

**VOL. 335 NO. 1 FEBRUARY 15, 1985**

**Bibliography Section**

L OF

# CHROMATOGRAPHY

INTERNATIONAL JOURNAL ON CHROMATOGRAPHY, ELECTROPHORESIS AND RELATED METHODS

**EDITOR, Michael Lederer (Switzerland)**

**ASSOCIATE EDITOR, K. Macek (Prague)**

**EDITOR, SYMPOSIUM VOLUMES, E. Heftmann (Berkeley, CA)**  
**EDITORIAL BOARD**

W. A. Aue (Halifax)  
 V. G. Berezkin (Moscow)  
 V. Betina (Bratislava)  
 A. Bevenue (Honolulu, HI)  
 P. Boček (Brno)  
 P. Boulanger (Lille)  
 A. A. Boulton (Saskatoon)  
 G. P. Carton (Rome)  
 E. P. Demole (Geneva)  
 S. Dilli (Kensington, N.S.W.)  
 G. Duyckaerts (Liège)  
 L. Fishbein (Jefferson, AR)  
 R. W. Frei (Amsterdam)  
 A. Frigerio (Milan)  
 C. W. Gehrk (Columbia, MO)  
 E. Gil-Av (Rehovot)  
 G. Guiochon (Palaiseau)  
 I. M. Hais (Hradec Králové)  
 J. K. Haken (Kensington, N.S.W.)  
 S. Hjertén (Uppsala)  
 E. C. Horning (Houston, TX)  
 Cs. Horváth (New Haven, CT)  
 J. F. K. Huber (Vienna)  
 A. T. James (Sharnbrook)  
 J. Janák (Brno)  
 E. sz. Kováts (Lausanne)  
 K. A. Kraus (Oak Ridge, TN)  
 E. Lederer (Gif-sur-Yvette)  
 A. Liberti (Rome)  
 H. M. McNair (Blacksburg, VA)  
 Y. Marcus (Jerusalem)  
 G. B. Marini-Bettolo (Rome)  
 A. J. P. Martin (Lausanne)  
 Č. Michalec (Prague)  
 R. Neher (Basel)  
 G. Nickless (Bristol)  
 J. Novák (Brno)  
 N. A. Parris (Wilmington, DE)  
 R. L. Patience (Brighton)  
 P. G. Righetti (Milan)  
 O. Samuelson (Göteborg)  
 G.-M. Schwab (Munich)  
 R. Schwarzenbach (Dübenhof)  
 G. Semenza (Zürich)  
 L. R. Snyder (Yorktown Heights, NY)  
 A. Zlatkis (Houston, TX)

**EDITORS, BIBLIOGRAPHY SECTION**

Z. Deyl (Prague), J. Janák (Brno), K. Macek (Prague)

**ELSEVIER**

## JOURNAL OF CHROMATOGRAPHY

**Scope.** The *Journal of Chromatography* publishes papers on all aspects of chromatography, electrophoresis and related methods. Contributions consist mainly of research papers dealing with chromatographic theory, instrumental development and their applications. The section *Biomedical Applications*, which is under separate editorship, deals with the following aspects: developments in and applications of chromatographic and electrophoretic techniques related to clinical diagnosis (including the publication of normal values); screening and profiling procedures with special reference to metabolic disorders; results from basic medical research with direct consequences in clinical practice; combinations of chromatographic and electrophoretic methods with other physicochemical techniques such as mass spectrometry. In *Chromatographic Reviews*, reviews on all aspects of chromatography, electrophoresis and related methods are published.

**Submission of Papers.** Papers in English, French and German may be submitted, in three copies. Manuscripts should be submitted to: The Editor of *Journal of Chromatography*, P.O. Box 681, 1000 AR Amsterdam, The Netherlands, or to: The Editor of *Journal of Chromatography, Biomedical Applications*, P.O. Box 681, 1000 AR Amsterdam, The Netherlands. Review articles are invited or proposed by letter to the Editors and will appear in *Chromatographic Reviews* or *Biomedical Applications*. An outline of the proposed review should first be forwarded to the Editors for preliminary discussion prior to preparation. Submission of an article is understood to imply that the article is original and unpublished and is not being considered for publication elsewhere. For copyright regulations, see below.

**Subscription Orders.** Subscription orders should be sent to: Elsevier Science Publishers B.V., P.O. Box 211, 1000 AE Amsterdam, The Netherlands. The *Journal of Chromatography* and the *Biomedical Applications* section can be subscribed to separately.

**Publication.** The *Journal of Chromatography* (incl. *Biomedical Applications*, *Chromatographic Reviews* and *Cumulative Author and Subject Indexes*, Vols. 301-325) has 34 volumes in 1985. The subscription prices for 1985 are:

*J. Chromatogr.* (incl. *Chromatogr. Rev.* and *Cum. Indexes*, Vols. 301-325) + *Biomed. Appl.* (Vols. 312-345): Dfl. 5440.00 plus Dfl. 748.00 (postage) (total ca. US\$ 2291.75)

*J. Chromatogr.* (incl. *Chromatogr. Rev.* and *Cum. Indexes*, Vols. 301-325) only (Vols. 312-335): Dfl. 4320.00 plus Dfl. 528.00 (postage) (total ca. US\$ 1795.50)

*Biomed. Appl.* only (Vols. 336-345):

Dfl. 1750.00 plus Dfl. 220.00 (postage) (total ca. US\$ 729.75).

Journals are automatically sent by airmail at no extra costs to Australia, Brasil, Canada, China, Hong Kong, India, Israel, Japan, Malaysia, New Zealand, Pakistan, Singapore, South Africa, South Korea, Taiwan and the U.S.A. Back volumes of the *Journal of Chromatography* (Vols. 1 through 311) are available at Dfl. 204.00 (plus postage). Claims for issues not received should be made within three months of publication of the issue. If not, they cannot be honoured free of charge. Customers in the U.S.A. and Canada wishing information on this and other Elsevier journals, please contact Journal Information Center, Elsevier Science Publishing Co. Inc., 52 Vanderbilt Avenue, New York, NY 10017. Tel. (212) 916-1250.

**Abstracts/Contents** Lists published in Analytical Abstracts, Biochemical Abstracts, Biological Abstracts, Chemical Abstracts, Chemical Titles, Current Contents/Physical, Chemical & Earth Sciences, Current Contents/Life Sciences, Deep-Sea Research/Part B: Oceanographic Literature Review, Index Medicus, Mass Spectrometry Bulletin, PASCAL-CNRS, Referativnyi Zhurnal and Science Citation Index.

See page 3 of cover for Publication Schedule, Information for Authors and information on Advertisements.

---

© ELSEVIER SCIENCE PUBLISHERS B.V. — 1985

0021-9673/85/\$03.30

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher, Elsevier Science Publishers B.V., P.O. Box 330, 1000 AH Amsterdam, The Netherlands.

Upon acceptance of an article by the journal, the author(s) will be asked to transfer copyright of the article to the publisher. The transfer will ensure the widest possible dissemination of information. Submission of an article for publication implies the transfer of the copyright from the author(s) to the publisher and entails the authors' irrevocable and exclusive authorization of the publisher to collect any sums or considerations for copying or reproduction payable by third parties (as mentioned in article 17 paragraph 2 of the Dutch Copyright Act of 1912 and in the Royal Decree of June 20, 1974 (S. 351) pursuant to article 16 b of the Dutch Copyright Act of 1912) and/or to act in or out of Court in connection therewith.

**Special regulations for readers in the U.S.A.** This journal has been registered with the Copyright Clearance Center, Inc. Consent is given for copying of articles for personal or internal use, or for the personal use of specific clients. This consent is given on the condition that the copier pays through the Center the per-copy fee stated in the code on the first page of each article for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. The appropriate fee should be forwarded with a copy of the first page of the article to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, U.S.A. If no code appears in an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. All articles published prior to 1980 may be copied for a per-copy fee of US\$ 2.25, also payable through the Center. This consent does not extend to other kinds of copying, such as for general distribution, resale, advertising and promotion purposes, or for creating new collective works.

Special written permission must be obtained from the publisher for such copying.

VOL. 335, NO. 1

JOURNAL OF CHROMATOGRAPHY

FEBRUARY 15, 1985

## CONTENTS

### *Bibliography Section*

Editorial . . . . .	. . . . .	B VII
Liquid Column Chromatography . . . . .	. . . . .	B1
Gas Chromatography . . . . .	. . . . .	B87
Planar Chromatography . . . . .	. . . . .	B117
Electrophoresis . . . . .	. . . . .	B147

# INSTRUMENTUNE-UP

A Computer Program  
for Improving the Performance  
of Common  
Laboratory Instruments

Authors: S.N. Deming and  
S.L. Morgan

- based on the sequential simplex method of optimization
- adjust as many as ten continuous variables simultaneously
- available for the Apple II series and IBM-PC
- clear, fully descriptive manual with tutorial
- full source code listings
- easy to use
- US \$ 150.00

## AVAILABLE FROM

Elsevier Scientific Software (JIC)  
52 Vanderbilt Avenue  
New York, NY 10017 USA  
Phone: (212) 370 5520  
Telex: 420643

or  
Elsevier Scientific Software  
P.O. Box 330  
1000 AH Amsterdam  
THE NETHERLANDS  
Phone: (020) 5803 911  
Telex: 18582

*Write to us for further  
information on our other  
programs.*

No shipping  
charge if  
paid in  
advance



Apple is a registered trademark  
of Apple Computer, Inc.  
IBM-PC is a registered trademark of IBM

JOURNAL OF CHROMATOGRAPHY

VOL. 335 (1985)



# JOURNAL of CHROMATOGRAPHY

INTERNATIONAL JOURNAL ON CHROMATOGRAPHY,  
ELECTROPHORESIS AND RELATED METHODS

EDITOR  
MICHAEL LEDERER (Switzerland)

ASSOCIATE EDITOR  
K. MACEK (Prague)

EDITOR, SYMPOSIUM VOLUMES  
E. HEFTMANN (Berkeley, CA)

## EDITORIAL BOARD

W. A. Aue (Halifax), V. G. Berezkin (Moscow), V. Betina (Bratislava), A. Bevenue (Honolulu, HI), P. Boček (Brno), P. Boulanger (Lille), A. A. Boulton (Saskatoon), G. P. Cartoni (Rome), E. P. Demole (Geneva), S. Dilli (Kensington, N.S.W.), G. Duyckaerts (Liège), L. Fishbein (Jefferson, AR), R. W. Frei (Amsterdam), A. Frigerio (Milan), C. W. Gehrke (Columbia, MO), E. Gil-Av (Rehovot), G. Guiochon (Palaiseau), I. M. Hais (Hradec Králové), J. K. Haken (Kensington, N.S.W.), S. Hjertén (Uppsala), E. C. Horning (Houston, TX), Cs. Horváth (New Haven, CT), J. F. K. Huber (Vienna), A. T. James (Sharnbrook), J. Janák (Brno), E. sz. Kováts (Lausanne), K. A. Kraus (Oak Ridge, TN), E. Lederer (Gif-sur-Yvette), A. Liberti (Rome), H. M. McNair (Blacksburg, VA), Y. Marcus (Jerusalem), G. B. Marini-Bettolo (Rome), A. J. P. Martin (Lausanne), Č. Michálek (Prague), R. Neher (Basel), G. Nickless (Bristol), J. Novák (Brno), N. A. Parris (Wilmington, DE), R. L. Patience (London), P. G. Righetti (Milan), O. Samuelson (Göteborg), G.-M. Schwab (Munich), R. Schwarzenbach (Dübendorf), G. Semenza (Zürich), L. R. Snyder (Yorktown Heights, NY), A. Zlatkis (Houston, TX)

EDITORS, BIBLIOGRAPHY SECTION  
Z. Deyl (Prague), J. Janák (Brno), K. Macek (Prague)



ELSEVIER  
AMSTERDAM — OXFORD — NEW YORK — TOKYO



# BIBLIOGRAPHY SECTION

SUPPLEMENT TO THE  
JOURNAL OF CHROMATOGRAPHY  
1985

## EDITORS:

Z. DEYL (Prague)

J. JANÁK (Brno)

K. MACEK (Prague)

© ELSEVIER SCIENCE PUBLISHERS B.V. — 1985

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher, Elsevier Science Publishers B.V., P.O. Box 330, 1000 AH Amsterdam, The Netherlands.

Printed in The Netherlands

**Editorial**

When looking through the last year Bibliography Section one immediately realizes that the number of papers published particularly about liquid column chromatography keeps increasing. This causes several problems: how to cover the material adequately up-to-date, how to make the reader easily oriented in the bibliographic data, what types of papers to delete not speaking about the technical aspects of the matters. This made us to introduce some alterations into the 1985 Bibliography Section. The categorization of the individual entries was enriched by introducing Trace analysis and preseparation techniques (4f), Separation of enantiomers (4g) and Functional analysis (4e) into the CC, GC and PC sections and by introducing Food analysis (35c) and Compounds with distinct biological activity and diverse chemical nature (35e) into all parts of the Bibliography inclusive electrophoresis. Electrophoresis part of the Bibliography was completed with Two dimensional electrophoresis (4c) and Affinity electrophoresis (4f). The rest of the classification system remains unaltered. The chromatographically less important papers will be quoted, namely in the Column chromatography part by their C.A. reference only. These, as in the last year, will be found at the end of each section of the classification scheme.

During 1985 Bibliography Section will appear as a separate issue bimonthly; the Indexes will be attached to the last number of the year. We shall make every effort not to extend the period between the appearance of the paper and its Bibliography quotation over six months.

In order to keep the handling period of the Bibliography Section short, we have decided to number the individual parts of the Bibliography, e.g. LC, GC, PC and ELPHO separately. This is of particular importance for using the Indexes. We hope that all these alterations will help us in the future to keep our readers adequately well informed in the whole area of chromatographic and electromigration techniques.

Prague, Czechoslovakia  
January 1985

Z. DEYL, J. JANÁK, K. MACEK



## Bibliography Section

---

### Liquid Column Chromatography

#### 1. REVIEWS AND BOOKS

- 1 Ahuja, S.: Overview: multiple pathways to ultrahigh-resolution chromatography. *ACS Symp. Ser.*, 250 (1984) 1-7; *C.A.*, 100 (1984) 220878r - a review with 29 refs.
- 2 Aivazov, B.V.: (*Introduction to Chromatography*.) Vysshaya Shkola, Moscow, 1983, 240 pp.; *C.A.*, 100 (1984) 220858j.
- 3 Anvaer, B.I. and Berezkin, V.G.: Citation of books on chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 296-300 - a review with 11 refs.
- 4 Baldassarri, L.T., Ferrari, E. and Rolla, A.: (Ion chromatography: its evolution and its application to environmental analyses). *Chim. Ind. (Milan)*, 66 (1984) 160-166; *C.A.*, 101 (1984) 59298k - a review with 31 refs.
- 5 Belavadi, V.: High performance liquid chromatography of oils and fats - a review. *J. Oil Technol. Assoc. India*, 15 (1983) 68-75; *C.A.*, 101 (1984) 25324a - a review with 71 refs.
- 6 Boehme, W.: (History of instrumental analysis. VIII. Modern liquid chromatography). *Chem. Labor. Betr.*, 35 (1984) 343-345; *C.A.*, 101 (1984) 143192d - a review with no refs.
- 7 Borman, S.A.: Microcolumn liquid chromatography. *Anal. Chem.*, 56 (1984) 1031A-1036A.
- 8 Caude, M.: (Liquid chromatography: fundamental aspects and optimization). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteins) (1983) 11-32; *C.A.*, 101 (1984) 32489u - a review with 13 refs.
- 9 Covey, T.R. and Henion, J.D.: High performance liquid chromatography in veterinary toxicology. *J. Liq. Chromatogr.*, 7 (1984) 205-315 - a review with 109 refs.
- 10 Dalmases, P. and Bonet, J.J.: (Liquid-solid column chromatography techniques). *Afinidad*, 41 (1984) 111-126; *C.A.*, 101 (1984) 28728v - a review with 11 refs.
- 11 Demarin, V., Rudnevskii, N.K. and Shushunova, A.F.: (*Chromatographic/Atomic-Absorption Analysis and Its Application. Textbook*). Gorkovskii Gosudarstvennyi Universitet, Gorkiy, 1983, 71 pp.; *C.A.*, 100 (1984) 202701y.
- 12 Dennis, R.: Recent advances in HPLC technology. *Pharm. Int.*, 5 (1984) 142-146; *C.A.*, 101 (1984) 157733t - a review with 11 refs.
- 13 Dionex, S.r.l.: (Recent developments and new methods in ion chromatography). *Chim. Oggi*, (1984) 25-27, 31; *C.A.*, 101 (1984) 142875s - a review with 21 refs.
- 14 Engewald, W.: (Advances in chromatography. I. Basics and methods; review). *Mitteilungsbl.-Chem. Ges. D.D.R.*, 30 (1983) 104-111; *C.A.*, 101 (1984) 143190b - a review with 32 refs.
- 15 Eppert, G.: (Progress in chromatography. II. Trends and results of high performance liquid chromatography). *Mitteilungsbl.-Chem. Ges. D.D.R.*, 30 (1983) 146-154; *C.A.*, 101 (1984) 117225x - a review with 17 refs.
- 16 Fan, R.: (Multidimensional HPLC). *Huaxue Tongbao*, (1984) 23-25, 12; *C.A.*, 101 (1984) 143180y - a review with 8 refs.
- 17 Fritz, J.S.: Ion chromatography. A review of methods and recent developments. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 446-452; *C.A.*, 101 (1984) 103021r - a review with 40 refs.
- 18 Games, D.E.: Combined LC/MS and its utility in studies of natural products. *Pharm. Weekbl.*, 119 (1984) 30-33; *C.A.*, 101 (1984) 50909c - a review with 48 refs.
- 19 Hansen, S.H., Helboe, P. and Lund, U.: Types of liquid column chromatography. In: *New Compr. Biochem. Separ. Methodes*, Z. Deyl (Editor), Elsevier, Amsterdam, 1984, pp. 151-153; *C.A.*, 101 (1984) 137529c - a review with 4 refs.

- 20 Hansen, S.H., Helboe, P. and Lund, U.: Instrumentation (for liquid chromatography). In: *New Compr. Biochem., Separation Methods*, Z. Deyl (Editor), Elsevier, Amsterdam, 1984, pp. 155-159; C.A., 101 (1984) 162704p - a review with 12 refs.
- 21 Herzog, R.: (Technique of column chromatographic separation). *Pharm. Unserer Zeit*, 13 (1984) 39-50; C.A., 101 (1984) 3242v - a review with 8 refs.
- 22 Holding, S.R.: Gel permeation chromatography. *Endeavour*, 8 (1984) 17-20; C.A., 101 (1984) 39048a - a review with 9 refs.
- 23 Jandera, P. and Churacek, J.: (*Liquid Chromatography with Programmed Composition of the Mobile Phase*). Academia, Prague, 1984, 166 pp.; C.A., 101 (1984) 12740h.
- 24 Jardy, A.: (Separation methods and stationary phases in liquid chromatography). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 33-58; C.A., 101 (1984) 16499j - a review with 25 refs.
- 25 Jira, T., Beyrich, T. and Lemke, E.: (Ion pair-HPLC). *Pharmazie*, 39 (1984) 141-149; C.A., 101 (1984) 18745z - a review with 150 refs.
- 26 Kakuno, T., Aoki, K., Yamashita, J. and Horio, T.: (Isoelectric chromatography). *Kagaku Zokan*, (1984) 231-240; C.A., 101 (1984) 50937k - a review with 5 refs.
- 27 Kalasz, H. (Editor): *Analytical Chemistry Symposia Series, Vol. 16: New Approaches in Liquid Chromatography*. Elsevier, Amsterdam, 1984, 291 pp.; C.A., 101 (1984) 43987y.
- 28 Kambara, H.: (New ionization methods for nonvolatile compounds). *Bunseki*, (1984) 340-351; C.A., 101 (1984) 83013j - a review with 13 refs.
- 29 Kato, Y. and Nakamura, K.: (High-performance ion exchange liquid chromatography). *Kagaku Zokan*, (1984) 223-229; C.A., 101 (1984) 50935h - a review with 3 refs.
- 30 Kerber, J.D. and Yarbro, S.K.: "Micro" high-performance liquid chromatography. Microbore and microparticulate columns. *Chromatogr. Newslett.*, 11 (1983) 24-26; C.A., 101 (1984) 83249r - a review with 1 ref.
- 31 Kucera, P. (Editor): *Microcolumn High-Performance Liquid Chromatography*. *J. Chromatogr. Libr.*, 28, Elsevier, Amsterdam, 1984, XVI + 302 pp.
- 32 Lawrence, J.F. (Editor): *Liquid Chromatography in Environmental Analysis*. Humana Press, Clifton, 1984, 373 pp.; C.A., 101 (1984) 47880f.
- 33 Love, L.J.C., Habarta, J.G. and Dorsey, J.G.: The micelle - analytical chemistry interface. *Anal. Chem.*, 56 (1984) 1133A-1148A.
- 34 Mazzola, S., Longhi, R. and Castiglioni, E.: (Ion chromatography). *Prod. Chim. Aerosol Sel.*, (1983) 30-35; C.A., 101 (1984) 16294p - a review with 25 refs.
- 35 McHugh, A.J.: Particle size measurement using chromatography. *CRC Crit. Rev. Anal. Chem.*, 15 (1984) 63-117; C.A., 101 (1984) 28744y - a review with 116 refs.
- 36 Muto, Y.: (Ion chromatography). *Kodansha, Tokyo*, 1983, 162 pp.; C.A., 101 (1984) 47881g.
- 37 Novak, J.: Principles and theory of chromatography. In: *New Compr. Biochem., Separ. Methods*, Z. Deyl (Editor), Elsevier, Amsterdam, 1984, 1-28 pp.; C.A., 101 (1984) 137527a - a review with 28 refs.
- 38 Perrut, M.: (Elution chromatography on the industrial scale). *Inf. Chim.*, 248 (1984) 107-109; C.A., 101 (1984) 74917e - a review with 18 refs.
- 39 Pohlandt, C.: Ion chromatography - the missing link in analytical chemistry. *S. Afr. J. Sci.*, 80 (1984) 208-209; C.A., 101 (1984) 162703n - a review with 11 refs.
- 40 Rittich, B. and Dubsky, H.: (Use of HPLC for the determination of hydrophobic parameters of chemical compounds). *Cesk. Farm.*, 33 (1984) 125-129; C.A., 101 (1984) 89912y - a review with 53 refs.
- 41 Ryan, J.J.: High performance liquid chromatography as a cleanup technique. In: *Liq. Chromatogr. Environ. Anal.*, J.F. Lawrence (Editor), Humana, Clifton, N.Y., 1984, pp. 341-362; C.A., 101 (1984) 162952t - a review with 28 refs.
- 42 Schill, G.: (Liquid chromatography - rapid development of a gentle separation technique). *Kem. Tidskr.*, 96 (1984) 37-40, 42; C.A., 101 (1984) 83248q - a review with 8 refs.
- 43 Smith, R.M.: Standardization in reversed-phase HPLC. *TrAC*, 3 (1984) 186-190 - a review with 25 refs.
- 44 Tang, Y.: (Some experimental aspects in the separation of peptides by reversed-phase HPLC). *Huaxue Tongbao*, (1984) 31-35; C.A., 101 (1984) 35266x - a review with 43 refs.
- 45 Verpoorte, R. and Baerheim Svendsen, A.: *Chromatography of Alkaloids, Part B. Gas Liquid and High Performance Chromatography*. *J. Chromatogr. Libr.*, 28, Elsevier, Amsterdam, 1984, 457 pp.

- 46 Wehr, C.T.: High-performance liquid chromatography: care of columns. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 133-154; *C.A.*, 101 (1984) 35271v - a review with 8 refs.  
47 Wu, Y.: (Flash chromatography). *Youji Huaxue*, (1984) 314-320; *C.A.*, 101 (1984) 117237c - a review with 2 refs.

For additional information see:  
*C.A.*, 101 (1984) 19897y.

See also 64, 80, 117, 124, 127, 145, 180, 214, 216, 217, 219, 224, 229, 234, 236, 238, 240, 243, 309, 312, 330, 346, 347, 377, 452, 548, 592, 596, 614, 643, 718, 730, 827, 913, 929, 944, 1012, 1051, 1179, 1189, 1204, 1210, 1221, 1377, 1401, 1413, 1440, 1461, 1464, 1469, 1487, 1492, 1494, 1496, 1502.

## 2. FUNDAMENTALS, THEORY AND GENERAL

### 2a. General

- 48 Bidlingmeyer, B.A. and Warren, F.V., Jr.: An inexpensive experiment for the introduction of high performance liquid chromatography. *J. Chem. Educ.*, 61 (1984) 716-720; *C.A.*, 101 (1984) 129731x.  
49 Blumberg, L.M.: Minimization of errors in measurement of chromatographic retention time. *Anal. Chem.*, 56 (1984) 1726-1729.  
50 Hawkes, S.J.: Why van Deemter parameters? *J. Chem. Educ.*, 61 (1984) 475-476; *C.A.*, 101 (1984) 6152b.  
51 Majors, R.E.: Column switching in HPLC. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 358-364; *C.A.*, 101 (1984) 3328c.  
52 Marshall, D. and McKenna, W.P.: Deuterium nuclear magnetic resonance relaxation study of mobile phase-stationary phase interactions in reversed-phase high-performance liquid chromatography. *Anal. Chem.*, 56 (1984) 2090-2093.  
53 Miller, R.L. and Kerber, J.D.: High-performance high-speed gel permeation chromatography. A system approach. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 189-206; *C.A.*, 101 (1984) 7895h.  
54 Okada, T. and Kuwamoto, T.: Formation mechanism of dip peaks in nonsuppressed ion chromatography. *Anal. Chem.*, 56 (1984) 2073-2078.  
55 Scott, D.M. and Fritz, J.S.: Model for chromatographic separations based on renewal theory. *Anal. Chem.*, 56 (1984) 1561-1566.  
56 Seshadri, S. and Deming, S.N.: Simulation of component interactions in high-performance liquid chromatography. *Anal. Chem.*, 56 (1984) 1567-1572.  
57 Shaltiel, S.: Hydrophobic chromatography. *Methode Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 69-96; *C.A.*, 101 (1984) 125524j.  
58 Smith, R.D., Wright, B.W. and Udseth, H.R.: Supercritical fluid methods in analytical chemistry. *ACS Symp. Ser.*, 19 (Anal. Spectrosc.) (1984) 375-380; *C.A.*, 101 (1984) 143196h.  
59 Vajda, J. and Leisztner, L.: Critical evaluation of optimization methods for HPLC. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 103-107; *C.A.*, 101 (1984) 43978w.  
60 Veress, G.E., Horvath, C. and Pungor, E.: Efficiency of separation processes as applied to displacement chromatography. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 45-56; *C.A.*, 101 (1984) 43975t.  
61 Wu, C.-G. and Deming, S.N.: Interfacial tension effects of polar modifiers in nonpolar-nonpolar liquid chromatography. *J. Chromatogr.*, 302 (1984) 79-88.

For additional information see:  
*C.A.*, 101 (1984) 65197t, 162760d, 162980a.

See also 263.

