 Gotti, R., Cavrini, V., Andrisano, V. and Mascellani, G.: Semi-synthetic chondroitins as chiral buffer additives in capillary electrophoresis. *J. Chromatogr. A*, 845 (1999) 247-256.
- 1411 He, Y., Zheng, M. and Gan, W.: (Analysis of chiral compounds by micelle electrokinetic capillary chromatography). *Sepu*, 17 (1999) 26-29; *C.A.*, 130 (1999) 231590 - a review with 64 refs.
- 1412 Pesek, J.J., Matyska, M.T. and Menezes, S.: Chiral separations by open tubular capillary electrokinetic chromatography. *J. Chromatogr. A*, 853 (1999) 151-158.
- 1413 Roberts, K.P., Lin, C.-H., Jankowiak, R. and Small, G.J.: On-line identification of diastereomeric dibenzo[a,h]pyrene diol epoxide-derived deoxyadenosine adducts by capillary electrophoresis-fluorescence line-narrowing and non-line narrowing spectroscopy. *J. Chromatogr. A*, 853 (1999) 159-170.
- 1414 Swartz, M.E. and Brown, Ph.R.: Micelle-mediated capillary electrophoretic separation of enantiomeric compounds. *Chem. Anal.*, 142 (1997) 377-399; *C.A.*, 130 (1999) 287113 - a review with 56 refs.
- 1415 Zhu, X. and Lin, B.: (Chiral resolution by capillary electrophoresis). *Sepu*, 17 (1999) 153-157; *C.A.*, 130 (1999) 305782 - a review with 51 refs.
- For additional information see *C.A.*:
130 (1999) 261209.
- See also 1370, 1443, 1466, 1471, 1472, 1473, 1475, 1476, 1547, 1548, 1551, 1555, 1573, 1578, 1579, 1584, 1585, 1593, 1594, 1595, 1605, 1612.

4i. Other special techniques

- 1416 Fang, Q., Wang, F.-R., Wang, S.-L., Liu, S.-S., Xu, S.-K. and Fang, Z.-L.: Sequential injection sample introduction microfluidic-chip based capillary electrophoresis system. *Anal. Chim. Acta*, 390 (1999) 27-37.
- 1417 Fang, Z.-L., Fang, Q., Liu, X.-Z., Chen, H.-W. and Liu, C.-L.: Continuous monitoring in drug dissolution testing using flow injection systems. *TrAC*, 18 (1999) 261-271.
- 1418 Gole, A.M., Sathivel, C., Lachke, A. and Sastry, M.: Size separation of colloidal nanoparticles using a miniscale isoelectric focusing technique. *J. Chromatogr. A*, 848 (1999) 485-490.
- 1419 Howard, A.G., Shafik, T., Moffatt, F. and Wilson, I.D.: Electroosmotically driven thin-layer electrochromatography on silica media. *J. Chromatogr. A*, 844 (1999) 333-340.
- 1420 Khandurina, J., Jacobson, S.C., Waters, L.C., Foote, R.S. and Ramsey, J.M.: Microfabricated porous membrane structure for sample concentration and electrophoretic analysis. *Anal. Chem.*, 71 (1999) 1815-1819.
- 1421 Li, J., Thibault, P., Bings, N.H., Skinner, C.D., Wang, C., Colyer, C. and Harrison, J.: Integration of microfabricated devices to capillary electrophoresis - electrospray mass spectrometry using a low dead volume connection: application to rapid analyses of proteolytic digests. *Anal. Chem.*, 71 (1999) 3036-3045.
- 1422 Pedersen-Bjergaard, S. and Rasmussen, K.: Liquid-liquid-liquid microextraction for sample preparation of biological fluids to capillary electrophoresis. *Anal. Chem.*, 71 (1999) 2650-2656.
- 1423 Shihabi, Z.K.: Field amplified injection in the presence of salts for capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 3-9.
- 1424 Xue, G., Pang, H.-m. and Yeung, E.S.: Multiplexed capillary zone electrophoresis and micellar electrokinetic chromatography with internal standardization. *Anal. Chem.*, 71 (1999) 2642-2649.
- 1425 Zhang, R., Liu, H., Karger, B.L. and Foret, F.: Microfabricated devices for capillary electrophoresis - electrospray mass spectrometry. *Anal. Chem.*, 71 (1999) 3258-3264.

For additional information see C.A.:
130 (1999) 234335.

See also 1352, 1355, 1358, 1384, 1445, 1481, 1523, 1587, 1617, 1634, 1639.

5. HYDROCARBONS AND HALOGEN DERIVATIVES

5b. Cyclic hydrocarbons, fullerenes

See 1392, 1399, 1413.

6. ALCOHOLS

See 1331, 1366, 1621.

7. PHENOLS

- 1426 Mellenthin, O. and Galensa, R.: Analysis of polyphenols using capillary zone electrophoresis and HPLC: detection of soy, lupin and pea protein in meat products. *J. Agric. Food Chem.*, 47 (1999) 594-602.
- 1427 Morales, S. and Cela, R.: Capillary electrophoresis and sample stacking in non-aqueous media for the analysis of priority pollutant phenols. *J. Chromatogr. A*, 846 (1999) 401-411.
- 1428 Zhang, S., Liang, L. and Yuan, Z.: (Analysis of the isomers of dihydroxybenzenes by micellar electrokinetic capillary chromatography with on-column amperometric detection at carbon-fiber microelectrode). *Sepu*, 17 (1999) 52-54; *C.A.*, 130 (1999) 245901.

See also 1339, 1366, 1624, 1639.

8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8a. Flavonoids

- 1429 Barroso, M.B. and van de Werken, G.: Determination of green and black tea composition by capillary electrophoresis. *J. High Resolut. Chromatogr.*, 22 (1999) 225-230.

9. OXO COMPOUNDS, ETHERS, EPOXIDES AND QUINONES

- 1430 Dabek-Zlotorzynska, E. and Lai, E.P.C.: Separation of carbonyl 2,4-dinitrophenylhydrazones by capillary electrochromatography with diode array detection. *J. Chromatogr. A*, 853 (1999) 487-496.
- 1431 Ganzera, M., Moraes, R.M. and Khan, I.A.: Separation of *Podophyllum* lignans by micellar electrokinetic capillary chromatography (MECC). *Chromatographia*, 49 (1999) 552-556.

See also 1331.

10. CARBOHYDRATES

10a. Mono and oligosaccharides. Structural studies

- 1432 Cheng, M.-C., Lin, C.-H., Khoo, K.-H. and Wu, S.-H.: Regioselective locatonization of α -(2 \rightarrow 8)-trisialic acid. *Angew. Chem., Int. Ed.*, 38 (1999) 686-689; *C.A.*, 130 (1999) 267677.
- 1433 Corradini, C., Cavazza, A., Canali, G. and Nicoletti, I.: Improved method for the analysis of alditols in confectionery products by capillary zone electrophoresis (CZE) comparison with high-performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD). *Ital. J. Food Sci.*, 10 (1998) 195-206; *C.A.*, 130 (1999) 195883.
- 1434 Lamari, F. and Karamanos, N.K.: High performance capillary electrophoresis as a powerful analytical tool of glycoconjugates. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1295-1317 - a review with 60 refs.

- 1435 Pfaff, P., Weide, F. and Kuhn, R.: Investigation of derivatization of oligosaccharides by means of reductive amination for separation in capillary electrophoresis. *Chromatographia*, 49 (1999) 666-670.

See also 1329.

10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*

- 1436 Barnett, Ch., Smith, A., Scanlon, B. and Israilides, C.J.: Pullulan production by *Aureobasidium pullulans* growing on hydrolyzed potato starch waste. *Carbohydr. Polym.*, 38 (1999) 203-209; *C.A.*, 130 (1999) 266408.
- 1437 Lamari, F., Theocharis, A., Hjerpe, A. and Karamanos, N.K.: Ultrasensitive capillary electrophoresis of sulfated disaccharides in chondroitin/dermatan sulfates by laser-induced fluorescence after derivatization with 2-aminoacridone. *J. Chromatogr. B*, 730 (1999) 129-133.
- 1438 Stefansson, M.: Assessment of alginic acid molecular weight and chemical composition through capillary electrophoresis. *Anal. Chem.*, 71 (1999) 2373-2378.
- 1439 Stefansson, M.: Electrohydrodynamic instabilities and segregation of polysaccharides in capillary polymer solution electrophoresis. *Biopolymers*, 49 (1999) 515-524; *C.A.*, 130 (1999) 282260.

See also 1441.