*2b. Thermodynamics and theoretical relationships*

- 62 Adesanya, B.A., Yen, H.C., Timm, D.C. and Plass, N.C.: Gel permeation chromatography. Correction procedure for imperfect resolution. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 113-124; *C.A.*, 101 (1984) 7892e.
- 63 Anderson, D.J. and Walters, R.R.: Effect of baseline errors on the calculation of statistical moments of tailed chromatographic peaks. *J. Chromatogr. Sci.*, 22 (1984) 353-359.
- 64 Bartha, A. and Vigh, G.: (Retention models for reversed-phase ion pair chromatography). *Magy Kem. Lapja*, 39 (1984) 114-120; *C.A.*, 101 (1984) 28726u - a review with 29 refs.
- 65 Bartha, A., Vigh, G., Billiet, H.A.H. and DeGalan, L.: Studies in reversed-phase ion-pair chromatography IV. The role of the chain length of the pairing ion. *J. Chromatogr.*, 303 (1984) 29-38.
- 66 Bidleman, T.F., Simon, C.G., Burdick, N.F. and You, F.: Theoretical plate measurements and collection efficiencies for high-volume air samplers using polyurethane foam. *J. Chromatogr.*, 301 (1984) 448-453.
- 67 Bouiné, J.P., Guiochon, G. and Colin, H.: A simple pragmatic optimization procedure for some parameters involved in high-performance liquid chromatographic separations: column design, temperature, solvent flow-rate and composition. *J. Chromatogr.*, 298 (1984) 1-20.
- 68 Buffham, B.A.: The velocity of chromatographic fronts or waves. *J. Chromatogr. Sci.*, 22 (1984) 249-251.
- 69 Dawidowicz, A.L. and Sokolowski, S.: Adsorption effects in gel permeation chromatography: the application of binary mobile phases. *Chromatographia*, 18 (1984) 579-584.
- 70 DeLigny, C.L., Spanjer, M.C., van Houwelingen, J.C. and Weesie, H.M.: Three-mode factor analysis of data on retention in normal-phase high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 311-324.
- 71 Delley, R.: The peak width of nearly Gaussian peaks. *Chromatographia*, 18 (1984) 374-382.
- 72 Diaz, A., Margarit, L., Tomas, X. and Gassiot, M.: Determination of the dead time in reversed-phase liquid chromatography. *Afinidad*, 41 (1984) 253-255; *C.A.*, 101 (1984) 65230y.
- 73 Dufek, P.: A method for calculating capacity factors at different mobile phase compositions and at different temperatures for members of homologous series in reversed-phase high-performance liquid chromatography. III. *J. Chromatogr.*, 299 (1984) 109-117.
- 74 Fedorov, E.F.: (Modeling of nonsteady-state conditions in a chromatographic column containing a solid sorbent). *Zh. Fiz. Khim.*, 58 (1984) 951-954; *C.A.*, 100 (1984) 216074h.
- 75 Figueruelo, J.E., Campos, A., Soria, V. and Tejero, R.: A model accounting for concentration effects in exclusion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1061-1078.
- 76 Giddings, J.C., Davis, J.M. and Schure, M.R.: Test of the statistical model of component overlap by computer-generated chromatograms. *ACS Symp. Ser.*, 250 (Ultrahigh Resolut. Chromatogr.) (1984) 9-26; *C.A.*, 101 (1984) 83045w.
- 77 Hanielec, A.E.: Correction for axial dispersion in steric exclusion liquid chromatography. *Chromatogr. Sci.*, 25 (1984) 117-160; *C.A.*, 100 (1984) 210678m - a review with 41 refs.
- 78 Hoffman, G.A. and Miller, E.M., Jr.: Effect of non-Newtonian solutions on the behavior of the thermal pulse time-of-flight flowmeter. *Anal. Chem.*, 56 (1984) 1682-1685.
- 79 Jaroniec, M. and Jaroniec, J.A.: Theoretical description of association effects in liquid adsorption chromatography with a mixed mobile phase. *J. Chromatogr.*, 295 (1984) 377-386.
- 80 Jaroniec, M. and Jaroniec, J.A.: Theoretical foundations of liquid adsorption chromatography with mixed eluent. *J. Liq. Chromatogr.*, 7 (1984) 393-431 - a review with 92 refs.
- 81 Jónsson, J.Å.: Elution curves and statistical moments in non-ideal, linear chromatography. *Chromatographia*, 18 (1984) 427-433.
- 82 Kalasz, H., Nagy, J. and Kerecsen, L.: Optimization of gel chromatographic separations. Numerical evaluation of gel chromatographic elution curves, optimal sample size and fractionation. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 129-156; *C.A.*, 101 (1984) 68667g.

- 83 Lochmueller, C.H.: Approaches to ultrahigh-resolution chromatography. Interactions between relative peak ( $N$ ), relative retention ( $\alpha$ ), and absolute retention ( $k'$ ). *ACS Symp. Ser.*, 250 (1984) 37-48; *C.A.*, 100 (1984) 220885r.
- 84 Melander, W.R. and Horvath, Cs.: Mobile phase effects in reversed-phase chromatography VI. Thermodynamic models for retention and its dependence on mobile phase composition and temperature. *Chromatographia*, 18 (1984) 353-361.
- 85 Miller, M.L., Linton, R.W., Bush, S.G. and Jorgenson, J.W.: Correlation of retention behavior with quantitative surface analysis of octadecyl bonded chromatographic supports. *Anal. Chem.*, 56 (1984) 2204-2210.
- 86 Mori, S.: Effect of experimental conditions (in steric exclusion liquid chromatography). *Chromatogr. Sci.*, 25 (1984) 161-211; *C.A.*, 100 (1984) 210679n - a review with 102 refs.
- 87 Pokorny, S.: Precision and accuracy of results. *Chromatogr. Sci.*, 25 (1984) 297-324; *C.A.*, 100 (1984) 210680f - a review with 50 refs.
- 88 Satcs, V., Sakhartova, O.V., Belikov, V.A., Brivkalne, L. and Grigor'eva, V.D.: (Selection of elution conditions in reversed-phase chromatography. Relation between capacity factors and concentration of the organic component in the mobile phase). *Zh. Anal. Khim.*, 39 (1984) 331-340; *C.A.*, 100 (1984) 220895u.
- 89 Sigal, V.I.: On constructing a quantitative theory of open capillary chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1961-1968.
- 90 Sun, H., An, D. and Wu, R.: (Comment on McCall's observation method - a discussion on the method of observation of the partition efficiency of chromatography). *Yaoxue Xuebao*, 19 (1984) 137-140; *C.A.*, 101 (1984) 43981s.
- 91 Weber, S.G.: Chromatographic band broadening theory using a random walk with a step-length distribution. *Anal. Chem.*, 56 (1984) 2104-2109.
- 92 Weiser, E.L., Salotto, W., Flach, S.M. and Snyder, L.R.: Basis of retention in normal-phase high-performance liquid chromatography with cyano-propyl columns. *J. Chromatogr.*, 303 (1984) 1-12.
- 93 Widmer, H.M. and Grolimund, K.: The role of ultrahigh-resolution chromatography in the chemical industry. *ACS Symp. Ser.*, 250 (1984) 199-222; *C.A.*, 100 (1984) 220887t.

For additional information see:

*C.A.*, 101 (1984) 60757r, 98260m, 103310j, 117378z, 137680v.

See also 201, 225, 590, 1148, 1404.

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

- 94 Guerra, M.C., Barbaro, A.M., Forti, G.C., Pietrogrande, M.C., Borea, P.A. and Biagi, G.L.: Determination of lipophilic character of a series of dermorphin-related oligopeptides by means of reversed-phase HPLC. *J. Liq. Chromatogr.*, 7 (1984) 1495-1500.
- 95 Kaliszan, R.: High performance liquid chromatography as a source of structural information for medicinal chemistry. *J. Chromatogr. Sci.*, 22 (1984) 362-370.
- 96 Rozylo, J.K., Gross, J., Poniewaz, M., Lekowski, R. and Buszewski, B.: The correlations between capacity factors  $k'$  and  $R_M$  values in liquid column and thin-layer chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1301-1312.
- 97 Shalaby, A., Budvari-Barany, Z. and Szasz, G.: HPLC retention index scale for nitrogen-bridged compounds. *J. Liq. Chromatogr.*, 7 (1984) 1133-1150.
- 98 Shalaby, A., Budvari-Barany, Z., Hanko-Novak, K., Szasz, G. and Hermecz, I.: Chemical structure and liquid chromatographic behavior among nitrogen-bridged compounds. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 165-188; *C.A.*, 101 (1984) 130130g.
- 99 Valko, K.: General approach for the estimation of octanol/water partition coefficient by reversed-phase high-performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1405-1424.

See also 40, 85, 294, 402, 983.

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

- 100 Alfredson, T.V., Tallman, L. and Perry, W.J.: Comparison of size exclusion chromatography calibration techniques using narrow and broad molecular weight distribution standards. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 73-95; *C.A.*, 101 (1984) 7890c.
- 101 Cheng, R. and Bo, S.: Size exclusion chromatography molecular weight separation and column dispersion. Simultaneous calibration with characterized polymer standards. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 125-134; *C.A.*, 101 (1984) 7893f.
- 102 Cheng, W.: Static exclusion method for determination of specific pore volume. *Anal. Chem.*, 56 (1984) 1781-1785.
- 103 Hester, R.D. and Mitchell, P.H.: A calibration technique for size exclusion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1511-1536.
- 104 Jinno, K.: The use of capacity factors with micro-HPLC as descriptors in quantitative-structure-activity relationships. *Anal. Lett.*, 17 (1984) 183-190.
- 105 Neff, B.L. and Overton, J.R.: A method of correcting for flow-rate fluctuations in size exclusion chromatography calculations: applications to methylene chloride/hexafluoroisopropanol solvent system. *J. Liq. Chromatogr.*, 7 (1984) 1537-1544.
- 106 Street, K.W., Jr.: Determination of column void volume in HPLC using fluorescence detectors. *J. Chromatogr. Sci.*, 22 (1984) 225-230.
- 107 Trathnigg, B. and Jorde, Ch.: Densitometric detection in SEC. A semi-automated method for calculation of molecular weight averages. *J. Liq. Chromatogr.*, 7 (1984) 1789-1807.

See also 402, 1130, 1133, 1137.

**3. GENERAL TECHNIQUES**

*3a. Apparatus and accessories*

- 108 Asahi Chemical Industry Co., Ltd.: (Automatic intermittent solvent delivery system for liquid chromatography). *Jpn. Kokai Tokkyo Koho Pat.* JP 59 42,447 [84 42,447] (Cl. G01N31/08), 09 Mar. 1984, Appl. 82/153,047, 01 Sep. 1982; 4 pp.; *C.A.*, 101 (1984) 126313b.
- 109 Ebel, S. and Werner-Busse, A.: Konzept eines HPLC-Messplatzes für die Betriebsanalytik. *Fresenius' Z. Anal. Chem.*, 318 (1984) 295.
- 110 Garnier, J.P., Bousquet, B. and Dreux, C.: (Apparatus and its evolution in high-performance liquid chromatography). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 59-75; *C.A.*, 101 (1984) 16500c.
- 111 Girot, P.N. and Boschetti, E.: Automatic liquid chromatography apparatus. *Fr. Demande Pat.* FR 2,533,456 (Cl. B01D15/08), 30 Mar. 1984, Appl. 82/16,302, 28 Sep. 1982; 32 pp.; *C.A.*, 101 (1984) 74862h.
- 112 Hitachi, Ltd.: Liquid chromatograph. *Jpn. Kokai Tokkyo Koho Pat.* JP 58 223,752 [83 223,752] (Cl. G01N31/08), 26 Dec. 1983, Appl. 82/106,860, 23 Jun. 1982; 3 pp.; *C.A.*, 101 (1984) 16462s.
- 113 Jinno, K.: Very short micro-HPLC column packed with three-micron particles. *Anal. Lett.*, 17 (1984) 933-943.
- 114 Karlsson, K.-E. and Novotny, M.: A miniature gradient elution system for liquid chromatography with packed capillary columns. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 411-413.
- 115 Kourilova, D., Slais, K. and Krejci, M.: Preparation of short glass microbore columns for liquid chromatography and their properties. *Collect. Czech. Chem. Commun.*, 49 (1984) 764-771; *C.A.*, 101 (1984) 143203h.
- 116 Kowalczyk, J., Kaminski, M. and Klawiter, J.: (Column for liquid chromatography). *Eur. Pat. Appl.* EP 108, 242 (Cl. B01D15/08), 16 May 1984, PL Appl. 238,461, 01 Oct. 1982; 28 pp.; *C.A.*, 101 (1984) 40278g.
- 117 Krejci, M., Slais, K. and Kourilova, D.: (Microcolumns in liquid chromatography). *Chem. Listy*, 78 (1984) 469-486; *C.A.*, 101 (1984) 122269u - a review with 32 refs.
- 118 Meek, J.L.: Teflon tubing as a removable replacement for steel ferrules in high-pressure liquid chromatography. *Anal. Chem.*, 56 (1984) 1752-1753.

- 119 Morin, D. and Prechner, R.: Device and method for filling chromatographic columns. *Belg. Pat.* BE 897,865 (Cl. B01D), 29 Mar. 1984, FR Appl. 82/16,672, 05 Oct. 1982; 13 pp.; C.A., 101 (1984) 57133d.
- 120 Olesik, S.V., French, S.B. and Novotny, M.: Development of capillary supercritical fluid chromatography/Fourier transform infrared spectrometry. *Chromatographia*, 18 (1984) 489-495.
- 121 Schmidt, G.J. and Scott, R.P.W.: Simple and sensitive ion chromatograph for trace metal determination. *Analyst (London)*, 109 (1984) 997-1002.
- 122 Turnell, D.C. and Cooper, J.D.H.: Sample preparation for liquid chromatography. *Brit. UK Pat. Appl.* GB 2,124,370 (Cl. G01N31/08), 15 Feb. 1984, GB Appl. 82/20, 963, 20 Jul. 1982, 12 pp.; C.A., 100 (1984) 188412w.
- 123 Vozka, S., Coupek, J. and Gerke, H.E.: (Glass columns in HPLC). *LaborPraxis*, 8 (1984) 144-150; C.A., 101 (1984) 32588t.
- 124 Wada, A.: (Apparatus for high-performance liquid chromatography). *Bunseki*, (1984) 653-659; C.A., 101 (1984) 162959a - a review with 97 refs.

For additional information see:

C.A., 101 (1984) 9168x, 25450p, 40306q, 65213v, 83087m, 103253t, 103262v, 103263w, 122226c, 122236f, 122248m, 122252h, 122285w, 122327m, 137845c, 143176b, 162913f, 163007a.

See also 221.

### 3b. Detectors and detection reagents

- 125 Bjuttel, T., Vasarov, L., Vorseev, Yu.V. and Fominykh, V.I.: Detector for liquid chromatography. *Ger. (East) Pat.* DD 206,051 (Cl. G01N31/08), 11 Jan. 1984, Appl. 225,851, 06 Dec. 1980; 6 pp.; C.A., 101 (1984) 83302c.
- 126 Bobbitt, D.R. and Yeung, E.S.: Direct and indirect polarimetry for detection in microbore liquid chromatography. *Anal. Chem.*, 56 (1984) 1577-1581.
- 127 Bousquet, B., Garnier, J.P. and Dreux, C.: (Detection in liquid-phase chromatography, current aspects and future prospects). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 77-94; C.A., 101 (1984) 32590n - a review with 13 refs.
- 128 Dolan, J.W. and Berry, V.V.: Optical detectors, part III: variable-wavelength UV detectors. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 439-440, 442-444; C.A., 101 (1984) 83031p.
- 129 Driscoll, J.N., Conron, D.W., Ferioli, P., Krull, I.S. and Xie, K.-H.: Trace analysis of organic compounds by high-performance liquid chromatography with protoionization detection. *J. Chromatogr.*, 302 (1984) 43-50.
- 130 Ebel, S. and Werner-Busse, A.: Messmethoden in der HPLC mit Photodiodenarray-Detektoren. *Fresenius' Z. Anal. Chem.*, 318 (1984) 235-236.
- 131 Foley, J.P. and Dorsey, J.G.: Clarification of the limit of detection in chromatography. *Chromatographia*, 18 (1984) 503-511.
- 132 Gorbunov, A.A., Solov'yeva, L.Ya. and Pasechnik, V.A.: (Determination of the characteristics of the porous structure of sorbents using gel permeation chromatography of polymers). *Vysokomol. Soedin., Ser. A*, 26 (1984) 967-973; C.A., 101 (1984) 39130w.
- 133 Haddad, P.R., Low, G.K.-C. and Heckenberg, A.L.: A comparison of some electronic filters for use in noise suppression circuitry of HPLC detectors. *Chromatographia*, 18 (1984) 417-423.
- 134 Idei, M., Grof, J., Menyhart, J., Guoth, J. and Pajor, A.: (Isolated organ preparations as sensitive and specific detectors in liquid chromatography). *Magy. Kem. Poly.*, 90 (1984) 177-184; C.A., 101 (1984) 19992a.
- 135 Imai, K.: (High-performance liquid chromatographic analysis using chemiluminiscence). *Bunko Kenkyu*, 32 (1983) 404-405; C.A., 100 (1984) 188386r.
- 136 Jinno, K., Nakanishi, S. and Nagoshi, T.: Microcolumn liquid chromatography with inductively-coupled plasma atomic emission spectrometric detection. *Chromatographia*, 18 (1984) 437-440.
- 137 Karmen, A., Malikin, G. and Lam, S.: High-sensitivity radio-assay in chromatographic effluents. *J. Chromatogr.*, 302 (1984) 31-41.
- 138 Kollatzek, D., Oechsle, D., Kaiser, G., Tschöpel, P. and Tölg, G.: Application of mixed-gas microwave induced plasma as an on-line element-specific detector in high-performance liquid chromatography. *Fresenius' Z. Anal. Chem.*, 318 (1984) 485-489.

- 139 Kremers, H.D.: (Radioactivity detectors in high-pressure liquid chromatography). *GIT Fachz. Lab.*, 28 (1984) 536-539; *C.A.*, 101 (1984) 139282r.
- 140 Kretschmer, K. and Helbig, W.: (Use of a Specord instrument as a UV/VIS detector for continuous columns liquid chromatography). *Krim. Forensische Wiss.*, (1983) 51-52, 161-166; *C.A.*, 101 (1984) 32596u.
- 141 Lloyd, J.B.F.: Detection and differentiation of nitrocellulose traces of forensic science interest with reductive mode electrochemical detection at a pendent mercury drop electrode coupled with size-exclusion chromatography. *Anal. Chem.*, 56 (1984) 1907-1912.
- 142 Love, L.J.C., Weinberger, R. and Yarmchuk, P.: Micelle-mediated luminescence and chromatography. *Surfactants Solution (Proc. Int. Symp.)*, 4th 1982, Mittal, K.L. and Lindman, B. (Editors), Plenum, New York, 1984, 1139-1158 pp.
- 143 Lundy, C.E. and Hester, R.D.: An eluent pressure detector for aqueous size exclusion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1911-1934.
- 144 Malihi, F.B., Kuo, C., Koehler, M.E., Provder, T. and Kah, A.F.: Development of a continuous gel permeation chromatography viscosity detector for the characterization of absolute molecular weight distribution of polymers. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 281-294; *C.A.*, 101 (1984) 24206b.
- 145 Martinez, C.J. and Campins, F.P.: (Detectors used in high-performance column liquid chromatography: current status). *Tec. Lab.*, 9 (1982) 86-92; *C.A.*, 101 (1984) 122274s - a review with 24 refs.
- 146 Pungor, E., Toth, K., Pal, F., Eros, B., Nagy, J. and Bihatsi, L.: Capacitive cell for oscillometric analysis of flowing solutions and procedure for the determining the cell size. *Hung. Teljes Pat. HU 30,119 (Cl. GO1N31/08)*, 28 Feb. 1984, Appl. 81/3,137, 26 Oct. 1981, 14 pp.; *C.A.*, 101 (1984) 83221a.
- 147 Ravichandran, K. and Baldwin, R.P.: Enhancement of LCEC response by use of electrochemically pretreated glassy carbon electrodes. *J. Liq. Chromatogr.*, 7 (1984) 2031-2050.
- 148 Stulik, K., Pacakova, V. and Podolak, M.: Carbon fibre electrochemical detector for high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 225-230.
- 149 Wang, J. and Freiha, B.A.: Vitreous carbon-based composite electrode as an electrochemical detector for liquid chromatography. *J. Chromatogr.*, 298 (1984) 79-87.
- 150 Wang, J. and Freiha, B.A.: Liquid chromatography with detection by  $\alpha$ -alumina modified glassy carbon electrodes. *Anal. Chem.*, 56 (1984) 2266-2269.
- 151 White, P.C.: Recent developments in detection technique for high-performance liquid chromatography. Part II. Other detectors. *Analyst (London)*, 109 (1984) 973-984.
- 152 White, P.C. and Wheals, B.B.: Use of a rotating disc multiwavelength detector, operating in the visible region of the spectrum for monitoring ball pen inks separated by high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 211-216.

For additional information see:

*C.A.*, 101 (1984) 103305m, 106943d, 116688p, 122064y, 122069d, 122279x, 143195g, 162919n.

See also 260, 278, 293, 537, 557, 576, 602, 894.

### 3c. Sorbents, carriers, column and layer performance, packing procedures

- 153 Amano Pharmaceutical Co., Ltd.: (Surfactants for increasing flow rate in column chromatography). *Jpn. Kokai Tokkyo Koho Pat. JP 58 215,554 [83 215,554]* (Cl. GO1N31/08), 15 Dec. 1983, Appl. 82/99,065, 09 Jun. 1982, 3 pp.; *C.A.*, 101 (1984) 35565u.
- 154 Anderson, J.M.: The effect of tube-wall finish on HPLC column performance. *J. Chromatogr. Sci.*, 22 (1984) 332-334.
- 155 Andersson, T. and Hagel, L.: Some properties and applications of Superose 6B. *Anal. Biochem.*, 141 (1984) 461-465.
- 156 Armstrong, D.W. and DeMond, W.: Cyclodextrin bonded phases for the liquid chromatographic separation of optical, geometrical, and structural isomers. *J. Chromatogr. Sci.*, 22 (1984) 411-415.

- 157 Arunyanart, M. and Love, L.J.C.: Model for micellar effects on liquid chromatography capacity factors and for determination of micelle-solute equilibrium constants. *Anal. Chem.*, 56 (1984) 1557-1561.
- 158 Asahi Chemical Industry, Co. Ltd.: (Stationary phases for liquid chromatography). *Jpn. Kokai Tokkyo Koho Pat. JP 59 38,649 [84 38,649]* (Cl. G01N31/08), 02 Mar. 1984, Appl. 82/147,716, 27 Aug. 182, 7 pp.; *C.A.*, 101 (1984) 68920j.
- 159 Benson, J.R. and Woo, D.J.: Polymeric columns for liquid chromatography. *J. Chromatogr. Sci.*, 22 (1984) 386-399.
- 160 Benson, J.R., Woo, D.J. and Kitagawa, N.: Anion chromatography using polymeric columns. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 398-400; *C.A.*, 101 (1984) 136800x.
- 161 Cooke, M.: ODS phases for ion chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 515-519.
- 162 Crowther, J.B., Griffiths, P., Fazio, S.D., Magram, J. and Hartwick, R.A.: Synthesis of aromatic silica-based cation-exchange packings for HPLC. *J. Chromatogr. Sci.*, 22 (1984) 221-224.
- 163 Däppen, R., Meyer, V.R. and Arm, H.: Chiral covalently bonded stationary phases for the separation of enantiomeric amine derivatives by high-performance liquid chromatography. *J. Chromatogr.*, 295 (1984) 367-376.
- 164 Dolan, J.W.: Mobile phase preparation. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 582, 584, 587; *C.A.*, 101 (1984) 137542b.
- 165 Gilpin, R.K.: The bonded phase: Structure and dynamics. *J. Chromatogr. Sci.*, 22 (1984) 371-377.
- 166 Haber, M., Huang, P.H.T. and Stewart, B.W.: Limitations on the stability of benzoylated DEAE-cellulose. *Anal. Biochem.*, 139 (1984) 363-366.
- 167 Ishii, D. and Takeuchi, T.: Preparation and chromatographic properties of stationary phases for open-tubular capillary liquid chromatography. *J. Chromatogr. Sci.*, 22 (1984) 400-410.
- 168 Iwagami, S.: (Reversed-phase high-performance liquid chromatography with cyclodextrin-containing mobile phases). *Osaka-Furitsu Kosho Eisei Kenkyusho Kenkyu Hokoku, Yakuji Shido Hen*, 17 (1983) 37-46; *C.A.*, 101 (1984) 51015v.
- 169 Jinno, K. and Fujimoto, C.: Deuterated solvents as mobile phase in micro-HPLC. *J. Liq. Chromatogr.*, 7 (1984) 2059-2071.
- 170 Lee, D.P.: A new anion exchange phase for ion chromatography. *J. Chromatogr. Sci.*, 22 (1984) 327-331.
- 171 Marshall, D.B., Stutler, K.A. and Lochmüller, C.H.: Synthesis of LC reversed phases of higher efficiency by initial partial deactivation of the silica surface. *J. Chromatogr. Sci.*, 22 (1984) 217-220.
- 172 Meyer, R.F. and Hartwick, R.A.: Efficient packing of small particle microbore columns. *Anal. Chem.*, 56 (1984) 2211-2214.
- 173 Mikes, O., Strop, P., Hostomska, Z., Smrz, M., Slováková, S. and Coupek, J.: Ion-exchange derivatives of Spheron. V. Sulphate and sulpheo derivatives. *J. Chromatogr.*, 301 (1984) 93-105.
- 174 Motozato, Y. and Hirayama, C.: Preparation and properties of cellulose spherical particles and their ion exchangers. *J. Chromatogr.*, 298 (1984) 499-507.
- 175 Nesterov, V.V., Krasikov, V.D., Zhdanov, S.P., Venzel, B.I., Vilenchik, L.Z., Kurenbin, O.I., Zhmakina, T.P. and Belen'kii, B.G.: (Silica sorbent for gel permeation chromatography with linear standard curve). *Vysokomol. Soedin.*, Ser. B., 26 (1984) 163-167; *C.A.*, 101 (1984) 24210y.
- 176 Novak, I. and Berek, D.: Gel chromatography with silica gels. I. Column systems for conventional polymer separations extended towards lower molar masses. *J. Liq. Chromatogr.*, 7 (1984) 1831-1840.
- 177 Ohmacht, R. and Matus, Z.: "Chromsil", a new family of chromatographic packings. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 71-83; *C.A.*, 101 (1984) 43976u.
- 178 Pirkle, W.H. and Hyun, M.H.: A chiral stationary phase for the facile resolution of amino acids, amino alcohols and amines as the N-3,5-dinitrobenzoyl derivatives. *J. Org. Chem.*, 49 (1984) 3043-3046; *C.A.*, 101 (1984) 91414f.
- 179 Polson, A. and van der Merwe, K.J.: Agarose: a possible universal gel exclusion agent. *Prepar. Biochem.*, 14 (1984) 173-179.
- 180 Qu, C., Li, D. and Zhou, T.: (New types of resins for ion chromatography). *Huaxue Shiji*, 6 (1984) 107-110; *C.A.*, 101 (1984) 24299j - a review with 30 refs.
- 181 Rawat, J.P., Iqbal, M. and Abdul Aziz, H.M.A.: Separation of anions and cations on thorium tellurite. A new amphoteric ion exchanger. *J. Liq. Chromatogr.*, 7 (1984) 1691-1706.

- 182 Schomburg, G., Köhler, J., Figge, H., Dege, A. and Bien-Vogelsang, U.: Immobilization of stationary liquids on silica particles by  $\gamma$ -radiation. *Chromatographia*, 18 (1984) 265-274.
- 183 Schultz, H.S., Alden, P.G. and Ekmanis, J.L.: A new family of organic polymer-based high-efficiency gel permeation chromatography columns. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 145-169; *C.A.*, 101 (1984) 7723a.
- 184 Shiao, S.-Y., Johnson, J.S., Jr., Mohiudolin, G., Hata, W.Y., Tolan, J.S. and Doerr, W.W.: Ion-exchange properties of activated carbon filled with hydrous Zr(IV) and Zr(IV-P(V) oxides. *J. Chromatogr.*, 303 (1984) 13-28.
- 185 Smith, R.L. and Pietrzkyk, D.J.: Retention of inorganic and organic cations on a poly(styrene-divinylbenzene) adsorbent in the presence of alkylsulfonate salts. *Anal. Chem.*, 56 (1984) 1572-1577.
- 186 Sundén, T., Cedergren, A. and Siemer, D.D.: Carbon dioxide permeable tubing for postsuppression in ion chromatography. *Anal. Chem.*, 56 (1984) 1085-1089.
- 187 Tanaka, M., Kawaguchi, Y., Nakae, M., Mizobuchi, Y. and Shono, T.: Retention behaviour of disubstituted benzene derivatives on several  $\beta$ -cyclodextrin stationary phases. *J. Chromatogr.*, 299 (1984) 341-350.
- 188 Tanaka, M., Kawaguchi, Y., Shono, T., Deburi, M. and Kuge, Y.: Unmodified and acylated cyclodextrin stationary phases for liquid chromatographic separation of aromatic compounds. *J. Chromatogr.*, 301 (1984) 345-353.
- 189 Taylor, D.R.: Chiral bonded phases for HPLC analysis of racemic mixtures. *Anal. Proc. (London)*, 21 (1984) 199-200; *C.A.*, 101 (1984) 143183b.
- 190 Ujimoto, K. and Kurihara, H.: Evaluation of hydrophobicity of gels by use of some 1-alkanols as pilot solutes. *J. Chromatogr.*, 301 (1984) 51-64.
- 191 Wada, H.: Studies on separation mechanisms of biological molecules on a polyvinyl alcohol column. *Chromatographia*, 18 (1984) 550-555.
- 192 Zhang, K., Yao, M. and Chen, Z.: (Preparation of DNA-agarose by spraying and entrapping methods). *Huaxue Shiji*, 6 (1984) 127, 85; *C.A.*, 101 (1984) 51027a.

For additional information see:

*C.A.*, 101 (1984) 8972t, 28901x, 40173u, 51289n, 55867x, 75183z, 98318m, 101313p, 103341v, 111338q, 117226y, 117324d, 117364s, 117443s, 122251g, 122258q, 122299d, 131992b, 133053v, 153229k, 157729w, 158230p, 162759k, 162942q.

See also 7, 24, 92, 102, 1093, 197, 202, 261, 276, 301, 713, 1158.

### 3d. Quantitative analysis

- 193 Van den Berg, J.H.M., Horsels, H.W.M. and Groenen, R.J.M.: Microbore columns in quantitative column liquid chromatography. *Chromatographia*, 18 (1984) 574-578.
- 194 Wilson, S.A., Yeung, E.S. and Bobbitt, D.R.: Quantitative ion chromatography without standards by conductivity detection. *Anal. Chem.*, 56 (1984) 1457-1460.

### 3e. Preparative scale chromatography

- 195 Dobler, W.: (Combination of flash chromatography and MPLC (Medium-pressure liquid chromatography) - rapid method for separations on a preparative scale). *GIT Fachz. Lab.*, 27 (1983) 1078-1080; *C.A.*, 100 (1984) 209296d.
- 196 Isaaq, H.J.: The mobile phase in liquid chromatography. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 109-128; *C.A.*, 101 (1984) 43888s - a review with 22 refs.
- 197 Sharma, S. and Yamazaki, H.: Preparation of hydrophobic cotton cloth. *Biotechnol. Lett.*, 6 (1984) 301-306; *C.A.*, 101 (1984) 35288f.

See also 38, 227, 479.

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

- 198 Armstrong, D.W. and Boehm, R.E.: Gradient LC separation of macromolecules: Theory and mechanism. *J. Chromatogr. Sci.*, 22 (1984) 378-385.

- 199 Powley, Ch.R., Howard, W.A. and Rogers, L.B.: Mixing considerations in the development of a gradient microbore high-performance liquid chromatographic system. *J. Chromatogr.*, 299 (1984) 43-55.

See also 114, 697, 1458.

*3g. High performance procedures*

- 200 Boo, A.T. and Kronn, J.: Combination of automated pre-column trace enrichment and on-line evaporation in high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 335-344.
- 201 Goewie, C.E., Nielen, M.W.F., Frei, R.W. and Brinkman, U.A.T.: Optimization of precolumn design in liquid chromatography. *J. Chromatogr.*, 301 (1984) 325-334.
- 202 Menet, H.G., Gareil, P.C. and Rosset, R.H.: Experimental achievement of one million theoretical plates with microbore liquid chromatographic columns. *Anal. Chem.*, 56 (1984) 1770-1773.
- 203 Regnier, F.E.: High-performance ion-exchange chromatography. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 170-189; *C.A.*, 101 (1984) 35354z.

See also 105, 233, 257, 258, 265, 818.

**4. SPECIAL TECHNIQUES**

*4a. Automation and computerization*

- 204 Gauglitz, G., Klink, T. and Schmid, W.: Mikroprozessorgesteuerte Datenerfassung und Auswertung photochemischer Reaktionen über HPLC-Messungen. *Fresenius' Z. Anal. Chem.*, 318 (1984) 296-297.
- 205 Haddad, P.R. and Cowie, C.E.: Computer-assisted optimization of eluent concentration and pH in ion chromatography. *J. Chromatogr.*, 303 (1984) 321-330.
- 206 Hara, S. and Ijitsu, T.: (Automation of biological fluid analysis by switching column liquid chromatography. An application of caffeine analysis in urine). *Yakugaku Zasshi*, 104 (1984) 402-405; *C.A.*, 101 (1984) 124248k.
- 207 Jinno, K. and Kawasaki, K.: Automated optimization of reversed-phase liquid chromatographic separations using a computer-assisted retention prediction. *J. Chromatogr.*, 298 (1984) 326-335.
- 208 Jinno, K. and Noda, H.: Constitution of small data base for liquid chromatography. *Chromatographia*, 18 (1984) 326-329.
- 209 Jinno, K., Ohta, H., Hirata, Y., Sasaki, S. and Abe, H.: Microcolumn liquid chromatography combined with computer-assisted retention prediction system for polycyclic aromatic hydrocarbons in extract from Diesel particulate matter. *Anal. Lett.*, 17 (1984) 905-913.
- 210 Kaiser, R.E.: (Integration in the laboratory computer?) *LaborPraxis*, 7 (1983) 1244-1256; *C.A.* 101 (1984) 32441a.
- 211 Koehler, M.E., Kah, A.F., Niemann, T.F., Kuo, C. and Proverb, T.: Automated data analysis system for a gel permeation chromatograph with multiple detectors. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 57-71; *C.A.*, 101 (1984) 7889j.
- 212 Littler, J.S. and Scott, C.J.P.: A low-cost chromatograph data-collection system. *Biochem. Soc. Trans.*, 12 (1984) 991-993; *C.A.*, 101 (1984) 142978c.
- 213 Squillaro, G.J.: A method of accessing the microprocessor of a Level Four HP 5880A gas chromatograph by an automated amino acid analyzer. *J. Chromatogr. Sci.*, 22 (1984) 335-338.

For additional information see:  
*C.A.*, 101 (1984) 103298m, 111680v.

See also 200, 439, 1148.

*4b. Combination of various chromatographic techniques*

- 214 Giddings, J.C.: Two-dimensional separations: Concept and promise. *Anal. Chem.*, 56 (1984) 1258A-1270A.

See also 120.

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

- 215 Aleksandrov, M.L., Gall, L.N., Krasnov, N.V., Nikolaev, V.I., Pavlenko, V.A., Shkurov, V.A., Baram, G.I., Grachev, M.A., Knorre, V.D. and Kusner, Yu.S.: (Direct coupling of a microcolumn liquid chromatograph and a mass spectrometer). *Bioorg. Khim.*, 10 (1984) 710-712; *C.A.*, 101 (1984) 65234c.
- 216 Bruins, A.P.: (Liquid chromatography - mass spectrometry). *Tijdschr. Ned. Ver. Klin. Chem.*, 9 (1984) 8-10; *C.A.*, 101 (1984) 83247p - a review with 7 refs.
- 217 Desiderio, D.M. and Fridland, G.H.: A review of combined liquid chromatography and mass spectrometry. *J. Liq. Chromatogr.*, 7 (1984) 317-351 - a review with 82 refs.
- 218 Fan, T.P., Hardin, E.D. and Vestal, M.L.: Direct comparison of secondary ion and laser desorption mass spectrometry on bioorganic molecules in a moving belt liquid chromatography/mass spectrometry system. *Anal. Chem.*, 56 (1984) 1870-1876.
- 219 Games, D.E., McDowall, M.A., Foster, M.G. and Meresz, O.: Recent progress in LC/MS. *Comm. Eur. Communities Rep. EUR 1984*, EUR 8518, Anal. Org. Micropollut. Water 6876; *C.A.*, 101 (1984) 136494a - a review with 64 refs.
- 220 Games, D.E., McDowall, M.A., Levensen, K., Schafer, K.H., Dobberstein, P. and Gower, J.L.: A comparison of moving belt interfaces for liquid chromatography mass spectrometry. *Biomed. Mass Spectrom.*, 11 (1984) 87-95; *C.A.*, 101 (1984) 3476z.
- 221 Hayes, M.J., Schwartz, H.E., Vouros, P., Karger, B.L., Thurston, A.D., Jr. and McGuire, J.M.: Gradient liquid chromatography/mass spectrometry using microbore columns and moving belt interface. *Anal. Chem.*, 56 (1984) 1229-1236.
- 222 Henion, J.: Micro LC/MS (liquid chromatography/mass spectrometry) coupling. In: *Microcolumn High-Performance Liquid Chromatography*. *J. Chromatogr. Libr.* 28, P. Kucera (Editor), Elsevier, Amsterdam, 1984, pp. 260-300.
- 223 JGC Corp.: Liquid chromatographic mass analyzer. *Jpn. Kokai Tokkyo Koho Pat.* JP 59 32,861 [84 32,861] (Cl. G01N27/62), 22 Feb. 1984, Appl. B2/143,630, 18 Aug. 1982; 3 pp.; *C.A.*, 101 (1984) 32630a.
- 224 Schubert, R.: (Thermospray LC/MS). *GIT Fachz. Lab.*, 28 (1984) 323-325; *C.A.*, 101 (1984) 28348x - a review with 21 refs.
- 225 Wang, C.P., Sparks, D.T., Williams, S.S. and Isenhour, T.L.: Comparison of methods for reconstructing chromatographic data from liquid chromatography/Fourier transform infrared spectrometry. *Anal. Chem.*, 56 (1984) 1268-1272.

For additional information see:

*C.A.*, 101 (1984) 115976u, 142969a, 163008b, 163010w, 163012y.

See also 286, 618, 657, 999, 1098, 1099, 1457.

*4d. Affinity chromatography*

- 226 Calton, G.J.: Immunosorbent separations. *Methods Enzymol.*, 104 (Enzyme Purif. Relat., Pt. C) (1984) 381-387; *C.A.*, 101 (1984) 35317q.
- 227 Chase, H.A.: Prediction of the performance of preparative affinity chromatography. *J. Chromatogr.*, 297 (1984) 179-202.
- 228 Dellacherie, E.: (Separation by biospecific adsorbents). *Inf. Chim.*, 250 (1984) 167-169; *C.A.*, 101 (1984) 86643a.
- 229 Farooqui, A.A. and Horrocks, I.A.: Heparin-Sepharose affinity chromatography. *Adv. Chromatogr.*, 23 (1984) 127-148; *C.A.*, 100 (1984) 205368f - a review with 134 refs.
- 230 Freytag, J.W., Law, H.P. and Wadsley, J.J.: Affinity-column-mediated immuno-enzymometric assays: influence of affinity column ligand and valency of antibody-enzyme conjugates. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1494-1498.

- 231 Johansson, G. and Andersson, M.: Parameters determining affinity partitioning of yeast enzymes using polymer-bound triazine dye ligands. *J. Chromatogr.*, 303 (1984) 39-51.
- 232 Kaplan, L.J., Barr, F.G., Daims, M., Nelson, D. and Tanner, T.B.: The use of lectin affinity chromatography for the selective isolation of plasma membrane. *Prepar. Biochem.*, 14 (1984) 149-161.
- 233 Larsson, P.O.: High-performance liquid affinity chromatography. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 212-223; *C.A.*, 101 (1984) 35356b.
- 234 Limbach, B.: Affinitätschromatographie mit Triazinfarbstoffen. *Kontakte*, (1984) 32-41 - a review with 82 refs.
- 235 Lowe, C.R. and Pearson, J.C.: Affinity chromatography on immobilized dyes. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 97-113; *C.A.*, 101 (1984) 125402t.
- 236 Narayanan, S.: Chromatography: V. Affinity chromatography. *J. Clin. Lab. Autom.*, 4 (1984) 82-87; *C.A.*, 100 (1984) 205864q - a review with 15 refs.
- 237 Nilsson, K. and Mosbach, K.: Immobilization of ligands with organic sulfonyl chlorides. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 56-69; *C.A.*, 101 (1984) 125523h.
- 238 Orezzi, P.: (Modern technology for the isolation of biologically active macromolecules. 2. Affinity chromatography). *Prod. Chim. Aerosol. Sel.*, (1984) 6-10; *C.A.*, 101 (1984) 68550p - a review with 7 refs.
- 239 Sturgeon, C.M. and Kennedy, J.F.: A quick-reference summary of recent literature on molecular immobilization and bioaffinity phenomena: Survey No. 32. *Enzyme Microb. Technol.*, 6 (1984) 379-380; *C.A.*, 101 (1984) 125918r.
- 240 Wilchek, M., Miron, T. and Kohn, J.: Affinity chromatography. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 3-55; *C.A.*, 101 (1984) 1061t8p.

See also 242, 380, 381, 712, 713, 741, 743, 744, 763, 788, 792, 814, 829, 840, 868, 881, 887, 1491.

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

- 241 Jackson, W.P., Richter, B.E., Fjeldsted, J.C., Kong, R.C. and Lee, M.L.: High-resolution supercritical fluid chromatography. *ACS Symp. Ser.*, 250 (1984) 121-133; *C.A.*, 100 (1984) 220883p - a review with 20 refs.

See also 75, 1421, 1497, 1499.

#### 4g. Separation of enantiomers

- 242 Allenmark, S., Bomgen, B. and Andersson, S.: Some applications of chiral liquid affinity chromatography using bovine serum albumin as a stationary phase. *Prepar. Biochem.*, 14 (1984) 139-147.
- 243 Armstrong, D.W.: Chiral stationary phases for high performance liquid chromatographic separation of enantiomers: a mini-review. *J. Liq. Chromatogr.*, 7 (1984) 353-376 - a review with 63 refs.
- 244 Charles, R. and Gil-Av, E.: Self-amplification of optical activity by chromatography on an achiral adsorbent. *J. Chromatogr.*, 298 (1984) 516-520.
- 245 Okamoto, Y., Kawashima, M., Yamamoto, K. and Hatada, K.: Chromatographic resolution. 6. Useful chiral packing materials for high-performance liquid chromatographic resolution. Cellulose triacetate and tribenzoate coated on macroporous silica gel. *Chem. Lett.*, (1984) 739-742; *C.A.*, 101 (1984) 83260n.
- 246 Pirkle, W.H., Robertson, M.R. and Hyun, M.H.: A liquid chromatographic method for resolving chiral lactams as their diastereomeric ureide derivatives. *J. Org. Chem.*, 49 (1984) 2433-2437; *C.A.*, 101 (1984) 38294r.
- 247 Sinibaldi, M., Carunchio, V., Corradini, C. and Girelli, A.M.: High-performance liquid chromatographic resolution of enantiomers on chiral amine-bonded silica gel. *Chromatographia*, 18 (1984) 459-461.
- 248 Sumitomo Chemical Co., Ltd.: (Chromatographic stationary phase grafted with optically active acylated amino acid and its use in the separation of enantiomers). *Jpn. Kokai Tokkyo Koho Pat. JP 20,852 [84 20,852] (Cl. G01N31/08)*, 02 Feb. 1984, Appl. 82/131,378, 27 Jul. 1982; 8 pp.; *C.A.*, 101 (1984) 65273q.

- 249 Sumimoto Chemical Co., Ltd.: (Separation of enantiomer mixtures by chromatography using optically active silylalkylcarbamates as packings). *Jpn. Kokai Tokkyo Koho Pat.* JP 59 50,358 [B4 50,358] (Cl. G01N31/08), 23 Mar. 1984, Appl. 82/160,518, 14 Sep. 1982, 8 pp.; *C.A.*, 101 (1984) 111191m.

For additional information see:  
*C.A.*, 101 (1984) 83257s.

See also 156, 178, 569, 599, 676, 1178, 1230.

#### 4h. Other special techniques

- 250 Becker, H.: Nichtwässerige Systeme für die Droplet-Counter-Current-Chromatographic (DCCC). *Fresenius' Z. Anal. Chem.*, 318 (1984) 225-227.
- 251 Chester, T.L.: Capillary supercritical-fluid chromatography with flame-ionization detection: reduction of detection artifacts and extension of detectable molecular weight range. *J. Chromatogr.*, 299 (1984) 424-431.
- 252 endo, A., Suzuki, N., Hagiwara, S., Umemura, M., Utsugi, H. and Fukuda, T.: Impulsive response in centrifugal liquid chromatography. *J. Chem. Eng. Jpn.*, 17 (1984) 446-449; *C.A.*, 101 (1984) 137723m.
- 253 Gasukuro Kogyo, K.K.: Chromatography stick and method for developing sample using it. *Eur. Pat. Appl. EP 104,258* (Cl. G01N31/08), 04 Apr. 1984, JP Appl. 82/46,072, 23 Mar. 1982; 10 pp.; *C.A.*, 101 (1984) 9471r.
- 254 Giddings, J.C. and Caldwell, K.D.: Field-flow fractionation: Choices in programmed and nonprogrammed operation. *Anal. Chem.*, 56 (1984) 2093-2099.
- 255 Giddings, J.C., Schure, M.R., Myers, M.N. and Velez, G.R.: End effects in field-flow fractionation channels: Theory and means for reducing incremental zone broadening. *Anal. Chem.*, 56 (1984) 2099-2104.
- 256 Hirata, Y. and Nakata, F.: Supercritical fluid chromatography with fused-silica packed columns. *J. Chromatogr.*, 295 (1984) 315-322.
- 257 Ito, Y.: Experimental observations of the hydrodynamic behavior of solvent systems in high-speed countercurrent chromatography. I. Hydrodynamic distribution of two-solvent phases in a helical column subjected to two types of synchronous planetary motion. *J. Chromatogr.*, 301 (1984) 377-386.
- 258 Ito, Y. and Conway, W.D.: Experimental observations of the hydrodynamic behavior of solvent systems in high-speed countercurrent chromatography. III. Effects of physical properties of the solvent systems and operating temperature on the distribution of two-phase solvent systems. *J. Chromatogr.*, 301 (1984) 405-414.
- 259 Lesins, V. and Ruckenstein, E.: Control of the interaction potential for improved resolution in potential barrier chromatography. *Sep. Sci. Technol.*, 19 (1984) 219-240; *C.A.*, 101 (1984) 68673f.
- 260 Openheimer, L.E. and Mourey, T.H.: Use of an evaporative light-scattering mass detector in sedimentation field flow fractionation. *J. Chromatogr.*, 298 (1984) 217-224.
- 261 Randall, L.G.: Carbon dioxide-based supercritical fluid chromatography. Column efficiencies and mobile-phase solvent power. *ACS Symp. Ser.*, 250 (Ultrahigh-Resolut. Chromatogr.) (1984) 135-169; *C.A.*, 101 (1984) 16523n.
- 262 Rawdon, M.G. and Norris, T.A.: Supercritical fluid chromatography as a routine analytical technique. *Amer. Lab. (Fairfield, Conn.)*, 16 (1984) 17-23; *C.A.*, 101 (1984) 154491b.
- 263 Schimtz, F.P., Hilgers, H., Leyendecker, D., Lorenshat, B., Setzer, U. and Klesper, E.: Pressure and temperature dependent chromatographic behavior of n-pentane. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 590-592.
- 264 Takeuchi, T., Ishii, D., Saito, M. and Hibi, K.: Supercritical fluid chromatography with micro packed columns and carbon dioxide as a mobile phase. *J. Chromatogr.*, 295 (1984) 323-331.
- 265 Yto, Y.: Experimental observations of the hydrodynamic behavior of solvent systems in high-speed countercurrent chromatography. II. Phase distribution diagrams for helical and spiral columns. *J. Chromatogr.*, 301 (1984) 387-403.

For additional information see:  
*C.A.*, 101 (1984) 158339f.

See also 120, 134, 241, 353, 644, 995, 1141.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

## 5a. Aliphatic hydrocarbons

- 266 Gauglitz, G., Klink, T. and Schmid, W.: Untersuchung der Photochemie von Polycenen mit Hilfe von mikroprozessor-gesteuerter HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 298-299.

For additional information see:  
*C.A.*, 101 (1984) 83267v.

## 5b. Cyclic hydrocarbons

- 267 Baird, W.M., Salmon, C.P. and Diamond, L.: Benzo[*a*]pyrene-induced alterations in the metabolic activation of benzo[*a*]pyrene and 7,12-dimethylbenz[*a*]anthracene by hamster embryo cells. *Cancer Res.*, 44 (1984) 1445-1452.
- 268 Baltisberger, R.J., Wagner, S.E., Rao, S.P., Schwan, J.F. and Jones, M.B.: Evaluation of oligomeric models of coal asphaltenes and preasphaltenes as GPC calibration standards. *Prepr. Pap.-Am. Chem. Soc., Div. Fuel Chem.*, 29 (1984) 186-190; *C.A.*, 101 (1984) 9791v.
- 269 Bogar, R.G., Thomas, J.C. and Callis, J.B.: Lateral diffusion of solutes bound to the alkyl surface of C<sub>18</sub> reversed-phase liquid chromatography packings. *Anal. Chem.*, 56 (1984) 1080-1084.
- 270 Breuer, G.M.: Solvents and techniques for the extraction of polynuclear aromatic hydrocarbons from filter samples of Diesel exhaust. *Anal. Lett.*, 17 (1984) 1293-1306.
- 271 Brezina, M., Burda, J., Vodicka, L. and Kriz, J.: Preparative high-performance liquid chromatography in the synthesis of diamantane derivatives. *J. Chromatogr.*, 298 (1984) 345-351.
- 272 De Raat, W.K. and van Ardenne, R.A.M.: Sorption of organic compounds from urine in mutagenicity testing: choice of sorbent. *J. Chromatogr.*, 310 (1984) 41-49.
- 273 DiGiovanni, J., Singer, J.M. and Diamond, L.: Comparison of the metabolic activation of 7,12-dimethylbenz[*a*]anthracene by a human hepatoma cell line (HepG2) and low passage hamster embryo cells. *Cancer Res.*, 44 (1984) 2878-2884.
- 274 Gosciniak, W. and Szemplinski, K.: (Determination of polynuclear aromatic hydrocarbons in falling dust by high-pressure liquid chromatography). *Ochr. Powietrza*, 18 (1984) 12-15; *C.A.*, 101 (1984) 77947a.
- 275 Hirose, A., Wiesler, D. and Novotny, M.: High-efficiency microcolumn separation of polycyclic arene isomers isolated from carbon black. *Chromatographia*, 18 (1984) 239-242.
- 276 Jinno, K. and Kawasaki, K.: Effect of the chain length of chemically bonded phases on the retention of substituted benzene derivatives in reversed-phase liquid chromatography. *Chromatographia*, 18 (1984) 499-502.
- 277 Jinno, K. and Okamoto, M.: Molecular-shape recognition of polycyclic aromatic hydrocarbons in reversed phase liquid chromatography. *Chromatographia*, 18 (1984) 495-498.
- 278 Khaledi, M.G. and Dorsey, J.G.: Amperometric detection for liquid chromatographic separation of polynuclear hydrocarbons. *Anal. Chim. Acta*, 161 (1984) 201-209.
- 279 Lawrence, J.F. and Weber, D.F.: Determination of polycyclic aromatic hydrocarbons in some Canadian commercial fish, shellfish, and meat products by liquid chromatography with confirmation by capillary gas chromatography - mass spectrometry. *J. Agric. Food Chem.*, 32 (1984) 789-794.
- 280 Lawrence, J.F. and Weber, D.F.: Determination of polycyclic aromatic hydrocarbons in Canadian samples of processed vegetable and dairy products by liquid chromatography with fluorescence detection. *J. Agric. Food Chem.*, 32 (1984) 794-797.
- 281 Rossic, D.T., Desilets, D.J. and Pardue, H.L.: Quantitation and identification of polynuclear aromatic hydrocarbons by liquid chromatography and multiwavelength absorption spectroscopy. *Anal. Chim. Acta*, 161 (1984) 191-199.
- 282 Thakker, D.R., Yagi, H., Sayer, J.M., Kapur, U., Levin, W., Chang, R.L., Wood, A.W., Conney, A.H. and Jerina, D.M.: Effects of a 6-fluoro substituent on the metabolism of benzo[*a*]pyrene 7,8-dihydrodiol to bay-region diol epoxides by rat liver enzymes. *J. Biol. Chem.*, 259 (1984) 11249-11256.

- 283 Tong, H.Y. and Karasek, F.W.: Quantitation of polycyclic aromatic hydrocarbons in diesel exhaust particulate matter by high-performance liquid chromatography fractionation and high-resolution gas chromatography. *Anal. Chem.*, 56 (1984) 2129-2134.

For additional information see:  
*C.A.*, 101 (1984) 3462s, 75794z, 103316r.

See also 84, 114, 157, 209, 1494.

#### 5c. Halogen derivatives

- 284 Pohl, L.R., George, J.W. and Sato, H.: Strain and sex differences in chloroform-induced nephrotoxicity. Different rates of metabolism of chloroform to phosgene by the mouse kidney. *Drug Metab. Disp.*, 12 (1984) 304-308.  
 285 Scott, M.T. and Sinsheimer, J.E.: In vitro dehalogenation of para-substituted aromatic halides in rat liver preparations. *J. Pharm. Sci.*, 73 (1984) 1101-1104.

See also 271, 276, 296.

#### 5d. Complex hydrocarbon mixtures

- 286 Novotny, M., Hirose, A. and Wiesler, D.: Separation and characterization of very large polycyclic molecules in fossil fuels by microcolumn liquid chromatography and mass spectrometry. *Anal. Chem.*, 56 (1984) 1243-1248.  
 287 Sanchez, V., Murgia, E. and Lubkouritz, J.A.: Size exclusion chromatographic approach for the evaluation of processes for upgrading heavy petroleum. *Fuel*, 63 (1984) 612-615; *C.A.*, 101 (1984) 57349d.

For additional information see:  
*C.A.*, 101 (1984) 9717s, 25805h, 27592k, 57470m, 75653c, 93960e, 93983q, 94176r, 94194v, 113462z.

### 6. ALCOHOLS

- 288 Brown, R.T., Oliver, J., Kirk, K.L. and Kopin, I.J.: Determination of urinary 4-hydroxy-3-methoxyphenylethylene glycol in man by high performance liquid chromatography with electrochemical detection. *Life Sci.*, 34 (1984) 2313-2318; *C.A.*, 101 (1984) 19999h.  
 289 Haglund, Å.C. and Marsden, N.V.B.: Partitioning of aliphatic alcohols in Sephadex G-15 at 25°C with water as solvent. *J. Chromatogr.*, 301 (1984) 47-55.  
 290 Haglund, Å.C. and Marsden, N.V.B.: The partitioning of 1-alkanols and other compounds in Sephadex G-10 when eluted with formamide or aqueous solutions of urea, guanidinium salts and some simple electrolytes. *J. Chromatogr.*, 301 (1984) 365-376.

For additional information see:  
*C.A.*, 101 (1984) 122336p.

See also 247, 326, 352, 438, 555.

### 7. PHENOLS

- 291 Amin, S., Camanzo, J. and Hecht, S.S.: Inhibition by a perifluorine atom of 1,2-dihydrodiol formation as a basis for the lower tumorigenicity of 12-fluoro-5-methylchrysene than of 5-methylchrysene. *Cancer Res.*, 44 (1984) 3772-3778.  
 292 Carlson, R.M., Swanson, T.A., Oyler, A.R., Lukasewycz, M.T., Liukkonen, R.J. and Voelkner, K.S.: Phenol analysis using 2-fluoresulfonyl chloride as a UV-fluorescent derivatizing agent. *J. Chromatogr. Sci.*, 22 (1984) 272-275.  
 293 Balterio, R.A. and Hurtubise, R.J.: Second derivative solid surface luminiscence analysis of two-component liquid chromatography fractions. *Anal. Chem.*, 56 (1984) 1183-1186.