10c. *Glycoproteins and their constituents*

- 1440 Che, F.-Y., Song, J.-F., Shao, X.-X., Wang, K.-Y. and Xia, Q.-C.: Comparative study on the distribution of ovalbumin glycoforms by capillary electrophoresis. *J. Chromatogr. A*, 849 (1999) 599-608.
- 1441 Heegaard, N.H.H.: Microscale characterization of the structure-activity relationship of a heparin-binding glycopeptide using affinity capillary electrophoresis and immobilized enzymes. *J. Chromatogr. A*, 853 (1999) 189-195.
- 1442 Iwase, H., Tanaka, A., Hiki, Y., Kokubo, T., Sano, T., Ishii-Karakasa, I., Toma, K., Kobayashi, Y. and Hotta, K.: Mutual separation of hinge-glycopeptide isomers bearing five N-acetylgalactosamine residues from normal human serum immunoglobulin A1 by capillary electrophoresis. *J. Chromatogr. B*, 728 (1999) 175-183.
- 1443 Tanaka, Y. and Terabe, S.: Studies on enantioselectivities of avidin, avidin-biotin complex and streptavidin by affinity capillary electrophoresis. *Chromatographia*, 49 (1999) 489-495.

See also 1516.

11. ORGANIC ACIDS AND LIPIDS

11a. *Organic acids and simple esters*

- 1444 Ahumada, I., Mendoza, J. and Ascar, L.: Determination of organic acids and phosphate in soil aqueous extracts by capillary zone electrophoresis. *Commun. Soil Sci. Plant Anal.*, 30 (1999) 213-220; *C.A.*, 130 (1999) 251690.

- 1445 Chen, M.-J., Chen, H.-S., Lin, C.-Y. and Chang, H.-T.: Indirect detection of organic acids in non-aqueous capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 171-180.

- 1446 Chen, W.-H. and Liu, C.-Y.: Macrocylic polyamine as a selective modifier in a bonded-phase capillary column for the electrophoretic separation of aromatic acids. *J. Chromatogr. A*, 848 (1999) 401-416.

- 1447 Haddadian, F., Shamsi, S.A. and Warner, I.M.: Separation of saturated and unsaturated free fatty acids using capillary electrophoresis with indirect photometric detection. *J. Chromatogr. Sci.*, 37 (1999) 103-107.

- 1448 Johnson, S.K., Houk, L.L., Johnson, D.C. and Houk, R.S.: Determination of small carboxylic acids by capillary electrophoresis with electrospray-mass spectrometry. *Anal. Chim. Acta*, 389 (1999) 1-8.

- 1449 Klampfl, Ch.W.: Analysis of organic acids and inorganic anions in different types of beer using capillary zone electrophoresis. *J. Agric. Food Chem.*, 47 (1999) 987-990.

- 1450 Li, J. and Waldron, K.C.: Effect of surfactant concentration on the determination of trans, trans-muconic acid in urine by cationic micellar electrokinetic chromatography with thermo-optical absorbance detection. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1919-1933.

- 1451 Luong, J.H.T., Rigby, T., Male, K.B. and Bouvrette, P.: Separation of resin acids using cyclodextrin-modified capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1546-1554.

- 1452 Mallet, S., Arellano, M., Boulet, J.C. and Couderc, F.: Determination of tartaric acid in solid wine residues by capillary electrophoresis and indirect UV detection. *J. Chromatogr. A*, 853 (1999) 181-184.

- 1453 Samcová, E., Kvasnicová, Urban, J., Jelínek, I. and Coufal, P.: Determination of thiodiglycolic acid in urine by capillary electrophoresis. *J. Chromatogr. A*, 847 (1999) 135-139.

See also 1329, 1331, 1339, 1351, 1458, 1649.

11d. *Lipoproteins and their constituents*

- 1454 Schlenck, A., Schiele, F., Barbier, A., Shuvaev, V.V., Visvikis, S. and Siest, G.: Capillary electrophoretic analysis of recombinant human apolipoprotein E. Calibration mode of a protein reference material. *J. Chromatogr. A*, 853 (1999) 237-241.

- 1455 Zorn, U., Wolf, C.-F., Wennauer, R., Bachem, M.G. and Grünert, A.: Separation of lipoproteins by capillary isotachopheresis combined with enzymatic derivatization of cholesterol and triglycerides. *Electrophoresis (Weinheim)*, 20 (1999) 1619-1626.

13. STEROIDS

13a. *General techniques*

- 1456 Xu, Q., Zhang, Y., Gu, Z. and Chen, X.: (Separation of levonorgestrel, progesterone and testosterone by micellar electrokinetic capillary chromatography). *Sepu*, 17 (1999) 187-189; *C.A.*, 130 (1999) 272129.

See also 1392.

13b. *Pregnane and androstane derivatives*

- 1457 Rao, L.V., Petersen, J.R., Bissell, M.G., Okorodudu, A.O. and Mohammad, A.A.: Development of a urinary free cortisol assay using solid-phase extraction-capillary electrophoresis. *J. Chromatogr. B*, 730 (1999) 123-128.

See also 1456.

15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

15a. *Terpenes*

- 1458 Luong, J.H.T., Rigby, T., Male, K.B. and Bouvrette, P.: Derivatization of resin acids with a fluorescent label for cyclodextrin-modified electrophoretic separation. *J. Chromatogr. A*, 849 (1999) 255-266.

16. NITRO AND NITROSO COMPOUNDS

See 1331, 1639.

17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

17a. *Amines and polyamines*

- 1459 Zhou, L.L., Thompson, R.A., Ellison, D.K. and Locke, D.C.: Separation of *cis/trans*-diastereomers and enantiomers of aminoin-danol using capillary electrophoresis. *J. Capillary Electrophor.*, 4 (1997) 279-285; *C.A.*, 130 (1999) 17307.

See also 1462, 1639.

17b. *Catecholamines and their metabolites*

- 1460 Gardana, C., Pietta, P., Ciappellano, S. and Testolin, G.: Determination of histamine in fish products by capillary electrophoresis and ion-pair liquid chromatography with diode-array detection. *J. Sci. Food Agric.*, 79 (1999) 91-94.
- 1461 Liao, W., Paek, H., Mabuni, C., Angold, S. and Soliman, M.: Use of capillary electrophoresis with UV detection as a screening method to determine histamine in fish samples. *J. Chromatogr. A*, 853 (1999) 541-544.
- 1462 Rodríguez, I., Lee, H.K. and Li, S.F.Y.: Ion-pair solid-phase extraction of biogenic amines before micellar electrokinetic chromatography with laser-induced fluorescence detection of their fluorescein thiocarbamyl derivatives. *Electrophoresis (Weinheim)*, 20 (1999) 1862-1868.
- 1463 Sirén, H. and Karjalainen, U.: Study of catecholamines in patient urine samples by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 527-533.

See also 1486.

17c. *Urea and guanidine derivatives*

- 1464 Yan, S.-L., Lin, P.-Z. and Hsiao, M.-W.: Separation of urea, uric acid, creatine and creatinine by micellar electrokinetic capillary chromatography with sodium cholate. *J. Chromatogr. Sci.*, 37 (1999) 45-50.

18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS

18a. *Amino acids and their derivatives*

- 1465 Caussé, E., Siri, N., Bellet, H., Champagne, S., Bayle, C., Valdiguié, P., Salvayre, R. and Couderc, F.: Plasma homocysteine determined by capillary electrophoresis with laser-induced fluorescence detection. *Clin. Chem. (Washington)*, 45 (1999) 412-414.
- 1466 Chang, H.-M., Tsai, Ch.-F. and Li, Ch.-F.: Quantification of racemization of amino acids in alkaline-treated duck eggs by micellar capillary electrophoresis. *J. Agric. Food Chem.*, 47 (1999) 479-484.
- 1467 Culbertson, Ch.Y. and Jorgenson, J.W.: Separation of fluorescently derivatized deuterated isotopomers of phenylalanine using micellar electrokinetic chromatography and flow counter-balanced micellar electrokinetic chromatography. *J. Microcolumn Sep.*, 11 (1999) 175-183; *C.A.*, 130 (1999) 245897.
- 1468 Fabre, H., Perrin, C. and Bosc, N.: Determination of homotaurine as impurity in calcium acamprosate by capillary zone electrophoresis. *J. Chromatogr. A*, 853 (1999) 421-430.
- 1469 Fujii, T., Kawabe, S., Horike, T., Taguchi, T. and Ogata, M.: Simultaneous determination of the urinary metabolites of toluene, xylene and styrene using high-performance capillary electrophoresis. Comparison with high-performance liquid chromatography. *J. Chromatogr. B*, 730 (1999) 41-47.
- 1470 Jaworska, M., Szulinska, G., Wilk, M. and Tautt, J.: Capillary electrophoretic separation of N-acetylcysteine and its impurities as a method for quality control of pharmaceuticals. *J. Chromatogr. A*, 853 (1999) 479-485.
- 1471 Jin, L.J., Rodriguez, I. and Li, S.F.Y.: Enantiomeric separation of amino acids derivatized with fluorescein isothiocyanate isomer I by micellar electrokinetic chromatography using β - and γ -cyclodextrins as chiral selectors. *Electrophoresis (Weinheim)*, 20 (1999) 1538-1545.
- 1472 Miura, M., Terashita, Y., Funazo, K. and Tanaka, M.: Chiral separation of naphthoylamino acids by capillary zone electrophoresis with selectively methylated cyclodextrin derivatives. *Anal. Sci.*, 15 (1999) 299-302; *C.A.*, 130 (1999) 275983.
- 1473 Schmid, M.G., Rinaldi, R., Dreveny, D. and Gübitz, G.: Enantioseparation of α -amino acids and dipeptides by ligand-exchange capillary electrophoresis of various L-4-hydroxyproline derivatives. *J. Chromatogr. A*, 846 (1999) 157-163.
- 1474 Song, J.Z., Huang, D.P., Tian, S.J. and Sun, Z.P.: Determination of L-threonate in calcium L-threonate preparations by capillary electrophoresis with indirect UV detection. *Electrophoresis (Weinheim)*, 20 (1999) 1850-1855.
- 1475 Thompson, J.E., Vickroy, T.W. and Kennedy, R.T.: Rapid determination of aspartate enantiomers in tissue samples by microdialysis coupled on-line with capillary electrophoresis. *Anal. Chem.*, 71 (1999) 2379-2384.