- 294 Hanai, T. and Hubert, J.: Dependence of the retention of phenols upon Van der Waals volume,  $\pi$ -energy and hydrogen-bonding effects. *J. Chromatogr.*, 302 (1984) 89-94.
- 295 Lanouette, M., Cochrane, W.P. and Singh, J.: Liquid chromatographic determination of chlorinated phenol impurities in technical pentachlorophenol using electrochemical detection (coulometric mode). *J. Assoc. Off. Anal. Chem.*, 67 (1984) 494-497.
- 296 Lau, S.S., Monks, T.J. and Gillette, J.R.: Multiple reactive metabolites derived from bromobenzene. *Drug. Metab. Disp.*, 12 (1984) 291-296.
- 297 Ludwig, F.J., Sr. and Bailie, A.G., Jr.: Liquid chromatographic separation of *p*-alkylphenol-formaldehyde cyclic and linear oligomers. *Anal. Chem.*, 56 (1984) 2081-2085.
- 298 McDonald, K.L.: Determination of tetra- and pentachlorophenol in wood by ion exchange and HPLC. *J. Chromatogr. Sci.*, 22 (1984) 293-295.
- 299 Monks, T.J., Lau, S.S. and Hight, R.J.: Formation of nontoxic reactive metabolites of *p*-bromophenol. Identification of a new glutathione conjugate. *Drug Metab. Disp.*, 12 (1984) 432-437.
- 300 Munitch, M.J. and Fletcher, J.S.: Isolation and identification of the phenols of Paul's Scarlet rose stems and stem-derived suspension cultures. *Plant Physiol.*, 75 (1984) 592-595; *C.A.*, 101 (1984) 106739s.
- 301 Rokushika, S., Guo, Z.Y., Huang, D.Y. and Hatano, H.: Liquid chromatography of isomeric phenols and aromatic acids using a poly(ethyleneimine) coated silica gel micro-column. *Anal. Lett.*, 17 (1984) 945-955.
- 302 Steinberg, S., Venkatesan, M.I. and Kaplan, I.R.: Analysis of the products of the oxidation of lignin by CuO in biological and geological samples by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 427-434.

For additional information see:  
*C.A.*, 101 (1984) 128980r, 162950r.

See also 247, 272, 276, 322, 331, 438, 522, 526, 1310, 1402.

## 8. SUBSTANCES CONTAINING HETERO CYCLIC OXYGEN

### 8a. Flavonoids

- 303 Farmakalidis, E. and Murphy, P.A.: Semi-preparative high-performance liquid chromatographic isolation of soybean isoflavones. *J. Chromatogr.*, 295 (1984) 510-514.
- 304 Harborne, J.B. and Boardley, M.: Use of high-performance liquid chromatography in the separation of flavonol glycosides and flavonol sulphates. *J. Chromatogr.*, 299 (1984) 377-385.
- 305 Hiermann, A. and Kartnig, Th.: Ein Beitrag zur Wertbestimmung von *Crataegus*. *Sci. Pharm.*, 52 (1984) 30-35.
- 306 Inumura, M., Matsuura, S. and Tanaka, T.: Synthetic studies on flavone derivatives. XV. Isomerization of chalcones into flavanones in methyl cellosolve-phosphoric acid. *Chem. Pharm. Bull.*, 32 (1984) 1472-1476.
- 307 Sachse, J.: Quantitative Hochdruckflüssigchromatographie von Isoflavonen in Rotklee (*Trifolium pratense* L.). *J. Chromatogr.*, 298 (1984) 175-182.

For additional information see:  
*C.A.*, 101 (1984) 12273h.

See also 427, 491.

### 8b. Aflatoxins and other mycotoxins

- 308 Fremy, J.M. and Cariou, T.: (Recent applications of high performance liquid chromatography to mycotoxin analysis). *Analisis*, 12 (1984) 103-112; *C.A.*, 100 (1984) 207962u.

- 309 Gorst-Allman, C.P. and Steyn, P.S.: Applications of chromatographic techniques in the separation purification and characterization of mycotoxins. *Dev. Food Sci.*, 8 (Mycotoxins: Prod., Isol., Sep. Purif.) (1984) 59-85; *C.A.*, 101 (1984) 49573g - a review with 128 refs.
- 310 Hisada, K., Terada, H., Yamamoto, K., Tsubouchi, H. and Sakabe, Y.: Reverse phase liquid chromatographic determination and confirmation of aflatoxin M<sub>1</sub> in cheese. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 601-606.
- 311 Landsen, J.A.: Liquid chromatographic analysis system for cyclopiazonic acid in peanuts. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 728.
- 312 Majorus, P. and Woller, R.: (Thin layer chromatography and high pressure liquid chromatography in mycotoxin analysis). *Z. Lebensm.-Unters. Forsch.*, 178 (1984) 79-80; *C.A.*, 101 (1984) 88951y - a review with 8 refs.
- 313 Megalla, S.E.: Rapid, economical qualitative method for separation of aflatoxins B<sub>1</sub>, B<sub>2</sub> and G<sub>1</sub>, G<sub>2</sub> by dry column chromatography. *Mycopathologia*, 84 (1983) 45-47; *C.A.*, 100 (1984) 186986n.
- 314 Nakagawa, T., Kawamura, T., Fujimoto, Y. and Tatsuno, T.: (Determination of luteoskyrin in grain by high performance liquid chromatography). *Maikotokishin*, 18 (1983) 31-34; *C.A.*, 101 (1984) 22105u.
- 315 Qian, G.-S., Yasei, F. and Yang, G.C.: Rapid extraction and detection of aflatoxin M<sub>1</sub> in cow's milk by high-performance liquid chromatography and radioimmunoassay. *Anal. Chem.*, 56 (1984) 2079-2080.
- 316 Scott, P.M.: Roquefortine. *Dev. Food Sci.*, 8 (Mycotoxins: Prod. Isol., Sep. Purif.) (1984) 463-468; *C.A.*, 101 (1984) 49579p.
- 317 Tarter, E.J., Hanchay, J.-P. and Scott, P.M.: Improved liquid chromatographic method for determination of aflatoxins in peanut butter and other commodities. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 597-600.
- 318 Tyczkowska, K., Hutchins, J.E. and Hagler, W.H., Jr.: Liquid chromatographic determination of aflatoxin M<sub>1</sub> in milk. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 739-741.

For additional information see:  
*C.A.*, 101 (1984) 67079e.

See also 1394.

#### *8c. Other compounds with heterocyclic oxygen*

- 319 Pennell, T.R., Miller, J.A. and Miller, E.C.: Characterization of the biliary and urinary glutathione and N-acetylcysteine metabolites of the hepatic carcinogen 1'-hydroxy safrole and its 1'-oxo metabolite in rats and mice. *Cancer Res.*, 44 (1984) 3231-3240.
- 320 Kubeczka, K.H. and Rohde, A.: Qualitative und quantitative Analyse von Cumarinen in ausgewählten Aplaceen. *Presensius' Z. Anal. Chem.*, 318 (1984) 245-246.
- 321 Moran, E., O'Kennedy, R. and Thornes, R.D.: The analysis, metabolism and encapsulation of coumarin. *Biochem. Soc. Trans.*, 12 (1984) 459-460; *C.A.*, 101 (1984) 43490f.
- 322 Norman, R.L. and Wood, A.W.: *o*-Hydroxyphenylethanol, a novel lactone ring-opened metabolite of coumarin. *Drug Metab. Disp.*, 12 (1984) 543-549.
- 323 Tanaka, T., Sueyasu, T., Nonaka, G.-I. and Nishioka, I.: Tannins and related compounds. XXI. Isolation and characterization of galloyl and *p*-hydroxybenzoyl esters of benzophenone and xanthone C-glucosides from *Mangifera indica* L. *Chem. Pharm. Bull.*, 32 (1984) 2676-2686.

See also 1391.

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

- 324 Aitzetmueller, K., Fox, J., Arzberger, E. and Schoettler, H.: (Determination of metaldehyde residues in different kinds of vegetables by HPLC). *Dtsch. Lebensm.-Rundsch.*, 80 (1984) 201-203; *C.A.*, 101 (1984) 128978w.
- 325 Buell, P.E. and Girard, J.E.: Determination of 4-hydroxyanisole in serum using liquid chromatography with electrochemical detection. *Life Sci.*, 34 (1984) 2605-2611; *C.A.*, 101 (1984) 32741n.

- 326 Chen, C., Lefers, R.C., Brough, B.L. and Gurka, D.P.: Metabolism of alcohol and ketone by cytochrome P-450 oxygenase: fluoren-9-ol  $\rightleftharpoons$  fluoren-9-one. *Drug. Metab. Disp.*, 12 (1984) 421-426.
- 327 Esterbauer, H., Lang, J., Zadravec, S. and Slater, T.F.: Detection of malonaldehyde by high-performance liquid chromatography. *Methods Enzymol.*, 105 (Oxygen Radicals Biol. Syste.) (1984) 319-328; *C.A.*, 101 (1984) 35352x.
- 328 Hirota, K., Kawase, M. and Kishie, T.: Effect of sodium dodecyl sulphate on the extraction of ubiquinone-10 in the determination of plasma samples. *J. Chromatogr.*, 310 (1984) 204-207.
- 329 Kakoulidou, A. and Rekker, R.F.: A critical appraisal of log P fragmental procedures and connectivity indexing for reversed-phase thin-layer chromatographic and high-performance liquid chromatographic data obtained for a series of benzophenones. *J. Chromatogr.*, 295 (1984) 341-353.
- 330 Kusz, P.: (Chromatographic methods for analysis of 9,10-anthraquinone and some of its derivatives). *Chemik*, 37 (1984) 91-93; *C.A.*, 101 (1984) 122273r - a review with 56 refs.
- 331 Lau, S.S., Monks, T.J. and Gillette, J.R.: Identification of 2-bromohydroquinone as a metabolite of bromobenzene and *o*-bromophenol: implications for bromobenzene-induced nephrotoxicity. *J. Pharmacol. Exp. Ther.*, 230 (1984) 360-366.
- 332 Marston, A. and Hostettmann, K.: High-performance liquid chromatography of some naturally occurring naphthoquinones. *J. Chromatogr.*, 295 (1984) 526-529.
- 333 Okuda, T., Yoshida, T., Kuwahara, M., Memon, M.U. and Shingu, T.: Tannins of rosaceous medicinal plants. I. Structures of potentillin, agrimonic acids A and B, and agrimonin, a dimeric ellagitannin. *Chem. Pharm. Bull.*, 32 (1984) 2165-2173.
- 334 Read, H.: Identification and quantification of peroxides by TLC and HPLC. *Anal. Proc. (London)*, 21 (1984) 197-199; *C.A.*, 101 (1984) 131543f.
- 335 Stahovc, W.L. and Mopper, K.: Trace analysis of aldehydes by pre-column fluorogenic labeling with 1,3-cyclohexanedione and reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 399-406.
- 336 Vadhavavikit, S., Morishita, M., Duff, G.A. and Folkers, K.: Micro-analysis for coenzyme Q<sub>10</sub> in endomyocardial biopsies of cardiac patients and data on bovine and canine hearts. *Biochem. Biophys. Res. Commun.*, 123 (1984) 1165-1169.
- 337 Vyskrebentsev, V.P., Zhirnov, V.O., Shushunova, A.F. and Arutyunov, Yu.I.: (Determination of diphenylethyl hydroperoxide and products of its thermal decomposition using high-performance liquid chromatography). *Zh. Anal. Khim.*, 39 (1984) 547-550; *C.A.*, 101 (1984) 32617b.

For additional information see:  
*C.A.*, 101 (1984) 116454j.

See also 276, 302, 323, 438, 526, 979.

## 10. CARBOHYDRATES

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

- 338 Athinasios, A.K.: Isolation and determination of trace levels of D-arabino-2-hexosulose (D-glucosone) by microcolumn, thin layer and high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1991-2001.
- 339 Barker, P.E. and Thawait, S.: Measurements of the variation of distribution coefficients of glucose and fructose with on-column sugar concentration in chromatography columns. *J. Chromatogr.*, 295 (1984) 479-485.
- 340 Barker, P.E., Irlam, G.A. and Abusabah, E.K.E.: Continuous chromatographic separation of glucose- fructose mixtures using anion-exchange resins. *Chromatographia*, 18 (1984) 567-574.
- 341 Betschart, H.F. and Prenosil, J.E.: High-performance liquid chromatographic analysis of the products of enzymatic lactose hydrolysis. *J. Chromatogr.*, 299 (1984) 498-502.
- 342 Bitko, S.A., Savelev, E.P. and Petrov, G.I.: (Determining amino saccharides from the *Streptococcus* cell wall using a carbohydrate analyzer). *Prikl. Biokhim. Mikrobiol.*, 20 (1984) 285-289; *C.A.*, 101 (1984) 3296r.

- 343 Bonn, G. and Bobleter, O.: HPLC-analyses of plant biomass hydrolysis and fermentation solutions. *Chromatographia*, 18 (1984) 445-448.
- 344 Ching, C.B. and Ruthven, D.M.: Analysis of the performance of a simulated countercurrent chromatographic system for fructose-glucose separation. *Can. J. Chem. Eng.*, 62 (1984) 398-403; *C.A.*, 101 (1984) 132871y.
- 345 Hannan, G.N., Redmond, J.W. and McAuslan, B.R.: Similarity of the carbohydrate moieties of fibronectins derived from blood plasma and synthesised by cultured endothelial cells. *Biochim. Biophys. Acta*, 801 (1984) 396-402.
- 346 Honda, S.: (Analysis of monosaccharides in glycoprotein). *Kagaku, Zokan*, (1984) 277-291; *C.A.*, 101 (1984) 50936j - a review with 34 refs.
- 347 Honda, S.: High-performance liquid chromatography of mono- and oligosaccharides. *Anal. Biochem.*, 140 (1984) 1-47.
- 348 Honda, S., Konishi, T. and Suzuki, S.: Electrochemical detection of reducing carbohydrates in high-performance liquid chromatography after post-column derivatization with 2-cyanoacetamide. *J. Chromatogr.*, 299 (1984) 245-251.
- 349 Heish, P. and Robbins, P.W.: Regulation of asparagine-linked oligosaccharide processing. Oligosaccharide processing in *Aedes albopictus* mosquito cells. *J. Biol. Chem.*, 259 (1984) 2375-2382.
- 350 Hull, S.R., Laine, R.A., Kaizu, T., Rodriguez, I. and Caraway, K.L.: Structures of the O-linked oligosaccharides of the major cell surface sialoglycoprotein of MAT-B1 and MAT-C1 ascites sublines of the 13762 rat mammary adenocarcinoma. *J. Biol. Chem.*, 259 (1984) 4866-4877.
- 351 Jeon, I.J., Galitzer, S.J. and Hennessy, K.J.: Rapid determination of lactose and its hydrolyzates in whey and whey permeate by high performance liquid chromatography. *J. Dairy Sci.*, 67 (1984) 884-887; *C.A.*, 101 (1984) 5611p.
- 352 McFeeters, R.F., Thompson, R.L. and Fleming, H.P.: Liquid chromatographic analysis of sugars, acids and ethanol in lactic acid vegetable fermentations. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 710-714.
- 353 Moriyasu, M., Kato, A., Okada, M. and Hashimoto, Y.: HPLC separation of sugar anomers in a very low temperature region. *Anal. Lett.*, 17 (1984) 689-699.
- 354 Pražník, W., Beck, R.H.F. and Nitsch, E.: Determination of fructan oligomers of degree of polymerization 2-30 by high performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 417-421.
- 355 Rabinowitz, I.N., Kov, O., King, D.K. and Kunberger, G.: Observation of fructose configurations via light-scattering detection of HPLC peaks. *Liq. Chromatogr. HPLC Mag.*, 1 (1983) 496-497; *C.A.*, 100 (1984) 496-497.
- 356 Reimerdes, E.H. and Rothkitt, D.-D.: Die qualitative und quantitative Analyse von Kohlenhydraten in Lebensmitteln. *Fresenius' Z. Anal. Chem.*, 318 (1984) 220-224.
- 357 Reimerdes, E.H., Rothkitt, K.D. and Schauer, R.: Bestimmung von Kohlenhydraten mittels Ionenaustauscher-Chromatographie ihrer Boratkomplexe. *Fresenius' Z. Anal. Chem.*, 318 (1984) 285-286.
- 358 Rossi, M., Germondari, I. and Casini, P.: Comparison of chickpea cultivars: Chemical composition, nutritional evaluation, and oligosaccharide content. *J. Agric. Food Chem.*, 32 (1984) 811-814.
- 359 Saini, H.S. and Knights, E.J.: Chemical constitution of starch and oligosaccharide components of "desi" and "kabuli" chickpea (*Cicer arietinum*) seed types. *J. Agric. Food Chem.*, 32 (1984) 940-944.
- 360 Seldin, D.C., Seno, N., Austen, K.F. and Stevens, R.L.: Analysis of polysulfated chondroitin disaccharides by high-performance liquid chromatography. *Anal. Biochem.*, 141 (1984) 291-300.
- 361 Sharp, J.K., Valent, B. and Alberheime, P.: Purification and partial characterization of a  $\beta$ -glucan fragment that elicits phytoalexin accumulation in soybean. *J. Biol. Chem.*, 259 (1984) 11312-11320.
- 362 Sloan, H.R., Kerzner, B. and Seckel, C.: Large scale preparation of selected glucose oligomers and polymers by gel filtration chromatography. *Prepar. Biochem.*, 14 (1984) 245-256.
- 363 Spiro, R.G. and Bhoyroo, V.D.: Occurrence of  $\alpha$ -D-galactosyl residues in the thyroglobulins from several species. Localization in the saccharide chains of the complex carbohydrate units. *J. Biol. Chem.*, 259 (1984) 9858-9866.
- 364 Vidal-Valverde, C., Olmedilla, B. and Martin-Villa, C.: Reliable separation of xylitol from some carbohydrates and polyols by high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 2003-2010.
- 365 Vora, P.S. and Tuorto, R.M.: Liquid chromatographic determination of sugars in licorice products. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 529-531.

- 366 Vora, P.S. and Tuorto, R.M.: Liquid chromatographic determination of sugars in licorice extracts: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 764-767.
- 367 Vratny, P., Frei, R.W., Brinkman, U.A.Th. and Nielsen, M.W.F.: Evaluation of various packings for solid-state catalytic reactors used in the liquid chromatographic detection of non-reducing carbohydrates. *J. Chromatogr.*, 295 (1984) 355-366.
- 368 Wang, W.T., LeDonne, N.C., Jr., Ackerman, B. and Sweeney, C.C.: Structural characterization of oligosaccharides by high-performance liquid chromatography, fast atom bombardment-mass spectrometry, and exoglycosidase digestion. *Anal. Biochem.*, 141 (1984) 366-381.
- 369 Watanabe, N., Toda, G. and Ikeda, Y.: (Determination of carbohydrates in human serum by high performance liquid chromatography with electrochemical detection). *Bunsaki Kagaku*, 33 (1984) E241-E248.
- 370 Wink, O. and Beyermann, K.: Selektive Anreicherung von Monosacchariden und neutralen aromatischen Glykosiden aus wässrigen Lösungen. *Fresenius' Z. Anal. Chem.*, 318 (1984) 608-610.
- 371 Wu, A.M., Kabat, E.A., Nilsson, B., Zopf, D.A., Gruezo, F.G. and Liao, J.: Immunochemical studies on blood groups. Purification and characterization of radioactive  $^3\text{H}$ -reduced di-to-hexasaccharides produced by alkaline  $\beta$ -elimination-borohydride  $^3\text{H}$  reduction of Smith degraded blood group a active glycoproteins. *J. Biol. Chem.*, 259 (1984) 7178-7186.
- 372 Yamashita, K., Ohkura, T., Tachibana, Y., Takasaki, S. and Kobata, A.: Comparative study of the oligosaccharides released from baby hamster kidney cells and their polyoma transformant by hydrazinolysis. *J. Biol. Chem.*, 259 (1984) 10834-10840.

For additional information see:  
*C.A.*, 101 (1984) 5609u, 40161p, 40162q, 153780h, 163022b.

10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*

- 373 Ceriello, A., Dello Russo, P., Curgio, F., Paolisso, G., Illiano, G., Sgambato, S. and Giugliano, D.: Glycosylated proteins as an indicator of metabolic control in diabetes: evaluation by aminophenylboronic acid affinity chromatography. *Acta Diabetol. Lat.*, 21 (1984) 49-54; *C.A.*, 101 (1984) 3317y.
- 374 Clezardin, P., McGregor, J.L., Manach, M., Robert, F., Dechavanne, M. and Clemetson, K.J.: Isolation of thrombospondin released from thrombin-stimulated human platelets by fast protein liquid chromatography on an anion-exchange Mono-Q column. *J. Chromatogr.*, 296 (1984) 249-256.
- 375 Cummings, R.D. and Kornfeld, S.: The distribution of repeating [Gal $\beta$ 1,4GlcNAc $\beta$ 1,3] sequences in asparagine-linked oligosaccharides of the mouse lymphoma cell lines BW5147 and PHA $R$ 2.1. Binding of oligosaccharides containing these sequences to immobilized *Datura stramonium* agglutinin. *J. Biol. Chem.*, 259 (1984) 6253-6260.
- 376 Hampson, I.N., Kumar, S. and Gallagher, J.T.: Heterogeneity of cell-associated and secretory heparan sulphate proteoglycans produced by cultured human neuroblastoma cells. *Biochim. Biophys. Acta*, 801 (1984) 306-313.
- 377 Hase, S.: (Application of HPLC to the structural analysis of glycoprotein). *Kagaku, Zokan*, (1984) 293-302; *C.A.*, 101 (1984) 50934g - a review with 22 refs.
- 378 Koizumi, K., Okada, Y., Utamura, T., Hisamatsu, M. and Amemura, A.: Further studies on the separation of cyclic (1 $\rightarrow$ 2)- $\beta$ -D-glucans (cyclosphoraoses) produced by *Rhizobium meliloti* IFO 13336, and determination of their degrees of polymerization by high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 215-224.
- 379 Lin, J.-Y. and Chow, T.-B.: Isolation and characterization of a lectin from edible mushroom, *Volvariella volvacea*. *J. Biochem. (Tokyo)*, 96 (1984) 35-40.
- 380 Lutsik, M.D.: (New affinity sorbent for purification of lectins and its use for isolation of wheat germ agglutinin). *Ukr. Biokhim. Zh.*, 56 (1984) 432-436; *C.A.*, 101 (1984) 126263k.
- 381 Maresh, G.A., Chernoff, E.A.G. and Culp, L.A.: Heparan sulfate proteoglycans of human neuroblastoma cells: affinity fractionation on columns of platelet factor-4 $^+$ . *Arch. Biochem. Biophys.*, 233 (1984) 428-437.
- 382 Minshall, L. and Whish, W.J.D.: The use of concanavalin A as a probe for ADP-ribosylated glycoproteins. *Biochem. Soc. Trans.*, 12 (1984) 291-292; *C.A.*, 100 (1984) 205938s.

- 383 Motohashi, N. and Mori, I.: Molecular weight determination of hyaluronic acid and its separation from mouse skin extract by high-performance gel permeation chromatography using a precision differential refractometer. *J. Chromatogr.*, 299 (1984) 508-512.
- 384 Muller, D., Ndoume-Nze, M. and Jozefonvicz, J.: High-pressure size-exclusion chromatography of anticoagulant materials. *J. Chromatogr.*, 297 (1984) 351-358.
- 385 Ohno, N., Suzuki, I., Oikawa, S., Sato, K., Miyazaki, T. and Yadomae, T.: Antitumor activity and structural characterization of glucans extracted from cultured fruit bodies of *Grifola frondosa*. *Chem. Pharm. Bull.*, 32 (1984) 1142-1151.
- 386 Plummer, T.H., Jr., Elder, J.H., Alexander, S., Phelan, A.W. and Tarentino, A.L.: Demonstration of peptide: N-glycosidase F activity in endo- $\beta$ -N-acetylglucosaminidase F preparations. *J. Biol. Chem.*, 259 (1984) 10700-10704.
- 387 Reeber, A., Zanetta, J.P. and Vincendon, G.: Glycans of synaptosomal plasma membrane glycoproteins from adult rat forebrain. Characterization after fractionation by concanavalin A-Sepharose affinity chromatography. *Biochim. Biophys. Acta*, 801 (1984) 444-455.
- 388 Sanemasa, I., Mizoguchi, T. and Deguchi, T.: Application of gel chromatography to determining formation constants of inclusion compounds of cyclodextrins. *Bull. Chem. Soc. Jpn.*, 57 (1984) 1358-1361; *C.A.*, 101 (1984) 12922u.
- 389 Swann, D.A., Garg, H.G., Silver, F.H. and Larsson, A.: On the structure of bovine articular cartilage high density proteoglycans. Isolation of the keratan sulfate and chondroitin sulfate side chains. *J. Biol. Chem.*, 259 (1984) 7693-7700.
- 390 Wagner, H., Proksch, A., Riess-Maurer, I., Vollmar, A., Odenthal, S., Stuppner, H., Jurcic, K., Le Turdu, M. and Heur, Y.H.: Immunstimulierend wirkende Polysaccharide (Heteroglykane) aus höheren Pflanzen. *Arzneim.-Forsch.*, 34 (1984) 659-661.
- 391 Yanagishita, M. and Hascall, V.C.: Proteoglycans synthesized by rat ovarian granulosa cells in culture. Isolation, fractionation, and characterization of proteoglycans associated with the cell layer. *J. Biol. Chem.*, 259 (1984) 10260-10269.

For additional information see:  
*C.A.*, 100 (1984) 188362e, 206099f;  
101 (1984) 3506j, 12053m, 19977z, 103318t, 112641v, 125636x.

See also 742, 810.

## 11. ORGANIC ACIDS AND LIPIDS

### 11a. Organic acids and simple esters

- 392 Ashoor, S.H. and Knox, M.J.: Determination of organic acids in foods by high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 288-292.
- 393 Bichsel, S.: (Lactate-acetate determination in infusions or dialysis solutions using high-pressure liquid chromatography). *Pharm. Acta Helv.*, 59 (1984) 62-64; *C.A.*, 101 (1984) 12276m.
- 394 Buta, J.G.: Analysis of plant phenolics by high-performance liquid chromatography using a polystyrene-divinylbenzene resin column. *J. Chromatogr.*, 295 (1984) 506-509.
- 395 Causey, A.G. and Bartlett, K.: A radio-HPLC assay for the measurement of methylmalonyl-CoA mutase. *Clin. Chim. Acta*, 139 (1984) 179-186.
- 396 Christie, W.W., Connor, K. and Noble, R.C.: Preparative separation of milk fatty acid derivatives by high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 513-515.
- 397 El Dine, A.S., Bermond, A., Rutledge, D.N. and Ducauze, Ch.: Analysis of the ozonation products of phthalic acid in water using combined HPLC-MS. *Analyst (London)*, 109 (1984) 817-821.
- 398 Fitzpatrick, F., Liggett, W., McGee, J., Bunting, S., Morton, D. and Samuelsson, B.: Metabolism of leukotriene  $A_4$  by human erythrocytes. A novel cellular source of leukotriene  $B_4$ . *J. Biol. Chem.*, 259 (1984) 11403-11407.

- 399 Fung, K. and Grosjean, D.: Determination of particulate atmospheric benzoic acid by ion chromatography with ultraviolet detection. *Anal. Lett.*, 17 (1984) 475-482.
- 400 Goldyne, M.E., Burrish, G.F., Poubelle, P. and Borgeat, P.: Arachidonic acid metabolism among human mononuclear leukocytes. Lipoxygenase-related pathways. *J. Biol. Chem.*, 259 (1984) 8815-8819.
- 401 Han, L.M. and Adams, J.M.: Liquid chromatographic determination of adulteration of sesame oil. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 916-918.
- 402 Hanai, T. and Hubert, J.: Optimization of retention time of aromatic acids in liquid chromatography from log P and predicted pKa values. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 524-528.
- 403 Hartel, G. and Pickel, K.H.: Zur Charakterisierung der Reaktionsprodukte bei der Umsetzung höhermolekularer ungesättigter Fettsäureester mit Schwefelwasserstoff bei Anwesenheit von elementarem Schwefel. *Fette, Seifen, Anstrichm.*, 86 (1984) 300-303.
- 404 Hashitsume, M., Takahashi, I., Iizuka, T. and Ujie, A.: (Determination of organic acids in food). *Gunma-Ken Eisei Kogai Kenkyusho Nenpo*, 15 (1983) 66-72; C.A., 100 (1984) 207954t.
- 405 Hirata, H., Higuchi, K. and Nakasato, S.: Analyses of various fatty acid esters by reverse phase high-performance liquid chromatography. *Yakugaku*, 33 (1984) 290-293; C.A., 101 (1984) 40188c.
- 406 Ichinose, N., Nakamura, K., Shimizu, C., Kurokura, H. and Okamoto, K.: (Fluorescence high performance liquid chromatography of eicosapentaenoic acid in serum and vital blood of fishers and in body fluid of plankton after labeling with 9-anthryldiazomethane). *Bunseki Kagaku*, 33 (1984) E271-E278.
- 407 Ichinose, N., Nakamura, K., Shimizu, C., Kurokura, H. and Okamoto, K.: High-performance liquid chromatography of 5,8,11,14,17-eicosapentaenoic acid in fatty acids (C<sub>18</sub> and C<sub>20</sub>) by labelling with 9-anthryldiazomethane as a fluorescent agent. *J. Chromatogr.*, 295 (1984) 463-469.
- 408 Ikeda, M., Shimada, K. and Matsumoto, U.: High performance liquid chromatographic determination of fatty acids in phospholipid fraction of human platelets and plasma after administration of eicosapentaenoic acid. *Bunseki Kagaku*, 33 (1984) E219-E226.
- 409 Ingalls, S.T., Minkler, P.E., Hoppel, C.L. and Nordlander, J.E.: Derivatization of carboxylic acids by reaction with 4'-bromophenacyl trifluoromethanesulfonate prior to determination by high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 365-376.
- 410 Kimmey, R.L. and Perkins, E.G.: Confectionery fat analysis with high performance liquid chromatography. *J. Am. Oil Chem. Soc.*, 61 (1984) 1209-1211.
- 411 Kodali, D.R., Atkinson, D., Redgrave, T.G. and Small, D.M.: Synthesis and polymorphism of 1,2-dipalmitoyl-3-acyl-sn-glycerols. *J. Am. Oil Chem. Soc.*, 61 (1984) 1078-1084.
- 412 Koike, K. and Koke, M.: Fluorescent analysis of  $\alpha$ -keto acids in serum and urine by high-performance liquid chromatography. *Anal. Biochem.*, 141 (1984) 481-487.
- 413 Kumar, T.N., Sastry, Y.S.R. and Lakshminarayana, G.: Analysis of polyglycerols by high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 360-365.
- 414 Lavanchy, P. and Steiger, G.: Determination of orotic acid and of other carboxylic acids in milk and dairy products by HPLC. *Spec. Publ.-R. Soc. Chem.*, (1984) 317-318; C.A., 101 (1984) 53449p.
- 415 Lee, T.H., Mencia-Huerta, J.-M., Shih, Ch., Corey, E.J., Lewis, R.A. and Austen, K.F.: Characterization and biologic properties of 5,12-dihydroxy derivatives of eicosapentaenoic acid, including leukotriene B<sub>5</sub> and the double lipoxygenase product. *J. Biol. Chem.*, 259 (1984) 2383-2389.
- 416 Nassos, P.S., Schade, J.E., King, A.D., Jr. and Stafford, A.E.: Comparison of HPLC and GC methods for measuring lactic acid in ground beef. *J. Food Sci.*, 49 (1984) 671-674; C.A., 101 (1984) 89009j.
- 417 Nordby, H.E.: Analysis of triacylglycerols in leaves of citrus by HPLC. *J. Am. Oil Chem. Soc.*, 61 (1984) 1028-1031.
- 418 Oi, N. and Kitahara, H.: (Enantiomer separation of amino acids and hydroxy acids by high performance liquid chromatography with chiral stationary phases). *Bunseki Kagaku*, 33 (1984) 386-388.
- 419 Patel, B., Purnell, J.H. and Wellington, C.A.: The optimized separation of aromatic carboxylic acids by HPLC. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 375-381.

- 420 Podlaha, O. and Töregard, B.: HPLC-Trennung mono-ungesättigter Triglyceride hinsichtlich der  $\alpha$ - oder  $\beta$ -Position der Ölsäure in einigen vegetabilischen Fetten. *Fette, Seifen, Anstrichm.*, 86 (1984) 243-245.
- 421 Powell, W.S.: Properties of leukotriene B<sub>4</sub> 20-hydroxylase from polymorphonuclear leukocytes. *J. Biol. Chem.*, 259 (1984) 3082-3089.
- 422 Prescott, S.M.: The effect of eicosapentaenoic acid on leukotriene B production by human neutrophils. *J. Biol. Chem.*, 259 (1984) 7615-7621.
- 423 Prestwich, G.D., Yamaoka, R., Phirwa, S. and DePalma, A.: Isolation of 2-fluoro-citrate produced by *in vivo* dealkylation of 29-fluorostigmasterol in an insect. *J. Biol. Chem.*, 259 (1984) 11022-11026.
- 424 Reed, A.W., Deeth, H.C. and Clegg, D.E.: Liquid chromatographic method for quantitative determination of free fatty acids in butter. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 718-721.
- 425 Reidel, G., Bauer, R. and Pabst, H.W.: Preparation and purification of  $\omega$ -(*p*-123)-iodophenylpentadecanoic acid. *Int. J. Appl. Radiat. Isot.*, 34 (1983) 1642-1644; *C.A.*, 100 (1984) 191504h.
- 426 Robinson, J.L. and Macrae, R.: Comparison of detection systems for the high-performance liquid chromatographic analysis of complex triglyceride mixtures. *J. Chromatogr.*, 303 (1984) 386-390.
- 427 Seo, A. and Morr, C.V.: Improved high-performance liquid chromatographic analysis of phenolic acids and isoflavonoids from soybean protein products. *J. Agric. Food Chem.*, 32 (1984) 530-533.
- 428 Shal, S. and Goldstein, I.M.:  $\omega$ -Oxidation is the major pathway for the catabolism of leukotriene B<sub>4</sub> in human polymorphonuclear leukocytes. *J. Biol. Chem.*, 259 (1984) 10181-10187.
- 429 Steiner, W., Mueller, E., Froehlich, D. and Battaglia, R.: (HPLC determination of carboxylic acids as *p*-nitrobenzyl esters in fruit juices and wine). *Mitt. Geb. Lebensmittelunters. Hyg.*, 75 (1984) 37-50; *C.A.*, 101 (1984) 37157m.
- 430 Stuurman, H.W.: (Extraction of hydrophilic acids by hydrogen bond formation with tri-*n*-octylphosphine oxide and application in reversed-phase liquid-liquid chromatography). *Pharm. Weekbl.*, 118 (1984) 571-575; *C.A.*, 101 (1984) 43660m.
- 431 Takahashi, K., Hirano, T. and Zama, K.: A new concept for determining triglyceride composition of fats and oils by liquid chromatography. *J. Am. Oil Chem. Soc.*, 61 (1984) 1226-1229.
- 432 Todoroki, H., Hayashi, T. and Naruse, H.: High-performance liquid chromatographic method for screening disorders of aromatic acid metabolism using a multi-detection system. *J. Chromatogr.*, 310 (1984) 273-281.
- 433 Tsuchiya, H., Hayashi, T., Sato, M., Tatsumi, M. and Takagi, N.: Simultaneous separation and sensitive determination of free fatty acids in blood plasma by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 43-52.
- 434 Vallon, J.J., Mathieu, P., Greffe, J. and Bichon, C.: Utilization de la vanilline et de son oxime comme étalon interne dans les dosages des acide-phenols par chromatographie liquide. I. Application au dosage de l'acide homovanillique urinaire. *Anal. Lett.*, 17 (1984) 329-347.
- 435 Vanderhoek, J.Y. and Bailey, J.M.: Activation of a 15-lipoxygenase/leukotriene pathway in human polymorphonuclear leukocytes by the anti-inflammatory agent ibuprofen. *J. Biol. Chem.*, 259 (1984) 6752-6756.
- 436 VanRollins, M., Baker, R.C., Sprecher, H.W. and Murphy, R.C.: Oxidation of docosahexaenic acid by rat liver microsomes. *J. Biol. Chem.*, 259 (1984) 5776-5783.
- 437 Vaughan, G.T. and Milborrow, B.V.: The resolution by HPLC of RS-(2-<sup>14</sup>C)methyl-1',4'-*cis*-diol of abscisic acid and the metabolism of (-)-*R*- and (+)-*S*-abscisic acid. *J. Exp. Bot.*, 35 (1984) 110-120; *C.A.*, 100 (1984) 205908g.
- 438 Yang, S.K., Chou, M.W., Evans, F.E. and Fu, P.P.: Metabolism of 8-hydroxymethyl-benz[*a*]anthracene by rat liver microsomes. Stereochemistry of dihydrodiol metabolites and the effect of enzyme induction. *Drug Metab. Disp.*, 12 (1984) 403-413.

For additional information see:

*C.A.*, 100 (1984) 22081h, 12710y, 35573v, 143231r, 143216q, 86627y, 25306w, 27977q, 106751q, 103304k, 83300a;  
*C.A.*, 101 (1984) 191580f.

See also 170, 271, 272, 276, 301, 302, 352, 449, 542, 547, 564, 580, 973, 1167, 1170, 1285, 1485.

*11b. Prostaglandins*

- 439 Cox, J.W. and Pullen, R.H.: Determination of E prostaglandins by automated heteromodal column switching high-performance liquid chromatography with fluorescence detection. *Anal. Chem.*, 56 (1984) 1866-1870.
- 440 Hall, E.R., Papp, A., Wu, K.K., Koloch, R. and Venton, D.L.: Effect of pH on the gel filtration of prostaglandins. *Prostaglandins, Leukotrienes Med.*, 14 (1984) 11-12; *C.A.*, 101 (1984) 17528e.
- 441 Henke, D.C., Kouzan, S. and Eling, T.E.: Analysis of leukotrienes, prostaglandins, and other oxygenated metabolites of arachidonic acid by high-performance liquid chromatography. *Anal. Biochem.*, 140 (1984) 87-94.
- 442 Krause, W., Hümperl, M. and Hoyer, G.-A.: Biotransformation of the stable prostacyclin analogue, iloprost, in the rat. *Drug Metab. Disp.*, 12 (1984) 645-651.
- 443 Mitsuhashi, N., Yasumizu, T. and Kato, J.: (A method for determination of prostaglandins in human seminal fluid). *Nippon Sanka Fujinka Gakkai Zasshi*, 36 (1984) 771-777; *C.A.*, 101 (1984) 84070n.
- 444 Yamamura, K. and Yotsuyanagi, T.: High-performance liquid chromatographic assay for prostaglandin E<sub>1</sub> in various ointment vehicles. Separation and stability testing. *J. Chromatogr.*, 303 (1984) 165-172.
- 445 Zijlstra, F.J. and Vincent, J.E.: Determination of leukotrienes and prostaglandins in <sup>14</sup>C arachidonic acid labelled human lung tissue by high-performance liquid chromatography and radioimmunoassay. *J. Chromatogr.*, 311 (1984) 39-50.
- 446 Zolotukhin, S.V., Alekseev, S.M., Kucherenko, N.E., Pomoinetskii, V.D., Yurkiv, V.A., Sarycheva, I.K. and Evstigneeva, R.P.: (Use of high-performance liquid chromatography of methylbenzocoumarin esters of prostaglandins for quantitative fluorometric analysis). *Ukr. Biokhim. Zh.*, 56 (1984) 171-175; *C.A.*, 100 (1984) 185918e.

*11c. Lipids and their constituents*

- 447 Aitzetmüller, K.: HPLC and phospholipids. Part I: General consideration. *Fette, Seifen, Anstrichm.*, 86 (1984) 318-322.
- 448 Aitzetmüller, K. and Handt, D.: HPLC and phospholipids. Part II: Determination of PC and LPC in defatted soyabean lecithins. *Fette, Seifen, Anstrichm.*, 86 (1984) 322-325.
- 449 Blank, M.L., Robinson, M., Fitzgerald, V. and Snyder, F.: Novel quantitative method for determination of molecular species of phospholipids and diglycerides. *J. Chromatogr.*, 298 (1984) 473-482.
- 450 Christie, W.W.: The chromatographic analysis of milk lipids. *Spec. Publ.-R. Soc. Chem.*, (1984) 139-154; *C.A.*, 101 (1984) 53387s - a review with 93 refs.
- 451 Deffense, E.: (Use of high performance liquid chromatography for analysis of triglycerides of vegetable and animal fats and their fractions obtained by fractional crystallization). *Rev. Fr. Corps Gras*, 31 (1984) 123-129; *C.A.*, 101 (1984) 25356n.
- 452 Graciani Constante, E.: (Review of high performance liquid chromatography applications to the analysis and study of edible fats and oils). *Grasas Aceites*, 35 (1984) 122-126; *C.A.*, 101 (1984) 88958f - a review with 56 refs.
- 453 Jackson, E.M., Mott, G.E., Hoppens, C., McManus, L.M., Weintraub, S.T., Ludwig, J.C. and Pinckard, R.N.: High performance liquid chromatography of platelet-activating factors. *J. Lipid Res.*, 25 (1984) 753-757.
- 454 Jungalwala, F.B., Evans, J.E. and McCluer, R.H.: Compositional and molecular species analysis of phospholipids by high performance liquid chromatography coupled with chemical ionization mass spectrometry. *J. Lipid Res.*, 25 (1984) 738-749.
- 455 Kiuchi, K. and Hager, L.P.: Reconstitution of the lipid-depleted pyruvate oxidase system of *Escherichia coli*: the palmitic acid effect. *Arch. Biochem. Biophys.*, 233 (1984) 776-784.
- 456 Kremmer, T., Toth, T. and Holczinger, L.: Application of liquid chromatographic methods in the biochemical analysis of tumor cell membranes. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 261-273; *C.A.*, 101 (1984) 68861r.
- 457 Marmer, W.N., Foglia, T.A. and Vail, P.D.: HPLC of plasmalogen-containing phosphatidylcholine under reversed-phase or argentation conditions. *Lipids*, 19 (1984) 353-358; *C.A.*, 101 (1984) 86583f.

- 458 Palmer, D.N., Anderson, M.A. and Jolly, R.D.: Separation of some neutral lipids by normal-phase high-performance liquid chromatography on a cynopropyl columns: ubiquinone, dolichol and cholesterol levels in sheep liver. *Anal. Biochem.*, 140 (1984) 315-319.
- 459 Perrin, J.L., Redero, F. and Prevot, A.: (Rapid determination of triglyceride polymers by exclusion chromatography). *Rev. Fr. Corps Gras*, 31 (1984) 131-133; *C.A.*, 101 (1984) 53433d.
- 460 Phillips, F.C., Erdahl, W.L., Nadenicek, J.D., Nutter, L.J., Schmit, J.A. and Privett, O.S.: Analysis of triglyceride species by high-performance liquid chromatography via a flame ionization detector. *Lipids*, 19 (1984) 142-150; *C.A.*, 100 (1984) 205911c.
- 461 Sonnino, S., Ghidoni, R., Gazzotti, G., Kirschner, G., Galli, G. and Tettamanti, G.: High performance liquid chromatography preparation of the molecular species of GM1 and GD1a gangliosides with homogeneous long chain base composition. *J. Lipid Res.*, 25 (1984) 620-629.
- 462 Sulpice, J.C. and Ferezou, J.: Squalene isolation by HPLC and quantitative comparison by HPLC and GLC. *Lipids*, 19 (1984) 631-635; *C.A.*, 101 (1984) 126154a.
- 463 Watanabe, K. and Tomono, Y.: One-step fractionation of neutral and acidic glycosphingolipids by high-performance liquid chromatography. *Anal. Biochem.*, 139 (1984) 367-372.

For additional information see:  
*C.A.*, 101 (1984) 19970s, 74706k.

See also 5.

#### *11d. Lipoproteins and their constituents*

- 464 Abad, C., Braco, L., Figueruelo, J.E. and Goni, F.M.: A study on lipid-lipid and lipid-polypeptide interactions by high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1567-1578.
- 465 Okazaki, M. and Hara, I.: (Determination of human serum lipoproteins by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) 356-360.
- 466 Peuchant, E., Covi, G. and Jensen, R.: Faecal lipid chromatography. I. Quantitative determination with Chromarods. *J. Chromatogr.*, 310 (1984) 297-305.
- 467 Yoshida, K., Seta, K., Miyajima, E. and Nakamura, H.: (High performance liquid chromatography of fat-soluble components of human plasma lipoprotein fractions). *Bunseki Kagaku*, 33 (1984) 371-376.
- 468 Young, P.M., Boehm, T.M. and Brown, J.E.: Resolution and quantitation of apolipoproteins A-I and A-II from human high density lipoprotein by size exclusion high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 79-92.

#### 12. ORGANIC PEROXIDES

- 469 Nakashima, K., Ando, T. and Akiyama, S.: High performance liquid chromatographic determination of lipoperoxides in rat plasma following derivatization to 1,3-di-phenyl-2-thiobarbituric acid condensate. *Chem. Pharm. Bull.*, 32 (1984) 1654-1657.

#### 13. STEROIDS

- 470 Lin, J.T.: Separation of steroid hormones by HPLC. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 135-138; *C.A.*, 100 (1984) 188198f.

For additional information see:  
*C.A.*, 101 (1984) 86600j.

13a. *Pregnane and androstane derivatives*

- 471 Alvinerie, M. and Fountain, P.L.: Determination of methyl-prednisolone and methylprednisolone acetate in synovial fluid using high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 385-390.
- 472 Antal, E.J., Wright, C.E., Gillespie, W.G. and Albert, K.S.: Influence of route of administration on the pharmacokinetics of methylprednisolone. *J. Pharmacokin. Biopharm.*, 11 (1983) 561-576.
- 473 Bodor, N. and Farag, H.H.: Improved delivery through biological membranes XIV: brain-specific, sustained delivery of testosterone using a redox chemical delivery system. *J. Pharm. Sci.*, 73 (1984) 385-389.
- 474 Dumont, E., Sclavons, M. and Desager, J.-P.: Use of an internal standard to assay 6 $\beta$ -hydroxycortisol in urine. *J. Liq. Chromatogr.*, 7 (1984) 2051-2057.
- 475 Eibs, G. and Schönenhöfer, M.: Simultaneous determination of fifteen steroid hormones from a single serum sample by high-performance liquid chromatography and radioimmunoassay. *J. Chromatogr.*, 310 (1984) 386-389.
- 476 Hämäläinen, E.K., Fotsis, T. and Adlercreutz, H.: Rapid and reliable separation of 5-alpha-dihydrotestosterone from testosterone on silica gel microcolumns. *Clin. Chim. Acta*, 139 (1984) 173-177.
- 477 Kekhia, B., Alguemei, C., Alouane, L. and Kallai, Z.: (Extraction of urinary pregnanediol and estriol with a Bio-Rad column). *Arch. Inst. Pasteur Tunis*, 60 (1983) 29-42; *C.A.*, 101 (1984) 66133f.
- 478 Khalafallah, N. and Jusko, W.J.: Tissue distribution of prednisolone in the rabbit. *J. Pharmacol. Exp. Ther.*, 229 (1984) 719-725.
- 479 Matlin, S.A. and Chan, L.: Preparative HPLC. Part 1: A comparison of three types of equipment for the purification of steroids. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 570-576.
- 480 Matlin, S.A., Chan, L. and Prazeres, M.A.: HPLC analysis of steroid esters. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 584-586.
- 481 Mattox, V.R., Nelson, A.N., Vrieze, W.D. and Jardine, I.: Synthesis of mono- and diglucosiduronates of metabolites of deoxycorticosterone and corticosterone and analysis by a new mass spectrometric technique. *Steroids*, 42 (1984) 349-364.
- 482 Raju, U., Levitz, M., Kaganowicz, A. and Blaustein, A.: Glucosiduronation of androsterone by human breast tumors *in vitro* in relation to the progesterone receptor content. *Steroids*, 42 (1983) 449-455.
- 483 Seki, T. and Yamaguchi, Y.: (Fluorometric determination of free glucocorticoids in human urine by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) 388-390.
- 484 Thomas, P. and Wofford, H.W.: High-performance liquid chromatography of corticosteroids in vertebrate plasma: assay of cortisol in mullet and corticosterone in the rat. *Comp. Biochem. Physiol., B: Comp. Biochem.*, 78B (1984) 473-479; *C.A.*, 101 (1984) 104274n.
- 485 Tredger, J.M., Smith, H.M. and Williams, R.: Effects of ethanol and enzyme-inducing agents on the monooxygenation of testosterone and xenobiotics in rat liver microsomes. *J. Pharmacol. Exp. Ther.*, 229 (1984) 292-298.
- 486 Weissenborn, U. and Erbler, H.C.: Metabolism of spirolactones by the rat testis *in vitro*. *Steroids*, 42 (1983) 365-388.

For additional information see:  
*C.A.*, 101 (1984) 48739d, 48777q, 86527r, 137089j.

13b. *Estrogens*

- 487 Ager, R.P. and Oliver, R.W.A.: Review. Separation of oestrogen conjugates in urine and synthetic mixtures by high-performance liquid chromatographic methods. *J. Chromatogr.*, 309 (1984) 1-15 - a review with 28 refs.
- 488 Andreolini, F., Borra, C., Di Corcia, A., Lagana, A., Samperi, R. and Rapini, G.: Improved assay of unconjugated estriol in maternal serum or plasma by adsorption and liquid chromatography with fluorimetric detection. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 742-744.
- 489 Carignan, G., Lodge, B.A. and Skakum, W.: High-performance liquid chromatographic analysis of estradiol valerate-testosterone enanthate in oily formulations. *J. Chromatogr.*, 301 (1984) 292-296.

- 490 DiNunno, C.M., Burdett, J.E., Jr., Rao, P.N., Kim, H.K. and Blye, R.P.:  $\Delta^{14}$ -Methylnorethindrone enanthate 10 $\beta$ -hydroperoxide: isolation and characterization. *Steroids*, 42 (1983) 401-408.
- 491 Pettersson, H. and Kiessling, K.-H.: Liquid chromatographic determination of the plant estrogens, coumestrol and isoflavones, in animal feed. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 503-506.
- 492 Watanabe, K., Kimura, R. and Yoshizawa, I.: Evidence for 4-hydroxylation of estradiol 17-sulfate by rat liver microsomes (clinical analysis on steroids XXIX). *Chem. Pharm. Bull.*, 32 (1984) 2745-2751.

For additional information see:  
*C.A.*, 101 (1984) 78940e, 84616v.

See also 980.

#### 13c. Sterols

- 493 Hurst, W.J., Aleo, M.D. and Martin, R.A., Jr.: Nonaqueous reverse phase liquid chromatographic analysis for cholesterol in milk chocolate. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 698-700.
- 494 Kadota, S., Matsuda, S., Suehara, H. and Kikuchi, T.: Isolation and structure of cyclonervilasterol, 24-epicyclonervilasterol, dihydrocyclonervilasterol, and 24-epidihydrocyclonervilasterol. Novel methylsterols from *Nervilia purpurea* Schlechter. *Chem. Pharm. Bull.*, 32 (1984) 1256-1259.
- 495 Kawakami, S., Morisaki, M. and Ikekawa, N.: Nutritional effect of some cholestenols and cholestadienols on the silkworm *Bombyx mori*. *Chem. Pharm. Bull.*, 32 (1984) 1608-1611.
- 496 Morisaki, M. and Ikekawa, N.: High pressure liquid chromatography of sterol benzoates. *Chem. Pharm. Bull.*, 32 (1984) 865-871.

For additional information see:  
*C.A.*, 100 (1984) 188220g.

#### 13d. Bile acids and alcohols

- 497 Baillet-Guffroy, A., Baylocq, D., Rabaron, A. and Pellerin, F.: Nuclear magnetic resonance spectrometry and liquid chromatography of two bile acid epimers: ursodeoxycholic and chenodeoxycholic acid. *J. Pharm. Sci.*, 73 (1984) 847-849.
- 498 Karlaganis, G., Karlaganis, V. and Sjöval, J.: Identification of 27-nor-5 $\beta$ -cholestane-3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ ,24 $\xi$ ,25 $\xi$ ,26-hexol and partial characterization of the bile alcohol profile in urine. *J. Lipid Res.*, 25 (1984) 693-702.
- 499 Takeda, M., Kamada, S., Maeda, M., Tsuji, A., Goto, J. and Nambara, T.: (Fluorescence high performance liquid chromatography of bile acid 3-sulfates using 1-bromoacetylpyrene as prelabeling reagent). *Bunseki Kagaku*, 33 (1984) E249-E256.
- 500 Tandon, R., Axelson, M. and Sjövall, J.: Selective liquid chromatographic isolation and gas chromatographic-mass spectrometric analysis of ketonic bile acids in faeces. *J. Chromatogr.*, 302 (1984) 1-14.

For additional information see:  
*C.A.*, 101 (1984) 20229p, 35340s.

#### 13e. Ecdysones and other insect steroid hormones

- 501 Kubo, I., Matsumoto, A. and Ayafor, J.F.: Efficient isolation of a large amount of 20-hydroxyecdysone from *Vitex madiensis* (Verbenaceae) by droplet counter-current chromatography. *Agric. Biol. Chem.*, 48 (1984) 1683-1684; *C.A.*, 101 (1984) 51064k.
- 502 Miller, M.L. and Sutter, R.P.: Methyl trisporate E. A sex pheromone in *Phycomyces blakesleeana*? *J. Biol. Chem.*, 259 (1984) 6420-6422.

*13f. Other steroids*

- 503 Jansen, E.H.J.M., Both-Miedema, R., van Blitterswijk, H. and Stephany, R.W.: Separation and purification of several anabolics present in bovine urine by isocratic high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 450-455.

**14. STEROID GLYCOSIDES AND SAPONINS**

- 504 Bockbrader, H.N. and Reuning, R.H.: Digoxin and metabolites in urine: a derivatization-high-performance liquid chromatographic method capable of quantitating individual epimers of dihydrodigoxin. *J. Chromatogr.*, 310 (1984) 85-95.
- 505 Kitagawa, I., Yoshikawa, M., Hayashi, T. and Taniyama, T.: (Quantitative determination of soyasaponins in soybeans of various origins and soybean products by means of high performance liquid chromatography). *Yakugaku Zasshi*, 104 (1984) 275-279; *C.A.*, 101 (1984) 5624v.
- 506 Slezinska, B.: Investigation of conditions of the preparative liquid chromatographic separation of cardiac glycosides present in *Digitalis lanata*. *J. Chromatogr.*, 303 (1984) 179-184.

For additional information see:  
*C.A.*, 101 (1984) 97633y, 97739n, 157743w.

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

- 507 Ekström, T.J., Chojnacki, T. and Dallner, G.: Metabolic labeling of dolichol and dolichyl phosphate in isolated hepatocytes. *J. Biol. Chem.*, 259 (1984) 10460-10468.
- 508 Ichikawa, T., Ishida, S., Sakiya, Y. and Akada, Y.: High-performance liquid chromatographic determination of glycyrrhizin and glycyrrhetic acid in biological materials. *Chem. Pharm. Bull.*, 32 (1984) 3734-3738.
- 509 Marcelle, G.B., Ahmed, M.S., Pezzuto, J.M., Cordell, G.A., Waller, D.P., Soejarto, D.D. and Fong, H.H.S.: Analysis of gossypol and gossypol-acetic acid by high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 396-398.
- 510 Parkin, J.E.: High performance liquid chromatographic assay of menthol using indirect photometric detection. *J. Chromatogr.*, 303 (1984) 436-439.
- 511 Shibuya, H., Tsujii, S., Yamamoto, Y., Miura, H. and Kitagawa, I.: Chemical transformation of terpenoids. VII. Syntheses of chiral segments, key building-blocks for the right half of taxane-type diterpenoids. *Chem. Pharm. Bull.*, 32 (1984) 3417-3427.