- 1476 Yuan, Z., Yang, L. and Zhang, S.: Enantiomeric separation of amino acids by copper(II)-L-arginine ligand exchange capillary zone electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1842-1845.
- See also 1396, 1400, 1486.
- 18b. Peptides, peptidic and proteinous hormones, growth factors**
- 1477 Arcelloni, C., Aiuti, A., Cipponi, A. and Paroni, R.: High-performance liquid chromatographic purification and capillary electrophoresis quantification of the chemokine stromal cell-derived factor-1. *J. Chromatogr. B*, 729 (1999) 369-374.
- 1478 Beck, A., Lehmann, R., Gambaro, G., Häring, H.-U., Schleicher, E.D., Voelter, W. and Ceol, M.: Advances in reverse transcription polymerase chain reaction analysis of cellular mRNA levels of transforming growth factor- β 1 by capillary electrophoresis with laser-induced fluorescence detection. *Clin. Chem. Lab. Med.*, 37 (1999) 527-532.
- 1479 Cao, P. and Stults, J.T.: Phosphopeptide analysis by on-line immobilized metal-ion affinity chromatography-capillary electrophoresis-electrospray ionization mass spectrometry. *J. Chromatogr. A*, 853 (1999) 225-235.
- 1480 Chen, J., Fausnaugh-Pollitt, J. and Gu, L.: Development and validation of a capillary electrophoresis method for the characterization of proteoglycan IB-367. *J. Chromatogr. A*, 853 (1999) 197-206.
- 1481 Figeys, D., Corthals, G.L., Gallis, B., Goodlett, D.R., Ducret, A., Corson, M.A. and Aebersold, R.: Data-dependent modulation of solid-phase extraction capillary electrophoresis for the analysis of complex peptide and phosphopeptide mixtures by tandem mass spectrometry: application to endothelial nitric oxide synthase. *Anal. Chem.*, 71 (1999) 2279-2287.
- 1482 Havel, K., Pritts, K. and Wielgos, T.: Quantitation of oxidized and reduced glutathione in plasma by micellar electrokinetic capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 215-223.
- 1483 He, B., Ji, J. and Regnier, F.E.: Capillary electrochromatography of peptides in a microfabricated system. *J. Chromatogr. A*, 853 (1999) 257-262.
- 1484 Huang, P., Jin, X., Chen, Y., Srinivasan, J.R. and Lubmann, D.M.: Use of a mixed-mode packing and voltage tuning for peptide mixture separation in pressurized capillary electrochromatography with an ion trap storage reflectron time-of-flight mass spectrometer detector. *Anal. Chem.*, 71 (1999) 1786-1791.
- 1485 Huie, W.R. and Wong, S.S.: Improvement in assay sensitivity for plasma dolastatin-10 using capillary electrophoresis at elevated temperatures. *J. Chromatogr. B*, 729 (1999) 1-10.
- 1486 Jäverfalk-Hoyes, E.M., Bondesson, U., Westerlund, D. and Andréén, P.E.: Simultaneous analysis of endogenous neurotransmitters and neuropeptides in brain tissue using capillary electrophoresis - microelectrospray-tandem mass spectrometry. *Electrophoresis (Weinheim)*, 20 (1999) 1527-1532.
- 1487 Kristiansen, K.R., Deding, A.S., Jensen, D.F., Ardøe, Y. and Qvist, K.B.: Influence of salt content on ripening of semi-hard round-eyed cheese of Danbo-type. *Milchwissenschaft*, 54 (1999) 19-23; *C.A.*, 130 (1999) 181731.
- 1488 Richards, M.P., Ashwell, C.M. and McMurtry, J.P.: Analysis of leptin gene expression in chickens using reverse transcription polymerase chain reaction and capillary electrophoresis with laser-induced fluorescence detection. *J. Chromatogr. A*, 853 (1999) 321-335.
- 1489 Schmerr, M.J., Jenny, A.L., Bulgin, M.S., Miller, J.M., Hamir, A.N., Cutlip, R.C. and Goodwin, K.R.: Use of capillary electrophoresis and fluorescent labeled peptides to detect the abnormal prion protein in the blood of animals that are infected with a transmissible spongiform encephalopathy. *J. Chromatogr. A*, 853 (1999) 207-214.
- 1490 Soudan, B., Hennebicq, S., Tetaert, D., Boersma, A., Richet, C., Demeyer, D., Briand, G. and Degand, P.: Capillary zone electrophoresis and MALDI-mass spectrometry for the monitoring of *in vitro* O-glycosylation of a threonine/serine-rich MUC5AC hexadecapeptide. *J. Chromatogr. B*, 729 (1999) 65-74.
- See also 1335, 1371, 1380, 1382, 1402, 1425, 1441, 1473, 1491, 1556.
- 18c. Elucidation of structure of proteins and enzymes**
- 1491 Issaq, H.J., Chan, K.C., Janini, G.M. and Muschik, G.M.: A simple two-dimensional high performance liquid chromatography/high performance capillary electrophoresis set-up for the separation of complex mixtures. *Electrophoresis (Weinheim)*, 20 (1999) 1533-1537.
- 1492 Janini, G.M., Metral, C.J., Issaq, H.J. and Muschik, G.M.: Peptide mobility and peptide mapping in capillary zone electrophoresis. Experimental determination and theoretical simulation. *J. Chromatogr. A*, 848 (1999) 417-433.
- 1493 Vankova, H.: (Peptide maps.) *Chem. Listy*, 93 (1999) 120-127; *C.A.*, 130 (1999) 120-127 - a review with 69 refs.
- See also 1421, 1508.
- 19. PROTEINS**
- 19a. General techniques**
- 1494 Ding, Y. and Lin, B.: (Study of molecular association by capillary zone electrophoresis/frontal analysis). *Fenxi Huaxue*, 27 (1999) 20-23; *C.A.*, 130 (1999) 276167.
- 1495 Rochu, D., Ducret, G., Ribes, F., Vanin, S. and Masson, P.: Capillary zone electrophoresis with optimized temperature control for studying thermal denaturation of proteins at various pH. *Electrophoresis (Weinheim)*, 20 (1999) 1586-1594.
- 1496 Tong, W., Link, A., Eng, J.K. and Yates, J.R., III.: Identification of proteins in complexes by solid-phase microextraction/multistep elution/capillary electrophoresis/tandem mass spectrometry. *Anal. Chem.*, 71 (1999) 2270-2278.
- 1497 Wang, Q., Luo, G., Ou, J. and Yeung, W.S.B.: Noncompetitive immunoassays using protein G affinity capillary chromatography and capillary electrophoresis with laser-induced fluorescence detection. *J. Chromatogr. A*, 848 (1999) 139-148.
- 1498 Zhou, G.-H., Luo, G.-A. and Zhang, X.-D.: Microemulsion electrokinetic chromatography of proteins. *J. Chromatogr. A*, 853 (1999) 277-284.

See also 1338, 1371, 1380, 1403, 1479, 1504.

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

See 1488.

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

1499 Hunt, G. and Nashabeh, W.: Capillary electrophoresis sodium dodecylsulfate nongel sieving analysis of a therapeutic recombinant monoclonal antibody: a biotechnology perspective. *Anal. Chem.*, 71 (1999) 2390-2397.

See also 1454, 1516.

19d. *Microbial and plant proteins*

1500 Arangoa, M.A., Campanero, M.A., Popineau, Y. and Irache, J.M.: Electrophoretic separation and characterisation of gliadin fractions from isolates and nanoparticulate drug delivery systems. *Chromatographia*, 50 (1999) 243-246.