*15b. Essential oils*

- 512 Mazza, G.: (Determination of β-asarone in essential oils of *Acorus calamus* L. and in alcoholic beverages by high-performance liquid chromatography). *Sci. Aliments*, 4 (1984) 233-245; *C.A.*, 101 (1984) 128769d.
- 513 Thies, W.: HPLC von Levendel-, Pfefferminz- und Kümmelöl. *Fresenius' Z. Anal. Chem.*, 318 (1984) 249-250.

*15c. Bitter substances*

- 514 Ondrousek, S., Cepicka, J. and Basarova, G.: (Modern analytical methods for the determination of bitter substances in hops). *Prum. Potravin.*, 35 (1984) 17-20; *C.A.*, 101 (1984) 5491z.
- 515 Verzele, M., Dewaele, C., Van Kerrebroeck, M., Strating, J. and Verhagen, L.: Fast high-performance liquid chromatography analysis of hop bitter compounds: correction and addendum. *J. Amer. Soc. Brew. Chem.*, 42 (1984) 94-95; *C.A.*, 101 (1984) 53208j.

## 16. NITRO AND NITROSO COMPOUNDS

- 516 Bond, J.A. and Mauderly, J.L.: Metabolism and macromolecular covalent binding of [<sup>14</sup>C]-1-nitropyrene isolated perfused and ventilated rat lungs. *Cancer Res.*, 44 (1984) 3924-3929.
- 517 Chism, J.P., Turner, M.J., Jr. and Rickert, D.E.: The metabolism and excretion of mononitrotoluenes by Fischer 344 rats. *Drug Metab. Disp.*, 12 (1984) 596-602.
- 518 Dubini, A., Revuelto de Ferrari, S.C. and Rucci, A.O.: High-performance liquid chromatographic determination of octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine and hexahydro-1,3,5-trinitro-s-triazine on a polar (amino-cyano)-bonded phase. *Am. Asoc. Quim. Argent.*, 72 (1984) 135-139; *C.A.*, 101 (1984) 57279f.
- 519 Liberti, A., Ciccioli, P., Cecinato, A., Brancaleoni, E. and Di Palo, C.: Determination of nitrated-polyaromatic hydrocarbons (nitro-PAHs) in environmental samples by high resolution chromatographic techniques. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 389-397.
- 520 Maskarinec, M.P., Manning, D.L., Harvey, R.W., Griest, W.H. and Tomkins, B.A.: Determination of munitions components in water by resin adsorption and high-performance liquid chromatography-electrochemical detection. *J. Chromatogr.*, 302 (1984) 51-63.
- 521 Stronks, H.J., Janzen, E.G. and Weber, J.R.: Electrochemical detection of PBN spin adduct aminoxyls (nitroxides) separated by high performance liquid chromatography. *Anal. Lett.*, 17 (1984) 321-328.
- 522 Suzuki, J., Yagi, N. and Suzuki, S.: Photochemical nitrosation of phenol in aqueous nitrite solution. *Chem. Pharm. Bull.*, 32 (1984) 2803-2808.
- 523 Swaminathan, S. and Bryan, G.T.: Biotransformation of the bladder carcinogen N-[4-(5-nitro-2-furyl)-2-thiazolyl]formamide in mice. *Cancer Res.*, 44 (1984) 2331-2338.

For additional information see:  
*C.A.*, 101 (1984) 67166g, 154276k.

See also 272, 276, 905.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

## 17a. Amines and polyamines

- 524 Bontemps, J., Etienne, A., Kadri, M., van Cutsem, J.-L., Dandrifosse, G. and Forget, P.-Ph.: High-speed analysis of dansyl derivatives of polyamines. *Chromatographia*, 18 (1984) 525-527.
- 525 Bontemps, J., Laschet, J. and Dandrifosse, G.: Analysis of dansyl derivatives of di- and polyamines in mouse brain, human serum and duodenal biopsy specimens by high-performance liquid chromatography on a standard reversed-phase column. *J. Chromatogr.*, 311 (1984) 59-67.
- 526 Brown, R.S., Amateis, P.G. and Taylor, L.T.: Detectability of phenols and amines by normal phase microbore HPLC-FTIR employing highly IR transparent solvents. *Chromatographia*, 18 (1984) 396-400.
- 527 Causon, R.C. and Brown, M.J.: Measurement of tyramine in human plasma, utilising ion-pair extraction and high-performance liquid chromatography with amperometric detection. *J. Chromatogr.*, 310 (1984) 11-17.
- 528 Cuisinnaud, G., Bernard, N., Julien, C., Rodriguez, C. and Sassard, J.: Separation of twenty biogenic amines and derivatives by a high-performance liquid chromatographic column switching technique with on-line fluorimetric and electrochemical detections. *Int. J. Environ. Anal. Chem.*, 18 (1984) 51-73; *C.A.*, 101 (1984) 123181w.
- 529 Gill, T.A. and Thompson, J.W.: Rapid, automated analysis of amines in seafood by ion-moderated partition HPLC. *J. Food Sci.*, 49 (1984) 603-606; *C.A.*, 100 (1984) 190395m.
- 530 Goldstein, J.A., Weaver, R. and Sundheimer, D.W.: Metabolism of 2-acetylaminofluorene by two 3-methylcholanthrene-inducible forms of rat liver cytochrome P-450. *Cancer Res.*, 44 (1984) 3768-3771.

- 531 Gooderham, N.J. and Gorrod, J.W.: The application of reversed-phase high-performance liquid chromatography to *in vitro* drug metabolism studies with N-alkylarylamines. *J. Chromatogr.*, 309 (1984) 339-346.
- 532 Heideman, R.L., Fickling, K.B. and Walker, L.J.: Free and total putrescine in cerebrospinal fluid quantified by reversed-phase liquid chromatography. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1243-1245.
- 533 Kontur, P., Dawson, R. and Monjan, A.: Manipulation of mobile phase parameters for the HPLC separation of endogenous monoamines in rat brain tissue. *J. Neurosci. Methods*, 11 (1984) 5-18; *C.A.*, 101 (1984) 106760s.
- 534 Maskarinec, M.P., Sepaniak, M.J., Balchunas, A.T. and Vargo, J.D.: Liquid chromatography in open tubes. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1473-1476.
- 535 Mayer, K. and Pause, G.: (Determination of biologically active amines in wine by HPLC). *Lebensm.-Wiss. Technol.*, 17 (1984) 177-179; *C.A.*, 101 (1984) 70916f.
- 536 Nakamura, H., Himuro, A. and Tamura, Z.: Mechanism of conversion of secondary amines to primary amines by sodium hypochlorite. *Eunseki Kagaku*, 33 (1984) E227-E234.
- 537 Sigvardsson, K.W., Kennish, J.M. and Birks, J.W.: Peroxyxalate chemiluminescence detection of polycyclic aromatic amines in liquid chromatography. *Anal. Chem.*, 56 (1984) 1096-1102.
- 538 Tonogai, Y., Ito, Y. and Harada, M.: (Putrefaction of food. I. A separative determination of putrefactive nonvolatile amines in raw fish and fish products by high performance liquid chromatography with fluorescence detection). *Shokuhin Eiseigaku Zasshi*, 25 (1984) 41-46; *C.A.*, 101 (1984) 22094q.

For additional information see:  
*C.A.*, 101 (1984) 122337q, 129031u.

See also 178, 247, 272, 276, 607, 910, 1216, 1294, 1310, 1499.

#### 17b. Catecholamines and their metabolites

- 539 Anton, A.H.: A simple, reliable and rapid method for increasing the responsiveness of the glassy carbon electrode (GCE) for the analysis of biogenic amines by high performance liquid chromatography with electrochemical detection (LCEC). *Life Sci.*, 35 (1984) 79-85; *C.A.*, 101 (1984) 33356c.
- 540 Chen, J.C., Rhee, K.K., Beaudry, D.M. and Ramirez, V.D.: *In vivo* output of dopamine and metabolites from the rat caudate nucleus as estimated with push-pull perfusion on-line with HPLC-EC in unrestrained, conscious rats. I. Chromatographic and biological validation. *Neuroendocrinology*, 38 (1984) 362-370; *C.A.*, 101 (1984) 907e.
- 541 Copmann, T.L. and Strasser, J.M.: Rapid extraction of urinary catecholamines and separation by liquid chromatography with electrochemical detection. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 402-403; *C.A.*, 101 (1984) 17512v.
- 542 Dutrieu, J. and Delmotte, Y.A.: Evaluation of a new kit for the determination of 3-methoxy-4-hydroxymandelic acid (VMA) by liquid chromatography and electrochemical detection (LCEC). *Fresenius' Z. Anal. Chem.*, 319 (1984) 70-73.
- 543 Gagnieu, M.-C., Menouni-Foray, V., Guardiola, P., Quincy, C. and Renaud, B.: Liquid chromatographic determination of homovanillic acid, 5-hydroxyindoleacetic acid and probenecid levels in human cerebrospinal fluid during probenecid test. *Clin. Chim. Acta*, 139 (1984) 1-12.
- 544 Goldstein, D.S., Stull, R., Markey, S.P., Marks, E.S. and Keiser, H.R.: Dihydrocafeic acid: a common contaminant in the liquid chromatographic-electrochemical measurement of plasma catecholamines in man. *J. Chromatogr.*, 311 (1984) 148-153.
- 545 Goldstein, D.S., Stull, R., Zimlichman, R., Levinson, P.D., Smith, H. and Keiser, H.R.: Simultaneous measurement of DOPA, DOPAC, and catecholamines in plasma by liquid chromatography with electrochemical detection. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 815-816.
- 546 Guyon, F., Lecomte-Joulin, V., Falcy, C. and Dupeyron, J.P.: Chromatographie en phase liquide automatique de la dopamine urinaire. *J. Chromatogr.*, 311 (1984) 160-166.
- 547 Harris, P.Q., Bacopoulos, N.G. and Brown, S.J.: Measurement of homovanillic acid in human plasma by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 309 (1984) 379-384.

- 548 Hjemdahl, P.: Catecholamine measurements by high-performance liquid chromatography. *Amer. J. Physiol.*, 247 (1984) E13-E20; *C.A.*, 101 (1984) 84063n - a review with 43 refs.
- 549 Honegger, C.G., Burri, R., Langemann, H. and Kempf, A.: Determination of neurotransmitter systems in human cerebrospinal fluid and rat nervous tissue by high-performance liquid chromatography with on-line data evaluation. *J. Chromatogr.*, 309 (1984) 53-61.
- 550 Imperato, A. and Di Chiara, G.: Trans-striatal dialysis coupled to reverse-phase high-performance liquid chromatography with electrochemical detection: a new method for the study of the *in vivo* release of endogenous dopamine and metabolites. *J. Neurosci.*, 4 (1984) 966-977; *C.A.*, 101 (1984) 890u.
- 551 Ito, S., Kato, T., Maruta, K. and Fujita, K.: Determination of DOPA, dopamine, and 5-S-cysteinyl-DOPA in plasma, urine, and tissue samples by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 311 (1984) 154-159.
- 552 Karge, F., Gaillard, J.M., Bovier, P. and Tissot, R.: Positive correlation between total 3-methoxy-4-hydroxyphenylglycol in plasma and 24-h urine in psychiatric patients. *Clin. Chim. (Winston-Salem, N.C.)*, 30 (1984) 1416-1417.
- 553 Matson, W.R., Langlais, P., Volicer, L., Gamache, P.H., Bird, E. and Mark, K.A.: n-Electrode three-dimensional liquid chromatography with electrochemical determination of neurotransmitters. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1477-1488.
- 554 McKay, L., Bradberry, C. and Oke, A.: Ascorbic acid oxidase speeds up analysis for catecholamines, indoleamines and their metabolites in brain tissue using high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 311 (1984) 167-169.
- 555 Minegishi, A. and Ishizaki, T.: Determination of free 3-methoxy-4-hydroxyphenylglycol with several other monoamine metabolites in plasma by high-performance liquid chromatography with amperometric detection. *J. Chromatogr.*, 311 (1984) 51-57.
- 556 Moerman, E.J. and De Schaepperdryver, A.F.: Quantitation of catecholamines in urine and in plasma. *Clin. Chim. Acta*, 139 (1984) 321-333.
- 557 Nohta, H., Mitsui, A. and Ohkura, Y.: (High performance liquid chromatography of free catecholamines in urine using 1,2-diphenylenediamine as new precolumn fluorescent derivatization agent). *Bunseki Kagaku*, 33 (1984) E263-E269.
- 558 Piemonte, G. and Perina, L.: Determination of catecholamines in biological samples by high performance liquid chromatography. *G. Ital. Chim. Clin.*, 8 (1983) 57-73; *C.A.*, 100 (1984) 203765j.
- 559 Reinhard, J.F., Jr. and Perry, J.A.: Fast analysis of tissue catechols using a short, high-efficiency (3 µm) LC column and amperometric detection. *J. Liq. Chromatogr.*, 7 (1984) 1211-1220.
- 560 Saller, C.F. and Salama, A.I.: Rapid automated analysis of biogenic amines and their metabolites using reversed-phase high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 309 (1984) 287-298.
- 561 Scheinin, M., Seppala, T., Koulu, M. and Linnoila, M.: Determination of conjugated dopamine in cerebrospinal fluid from humans and non-human primates with high performance liquid chromatography using electrochemical detection. *Acta Pharmacol. Toxicol.*, 55 (1984) 88-94; *C.A.*, 101 (1984) 123199h.
- 562 Tokuda, T., Yoshioka, M., Tamura, Z. and Yokomori, K.: (Automatic analysis of homovanillic acid and vanillylmandelic acid by anion exchange high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) E331-E334.
- 563 Wielders, J.P.M. and Mink, C.J.K.: Analysis of vanillylmandelic acid, homo-vanillic acid and 5-hydroxyindoleacetic acid in human urine by high-performance liquid chromatography and fluorometry. *J. Chromatogr.*, 310 (1984) 379-385.
- 564 Yoshida, A., Yamaguchi, Y., Yoshioka, M. and Tamura, Z.: (Simultaneous determination of homovanillic acid, vanillylmandelic acid and 5-hydroxyindole-3-acetic acid in urine by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) E257-E262.

For additional information see:

*C.A.*, 101 (1984) 3302q, 17494r, 17944n, 18537u, 33326t, 48724v, 51021u, 104942d, 122314e, 123030w, 123198g, 126335k.

See also 957, 1240, 1294.

*17c. Amino derivatives and amides (excluding peptides)*

- 565 Borenkamp, J.W., Lacroix, B.V. and Henshaw, P.F.: The retention times of oximes in reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 492-496.
- 566 Chang, C.A., Tu, C.-F. and Huang, C.-S.: Normal phase separation of chloro-anilines and nitroanilines with silica, amine, and cobalt(III) complex bonded phases. *J. Chromatogr. Sci.*, 22 (1984) 321-326.
- 567 Cramer, S.M., Nathanael, B. and Horvath, Cs.: High-performance liquid chromatography of deferoxamine and ferrioxamine interference by iron present in the chromatographic system. *J. Chromatogr.*, 295 (1984) 405-411.
- 568 Davidson, A.D.: Liquid chromatographic determination of nitrogen derived from urea and water-soluble methylene ureas in urea-formaldehyde fertilizers: collaborative study II. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 768-770.
- 569 Forsman, U.: Enantiomeric resolution of an optically active guanine derivative by high-performance liquid chromatography with phenylalanine-Cu(II) in the mobile phase. *J. Chromatogr.*, 303 (1984) 217-221.
- 570 Higashidate, S., Maekubo, T., Saito, M., Senda, M. and Hoshino, T.: (Rapid and highly sensitive method for the determination of guanidino compounds in body fluids). *Bunseki Kagaku*, 33 (1984) 366-370.
- 571 Jasinski, J.S.: Liquid chromatographic determination of nitrosamines in malt and beer with a photoconductivity detector. *Anal. Chem.*, 56 (1984) 2214-2218.
- 572 Kuwada, M. and Katayama, K.: Differentiation of endopeptidases and amino-peptidases by high-performance liquid chromatography of reaction products from chromogenic peptide p-nitroanilines as substrates. *Anal. Biochem.*, 139 (1984) 438-443.
- 573 Martin, R. and Becker, H.: Isolierung strukturverwandter Säureamide durch Kombination von Nieder- und Hochdruck-Flüssig-Chromatographie. *Presenius' Z. Anal. Chem.*, 318 (1984) 247-248.
- 574 Schmollack, W., Steup, A. and Bekemeier, H.: Fluorimetriche Bestimmung von Levarterenol, Epinephrin und Dopamin im Urin von Ratten mit Carrageeinindödem und Adjuvansarthritis. *Pharmazie*, 39 (1984) 30-33.
- 575 Schultz, B.: Determination of 4-aminophenol in water by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 299 (1984) 484-486.

For additional information see:  
C.A., 101 (1984) 126131, 126334j.

See also 178, 528, 978.

**18. AMINO ACIDS AND PEPTIDES; CHEMICAL STRUCTURE OF PROTEINS***18a. Amino acids and their derivatives*

- 576 Allison, L.A., Mayer, G.S. and Shoup, R.E.: *o*-Phthalaldehyde derivatives of amines for high-speed liquid chromatography/electrochemistry. *Anal. Chem.*, 56 (1984) 1089-1096.
- 577 Besenfelder, E.: Determination of tetraiodothyronine in serum by HPLC and electrochemical detection. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 566-569.
- 578 Bianchi, R., Mollea, N., Cazzuola, F., Fusani, L., Lotti, M., Bertelli, P., Ferdeghini, M. and Mariani, G.: High-performance liquid chromatographic separation of iodoamino acids for tracer turnover studies of thyroid hormones *in vivo*. *J. Chromatogr.*, 297 (1984) 393-398.
- 579 Biggs, H.G. and Gentilcore, L.J.: Liquid-chromatographic measurement of amino acids in biological samples after formation of phenylthiohydantoin derivatives. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 851-855.
- 580 Brodelius, P.: High-performance liquid chromatographic analysis of analogous amino and oxo acids for the determination of amino acid oxidase and transaminase activities. *Acta Chem. Scand., Ser. B*, B38 (1984) 219-223; C.A., 101 (1984) 68208h.

- 581 Buck, R.H. and Krummen, K.: High-performance liquid chromatography with automated pre-column derivatization for amino acids. *J. Chromatogr.*, 303 (1984) 238-243.
- 582 Buly, R.L. and Mumma, R.O.: Excretion and metabolism of [(2,4-dichlorophenoxy)acetyl]aspartic acid and [(2,4-dichlorophenoxy)acetyl]valine in the rat. *J. Agric. Food Chem.*, 32 (1984) 571-577.
- 583 Cloete, C.: Automated optimised high performance liquid chromatographic analysis of pre-column *o*-phthalaldialdehyde-amino acid derivatives. *J. Liq. Chromatogr.*, 7 (1984) 1979-1990.
- 584 Eslami, M., Stuart, J.D. and Hill, D.W.: Separation of orthophthalaldehyde/ethanethiol derivatives of taurine and closely eluting amino acids by high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1117-1131.
- 585 Fell, A.F., Clark, B.J. and Scott, H.P.: Analysis and characterisation of aromatic amino acids, metabolites and peptides by rapid-scanning photodiode array detection in high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 203-214.
- 586 Ford, C.W.: Simultaneous determination of proline and betaines by high performance lipid chromatography. *J. Sci. Food Agric.*, 35 (1984) 881-886; *C.A.*, 101 (1984) 126144x.
- 587 Godel, H., Graser, T., Földi, P., Pfaender, P. and Fürst, P.: Measurement of free amino acids in human biological fluids by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 49-61.
- 588 Granberg, R.R.: Amino acid analysis for biotechnology: ultimate confirmation of purity and composition. *Amer. Biotechnol. Lab.*, 2 (1984) 58, 60-66, 68-69; *C.A.*, 101 (1984) 86596n.
- 589 Haroon, Y.: Rapid assay for  $\gamma$ -carboxyglutamic acid in urine and bone by pre-column derivatization and reversed-phase liquid chromatography. *Anal. Biochem.*, 140 (1984) 343-348.
- 590 Hearn, M.T.W. and Grego, B.: Solvent composition - capacity factor dependencies of iodoamino acids. *J. Liq. Chromatogr.*, 7 (1984) 1079-1088.
- 591 Herranz, A.S., Lerma, J. and Del Rio, R.M.: Determination of  $\gamma$ -aminobutyric acid in physiological samples by a simple, rapid high-performance liquid chromatographic method. *J. Chromatogr.*, 309 (1984) 139-144.
- 592 Hughes, G.J.: High-performance Liquid chromatography: analytical applications for amino acids. *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 181-197; *C.A.*, 101 (1984) 103284d - a review with 21 refs.
- 593 Ishimitsu, S., Fujimoto, S. and Ohara, A.: The formation of *m*-tyrosine and *O*-tyrosine in rats. *Chem. Pharm. Bull.*, 32 (1984) 2439-2441.
- 594 Iwatani, A. and Nakamura, H.: Determination of urinary tryptophan, 5-hydroxytryptamine and 5-hydroxyindoleacetic acid in neonatal hyperbilirubinaemic infants using reversed-phase high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 309 (1984) 145-150.
- 595 Kagedal, B., Källberg, M. and Martensson, J.: Determination of non-protein-bound N-acetylcysteine in plasma by high-performance chromatography. *J. Chromatogr.*, 311 (1984) 170-175.
- 596 Kaneda, N. and Yagi, K.: (Dansylamino acids). *Kagaku, Zokan*, (1984) 41-48; *C.A.*, 101 (1984) 19900u - a review with 12 refs.
- 597 Kiba, N. and Kaneko, M.: Use of immobilized amino acid oxidase as post column reactor in the high-performance liquid chromatography of amino acids. *J. Chromatogr.*, 303 (1984) 396-403.
- 598 Kondo, J. and Sakiyama, F.: DABTH-amino acids and Dabsyl-amino acids). *Kagaku, Zokan*, (1984) 57-65; *C.A.*, 101 (1984) 19899a - a review with 13 refs.
- 599 Lam, S.: Stereoselective analysis of D and L dansyl amino acids as the mixed chelate copper(II) complexes by HPLC. *J. Chromatogr. Sci.*, 22 (1984) 416-423.
- 600 Lam, S., Azumaya, H. and Karmen, A.: High-performance liquid chromatography of amino acids in urine and cerebrospinal fluid. *J. Chromatogr.*, 302 (1984) 21-29.
- 601 Lin, J.K. and Shiao, S.Y.L.: Determination of amino acids in human specimens by concave and linear gradient liquid chromatography with dabsyl chloride. *J. Chin. Biochem. Soc.*, 12 (1983) 47-60; *C.A.*, 101 (1984) 86610n.
- 602 Mahachi, T.J., Carlson, R.M. and Poe, D.P.: *p*-N,N-Dimethylaminophenylisothiocyanate as an electrochemical label for high-performance liquid chromatographic determination of amino acids. *J. Chromatogr.*, 298 (1984) 279-288.

- 603 Miyaguchi, K., Honda, K. and Imai, K.: Sub picomol chemiluminescence detection of Dns-amino acids separated by high-performance liquid chromatography with gradient elution. *J. Chromatogr.*, 303 (1984) 173-176.
- 604 Ohara, G. and Takahashi, S.: Chromatographic analysis of suberimidate - cross-linked lysine. *J. Liq. Chromatogr.*, 7 (1984) 1665-1672.
- 605 Opstvedt, J., Miller, R., Hardy, R.W. and Spinelli, J.: Heat-induced changes in sulphydryl groups and disulfide bonds in fish protein and their effect on protein and amino acid digestibility in rainbow trout (*Salmo gairdneri*). *J. Agric. Food Chem.*, 32 (1984) 929-935.
- 606 Otterburn, M.S. and Gargan, P.E.: Determination of dityrosine in protein fractions isolated from merino wool using reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 429-432.
- 607 Parris, N.: An improved fluorometric method for the determination of ammonia and volatile amines in meat tissue by high-performance liquid chromatography. *J. Agric. Food Chem.*, 32 (1984) 829-831.
- 608 Qureshi, G.A., van der Berg, S., Gutierrez, A. and Bergström, J.: Determination of histidine and 3-methylhistidine in physiological fluids by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 83-89.
- 609 Qureshi, G.A., Fohlin, L. and Bergström, J.: Application of high-performance liquid chromatography to the determination of free amino acids in physiological fluids. *J. Chromatogr.*, 297 (1984) 91-100.
- 610 Sano, A., Miyake, M. and Kakimoto, Y.: A rapid and sensitive method for the determination of hypusine in proteins and its distribution and developmental changes. *Biochim. Biophys. Acta*, 800 (1984) 135-139.
- 611 Schmid, R., Pollak, A., Vycudilík, W., Coradello, H., Lischka, A. and Lubec, G.: Determination of glucitollysine for the quantitation of non-enzymatic glucosylation by ion exchange chromatography and reverse phase liquid chromatography. *Clin. Chim. Acta*, 139 (1984) 119-126.
- 612 Shih, F.F. and Kalmar, A.D.: Determination of glutamine and asparagine by isocratic elution reverse phase liquid chromatography with fluorescent detection. *J. Liq. Chromatogr.*, 7 (1984) 1169-1183.
- 613 Takeuchi, T., Yamazaki, M. and Ishii, D.: Micro high-performance liquid chromatography of 5-dimethylaminonaphthalenesulphonyl-amino acids. *J. Chromatogr.*, 295 (1984) 333-339.
- 614 Toda, H., Ikenaka, T. and Narita, K.: (PTH-amino acids). *Kagaku, Zokan*, (1984) 3-12; *C.A.*, 101 (1984) 50912y - a review with 28 refs.
- 615 Watanabe, Y. and Imai, K.: Sensitive detection of amino acids in human serum and dried blood disc of 3 mm diameter for diagnosis of inborn errors of metabolism. *J. Chromatogr.*, 309 (1984) 279-286.
- 616 Weinstein, S. and Weiner, S.: Enantiomeric analysis of a mixture of the common protein amino acids as their Dns derivatives. Single-analysis reversed-phase high-performance liquid chromatographic procedure using a chiral mobile phase. *J. Chromatogr.*, 303 (1984) 244-250.
- 617 Winkler, G., Heinz, F.X. and Kunz, C.: Exclusive use of high-performance liquid chromatographic techniques for the isolation, 4-dimethylaminoazobenzene-4'-sulphonyl chloride amino acid analysis and 4-N,N-dimethylaminoazobenzene-4'-isothiocyanate phenyl isothiocyanate sequencing of a viral membrane protein. *J. Chromatogr.*, 297 (1984) 63-73.
- 618 Yergey, A.L., Liberato, D.J. and Millington, D.S.: Thermospray liquid chromatography/mass spectrometry for the analysis of L-carnitine and its short-chain acyl derivatives. *Anal. Biochem.*, 139 (1984) 278-283.
- 619 Yoza, N., Shuto, T., Baba, Y., Tanaka, A. and Ohashi, S.: Determination of complexing abilities of ligands for metal ions by flow injection analysis and high-performance liquid chromatography. II. Copper(II) complexes of amino-polycarboxylic acids. *J. Chromatogr.*, 298 (1984) 419-426.
- 620 Yuasa, S., Itoh, M. and Shimada, A.: Resolution of amino acids by a native-cellulose column. *J. Chromatogr. Sci.*, 22 (1984) 288-292.
- 621 Zunic, G., Stanimirovic, S. and Savic, J.: Rapid ion exchange method for the determination of 3-methylhistidine in rat urine and skeletal muscle. *J. Chromatogr.*, 311 (1984) 69-77.

For additional information see:

*C.A.*, 101 (1984) 19996e, 22090k, 3315w, 35566v, 19994c, 20016s, 19995d, 83265t, 53482u, 51033z, 88763p, 68674g, 109063c, 126127u, 126332g.