1501 Lam, M.T., Wan, Q.H., Boulet, C.A. and Le, X.C.: Competitive immunoassay for staphylococcal enterotoxin A using capillary electrophoresis with laser-induced fluorescence detection. *J. Chromatogr. A*, 853 (1999) 545-553.

1502 Lookhart, G.L., Bean, S.R. and Jones, B.L.: Separation and characterization of barley (*Hordeum vulgare* L.) hordeins by free zone capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1605-1612.

1503 Olivieri, E., Viotti, A., Lauria, M., Simò-Alfonso, E. and Righetti, P.G.: Variety identification in maize lines via capillary electrophoresis of zeins in isoelectric acidic buffers. *Electrophoresis (Weinheim)*, 20 (1999) 1595-1604.

1504 Richards, D.P., Stathakis, C., Polakowski, R., Ahmadzadeh, H. and Dovichi, N.J.: Labeling effects on the isoelectric point of green fluorescent protein. *J. Chromatogr. A*, 853 (1999) 21-25.

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

1505 Chelyapov, N., Jacobs, S.A. and Magee, T.J.: Determination of human immunodeficiency virus-1 protease inhibitors in patient serum using free solution capillary zone electrophoresis. *J. Chromatogr. A*, 853 (1999) 431-437.

1506 Moody, E.D., Viskari, P.J. and Colyer, C.L.: Non-covalent labeling of human serum albumin with indocyanine green: a study by capillary electrophoresis with diode laser-induced fluorescence detection. *J. Chromatogr. B*, 729 (1999) 55-64.

See also 1442, 1615.

19f. *Structural and muscle proteins*

1507 Bassompierre, M., Larsen, K.L., Zimmermann, W., McLean, E., Borresen, T. and Sandfeld, P.: Comparison of chemical, electrophoretic and *in vitro* digestion methods for predicting fish meal nutritive quality. *Aquacult. Nutr.*, 4 (1998) 233-239; *C.A.*, 130 (1999) 236611.

19h. *Chromoproteins and metalloproteins*

1508 Beattie, J.H., Wood, A.M. and Duncan, G.J.: Rat metallothionein-2 contains N⁶-acetylated and unacetylated isoforms. *Electrophoresis (Weinheim)*, 20 (1999) 1613-1618.

1509 Cao, P. and Moini, M.: Separation and detection of the α - and β -chains of hemoglobin of a single intact red blood cell using capillary electrophoresis/electrospray ionization time-of-flight mass spectrometry. *J. Am. Soc. Mass Spectrom.*, 10 (1999) 184-186; *C.A.*, 130 (1999) 264397.

1510 Minoura, K., Soga, T., Katayama, H., Ishihama, Y. and Hoshino, T.: (Application of capillary electrophoresis/mass spectrometry (CE/MS) to the determination of glycohemoglobin). *Chromatography*, 19 (1998) 270-271; *C.A.*, 130 (1999) 278877.

1511 Riechel, P., Weiss, T., Ulber, R., Buchholz, H. and Scheper, T.: Analysis of bovine lactoferrin in whey using capillary electrophoresis (CE) and micellar electrokinetic chromatography (MEKC). *Adv. Exp. Med. Biol.*, 443 (1998) 33-39; *C.A.*, 130 (1999) 181627.

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

1512 Cartoni, G., Coccioli, F., Jasionowska, R. and Masci, M.: Determination of cows' milk in goats' milk and cheese by capillary electrophoresis of the whey protein fractions. *J. Chromatogr. A*, 846 (1999) 135-141.

1513 Karasova, L., Rauch, P. and Fukal, L.: (Set-up of competitive enzyme immunoassay for determination of α -lactalbumin and β -lactoglobulins in cow milk). *Czech. J. Food Sci.*, 17 (1999) 5-14; *C.A.*, 130 (1999) 193894.

See also 1511.

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

1514 Berkova, N., Lemay, A., Korobko, V., Shingarova, L., Sagaidak, L. and Goupil, S.: Tumor necrosis factor mutants with selective cytotoxic activity. *Cancer Detect. Prev.*, 23 (1999) 1-7; *C.A.*, 130 (1999) 295321.

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

See 1443, 1505.

20. ENZYMES AND ENZYME ACTIVITY ESTIMATION

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

1515 Choi, S., Lee, Y.S., Na, D.S. and Yoo, Y.S.: Determination of enzymatic activity and properties of secretory phospholipase A₂ by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 285-293.

1516 Felten, C., Quan, C.P., Chen, A.B., Canova-Davis, E., McNerney, T., Goetzinger, W.K. and Karger, B.L.: Use of acidic and basic pH and calcium ion addition in the capillary zone electrophoretic characterization of recombinant human deoxyribonuclease, a complex phosphoglycoprotein. *J. Chromatogr. A*, 853 (1999) 295-308.

20f. *Other hydrolases*

- 1517 Jiang, K.-Y., Pitiot, O., Anissimova, M., Adenier, H. and Vijayalakshmi, M.A.: Structure-function relationship in glycosylated α -chymotrypsin as probed by IMAC and IMACE. *Biochim. Biophys. Acta*, 1433 (1999) 198-209.
- 1518 Shihabi, Z.K.: Analysis of angiotension-converting enzyme by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 185-188.
- 1519 Viglio, S., Luisetti, M., Zanaboni, G., Döring, G., Worlitzsch, D., Cetta, G. and Iadarola, P.: Simultaneous determination of *Pseudomonas aeruginosa* elastase, human leukocyte elastase and cathepsin G activities by micellar electrokinetic chromatography. *J. Chromatogr. A*, 846 (1999) 125-134.
- 1520 Viglio, S., Zanaboni, G., Lupi, A., Gianelli, L., Luisetti, M., Casali, L., Cetta, G. and Iadarola, P.: Micellar electrokinetic chromatography for analyzing active site specificity of *Pseudomonas aeruginosa* elastase. *Electrophoresis (Weinheim)*, 20 (1999) 1578-1585.

21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS

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

- 1521 Mangano, M.F., Battaglia, C., Salani, G., Bernardi, L.R. and de Bellis, G.: Composition dependent separation of oligonucleotides by capillary electrophoresis in acidic buffers with application to the quality control of synthetic oligonucleotides. *J. Chromatogr. A*, 848 (1999) 435-442.
- 1522 Pietta, P.G., Mangano, M.F., Battaglia, C., Salani, G., Bernardi, L.R. and de Bellis, G.: Application of capillary electrophoresis at low pH to oligonucleotides quality control. *J. Chromatogr. A*, 853 (1999) 355-358.
- 1523 Soper, S.A., Ford, S.M., Xu, Y., Qi, S., McWhorter, S., Lassiter, S., Patterson, D. and Bruch, R.C.: Nanoliter-scale sample preparation methods directly coupled to polymethylmethacrylate-based microchips and gel-filled capillaries for the analysis of oligonucleotides. *J. Chromatogr. A*, 853 (1999) 107-120.
- 1524 Terzuoli, L., Porcelli, B., Setacci, C., Giubbolini, M., Cinci, G., Carlucci, F., Pagani, R. and Marinello, E.: Comparative determination of purine compounds in carotid plaque by capillary zone electrophoresis and high-performance liquid chromatography. *J. Chromatogr. B*, 728 (1999) 185-192.

See also 1404, 1413, 1469.

21b. *Nucleic acids, RNA*

See 1404, 1488.

21c. *Nucleic acids, DNA*

- 1525 De Carmejane, O., Schwinefus, J.J., Wang, S.-C. and Morris, M.D.: Electrophoretic separation of linear and supercoiled DNA in uncoated capillaries. *J. Chromatogr. A*, 849 (1999) 267-276.
- 1526 Han, F., Huynh, B.H., Ma, Y. and Lin, B.: High-efficiency DNA separation by capillary electrophoresis in a polymer solution with ultralow viscosity. *Anal. Chem.*, 71 (1999) 2385-2389.

- 1527 Liu, Y. and Kuhr, W.G.: Separation of double- and single-stranded DNA restriction fragments: capillary electrophoresis with polymer solutions under alkaline conditions. *Anal. Chem.*, 71 (1999) 1668-1673.
- 1528 Mala, Z., Kleparnik, K. and Bocek, P.: Highly alkaline electrolyte for single-stranded DNA separations by electrophoresis in bare silica capillaries. *J. Chromatogr. A*, 853 (1999) 371-379.
- 1529 Matsuda, S. and Baba, Y.: (Analysis of supercoiled DNA by capillary electrophoresis). *Chromatography*, 19 (1998) 250-251; *C.A.*, 130 (1999) 262756.
- 1530 Orchard, M.J., Collin, I.P. and Bushell, M.: The use of capillary electrophoresis with entangled polymer matrix to analyse plasmid DNA and a cationic lipid/cholesterol liposome:DNA complex. *Chromatographia*, 50 (1999) 181-187.
- 1531 Yashiro, N. and Baba, Y.: (DNA typing by capillary gel electrophoresis). *Chromatography*, 19 (1998) 322-323; *C.A.*, 130 (1999) 262762.

For additional information see *C.A.*:
130 (1999) 204475, 234321.

See also 1420, 1523.

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

- 1532 Chen, H.-S. and Chang, H.-T.: Electrophoretic separation of small DNA fragments in the presence of electroosmotic flow using poly(ethylene oxide) solutions. *Anal. Chem.*, 71 (1999) 2033-2036.
- 1533 Chen, H.-S. and Chang, H.-T.: Stepwise capillary electrophoretic separation of DNA fragments using poly(ethylene oxide) solutions in the presence of electroosmotic flow. *J. Chromatogr. A*, 853 (1999) 337-347.
- 1534 Gao, Q., Pang, H.-m. and Yeung, E.S.: Simultaneous genetic typing from multiple short tandem repeat loci using a 96-capillary array electrophoresis system. *Electrophoresis (Weinheim)*, 20 (1999) 1518-1526.
- 1535 Klintschar, M., Ebner, A. and Reichenpfader, B.: Population genetic studies on nine tetrameric short tandem repeat loci using fluorescence dye-labeled primers and capillary electrophoresis in the Austrian population. *Electrophoresis (Weinheim)*, 20 (1999) 1740-1742.
- 1536 Lu, S.X. and Yeung, E.S.: Side-entry excitation and detection of square capillary array electrophoresis for DNA sequencing. *J. Chromatogr. A*, 853 (1999) 359-369.
- 1537 Scherer, J.R., Kheterpal, I., Radhakrishnan, A., Ja, W.W. and Mathies, R.A.: Ultra-high throughput rotary capillary array electrophoresis scanner for fluorescent DNA sequencing and analysis. *Electrophoresis (Weinheim)*, 20 (1999) 1508-1517.
- 1538 Shen, Y., Xu, Q., Han, F., Ding, K., Song, F., Fan, Y., Zhu, N., Wu, G. and Lin, B.: Application of capillary nongel sieving electrophoresis for gene analysis. *Electrophoresis (Weinheim)*, 20 (1999) 1822-1828.
- 1539 Shihabi, Z.K.: Capillary electrophoresis of double-stranded DNA in an untreated capillary. *J. Chromatogr. A*, 853 (1999) 349-354.
- 1540 Tan, W.G., Tyrrell, D.L.J. and Dovichi, N.J.: Detection of duck hepatitis B virus DNA fragments using on-column intercalating dye labeling with capillary electrophoresis-laser-induced fluorescence. *J. Chromatogr. A*, 853 (1999) 309-319.

For additional information see C.A.:
130 (1999) 248988.

See also 1528.

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

- 1541 Okayama, N., Itoh, M., Joh, T., Miyamoto, T., Takeuchi, T., Moriyama, A. Kato, T.: Regulatory mechanism of pepsinogen gene expression in monolayer cultured guinea pig gastric chief cells. *Dig. Dis. Sci.*, 43 (1998) 2744-2749; *C.A.*, 130 (1999) 265255.
- 1542 Sumita, Ch., Tsuhako, M. and Baba, Y.: Simultaneous analysis of genes by capillary electrophoresis with laser-induced fluorescence detector using a stepwise field strength gradient. *Chem. Pharm. Bull.*, 47 (1999) 111-113; *C.A.*, 130 (1999) 247549.
- 1543 Xian, J. and Harrington, M.: Mobility shift analysis of protein-DNA complexes by capillary electrophoresis. In: Tietz, D. (Editor), *Nucleic Acids Electrophor.*, Springer, Berlin, 1998, pp. 272-291; *C.A.*, 130 (1999) 248990.

For additional information see C.A.:
130 (1999) 232912.

See also 1538.

22. ALKALOIDS

- 1544 Haque, A. and Stewart, J.T.: Simultaneous determination of codeine, caffeine, butalbital and aspirin by free solution capillary electrophoresis. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1193-1204.
- 1545 Lazar, I.M., Naisbitt, G. and Lee, M.L.: Capillary electrophoresis time-of-flight mass spectrometry of an opium powder. *Chromatographia*, 50 (1999) 188-194.
- 1546 Matysik, F.-M.: Application of non-aqueous capillary electrophoresis with electrochemical detection to the determination of nicotine in tobacco. *J. Chromatogr. A*, 853 (1999) 27-34.
- 1547 Tahara, S.-i., Okayama, A., Kitada, Y., Watanabe, T., Nakazawa, H., Kakehi, K. and Hisamatu, Y.: Enantiomeric separation of atropine in *Scopolia* extract and *Scopolia Rhizome* by capillary electrophoresis using cyclodextrins as chiral selectors. *J. Chromatogr. A*, 848 (1999) 465-471.
- 1548 Wedig, M. and Holzgrabe, U.: Enantioseparation of tropane alkaloids by means of anionic cyclodextrin-modified capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1555-1560.

For additional information see C.A.:
130 (1999) 272100.

See also 1374, 1393, 1429.

23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

23b. Bile pigments

- 1549 Zhou, X.-M., Lliu, J.-W., Zou, X. and Chen, J.-j.: Monitoring catalytic reaction of bilirubin oxidase and determination of bilirubin and bilirubin oxidase activity by capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1916-1920.

23d. Pyridine derivatives

See 1593.

23e. Other N-heterocyclic compounds

- 1550 Freitag, D., Schmitt-Kopplin, P., Simon, R., Kaune, A. and Ketrup, A.: Interactions of hydroxy-s-triazines with sodium dodecyl sulfate-micelles investigated by micellar capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1568-1577.
- 1551 Sasse, A., Kiec-Kononowicz, K., Stark, H., Motyl, M., Reidemeister, S., Ganellin, C.R., Ligneau, X., Schwartz, J.-Ch. and Schunack, W.: Development of chiral N-alkylcarbamates as new leads for potent and selective H3-receptor antagonists: synthesis, capillary electrophoresis, and *in vitro* and oral *in vivo* activity. *J. Med. Chem.*, 42 (1999) 593-600; *C.A.*, 130 (1999) 237517.

See also 1460, 1461, 1462.

24. ORGANIC SULPHUR COMPOUNDS (INCL. GLUCOSINOLATES)

- 1552 Angelino, S., Prevot, A.B., Gennaro, M.C. and Pramauro, E.: Ion-interaction high-performance liquid chromatography and micellar electrokinetic capillary chromatography: two complementary techniques for the separation of aromatic sulfonated compounds. *J. Chromatogr. A*, 845 (1999) 257-271.
- 1553 Houzé, P., dal Cortivo, L., Anselme, M., Bousquet, B. and Gourmel, B.: Quantification of residual dimethyl sulfoxide in supernatants of haematopoietic stem cells by capillary zone electrophoresis. *J. Chromatogr. B*, 728 (1999) 75-83.
- 1554 Possanzini, M., di Palo, V., Desiderio, C., Fanali, S. and Liberti, A.: Determination of carbon disulphide in air as xanthogenate by ion chromatography and capillary electrophoresis. *Chromatographia*, 49 (1999) 678-680.

See also 1627.

25. ORGANIC PHOSPHORUS COMPOUNDS (INCL. SUGAR PHOSPHATES)

- 1555 Fischer, C., Schmidt, U., Dwars, T. and Oehme, G.: Enantiomeric resolution of derivatives of α -aminophosphonic and α -aminophosphinic acids by high-performance liquid chromatography and capillary electrophoresis. *J. Chromatogr. A*, 845 (1999) 273-283.

- 1556 Gamble, T., Ramachandran, C. and Bateman, K.P.: Phosphopeptide isomer separation using capillary zone electrophoresis for the study of protein kinases and phosphatases. *Anal. Chem.*, 71 (1999) 3469-3476.

See also 1479.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

26c. Coordination compounds

- 1557 Liu, B.-F., Liu, L.-B. and Cheng, J.-K.: Analysis of metal complexes in the presence of mixed ion pairing additives in capillary electrophoresis. *J. Chromatogr. A*, 848 (1999) 473-484.
- 1558 Okembo, A.A., Hill, H.H., Metcalf, S.G. and Bachelor, M.: Metal ion interferences in reverse polarity capillary zone electrophoretic analysis of Hanford Defense Waste for ethylenediaminetetraacetic acid (EDTA) and *n*-hydroxyethylethylenediaminetriacetic acid (HEDTA). *Anal. Chim. Acta*, 396 (1999) 105-116.

See also 1372, 1644.