See also 178, 213, 299, 418, 679, 682, 686, 910, 959, 979, 984, 1286, 1452, 1471, 1475.

*18b. Peptides and peptidic and proteinous hormones*

- 622 Antoniotti, H., Fagot-Revuat, P., Esteve, J.P., Fourmy, D., Pradayrol, L. and Ribet, A.: Purification of radioiodinated somatostatin-related peptides by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 181-188.
- 623 Argiolas, A. and Pisano, J.J.: Isolation and characterization of two new peptides, mastoparan C and crabrolin, from the venom of the european hornet, *Vespa crabro*. *J. Biol. Chem.*, 259 (1984) 10106-10111.
- 624 Balaspiri, L., Toth, M.V., Fekete, T., Janaky, T., Laszlo, F.A., Toth, G. and Sirokman, F.: Liquid chromatography, thin-layer chromatography and high-performance liquid chromatography of oxytocin, vasopressin, some of their specific analogs and fragments. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 217-230; *C.A.*, 101 (1984) 66036b.
- 625 Bolton, J.E., Livesey, J.H. and Hearn, M.R.W.: Assessment of the plasma-induced changes under acidic conditions in the apparent molecular volume of  $\beta$ -endorphin,  $\beta$ -lipotropin and  $\gamma$ -lipotropin by gel permeation and reversed phase high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1089-1099.
- 626 Bousfield, G.R. and Ward, D.N.: Purification of lutropin and follitropin in high yield from horse pituitary glands. *J. Biol. Chem.*, 259 (1984) 1911-1921.
- 627 Carlquist, M. and Rökaeus, A.: Isolation of a proform of porcine secretin by ion-exchange and reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 143-141.
- 628 Chou, J., Tang, J., Yang, H.-Y.T. and Costa, E.: Increase of striatal Met<sup>5</sup>-enkephalin-Arg<sup>6</sup>-Phe<sup>7</sup> (YGGFMRF) content elicited by long-term treatment with haloperidol. *J. Pharmacol. Exp. Ther.*, 229 (1984) 171-174.
- 629 Conlon, J.M. and Göke, B.: Metabolism of substance P in human plasma and in the rat circulation. *J. Chromatogr.*, 296 (1984) 241-247.
- 630 Cornell, H.J. and Boughdadu, N.M.: Isolation of insulin-like growth factors I and II from human plasma. *Prepar. Biochem.*, 14 (1984) 123-138.
- 631 Desiderio, D.M., Kai, M., Tanzer, F.S., Trimble, J. and Wakelyn, C.: Measurement of enkephalin peptides in canine brain regions, teeth, and cerebrospinal fluid with high-performance liquid chromatography and mass spectrometry. *J. Chromatogr.*, 297 (1984) 245-260.
- 632 Frelinger, A.L., III, and Zull, J.E.: Oxidized forms of parathyroid hormone with biological activity. Separation and characterization of hormone forms oxidized at methionine 8 and methionine 18. *J. Biol. Chem.*, 259 (1984) 5507-5513.
- 633 Fujii, N., Shimokura, M., Nomizu, M., Yajima, H., Shono, F., Tsuda, M. and Yoshitake, A.: Studies on peptides. CXVII. Solution synthesis of the tetracontapeptide amide corresponding to the entire amino acid sequence of growth hormone releasing factor, somatocrinin. *Chem. Pharm. Bull.*, 32 (1984) 520-529.
- 634 Fujii, N., Shimokura, M., Lee, W. and Yajima, H.: Studies on peptides. CXVIII. Synthesis of a hybrid growth hormone releasing factor (GRF)-PHI heptacosapeptide amide. *Chem. Pharm. Bull.*, 32 (1984) 739-743.
- 635 Fujii, N., Shimokura, M., Yajima, H., Shono, F., Tsuda, M. and Yoshitake, A.: Studies on peptides. CXIX. Synthesis of growth hormone releasing factor (hpGRF-40-OH). *Chem. Pharm. Bull.*, 32 (1984) 1193-1199.
- 636 Gankina, E.S., Kostyuk, I.O. and Belenki, B.G.: Microcolumn chromatography of large peptides. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 231-240; *C.A.*, 101 (1984) 68669j.
- 637 Grego, B., Baldwin, G.S., Knessel, J.A., Simpson, R.J., Morgan, F.J. and Hearn, M.T.W.: High-performance liquid chromatography of amino acids, peptides and proteins. LVIII. Application of reversed-phase high-performance liquid chromatography to the separation of tyrosine-specific phosphorylated polypeptides related to human growth hormone. *J. Chromatogr.*, 297 (1984) 21-29.
- 638 Hagopian, W.A. and Tager, H.S.: Receptor binding and cell-mediated metabolism of [<sup>125</sup>I]monoiodoglucagon by isolated canine hepatocytes. *J. Biol. Chem.*, 259 (1984) 8986-8993.
- 639 Hew, C.L., Joshi, S. and Wang, N.-C.: Analysis of fish antifreeze polypeptides by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 213-219.
- 640 Hiraga, Y., Shirone, K., Oh-Toshi, S., Sakakibara, S. and Kinoshita, T.: (High performance liquid chromatography of bradykinin and its application to the degradation study of bradykinin in plasma). *Bunseki Kagaku*, 33 (1984) E279-E286.

- 641 Imazu, M., Strickland, W.G. and Exton, J.H.: Multiple phosphorylation of rat-liver glycogen synthase by protein kinase. *Biochim. Biophys. Acta*, 789 (1984) 285-293.
- 642 Janssen, P.S.L., van Nispen, J.W., Hamelinck, R.L.A.E., Melgers, P.A.T.A. and Goverde, B.C.: Application of reversed-phase HPLC in some critical peptide separations. *J. Chromatogr. Sci.*, 22 (1984) 234-238.
- 643 Kimura, S.: (Analyses of peptides by reverse phase high performance liquid chromatography). *Kagaku Zokan*, (1984) 127-139; *C.A.*, 101 (1984) 35357v - a review with 8 refs.
- 644 Knight, M., Tamminga, C.A., Ito, Y., Gardner, J.D. and Chase, T.N.: Purification of a cholecystokinin fragment peptide in the horizontal flow-through coil planet centrifuge. *J. Chromatogr.*, 301 (1984) 277-281.
- 645 Köck, A. and Luger, T.A.: Purification of human interleukin 1 by high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 293-300.
- 646 Kurosu, Y., Kawasaki, H., Chen, X.-C., Amano, Y., Fang, Y.-I., Isobe, T. and Okuyama, T.: (Comparison of retention times of polypeptides in reversed phase high performance liquid chromatography on polystyrene resin and on alkyl bonded silica). *Bunseki Kagaku*, 33 (1984) E301-E308.
- 647 Laufer, R., Wormser, U., Selinger, Z., Chorev, M. and Gilon, C.: Ion-exchange chromatographic assay of peptidases acting on the C-terminal hexapeptide sequence of substance P. *J. Chromatogr.*, 301 (1984) 415-424.
- 648 Lebl, M., Cody, W.L. and Hruby, V.J.: Cyclic melanotropins. Part VI. Reverse phase HPLC studies. *J. Liq. Chromatogr.*, 7 (1984) 1195-1210.
- 649 Low, T.L.K. and Mercer, R.C.: Isolation and structural studies of porcine, ovine and murine thymosin  $\beta$ 4. High-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 221-239.
- 650 Marasco, W.A., Phan, S.H., Krutzsch, H., Showell, H.J., Feltner, D.E., Nairn, R., Becker, E.L. and Ward, P.A.: Purification and identification of formyl-methionyl-leucyl-phenylalanine as the major peptide neutrophil chemotactic factor produced by *Escherichia coli*. *J. Biol. Chem.*, 259 (1984) 5430-5439.
- 651 Munck, A., Kervran, A., Marie, J.C., Bataille, D. and Rosselin, G.: Glucagon-37 (oxyntomodulin) and glucagon-29 (pancreatic glucagon) in human bowel: analysis by HPLC and radioreceptor assay. *Peptides*, 5 (1984) 553-561; *C.A.*, 101 (1984) 66172t.
- 652 Murray, E.D., Jr. and Clarke, S.: Synthetic peptide substrates for the erythrocyte protein carboxyl methyltransferase. Detection of a new site of methylation at isomerized L-aspartyl residues. *J. Biol. Chem.*, 259 (1984) 10722-10732.
- 653 Nicolaou, V. and Melius, P.: Peptide separation and isolation with an automated amino acid analyzer. *J. Chromatogr. Sci.*, 22 (1984) 285-287.
- 654 Nika, H.: Reaction detector system for the simultaneous monitoring of primary amino groups and sulfhydryl groups in peptides eluted by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 261-270.
- 655 Opoche, G., Boscaro, M., Luzzi, T., D'Agostino, D. and Mantero, F.: (Immunochemical profiles of ACTH by high performance liquid chromatography). *G. Ital. Chim. Clin.*, 8 (1983) 79-83; *C.A.*, 100 (1984) 203766k.
- 656 Panerai, A.E., Martini, A., De Rosa, A., Sacerdote, P. and Fraioli, F.: (A HPLC/RIA coupled technique for neuropeptides: its application to plasma and cerebro-spinal fluid samples). *G. Ital. Chim. Clin.*, 8 (1983) 39-47; *C.A.*, 100 (1984) 203763g.
- 657 Pilosof, D., Kim, H.Y., Dyckes, D.F. and Vestal, M.L.: Determination of non-derivatised peptides by thermospray liquid chromatography/mass spectrometry. *Anal. Chem.*, 56 (1984) 1236-1240.
- 658 Pingoud, V. and Trautschold, I.: High-performance liquid chromatography of iodine-labeled insulin and glucagon derivatives with on-line  $\gamma$ -detection. *Anal. Biochem.*, 140 (1984) 305-314.
- 659 Poe, M., Wu, J.K., Lin, T.Y., Hoogstein, K., Bull, H.G. and Slater, E.E.: Renin cleavage of a human kidney renin substrate analogous to human angiotensinogen, H-Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Val-Ile-His-Ser-OH, that is human renin specific and is resistant to cathepsin D. *Anal. Biochem.*, 140 (1984) 459-467.
- 660 Rabbani, S.A., Kremer, R., Bennett, H.P.J. and Goltzman, D.: Phosphorylation of parathyroid hormone by human and bovine parathyroid glands. *J. Biol. Chem.*, 259 (1984) 2949-2955.

- 661 Rabiet, M.J., Jandrot-Perrus, M., Boissel, J.P. and Dode, C.: (Analysis of human fibrinopeptides by high-performance liquid chromatography). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1984) 151-160; *C.A.*, 101 (1984) 51032y.
- 662 Reinhard, J.F., Jr.: Estimation of neurotransmitter metabolism by liquid chromatography and electrochemical detection: a possible means for assessing *in vivo* correlates of altered receptor sensitivity. *Monogr. Neural Sci.*, 10 (Neurorecept. Health Dis.) (1984) 27-52; *C.A.*, 101 (1984) 749e - a review with 73 refs.
- 663 Sauter, A. and Frick, W.: Determination of neuropeptides in discrete regions of the rat brain by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 297 (1984) 215-223.
- 664 Sharma, Y.D. and Tanzer, M.L.: High-performance liquid chromatographic separation of glycopeptides from *Nereis* cuticle collagen. *Anal. Biochem.*, 141 (1984) 205-212.
- 665 Sheth, J.J., Moodbidri, S.B., Sheth, A.R., Rao, S.S. and Panthaki, M.H.: Isolation and purification of prolactin from human amniotic fluid by a combination of affinity chromatography and chromatofocusing. *Indian J. Biochem. Biophys.*, 21 (1984) 89-92; *C.A.*, 101 (1984) 33351x.
- 666 Shi, Y.-F., Sherins, R.J., Brightwell, D., Gallelli, J.F. and Chatterji, D.C.: Long-term stability of aqueous solutions of luteinizing hormone-releasing hormone assessed by an *in vitro* bioassay and liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 819-821.
- 667 Stadalius, M.A., Gold, H.S. and Snyder, L.R.: Optimization model for the gradient elution separation of peptide mixtures by reversed-phase high-performance liquid chromatography. Verification of retention relationships. *J. Chromatogr.*, 296 (1984) 31-59.
- 668 Stanton, P.G., Grego, B. and Hearn, M.T.W.: High-performance liquid chromatography of amino acids, peptides and proteins. LVII. Analysis of radioiodinated thyrotropin polypeptides by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 189-197.
- 669 Stenman, U.-H., Laatikainen, T., Salminen, K., Huhtala, M.-L. and Leppäläluoto, J.: Rapid extraction and separation of plasma  $\beta$ -endorphin by cation-exchange high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 399-403.
- 670 Svoboda, M., Lambert, M., Moroder, L. and Christophe, J.: One-step isocratic high-performance liquid chromatographic purification of radioiodinated and radioiodinated-photoactivable derivatives of cholecystokinin. *J. Chromatogr.*, 296 (1984) 199-211.
- 671 Terabe, S., Tsuchiya, A. and Ando, T.: (Fluorometric detection of peptides using postcolumn derivatization with *o*-phthalaldehyde in high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) 361-365.
- 672 Tsuboi, S., Uda, N., Ikeda, M., Hirota, K. and Ohmori, S.: S-(1,2-Dicarboxyethyl) glutathione and S-(1,2-dicarboxyethyl)L-cysteine in lens. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 285-290.
- 673 Ulyashin, V.V. and Deigin, V.I.: High performance liquid chromatography of protected peptides. *Chem. Pept. Proteins, Proc. USSR-FRG Symp.*, 4th 1982, W. Voelter (Editor), de Gryuter, Berlin, 1984, 145-153 pp.; *C.A.*, 101 (1984) 143222p.
- 674 Urdal, D.L., Mochizuki, D., Conlon, P.J., March, C.J., Remerowski, M.L., Eisenman, J., Ramthun, C. and Gillis, S.: Lymphokine purification by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 171-179.
- 675 Wilks, J.W. and Butler, S.S.: Biologic activity of human chorionic gonadotropin following reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 123-130.
- 676 Yamada, T., Shimamura, M., Miyazawa, T. and Kuwata, S.: Separation of diastereomers of protected glycine-middled tripeptides. III. Application to the determination of the absolute configuration of constituent amino acids of peptides. *Pept. Chem.*, 21 (1983, Publ. 1984) 31-36; *C.A.*, 101 (1984) 68639z.
- 677 Yu, T.J., Karger, B.L. and Vouros, P.: High-performance liquid chromatographic mass spectrometric examination of C-methylation artifacts from the permethylation reaction of peptides. *Biomed. Mass. Spectrom.*, 10 (1983) 633-640; *C.A.*, 101 (1984) 20121x.

- 678 Zull, J.E. and Chuang, J.: Preparation and characterization of radioactive monoiodotyrosine and diiodotyrosine derivatives of parathyroid hormone. *Anal. Biochem.*, 140 (1984) 214-222.

For additional information see:

C.A., 101 (1984) 17514x, 71086x, 84940w, 86271c, 123166v, 123177z.

See also 94, 699.

18c. General techniques of elucidation of structure of proteins

- 679 Acharya, A.S., Sussman, L.G. and Manjula, B.N.: Application of reductive dihydroxypropylation of amino groups of proteins in primary structural studies: identification of phenylthiohydantoin derivative of  $\epsilon$ -dihydroxypropyl-lysine residues by high-performance liquid chromatography. *J. Chromatogr.*, (1984) 37-48.
- 680 Collawn, J.F., Jr., Lau, P.Y., Morgan, S.L., Fox, A. and Fish, W.W.: A chemical and physical comparison of ferritin subunit species fractionated by high-performance liquid chromatography. *Arch. Biochem. Biophys.*, 233 (1984) 260-266.
- 681 Ender, B.L. and Gassen, H.-G.: On the synthesis of a  $^{32}P$ -labelled Edman reagent for the sensitive identification of amino acid derivatives. *Hoppe Seyler's Z. Physiol. Chem.*, 365 (1984) 839-845.
- 682 Foriers, A., Lauwereys, M. and de Neve, R.: Complete high-performance liquid chromatographic separation of phenylthiohydantoin- and 4-N,N-dimethylaminoazo-benzene 4'-thiohydantoin-amino acids on an Ultrasphere ODS column with the same buffer system. *J. Chromatogr.*, 297 (1984) 75-82.
- 683 Geren, L.M., O'Brien, P., Stonehurner, J. and Millett, F.: Identification of specific carboxylate groups on adrenodoxin that are involved in the interaction with adrenodoxin reductase. *J. Biol. Chem.*, 259 (1984) 2155-2160.
- 684 Hojo, T., Nakamura, H., Nakajima, T. and Yasuhara, T.: A fluorescence method for selective isolation of tryptophan-containing peptide: modification of tryptophan residue in a protein with a chelating agent, 2-carboxy-1-hydroxy-4-naphthylmethylsulfonium chloride. *Chem. Pharm. Bull.*, 32 (1984) 2040-2043.
- 685 Iadarola, P., Ferri, G., Galliano, M., Minchiotti, L. and Zapponi, M.C.: Separation of cyanogen bromide fragments from normal and abnormal human serum albumin by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 336-344.
- 686 Muramoto, K., Kamiya, H. and Kawauchi, H.: The application of fluorescein isothiocyanate and high-performance liquid chromatography for the microsequencing of proteins and peptides. *Anal. Biochem.*, 141 (1984) 446-450.
- 687 Pan, Y.-C.E., Wideman, J., Blacher, R., Chang, M. and Stein, S.: Use of high-performance liquid chromatography for preparing samples for microsequencing. *J. Chromatogr.*, 297 (1984) 13-19.
- 688 Rodriguez, H., Kohr, W.J. and Harkins, R.N.: Design and operation of a completely automated Beckman microsequencer. *Anal. Biochem.*, 140 (1984) 538-547.
- 689 Tsunawawa, S.: (Separation of peptides produced by enzymic hydrolysis of proteins. II. An application in analysis of the primary structure of prolactin). *Kagaku, Zokan*, (1984) 183-192; C.A., 101 (1984) 19991z.
- 690 Tu, C.-P.D., Chang, M. and Reddy, C.C.: The major rat heart glutathione S-transferases are anionic isozymes composed of  $Y_b$  size subunits. *Biochem. Biophys. Res. Commun.*, 123 (1984) 981-988.
- 691 Yu, T.J., Schwartz, H.A., Cohen, S.A., Vouros, P. and Karger, B.L.: Sequence analysis of derivatized peptides by high-performance liquid chromatography-mass spectrometry. *J. Chromatogr.*, 301 (1984) 425-440.

See also 604, 617, 762.

19. PROTEINS

19a. General techniques

- 692 Albery, W.J., Svanberg, L.R. and Wood, P.: The estimation and identification of proteins by ring-disk titration. Part II. Application to liquid chromatography. *J. Electroanal. Chem. Interfacial Electrochem.*, 162 (1984) 45-53; C.A., 101 (1984) 3408d.

- 693 Barford, R.A. and Sliwinski, B.J.: Micellar chromatography of proteins. *Anal. Chem.*, 56 (1984) 1554-1556.
- 694 Bischoff, K.: (Protein separation using HPLC brings more information). *Labor-Praxis*, 8 (1984) 506-512; *C.A.*, 101 (1984) 20021q.
- 695 Boissel, J.P., Delpech, M., Rochette, J. and Wajcman, H.: (Use of high-performance ion-exchange chromatography in protein chemistry). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 115-130; *C.A.*, 101 (1984) 51029c.
- 696 Calton, G.J.: System design for industrial scale purification of high value proteins by immunosorbent chromatography. *Affinity Chromatogr. Biol. Recognit.*, [Proc. Int. Symp.], 5th 1983, 383-391; *C.A.*, 100 (1984) 215337j.
- 697 Cohen, K.A., Schellenberg, K., Benedek, K., Karger, B.L., Grego, B. and Hearn, M.T.W.: Mobile-phase and temperature effects in the reversed phase chromatographic separation of proteins. *Anal. Biochem.*, 140 (1984) 223-235.
- 698 Crabb, J.W. and Heilmeyer, L.M.G., Jr.: Micropreparative protein purification by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 129-141.
- 699 Di Bussolo, J.M.: Reversed-phase liquid chromatography of proteins and peptides. *Amer. Biotechnol. Lab.*, 2 (1984) 20-37; *C.A.*, 101 (1984) 86595m.
- 700 Di Bussolo, J.M. and Di Cesare, J.L.: Rapid separations of proteins by reversed-phase liquid chromatography. *Liq. Chromatogr. HPLC Mag.*, 1 (1983) 45-47; *C.A.*, 100 (1984) 188199g.
- 701 Furth, A.J., Bolton, H., Potter, J. and Priddle, J.D.: Separating detergent from proteins. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 318-328; *C.A.*, 101 (1984) 86821g.
- 702 Geng, X. and Regnier, F.E.: Retention model for proteins in reversed-phase liquid chromatography. *J. Chromatogr.*, 296 (1984) 15-30.
- 703 Gooding, D.L., Schwuck, M.N. and Gooding, K.M.: Analysis of proteins with new, mildly hydrophobic high-performance liquid chromatography packing materials. *J. Chromatogr.*, 296 (1984) 107-114.
- 704 Gooding, K.M. and Schwuck, M.N.: Ion selectivity in the high-performance cation-exchange chromatography of proteins. *J. Chromatogr.*, 296 (1984) 321-328.
- 705 Hearn, M.T.W. and Grego, B.: High-performance liquid chromatography of amino acids, peptides and proteins. LV. Studies on the origin of band broadening of polypeptides and protein separated by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 61-82.
- 706 Hearn, M.T.W. and Grego, B.: High-performance liquid chromatography of amino acids, peptides and proteins. LVI. Detergent-mediated reversed-phase high-performance liquid chromatography of polypeptides and proteins. *J. Chromatogr.*, 296 (1984) 309-319.
- 707 Hjerten, S., Liu, Z.-Q. and Yang, D.: Some studies on the resolving power of agarose-based high-performance liquid chromatographic media for the separation of macromolecules. *J. Chromatogr.*, 296 (1984) 115-120.
- 708 Isobe, T., Kurosu, Y., Fang, Y.-L. and Okuyama, T.: High performance liquid chromatography of low molecular weight proteins on a non-ionic macroreticular polystyrene resin. *J. Liq. Chromatogr.*, 7 (1984) 1101-1115.
- 709 Kadoya, T., Amano, Y., Isobe, T., Kato, Y., Nakamura, K. and Okuyama, T.: (High performance ion exchange chromatography of proteins). *Bunseki Kagaku*, 33 (1984) E287-E294.
- 710 Kato, Y., Kitamura, T. and Hashimoto, T.: Operational variables in high-performance hydrophobic interaction chromatography of proteins on TSK gel Phenyl-5PW. *J. Chromatogr.*, 298 (1984) 407-418.
- 711 Lassak, H.F.: (Purification of proteins by HPLC). *LaborPraxis*, 8 (1984) 312-322; *C.A.*, 101 (1984) 20010k.
- 712 Laurent, P., Gianazza, E. and Arnaud, P.: Purification of human hemopexin by affinity chromatography using immobilized Cibacron Blue F3GA and concanavalin A. *Protides Biol. Fluids*, 31 (1983, Publ. 1984) 225-228; *C.A.*, 101 (1984) 20124a.
- 713 Ledger, R. and Stellwagen, E.: Preparation and analysis of reactive blue 2 bonded to silica via variable spacer groups. *J. Chromatogr.*, 299 (1984) 175-183.
- 714 Lindgren, G., Lundström, B., Källman, I. and Hansson, K.-A.: Physical characteristics and properties of new chromatographic packing materials for the separation of peptides and proteins. *J. Chromatogr.*, 296 (1984) 83-95.
- 715 Liu, Y.Ch., Ledger, R. and Stellwagen, E.: Quantitative analysis of protein: Immobilized dye interaction. *J. Biol. Chem.*, 259 (1984) 3796-3799.

- 716 Mann, D.F. and Moreno, R.O.: Mechanism of protein hydrophobic chromatography. Protein unfolding and its contribution to effective hydrophobicity. *Prepar. Biochem.*, 14 (1984) 91-98.
- 717 Nice, E.C., Lloyd, C.J. and Burgess, A.W.: The role of short microbore high-performance liquid chromatography columns for protein separation and trace enrichment. *J. Chromatogr.*, 296 (1984) 153-170.
- 718 Peterson, E.A. and Torres, A.R.: Displacement chromatography of proteins. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 113-133; *C.A.*, 101 (1984) 126040k - a review with 33 refs.
- 719 Potter, R.L. and Lewis, R.W.: Comparison of two new anion exchangers using a cell homogenate. *Liq. Chromatogr. HPLC Mag.*, 1 (1983) 31-39; *C.A.*, 100 (1984) 205910b.
- 720 Strobel, G.J.: (Rapid protein purification by automated method development). *LaborPraxis*, 7 (1983) 1270-1272; *C.A.*, 101 (1984) 19981w.
- 721 Sun, S.F.: Effect of concentration on size-exclusion liquid chromatography of protein polypeptides. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 314-316; *C.A.*, 101 (1984) 19968x.
- 722 Unger, K.: High-performance size-exclusion chromatography. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 154-169; *C.A.*, 101 (1984) 35353y.
- 723 Unger, K.K., Kinkel, J.N., Anspach, B. and Giesche, H.: Evaluation of advanced silica packings for the separation of biopolymers by high-performance liquid chromatography. I. Design and properties of parent silicas. *J. Chromatogr.*, 296 (1984) 3-14.
- 724 Witting, L.A., Gisch, D.J., Ludwing, R. and Eksteen, R.: Bonded-phase selection in the high-performance liquid chromatography of proteins. *J. Chromatogr.*, 296 (1984) 97-105.

For additional information see:  
*C.A.*, 100 (1984) 188231m;  
101 (1984) 20119c.

See also 26.

19b. *Proteins of cells, viruses and subcellular particles (excluding blood cells and platelets)*

- 725 Calam, D.H. and Davidson, J.: Isolation of influenza viral proteins by size-exclusion and ion-exchange high-performance liquid chromatography: the influence of conditions on separation. *J. Chromatogr.*, 296 (1984) 285-292.
- 726 Clark-Lewis, I., Kent, S.B.H. and Schrader, J.W.: Purification to apparent homogeneity of a factor stimulating the growth of multiple lineages of hemopoietic cells. *J. Biol. Chem.*, 259 (1984) 7488-7494.
- 727 Kratzin, H.D., Kruse, T., Maywald, F., Thinnnes, F.P., Götz, H., Egert, G., Pauly, E., Friedrich, J., Yang, C.-Y., Wernet, P. and Hilschmann, N.: Primary structure of human class II histocompatibility antigens. Reversed-phase high-performance liquid chromatography for integral membrane proteins. *J. Chromatogr.*, 297 (1984) 1-11.
- 728 Lin, J.-T., Schwarcz, K. and Stroh, A.: Chromatofocussing and centrifugal reconstitution as tools for the separation and characterization of the Na<sup>+</sup>-co-transport systems of the brushborder membrane. *Biochim. Biophys. Acta*, 774 (1984) 254-260.
- 729 Moriyama, R., Nakashima, H., Makino, S. and Koga, S.: A study on the separation of reconstituted proteoliposomes and unincorporated membrane proteins by use of hydrophobic affinity gels, with special reference to band 3 from bovine erythrocyte membranes. *Anal. Biochem.*, 139 (1984) 292-297.
- 730 Nakae, T.: (Isolation and analysis of biomembrane proteins). *Kagaku, Zokan*, (1984) 265-273; *C.A.*, 101 (1984) 35259x - a review with 9 refs.
- 731 Tang, C. and Zheng, J.: (Isolation of erythrocyte membranes of different ages by molecular sieves). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 55 (1984) 56-59; *C.A.*, 100 (1984) 188202c.
- 732 Welinder, B.S., Linde, S., Hansen, B. and Sonne, O.: Reversed-phase high performance liquid chromatographic separation of the four monoiodoinsulins: effect of column supports, buffers and organic modifiers. *J. Chromatogr.*, 298 (1984) 41-57.