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

- 1559 Davey, M.W., Persiau, G., Bauw, G. and van Montagu, M.: Direct measurement of ascorbic acid biosynthesis in Arabidopsis cell suspension culture using capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 381-389.
- 1560 Fotsing, L., Fillet, M., Chiap, P., Hubert, P. and Crommen, J.: Elimination of adsorption effects in the analysis of water-soluble vitamins in pharmaceutical formulations by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 391-401.
- 1561 Gomis, D.B., González, L.L. and Álvarez, D.G.: Micellar electrokinetic capillary chromatography analysis of water-soluble vitamins. *Anal. Chim. Acta*, 396 (1999) 55-60.
- 1562 Hustad, S., Ueland, P.M. and Schneede, J.: Quantification of riboflavin, flavin mononucleotide and flavin adenine dinucleotide in human plasma by capillary electrophoresis and laser-induced fluorescence detection. *Clin. Chem. (Washington)*, 45 (1999) 862-868.
- 1563 Sander, L.C., Pusch, M., Märker, B. and Wise, S.A.: Separation of carotenoid isomers by capillary electrochromatography with C₃₀ stationary phases. *Anal. Chem.*, 71 (1999) 3477-3483.

28. ANTIBIOTICS

- 1564 Gotti, R., Pomponio, R., Andrisano, V. and Cavrini, V.: Analytical study of penicillamine in pharmaceuticals by capillary zone electrophoresis. *J. Chromatogr. A*, 844 (1999) 361-369.
- 1565 Kowalski, P., Oledzka, I., Okoniewski, P., Switala, M. and Lamparczyk, H.: Determination of streptomycin in eggs yolk by capillary electrophoresis. *Chromatographia*, 50 (1999) 101-104.

- 1566 Pajchel, G. and Tyski, S.: Adaptation of capillary electrophoresis to piperacillin drug analysis. *J. Chromatogr. A*, 846 (1999) 223-226.

1567 Wang, A., Zhang, L. and Fang, Y.: Determination and separation of chloramphenicol and its hydrolysate in eye-drops by capillary zone electrophoresis with amperometric detection. *Anal. Chim. Acta*, 394 (1999) 309-316.

- 1568 Yongxin, Z., Hoogmartens, C., van Schepdael, A., Roets, E. and Hoogmartens, J.: Analysis of ampicillin and its degradation products by capillary electrophoresis. *J. Liq. Chromatogr. Relat. Technol.*, 22 (1999) 1403-1415.

See also 1608, 1613.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

29a. General techniques

- 1569 Leinweber, F.C. and Otto, M.: Systematic optimization of peak capacity for pesticide separation in micellar electrokinetic chromatography. *J. Chromatogr. A*, 848 (1999) 347-363.
- 1570 Sherma, J.: Pesticide residue analysis: 1997-1998. *J. Assoc. Off. Anal. Chem.*, 82 (1999) 561-574 - a review with 231 refs.

29b. Chlorinated insecticides

- 1571 Otsuka, K., Hayashibara, H., Yamauchi, S., Quirino, J.P. and Terabe, S.: Highly-sensitive micellar electrokinetic chromatographic analysis of dioxin-related compounds using on-line concentration. *J. Chromatogr. A*, 853 (1999) 413-420.

29c. Herbicides

- 1572 Lancas, F.M., Rissato, S.R. and Galhiane, M.S.: Determination of 2,4-D and Dicamba in food crops by MEKC. *Chromatographia*, 50 (1999) 35-40.
- 1573 Miura, M., Terashita, Y., Funazo, K. and Tanaka, M.: Separation of phenoxy acid herbicides and their enantiomers in the presence of selectively methylated cyclodextrin derivatives by capillary zone electrophoresis. *J. Chromatogr. A*, 846 (1999) 359-367.

See also 1405, 1624.

29g. Other types of pesticides and various agrochemicals

See 1655.

30. SYNTHETIC AND NATURAL DYES

30a. Synthetic dyes

- 1574 Takeda, S., Tanaka, Y., Nishimura, Y., Yamane, M., Siroma, Z. and Wakida, S.-i.: Analysis of dyestuff degradation products by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 503-509.

30b. Chloroplast and other natural pigments

- 1575 De Nobili, M., Bragato, G. and Mori, A.: The relative importance of molecular size and charge differences in capillary electrophoresis of humic substances of different origin. *Spec. Publ. - R. Soc. Chem.*, 228 (1998) 109-112; *C.A.*, 130 (1999) 248995.

31. PLASTICS AND THEIR INTERMEDIATES

- 1576 Gallardo, A., Rocio, L.A., San Roman, J., Cifuentes, A. and Diez-Masa, J.-C.: Micellar electrokinetic chromatography applied to copolymer systems with heterogeneous distribution. *Macromolecules*, 32 (1999) 610-617; *C.A.*, 130 (1999) 197011.

32. DRUG ANALYSIS

32a. Drug analysis, general techniques

- 1577 Altria, K.D.: Application of microemulsion electrokinetic chromatography to the analysis of a wide range of pharmaceuticals and excipients. *J. Chromatogr. A*, 844 (1999) 371-386.
- 1578 Ding, Y., Zhu, X. and Lin, B.: Study of interaction between drug enantiomers and serum albumin by capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1890-1894.
- 1579 Ma, L., Han, J., Wang, H., Gu, J. and Fu, R.: Capillary electrophoresis enantioseparation of drugs using β -cyclodextrin polymer: Intramolecular synergistic effect. *Electrophoresis (Weinheim)*, 20 (1999) 1900-1903.
- 1580 Rosés, M., Ràfols, C., Bosch, E., Martínez, A.M. and Abraham, M.H.: Solute-solvent interactions in micellar electrokinetic chromatography. Characterization of sodium dodecyl sulfate-Brij 35 micellar systems for quantitative structure-activity relationship modelling. *J. Chromatogr. A*, 845 (1999) 217-226.
- 1581 Seidel, B.S. and Faubel, W.: Miniaturized capillary electrophoretic drug analysis with photothermal detection. *AIP Conf. Proc.*, 463 (1999) 576-578; *C.A.*, 130 (1999) 287141.
- 1582 Ward, T.J. and Ward, K.D.: Separation of optically active pharmaceuticals using capillary electrophoresis. *Chem. Anal. (N. Y.)*, 142 (1997) 317-344; *C.A.*, 130 (1999) 287112.
- 1583 Yang, Q., Liu, X.-Y., Miyake, J. and Toyotama, H.: Self-assembly and immobilization of liposomes in fused-silica capillary by avidin-biotin binding. *Supramol. Sci.*, 5 (1998) 769-772; *C.A.*, 130 (1999) 179568.
- 1584 Zhu, X., Ding, Y., Lin, B., Jakob, A. and Koppenhoefer, B.: Study of enantioselective interactions between chiral drugs and serum albumin by capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1869-1877.
- 1585 Zhu, X., Lin, B., Jakob, A., Wuertner, S. and Koppenhoefer, B.: Separation of drugs by capillary electrophoresis, Part 10. Permethal-alpha-cyclodextrin as chiral solvating agent. *Electrophoresis (Weinheim)*, 20 (1999) 1878-1889.

See also 1374, 1389, 1410, 1417.

32b. Antirheumatics and antiinflammatory drugs

- 1586 Bartsch, H., Eiper, A., Habiger, K. and Kopelent-Frank, H.: Comparison of analytical methods for investigating the photostability of isoxicam. *J. Chromatogr. A*, 846 (1999) 207-216.
- 1587 Fillet, M., Bechet, I., Piette, V. and Crommen, J.: Separation of nonsteroidal anti-inflammatory drugs by capillary electrophoresis using nonaqueous electrolytes. *Electrophoresis (Weinheim)*, 20 (1999) 1907-1015.
- 1588 Hercegová, A. and Polonsky, J.: Determination of non-steroidal anti-inflammatory drugs in biological fluids. *Pharmazie*, 54 (1999) 479-486 - a review with 73 refs.
- 1589 Rudaz, S., Veuthey, J.L., Desiderio, C. and Fanali, S.: Simultaneous stereoselective analysis by capillary electrophoresis of tramadol enantiomers and their main phase I metabolites in urine. *J. Chromatogr. A*, 846 (1999) 227-237.
- 1590 Sádecká, J. and Polonský, J.: Determination of ibuprofen in serum by capillary isotachopheresis. *Pharmazie*, 54 (1999) 627.
- 1591 Sádecká, J., Hercegová, A. and Polonský, J.: Determination of fenopropfen in serum by capillary isotachopheresis. *J. Chromatogr. B*, 729 (1999) 11-17.

See also 1544.

32c. Autonomic and cardiovascular drugs

- 1592 Britz-Mickibbin, P., Wong, J. and Chen, D.D.Y.: Analysis of epinephrine from fifteen different dental anesthetic formulations by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 535-540.
- 1593 Christians, T., Diewald, D., Wessler, C., Otte, Y., Lehmann, J. and Holzgrabe, U.: Resolution of newly synthesized racemic dihydropridines with different chiral selectors by means of capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 455-460.
- 1594 Kuwahara, Y. and Nishi, H.: (Fast drug analysis by capillary electrophoresis. II. Analysis of denopamine tablets effects of purity of dimethyl β -cyclodextrin as chiral selector on enantiomer separations). *Yakugaku Zasshi*, 119 (1999) 288-298; *C.A.*, 130 (1999) 287135.
- 1595 Proksa, B.: Capillary zone electrophoretic separation of (R,S)-metipranolol and related substances. *Pharmazie*, 54 (1999) 431-434.

For additional information see *C.A.*:
130 (1999) 261383.

See also 1422, 1494, 1578, 1584.

32d. Central nervous system drugs

- 1596 Ban, E., Choi, S., Lee, J.A., Lho, D.-S. and Yoo, Y.S.: Cyclodextrin-mediated micellar electrokinetic chromatography and matrix-assisted laser desorption/ionization time-of-flight mass spectrometry for the enantiomer separation of racemorphan in human urine. *J. Chromatogr. A*, 853 (1999) 439-447.

- 1597 Huang, H., Zhi, D., Zhang, S. and Ma, C.: (Quantitative analysis of phenytoin sodium and phenobarbital sodium in the blood of neurosurgical patients by micellar electrokinetic capillary chromatography). *Tianjin Yiyao*, 26 (1998) 612-615; *C.A.*, 130 (1999) 246179.
- 1598 Jin, L.J., Wang, T. and Li, S.F.: Indirect laser-induced fluorescence detection of valproic acid in human serum by capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1856-1861.
- 1599 Peyrin, E. and Guillaume, Y.C.: Chemometric approach to the treatment of benzodiazepine separation and peak broadening in capillary electrophoresis. *J. Chromatogr. A*, 849 (1999) 563-573.
- 1600 Pucci, V., Raggi, M. and Kenndler, E.: Separation of antipsychotic drugs (clozapine, loxapine) and their metabolites by capillary zone electrophoresis. *J. Chromatogr. A*, 853 (1999) 461-468.
- 1601 Pucci, V., Raggi, M. and Kenndler, E.: Separation of eleven central nervous system drugs by capillary zone electrophoresis. *J. Chromatogr. B*, 728 (1999) 263-271.
- 1602 Varesio, E., Gauvrit, J.-Y., Longerey, R., Lantéri, P. and Veuthey, J.-L.: Optimization of fast CE analyses of ecstasy derivatives by use of experimental designs. *Chromatographia*, 50 (1999) 195-201.
- 1603 Wu, H.-L., Huang, C.-H., Chen, S.-H. and Wu, S.-M.: Chiral quantitation of pheniramine, chlorpheniramine and brompheniramine maleates by capillary zone electrophoresis. *J. Chromatogr. Sci.*, 37 (1999) 24-30.
- 1604 Wu, S.-M., Ko, W.-K., Wu, H.-L. and Chen, S.-H.: Trace analysis of haloperidol and its chiral metabolite in plasma by capillary electrophoresis. *J. Chromatogr. A*, 846 (1999) 239-243.
- 1605 Zhang, X.-X., Hong, F., Chang, W.-B., Ci, Y.-X. and Ye, Y.-H.: Enantiomeric separation of promethazine and D,L- α -amino- β -[4-(1,2-dihydro-2-oxo-quinoline)] propionic acid drugs by capillary zone electrophoresis using albumin as chiral selectors. *Anal. Chim. Acta*, 392 (1999) 175-181.

See also 1336, 1370, 1544, 1551.

32e. Chemotherapeutics (exc. cytostatics and antibiotics)

- 1606 Cross, R.F. and Cao, J.: Salt effects in capillary zone electrophoresis. IV. Resolution versus time and the effect of potassium phosphate and its concentration in the high ionic strength separation of sulphonamides. *J. Chromatogr. A*, 849 (1999) 575-585.
- 1607 Wang, A., Gong, F., Li, H. and Fang, Y.: Separation and determination of the active ingredients in tablets of composite sulphonamides by capillary zone electrophoresis with amperometric detection. *Anal. Chim. Acta*, 386 (1999) 265-269.

See also 1349, 1480.

32f. Cytostatics

- 1608 Siméon, N., Chatelut, E., Canal, P., Nertz, M. and Couderc, F.: Anthracycline analysis by capillary electrophoresis. Application to the analysis of daunorubicin in Kaposi sarcoma tumor. *J. Chromatogr. A*, 853 (1999) 449-454.

See also 1485.

32g. Other drug categories

- 1609 Andersson, E.K.M.: Impurities at a level of 0.01% in foscarnet sodium determined by capillary zone electrophoresis with indirect UV detection and sample self-stacking. *J. Chromatogr. A*, 846 (1999) 245-253.
- 1610 Davydova, N.N., Gotti, R., Welch, W.J. and Wainer, I.W.: Determination of iothalamate in rat urine, plasma, and tubular fluid by capillary electrophoresis. *J. Chromatogr. B*, 728 (1999) 143-149.
- 1611 Fan, G., Hu, J., Lin, M., Zhang, Z. and An, D.: (Analysis of trifluoroacetyl primaquine and primaquine by high-performance capillary electrophoresis). *Yaowu Fenxi Zazhi*, 19 (1999) 84-87; *C.A.*, 130 (1999) 301807.
- 1612 Hüttemann, H. and Blaschke, G.: Achiral and chiral determination of ciprofibrate and its glucuronide in human urine by capillary electrophoresis. *J. Chromatogr. B*, 729 (1999) 33-41.
- 1613 Kiessig, S., Bang, H. and Thuncke, F.: Interaction of cyclophilin and cyclosporins monitored by affinity capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 469-477.
- 1614 Ku, Y.-R., Chang, Y.-S., Wen, K.-C. and Ho, L.-K.: Analysis and confirmation of synthetic anorexics in adulterated traditional Chinese medicines by high-performance capillary electrophoresis. *J. Chromatogr. A*, 848 (1999) 537-543.
- 1615 Wan, Q.-H. and Le, X.C.: Capillary electrophoresis coupled with laser-induced fluorescence polarization as a hybrid approach to ultrasensitive immunoassays. *J. Chromatogr. A*, 853 (1999) 555-562.

For additional information see *C.A.*:
130 (1999) 257396, 301792.

See also 1468, 1605, 1617.

32h. Toxicological and forensic applications

- 1616 Piñeiro, N., Leão, J.M., Martínez, A.G. and Rodríguez Vázquez, J.A.: Capillary electrophoresis with diode array detection as an alternative analytical method for paralytic and amnesic shellfish toxins. *J. Chromatogr. A*, 847 (1999) 223-232.

See also 1407, 1450, 1501.

32i. Plant extracts

- 1617 Ji, S.-g., Chai, Y.-f., Zhang, G.-q., Wu, Y.-t., Yin, X.-p., Liang, D.-s. and Xu, Z.-m.: Determination of tetrahydropalmatine in Chinese traditional medicine by nonaqueous capillary electrophoresis. *Electrophoresis (Weinheim)*, 20 (1999) 1904-1906.
- 1618 Lechtenberg, M., Quandt, B., Kohlenberg, F.-J. and Nahrstedt, A.: Qualitative and quantitative micellar electrokinetic chromatography of kavalactones from dry extracts of *Piper methysticum* Forst. and commercial drugs. *J. Chromatogr. A*, 848 (1999) 457-464.
- 1619 Wang, D., Yang, G., Engelhardt, H. and Zhang, H.: Micellar electrokinetic capillary chromatography of psoralen and isopsoralen. *Electrophoresis (Weinheim)*, 20 (1999) 1895-1899.

1620 Yang, G., Song, X., Zhang, H., Wang, D. and Sun, H.: (Identification and determination of Paeonol and Paeoniflorin by micellar capillary electrophoresis). *Fenxi Huaxue*, 27 (1999) 1-4; C.A., 130 (1999) 278815.

1621 Zhao, Y., Cao, Q.-e., Xiang, Y. and Hu, Z.: Identification and determination of active components in *Gastrodia elata* Bl. by capillary electrophoresis. *J. Chromatogr. A*, 849 (1999) 277-283.

See also 1429.

33. CLINICO-CHEMICAL APPLICATIONS

33a. General papers and reviews

See 1325.

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

See 1457, 1465, 1562.

34. FOOD ANALYSIS

34a. General papers and reviews

1622 Sorensen, H., Sorensen, S., Bjerregaard, C. and Michaelsen, S.: *Chromatography and Capillary Electrophoresis in Food Analysis*. Royal Soc. Chem., Cambridge, 1999, 470, pp.; C.A., 130 (1999) 295819.

1623 Trenerry, V.C.: Development of capillary electrophoretic methods for food analysis. *Semin. Food Anal.*, 3 (1998) 309-338; C.A., 130 (1999) 181573 - a review with 46 refs.

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

See 1507, 1572, 1628.

35. ENVIRONMENTAL ANALYSIS

35a. General papers and reviews

1624 Martinez, D., Borrull, F. and Calull, M.: Strategies for determining environmental pollutants at trace levels in aqueous samples by capillary electrophoresis. *TrAC*, 18 (1999) 282-291.

1625 Timerbaev, A.R., Dabek-Zlotorzynska, E. and van den Hoop, M.A.G.T.: Inorganic environmental analysis by capillary electrophoresis. *Analyst (Cambridge)*, 124 (1999) 811-826.

See also 1637, 1649, 1653.

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

See 1554.

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

1626 Brumley, W.C. and Gerlach, C.L.: Capillary electrophoresis/laser-induced fluorescence in groundwater migration determination. *Am. Lab. (Shelton)*, 31 (1999) 45-49; C.A., 130 (1999) 257018.

See also 1427, 1558, 1635, 1641, 1650, 1653, 1654.

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

See 1652.

36. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

36a. Surfactants

1627 Cubat, M.J., Borrull, F. and Calull, M.: Separation of aromatic sulfonate compounds by coelectroosmotic micellar electrokinetic chromatography. *Chromatographia*, 50 (1999) 229-23.

See also 1351.

36b. Antioxidants and preservatives

1628 Boyce, M.C.: Simultaneous determination of antioxidants, preservatives and sweeteners permitted as additives in food by mixed micellar electrokinetic chromatography. *J. Chromatogr. A*, 847 (1999) 369-375.

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

1629 Hissner, F., Daus, B., Mattusch, J. and Heinig, K.: Determination of flotation reagents used in tin-mining by capillary electrophoresis. *J. Chromatogr. A*, 853 (1999) 497-502.

1630 Klampfl, C.W., Katzmayr, M.U., Buchberger, W. and Basener, N.: A fast and reliable method for the determination of anionic impurities and neutralization agents in electrocoat using capillary zone electrophoresis with conductivity detection. *J. High Resolut. Chromatogr.*, 22 (1999) 297-299.

For additional information see C.A.:

130 (1999) 238849.

37. CELLS, CELLULAR PARTICLES AND SUPRAMOLECULAR STRUCTURES

1631 Okun, V.M., Ronacher, B., Blaas, D. and Kennler, E.: Analysis of common cold virus (human rhinovirus serotype 2) by capillary zone electrophoresis: the problem of peak identification. *Anal. Chem.*, 71 (1999) 2028-2032.

1632 Radko, S.P. and Chrambach, A.: Capillary zone electrophoresis of rigid submicron-sized particles in polyacrylamide solution. Selectivity, peak spreading and resolution. *J. Chromatogr. A*, 848 (1999) 443-455.

- 1633 Smejtek, P., Mense, M., Work, R. and Wang, S.: Electrokinetic properties of the sarcoplasmic reticulum membrane obtained from reconstitution studies. *J. Membr. Biol.*, 167 (1999) 151-163; *C.A.*, 130 (1999) 292880;.
- 1634 Xu, C., Wang, Y., Cao, M. and Lu, Z.: Dielectrophoresis of human red cells in microchips. *Electrophoresis (Weinheim)*, 20 (1999) 1829-1831.

For additional information see *C.A.*:
130 (1999) 279167.

See also 1418.

38. INORGANIC COMPOUNDS

38a. Cations

- 1635 Dahlén, J. and Karlsson, S.: Determination of iron(II) in natural waters by capillary zone electrophoresis using on-capillary complexation with 2,4,6-tri(2'-pyridyl)-1,3,5-triazine. *J. Chromatogr. A*, 848 (1999) 491-502.
- 1636 Fu, C., Wang, L. and Fang, Y.: Determination of nonelectroactive cations by capillary electrophoresis with amperometric detection at a graphite electrode modified with a thin film of mixed-valent ruthenium-iron cyanide. *Anal. Chim. Acta*, 391 (1999) 29-34.
- 1637 Fung, Y.-S. and Tung, H.-S.: Capillary electrophoresis for trace metal ion analysis in environmental studies. *Electrophoresis (Weinheim)*, 20 (1999) 1832-1841.
- 1638 Gil, E.P., Ostapczuk, P. and Emons, H.: Determination of arsenic species by field amplified injection capillary electrophoresis after modification of the sample solution with methanol. *Anal. Chim. Acta*, 389 (1999) 9-19.
- 1639 Hu, S., Fu, E. and Li, P.C.H.: Capillary electrophoretic separation enhanced by a macrocyclic dioxopolymine additive. *J. Chromatogr. A*, 844 (1999) 439-446.
- 1640 Kar, S. and Dasgupta, P.K.: Improving resolution in capillary zone electrophoresis through bulk flow control. *Microchem. J.*, 62 (1999) 128-137; *C.A.*, 130 (1999) 305701.
- 1641 Kuban, P., Kuban, P. and Kuban, V.: Capillary electrophoretic determination of inorganic anions in the drainage and surface water samples. *J. Chromatogr. A*, 848 (1999) 545-551.
- 1642 Lustig, S., de Kimpe, J., Cornelis, R., Schramel, P. and Michalke, B.: Platinum speciation in clinical and environmental samples: scrutiny of data obtained by using electrophoresis techniques (flatbed and capillary). *Electrophoresis (Weinheim)*, 20 (1999) 1627-1633.
- 1643 Motomizu, Sh.: (Ion association and its reaction mechanism (review)). *Bunseki Kagaku*, 48 (1999) 151-181; *C.A.*, 130 (1999) 245711 - a review with 308 refs.

- 1644 Sharp, B.L., Batey, J., Begley, I.S., Gregson, D., Skilling, J., Sulaiman, A.B. and Verbogt, G.: Information retrieval from the inductively coupled plasma. *J. Anal. At. Spectrom.*, 14 (1999) 99-108; *C.A.*, 130 (1999) 204271 - a review with 35 refs.
- 1645 Swinney, K., Pennington, J. and Bornhop, D.J.: Ion analysis using capillary electrophoresis with refractive index detection. *Microchem. J.*, 62 (1999) 154-163; *C.A.*, 130 (1999) 305729.
- 1646 Yokoyama, T., Nakano, K. and Zenki, M.: Specific separation of nickel ion with bathophenanthroline disulfonic acid by capillary zone electrophoresis. *Anal. Chim. Acta*, 396 (1999) 117-123.
- 1647 Yongtan, Y., Liang, B., Kang, J. and Qu, Q.: (Determination of Ni, Co and Cu in nickel ores by capillary ion electrophoresis-indirect UV absorbance spectrometry). *Yankuang Ceshi*, 17 (1998) 275-278, 289; *C.A.*, 130 (1999) 245816.

For additional information see *C.A.*:
130 (1999) 285931, 285934, 293597.

See also 1332, 1625, 1650.

38b. Anions

- 1648 Arce, L., Kuban, P., Ríos, A., Valcárel, M. and Karlberg, B.: On-line ion-exchange preconcentration in a flow injection system coupled to capillary electrophoresis for the direct determination of UV absorbing anions. *Anal. Chim. Acta*, 390 (1999) 39-44.
- 1649 Colombara, R., Massaro, S. and Tavares, M.F.M.: Exploring the versatility of capillary electrophoresis for the analysis of ionic species in vehicular emission. *Anal. Chim. Acta*, 388 (1999) 171-180.
- 1650 Hiissa, T., Sirén, H., Kotiaho, T., Snellman, M. and Hautajärvi, A.: Quantification of anions and cations in environmental water samples. Measurements with capillary electrophoresis and indirect-UV detection. *J. Chromatogr. A*, 853 (1999) 403-411.
- 1651 Hissner, F., Mattusch, J. and Heinig, K.: Quantitative determination of sulfur-containing anions in complex matrices with capillary electrophoresis and conductivity detection. *J. Chromatogr. A*, 848 (1999) 503-513.
- 1652 Naidu, R., Naidu, S., Jackson, P., McLaren, R.G. and Sumner, M.E.: Application of capillary electrophoresis to anion speciation in soil water extracts. *Adv. Agron.*, 65 (1999) 131-150; *C.A.*, 130 (1999) 266750.
- 1653 Okemgbo, A.A., Hill, H.H., Metcalf, S.G. and Bachelor, M.A.: Determination of nitrate and nitrite in Hanford defense waste by reverse-polarity capillary zone electrophoresis. *J. Chromatogr. A*, 844 (1999) 387-394.
- 1654 Okemgbo, A.A., Hill, H.H., Siems, W.F. and Metcalf, S.G.: Reverse polarity capillary zone electrophoretic analysis of nitrate and nitrite in natural water samples. *Anal. Chem.*, 71 (1999) 2725-2731.
- 1655 Qiu, J., Fu, X. and Lu, J.: (Analysis of anions in photodegradation products of imidacloprid by capillary electrophoresis). *Huanjing Huaxue*, 17 (1998) 504-507; *C.A.*, 130 (1999) 1323.

See also 1329, 1339, 1444, 1449, 1624, 1625, 1640.