- 733 Welling, G.W., Nijmeijer, J.R.J., van der Zee, R., Groen, G., Wilterdink, J.B. and Welling-Wester, S.: Isolation of detergent-extracted Sendai virus proteins by gel-filtration, ion-exchange and reversed-phase high-performance liquid chromatography and the effect on immunological activity. *J. Chromatogr.*, 297 (1984) 101-109.

For additional information see:  
*C.A.*, 101 (1984) 68877a, 86641y.

See also 456.

#### 19c. Microbial and plant proteins

- 734 Burnouf, T. and Bietz, J.A.: Reversed-phase high-performance liquid chromatography of reduced glutenin, a disulfide-bonded protein of wheat endosperm. *J. Chromatogr.*, 299 (1984) 185-199.
- 735 Dawidowicz, A.L. and Kłobaczewski, J.: Influence of the thermal modification of controlled porosity glass on the affinity chromatography of fungal proteins. *Chromatographia*, 18 (1984) 389-392.
- 736 Lazarovici, P., Tayot, J.L. and Yavin, E.: Affinity chromatography purification and characterization of two iodinated tetanus toxin fractions exhibiting different binding properties. *Toxicon*, 22 (1984) 401-413; *C.A.*, 101 (1984) 124525y.
- 737 Manjula, B.N., Acharya, A.S., Mische, S.M., Fairwell, T. and Fischetti, V.A.: The complete amino acid sequence of a biologically active 197-residue fragment of M protein isolated from type 5 group A Streptococci. *J. Biol. Chem.*, 259 (1984) 3686-3693.
- 738 Maris, P. and Girre, L.: Purification of the two major antigens of bovine leukosis virus with a view towards the immunoenzymatic detection of antibodies to this virus. *Ann. Pharm. Fr.*, 42 (1984) 57-67; *C.A.*, 101 (1984) 108611t.
- 739 Mohri, M. and Matsushita, S.: Improvement of water absorption of soybean protein by treatment with bromelain. *J. Agric. Food Chem.*, 32 (1984) 486-490.
- 740 Simpson, L.L.: The binding fragment from tetanus toxin antagonizes the neuromuscular blocking actions of botulinum toxin. *J. Pharmacol. Exp. Ther.*, 229 (1984) 182-187.

For additional information see:  
*C.A.*, 101 (1984) 5601k, 86645c.

#### 19d. Proteins of blood, serum and blood cells

- 741 Buamah, P.K., Cornell, C. and Skillen, A.W.: Affinity chromatography used in distinguishing alpha-fetoprotein in serum from patients with tumors of hepatic parenchyma and of germ cells. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1257-1258.
- 742 Congote, L.F.: High-performance liquid chromatographic separation of serum erythropoietin and erythropoietin. *J. Chromatogr.*, 310 (1984) 396-400.
- 743 Dodd, I. and Imrie, R.C.: Elution of interferon  $\beta$  from Blue Sepharose by poly(vinylpyrrolidone). *Biochim. Biophys. Acta*, 787 (1984) 183-187.
- 744 Dresow, B. and Dalbrück, A.: The isolation and activity of growth-stimulating factors from human platelets. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 527-533.
- 745 Holmskov-Nielsen, U., Erb, K. and Jensenius, J.Ch.: Semi-automatic analysis of proteins and protein complexes by automated enzyme immunoassay after separation by high-performance gel-permeation chromatography. Size distribution of C3-IgG complexes. *J. Chromatogr.*, 297 (1984) 225-233.
- 746 Juarez-Salinas, H., Engelhorn, S.C., Bigbee, W.L., Lowry, M.A. and Stanker, L.H.: Ultrapurification of monoclonal antibodies by high-performance hydroxylapatite (HPHT) chromatography. *BioTechniques*, 2 (1984) 164-169; *C.A.*, 101 (1984) 70595a.
- 747 Kinkel, J.N., Anspach, B., Unger, K.K., Wieser, R. and Brunner, G.: Separation of plasma membrane proteins of cultured human fibroblasts by affinity chromatography on bonded microparticulate silicas. *J. Chromatogr.*, 297 (1984) 167-177.
- 748 Lundahl, P., Greijer, E., Lindblom, H. and Fägerstam, B.G.: Fractionation of human red cell membrane proteins by ion-exchange chromatography in detergent on Mono Q, with special reference to the glucose transporter. *J. Chromatogr.*, 297 (1984) 129-137.

- 749 Masuda, H., Kuromatsu, Y. and Takai, N.: (Evaluation of carbon adsorbent for artificial organs by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) 393-395.
- 750 Molnar, I.: Novel purification procedure of  $\alpha$ -fetoprotein. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 275-283; *C.A.*, 101 (1984) 68862s.
- 751 Paroutaud, P., Dutka, S., Haimovich, J. and Strosberg, A.D.: (Analysis of the structure of immunoglobulins by high-performance liquid chromatography). *Instl. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 161-167; *C.A.*, 101 (1984) 70592x.
- 752 Rathnam, P. and Saxena, B.B.: A "sandwich" solid-phase enzyme immunoassay for lutropin in urine. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 665-671.
- 753 Rinderknecht, E., O'Connor, B.H. and Rodriguez, H.: Natural human interferon- $\gamma$ . Complete amino acid sequence and determination of sites of glycosylation. *J. Biol. Chem.*, 259 (1984) 6790-6797.
- 754 Roy, S.K., Wever, D.V. and McGregor, W.C.: High-performance immunosorbent purification of recombinant leucocyte A interferon. *J. Chromatogr.*, 303 (1984) 225-228.
- 755 Sakamoto, W., Yoshikawa, K., Uehara, S., Nishikaze, O. and Handa, H.: Purification and characterization of rat low molecular weight kininogen. *J. Biochem. (Tokyo)*, 96 (1984) 81-88.
- 756 Sampson, I.A., Hodgen, A.N. and Arthur, I.H.: The separation of immunoglobulin M from human serum by fast protein liquid chromatography. *J. Immunol. Methods*, 69 (1984) 9-15; *C.A.*, 100 (1984) 189951h.
- 757 Schlabach, T.D.: Postcolumn detection of serum proteins with the biuret and Lowry reactions. *Anal. Biochem.*, 139 (1984) 309-315.
- 758 Simmonds, R.G., Smith, W. and Corvalan, J.R.F.: Affinity purification of CEA using an immobilized monoclonal anti-CEA antibody. *Protides Biol. Fluids*, 31 (1983, Pub. 1984) 917-920; *C.A.*, 101 (1984) 5158w.
- 759 Sinosich, M.J., Davey, M.W. and Grudzinskas, J.G.: Interactions of pregnancy associated plasma protein-A and  $\alpha_2$  macroglobulin on metal chelate affinity chromatography. *Protides Biol. Fluids*, 31 (1983, Pub. 1984) 19-22; *C.A.*, 101 (1984) 19260k.
- 760 Smith, G.J., McFarland, R.D., Reisner, H.M. and Hudson, G.S.: Lymphoblastoid cell-produced immunoglobulins: preparative purification from culture medium by hydroxylapatite chromatography. *Anal. Biochem.*, 141 (1984) 432-436.
- 761 Son, Y.-S.C. and Zilversmith, D.B.: Purification and characterization of human plasma proteins that inhibit lipid transfer activity. *Biochim. Biophys. Acta*, 795 (1984) 473-480.
- 762 Sottrup-Jensen, L., Stepanik, T.M., Jones, C.M., Lønblad, P.B., Kristensen, T. and Wierzbicki, D.M.: Primary structure of human  $\alpha_2$ -macroglobulin. I. Isolation of the 26 CNBr fragments, amino acid sequence of methionine-containing peptides, and alignment of all CNBr fragments. *J. Biol. Chem.*, 259 (1984) 8293-8303.
- 763 Strosberg, A.D.: Purification of plasma membrane proteins by affinity chromatography. *Recept. Biochem. Methodol.*, 2 (Recept. Purif. Proced.) (1984) 1-13; *C.A.*, 100 (1984) 188207h.
- 764 Suomela, H., Himberg, J.-J. and Kuronen, T.: High-performance liquid chromatography in the quality control of immunoglobulin preparations during production and storage. *J. Chromatogr.*, 297 (1984) 369-373.
- 765 Suzuki, T., Kanbara, N., Tomono, T., Hayashi, N. and Shinohara, I.: Physico-chemical and biological properties of poly(ethyleneglycol)-coupled immunoglobulin G. *Biochim. Biophys. Acta*, 788 (1984) 248-255.
- 766 Wolfe, R.A., Casey, J., Familletti, P.C. and Stein, S.: Isolation of proteins from crude mixtures with silica and silica-based adsorbents. *J. Chromatogr.*, 296 (1984) 277-284.
- 767 Wong, L.T. and Hsia, J.C.: High-performance liquid chromatography of proteins: purification of  $\alpha$ -fetoprotein from fetal calf serum. *J. Chromatogr.*, 310 (1984) 19-29.

For additional information see:

*C.A.*, 100 (1984) 188248f, 188440d, 206168c, 207595b, 207597d, 207764r; 101 (1984) 5176a, 5478a, 19961q, 35322n, 43435s, 86589n, 128517v.

See also 809, 1263.

*19e. Structural and muscle proteins*

- 768 768 Dalla Libera, L., Bettò, R. and Carraro, U.: Separation of myosin light chains by reversed-phase high-performance liquid chromatography on wide pore supports. *J. Chromatogr.*, 299 (1984) 293-300.
- 769 Deyl, Z. and Macek, K.: High-performance liquid chromatography of fibrous proteins. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 13-21; *C.A.*, 101 (1984) 51062h.
- 770 Grandier-Vazeille, X. and Tetaert, D.: Methodology for purification of large hydrophobic peptides by high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 301-308.
- 771 Holderbaum, D. and Ehrhart, L.A.: A single-step gel-filtration method for the isolation of procollagens from cell culture conditioned medium. *Anal. Biochem.*, 140 (1984) 380-385.
- 772 Hunter, G.K., Rogakou, C.C. and Pritzker, K.P.H.: Extracellular matrix synthesis by articular chondrocytes and synovial fibroblasts in long-term monolayer culture. *Biochim. Biophys. Acta*, 804 (1984) 459-465.
- 773 Muramoto, K., Ramachandran, J., Hall, J., Hui, A. and Stern, R.: A rapid sensitive assay for the quantitation of elastin. *Connect. Tissue Res.*, 12 (1984) 307-317; *C.A.*, 101 (1984) 68677k.

For additional information see:  
*C.A.*, 101 (1984) 50240c.

See also 803, 806.

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

- 774 Gurley, L.R., D'Anna, J.A., Blumenfeld, M., Valdez, J.G., Sebring, R.J., Donahue, P.R., Prentice, D.A. and Spall, W.D.: Preparation of histone variants and high-mobility group proteins by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 147-165.
- 775 Ohba, Y., Higurashi, M. and Hayashi, Y.: Phosphorylation of H1 subtypes in regenerating rat liver. *J. Biol. Chem.*, 259 (1984) 2942-2948.

For additional information see:  
*C.A.*, 101 (1984) 3251x, 125848t.

*19g. Chromoproteins and metalloproteins*

- 776 Bansal, S.K., Love, J.H. and Gurtoo, H.L.: Resolution of multiple forms of cytochrome P-450 by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 119-127.
- 777 Baudin, V. and Wajeman, H.: Rapid high-performance liquid chromatographic method for the separation of the three types of Y-chain of human fetal haemoglobin. *J. Chromatogr.*, 299 (1984) 495-497.
- 778 Beuzard, Y., Delanoe-Garin, J. and Rouyer-Fessard, P.: (Separation of human globin chains by reversed-phase chromatography). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 131-138; *C.A.*, 101 (1984) 51030w.
- 779 Chilvers, D.C., Dawson, J.B., Bahreyni-Toosi, M.H. and Hodgkinson, A.: Identification and determination of copper- and zinc-protein complexes in blood plasma after chromatographic separation on DEAE-Sepharose CL-6B. *Analyst (London)*, 109 (1984) 871.
- 780 Hsia, J.C., Hayes, T.M. and Er, S.S.: Separation of glyoxylated hemoglobin with varying oxygen affinity by polyanion fast protein liquid chromatography. *J. Chromatogr.*, 303 (1984) 425-428.
- 781 Ip, C.Y. and Asakura, T.: Separation of asymmetrical hybrid hemoglobins by anaerobic cation-exchange high-performance liquid chromatography. *Anal. Biochem.*, 139 (1984) 427-431.
- 782 Jeppsson, J.-O., Källman, I., Lindgren, G. and Fagerstam, L.G.: Hb-Linköping (β36 Pro → Thr): a new hemoglobin mutant characterized by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 31-36.

- 783 Kramlova, M., Pristoupil, T.I., Fricova, V. and Kraml, J.: Fast protein liquid chromatofocusing of lyophilized native haemoglobin and its chemically modified derivatives. *J. Chromatogr.*, 303 (1984) 422-424.
- 784 Kutlar, A., Kutlar, F., Wilson, J.B., Headlee, M.G. and Huisman, T.H.J.: Quantitation of hemoglobin components by high-performance cation-exchange liquid chromatography: its use in diagnosis and in the assessment of cellular distribution of hemoglobin variants. *Am. J. Hematol.*, 17 (1984) 39-53; *C.A.*, 101 (1984) 106740k.
- 785 Menez, J.F., Berhou, F., Meskar, A., Picart, D., Le Bras, R. and Bardou, L.G.: Glycosylated haemoglobin: high-performance liquid chromatographic determination of 5-(hydroxymethyl)-2-furfuraldehyde after haemoglobin hydrolysis. *J. Chromatogr.*, 297 (1984) 339-350.
- 786 Morgan, E.T. and Coon, M.J.: Effects of cytochrome b<sub>5</sub> on cytochrome P-450-catalyzed reactions. Studies with manganese-substituted cytochrome b<sub>5</sub>. *Drug Metab. Disp.*, 12 (1984) 358-364.
- 787 Robinet, D., Sarmini, H., Lesure, J. and Funes, A.: Separation of haemoglobins using a monodisperse cation exchanger. *J. Chromatogr.*, 297 (1984) 333-337.
- 788 Scott, M.G., Hoffmann, J.W., Meltzer, V.N., Siegfried, B.A. and Chan, K.-M.: Effects of azotemia on results of the boronate-agarose affinity and ion-exchange methods for glycated hemoglobin. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 896-898.
- 789 Shelton, J.B., Shelton, J.R. and Schroeder, W.A.: High performance liquid chromatographic separation of globin chains on a large-pore C<sub>4</sub> column. *J. Liq. Chromatogr.*, 7 (1984) 1969-1977.
- 790 Stenman, U.-H., Pesonen, K., Ylinen, K., Huhtala, M.-L. and Teramo, K.: Rapid chromatographic quantitation of glycosylated haemoglobins. *J. Chromatogr.*, 297 (1984) 327-332.
- 791 Suzuki, K.T., Sunaga, H. and Yajima, T.: Separation of metallothionein into isoforms by column switching on gel permeation and ion-exchange columns with high-performance liquid chromatography-atomic absorption spectrometry. *J. Chromatogr.*, 303 (1984) 131-136.
- 792 Ziomek, E., Williams, R.E. and Martin, W.G.: Application of hydrophobic chromatography to the large scale purification of *Desulfovibrio desulfuricans* cytochrome c<sub>3</sub>. *Prepar. Biochem.*, 14 (1984) 75-85.

For additional information see:

*C.A.*, 100 (1984) 188205f, 188426d;  
101 (1984) 3330x, 19969y, 19974w, 86551u, 86628z, 106727m.

*19h. Proteins of glands, gland products and various zymogens (including milk proteins)*

- 793 Aggarwal, B.B., Moffat, B. and Harkins, R.N.: Human lymphotoxin. Production by a lymphoblastoid cell line, purification, and initial characterization. *J. Biol. Chem.*, 259 (1984) 686-691.
- 794 Lindahl, L. and Vogel, H.J.: Metal-ion-dependent hydrophobic-interaction chromatography of  $\alpha$ -lactalbumins. *Anal. Biochem.*, 140 (1984) 394-402.
- 795 Monti, J.C., Fumeaux, D., Bardis-Larouse, V. and Jolles, P.: Relative distribution of human milk whey proteins in normal and abnormal samples: an approach by high performance liquid chromatography. *Milchwissenschaft*, 39 (1984) 219-221; *C.A.*, 101 (1984) 53566z.
- 796 Schwartz, M.W., Pool, W.R. and Bieber, A.L.: Mojave rattlesnake (*Crotalus scutulatus scutulatus*) venom: Enzyme activities and purification of arginine ester hydrolases. *Toxicicon*, 22 (1984) 327-338; *C.A.*, 101 (1984) 125726b.
- 797 Shewale, J.G., Sinha, S.K. and Brew, K.: Evolution of  $\alpha$ -lactalbumin. The complete amino acid sequence of the  $\alpha$ -lactalbumin from a marsupial (*Macropus rufogriseus*) and corrections to regions of sequence in bovine and goat  $\alpha$ -lactalbumin. *J. Biol. Chem.*, 259 (1984) 4947-4956.

For additional information see:

*C.A.*, 100 (1984) 188374k;  
101 (1984) 20241m, 35346y.

*19i. Proteins of neoplastic tissue*

- 798 Lambotte, P., van Snick, J. and Boon, T.: Partial purification of a membrane glycoprotein antigen by high-pressure size-exclusion chromatography without loss of antigenicity. *J. Chromatogr.*, 297 (1984) 139-145.

See also 456.

*19j. Specific binding proteins*

- 799 Caron, M.G., Regan, J.W., Dickenson, K.E.J., Leeb-Lundberg, L.M.F., Benovic, J.L., Wikberg, J.E.S., Heald, S.L., DeMarinis, R.M., DeBernardis, J.P. and Lefkowitz, R.J.: Molecular characterization of adrenergic receptors by affinity chromatography and photoaffinity labeling. *Neurol. Neurobiol.*, 8A (Catecholamines, Pt. A) (1984) 283-291; *C.A.*, 101 (1984) 123069r.
- 800 Chase, J.W., L'Italien, J.J., Murphy, J.B., Spicer, E.K. and Williams, K.R.: Characterization of the *Escherichia coli* SSB-113 mutant single-stranded DNA-binding protein. Cloning of the gene, DNA and protein sequence analysis, high pressure liquid chromatography peptide mapping, and DNA-binding studies. *J. Biol. Chem.*, 259 (1984) 805-814.
- 801 Heubner, A., Manz, B., Grill, H.-J. and Pollow, K.: High-performance and ion-exchange chromatography and chromatofocusing of the human uterine progesterone receptor: its application to the identification of 21-[<sup>3</sup>H]dehydro Org 2058-labelled receptor. *J. Chromatogr.*, 297 (1984) 301-311.
- 802 Hutchens, T.W., Gibbons, W.E. and Besch, P.K.: High-performance chromatofocusing and size-exclusion chromatography: separation of human uterine estrogen-binding proteins. *J. Chromatogr.*, 297 (1984) 283-299.
- 803 Kercret, H., Delavray, T. and Duval, J.: Interactions calmoduline-lipides: étude de l'encapsulation de la protéine en chromatographie liquide. *Can. J. Biochem.*, 62 (1984) 648-652.
- 804 Lehrman, M.A. and Hill, R.L.: Purification of rat liver fucose binding protein. *Methods Enzymol.*, 98 (Biomembranes, Pt. I) (1983) 309-320; *C.A.*, 100 (1984) 188208j.
- 805 Morgenthaler, J.J., Baillod, P. and Friedli, H.: Isolation of fibronectin under mild conditions. *Vox Sang.*, 47 (1984) 41-46; *C.A.*, 101 (1984) 86616u.
- 806 Tanaka, T., Umekawa, H., Ohmura, T. and Hidaka, H.: Calcium-dependent hydrophobic chromatography of calmodulin, S-100 protein and troponin-C. *Biochim. Biophys. Acta*, 787 (1984) 158-164.
- 807 White, M.F., Haring, H.-U., Kasuga, M. and Kahn, C.R.: Kinetic properties and sites of autophosphorylation of the partially purified insulin receptor from hepatoma cells. *J. Biol. Chem.*, 259 (1984) 255-264.
- 808 Wiegle, R.D. and Wittliff, J.L.: Isoforms of estrogen receptors by high-performance ion-exchange chromatography. *J. Chromatogr.*, 297 (1984) 313-326.
- 809 Yamaguchi, Y., Isemura, M., Kosakai, M., Sato, A., Suzuki, M., Ken, M. and Yosizawa, Z.: Characterization of fibronectin from fetal human plasma in comparison with adult plasma fibronectin. *Biochim. Biophys. Acta*, 790 (1984) 53-60.
- 810 Zhu, B.Ch.-R., Fisher, S.F., Pande, H., Galaycay, J., Shively, J.E. and Laine, R.A.: Human placental (fetal) fibronectin: Increased glycosylation and higher protease resistance than plasma fibronectin. Presence of polygalactosamine glycopeptides and properties of a 44-kilodalton chymotryptic collagen-binding domain: difference from human plasma fibronectin. *J. Biol. Chem.*, 259 (1984) 3962-3970.

For additional information see:  
*C.A.*, 100 (1984) 188195c, 188217n, 188427e;  
 101 (1984) 17510t.

See also 1221.

*19k. Urinary proteins*

- 811 Brunner, H. and Mann, H.: Combination of conventional and high-performance liquid chromatographic techniques for the isolation of so-called "uraemic toxins". *J. Chromatogr.*, 297 (1984) 405-416.

- 812 Hochstrasser, K., Reisinger, P., Albrecht, G.J., Wachter, E. and Schönberger, O.L.: Isolation of acid-resistant urinary trypsin inhibitors by high-performance liquid chromatography and their characterization by N-terminal amino acid sequence determination. *Hoppe Seyler's Z. Physiol. Chem.*, 365 (1984) 1123-1130.  
 813 Marshall, R.J., Turner, R., Yu, H. and Cooper, E.H.: Cluster analysis of chromatographic profiles of urine proteins. *J. Chromatogr.*, 297 (1984) 235-244.

See also 819.

#### 19l. Other proteins

- 814 Banateanu, D., Schell, H.D., Bentia, T. and Scripta-Cristof, R.M.: (Affinity chromatographic isolation of a natural protease inhibitor of *Helix pomatia* using  $\alpha$ -chymotrypsin immobilized on crosslinked poly(vinyl alcohol) as affinity support). *Stud. Cercet. Biochim.*, 26 (1983) 92-100; *C.A.*, 100 (1984) 205523c.  
 815 Delucas, L.J. and Muccio, D.D.: Purification of bovine rhodopsin by high-performance size-exclusion chromatography. *J. Chromatogr.*, 296 (1984) 121-128.  
 816 Gunzer, G. and Hennrich, N.: Purification of  $\alpha_1$ -proteinase inhibitor by triazine dye affinity chromatography, ion-exchange chromatography and gel filtration on Fractogel TSK. *J. Chromatogr.*, 296 (1984) 221-229.  
 817 Husseini, H.S. and Balzer, H.O.: Use of TSK-SW columns for the high-performance liquid chromatographic analysis of proteins, isolated from sympathetic nerves and fractionated by Fractogel TSK-HW chromatography. Purification of L-DOPA decarboxylase. *J. Chromatogr.*, 297 (1984) 375-383.  
 818 John, M. and Schmidt, J.: High-resolution hydroxyapatite chromatography of proteins. *Anal. Biochem.*, 141 (1984) 466-471.  
 819 Kimball, E.S., Bohn, W.H., Cockley, K.D., Warren, T.C. and Sherwin, S.A.: Distinct high-performance liquid chromatography pattern of transforming growth factor activity in urine of cancer patients as compared with that of normal individuals. *Cancer Res.*, 44 (1984) 3613-3619.  
 820 Lesjak, M.S. and Ghosh, P.: Polypeptide proteinase inhibitor from human articular cartilage. *Biochim. Biophys. Acta*, 789 (1984) 266-277.  
 821 Ling, N., Baird, A., Wehrenberg, B., Veno, N., Munegumi, T. and Brazeau, P.: Synthesis and *in vitro* bioactivity of C-terminal deleted analogs of human growth-hormone releasing factor. *Biochem. Biophys. Res. Commun.*, 123 (1984) 854-861.  
 822 Papazian, D.M., Rahamimoff, H. and Goldin, S.M.: Partial purification and functional identification of a calmodulin-activated, adenosine 5'-triphosphate-dependent calcium pump from synaptic plasma membranes. *J. Neurosci.*, 4 (1984) 1933-1943; *C.A.*, 101 (1984) 125104x.  
 823 Smith, J.A. and O'Hare, M.J.: Reversed-phase high-performance liquid chromatography of mouse epidermal growth factor and its congeners: mobile phase optimization with ion-pairing additives. *J. Chromatogr.*, 299 (1984) 13-28.  
 824 Tokutake, S.: Complete separation of the triplet components of neurofilament by DE-52 column chromatography depends upon urea concentration. *Anal. Biochem.*, 140 (1984) 203-207.  
 825 Viljoen, G.J., Mills, M.J., Neitz, A.W.H., Potgieter, D.J.J. and Vermeulen, N.M.J.: Determination of anti-protease homogeneity. *J. Chromatogr.*, 297 (1984) 359-367.

For additional information see:

*C.A.*, 101 (1984) 19602y, 68350g, 97624w, 116628u, 125777u.

#### 20. ENZYMES

- 826 Schoepp, W., Stolarski, K. and Schaefer, A.: (Enzyme separation by chromatography on 10-carboxydecyl-Sepharose). *Ger. (East) Pat. DD 207,928 (Cl. C12K9/00)*, 21 Mar. 1984, Appl. 239,630, 06 May 1982, 8 pp.; *C.A.*, 101 (1984) 86354g.  
 827 Sloan, D.L.: Kinetic analysis of enzymic reactions using high-performance liquid chromatography. *Adv. Chromatogr.*, 23 (1984) 97-125; *C.A.*, 100 (1984) 205367e - a review with 71 refs.

*20a. Oxidoreductases*

- 828 Chavez, C. and Flurkey, W.H.: Biospecific adsorption of peroxidase. *J. Chromatogr.*, 298 (1984) 169-171.
- 829 Cohen, B.-S., Grossman, S., Pinsky, A. and Klein, B.P.: Chlorophyll inhibition of lipoxygenase in growing pea plants. *J. Agric. Food Chem.*, 32 (1984) 516-519.
- 830 Farmer, E.E. and Easterby, J.S.: The purification of yeast glucose 6-phosphate dehydrogenase by dye-lingad chromatography. *Anal. Biochem.*, 141 (1984) 79-82.
- 831 Matsui, H., Kato, N., Yamamoto, C., Fujita, K., Sakai, H. and Nagatsu, T.: A sensitive fluorometric assay for dopamine- $\beta$ -hydroxylase activity by high-performance liquid chromatography. *Biochem. Med.*, 31 (1984) 140-146; *C.A.*, 100 (1984) 205428a.
- 832 Persson, B., Enander, K., Tang, H.-L. and Rydström, J.: Energy-linked nicotinamide nucleotide transhydrogenase. Properties of proton-translocating mitochondrial transhydrogenase from beef heart purified by fast protein liquid chromatography. *J. Biol. Chem.*, 259 (1984) 8626-8632.
- 833 Pridgar, E.M., Moses, G.C. and Henderson, A.R.: Purification of lactate dehydrogenase isoenzymes one, two, and three from human erythrocytes. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1353-1357.
- 834 Reinhard, J.F., Jr., Chao, J.Y., Smith, G.K., Duch, D.S. and Nichol, C.A.: A sensitive high-performance liquid chromatographic-fluorometric assay for dihydrofolate reductase in adult rat brain, using 7,8-dihydrobiopterin as substrate. *Anal. Biochem.*, 140 (1984) 548-552.
- 835 Woodland, M.P. and Dalton, H.: Purification of component A of the soluble methane monooxygenase of *Methylcoccus capsulatus* (Bath) by high-pressure gel permeation chromatography. *Anal. Biochem.*, 139 (1984) 459-462.

For additional information see:  
*C.A.*, 101 (1984) 50567q, 106522r.

See also 231, 888.

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

- 836 Bauvois, B., Montreuil, J. and Verbert, A.: Characterization of a sialyl  $\alpha$ 2-3 transferase and a sialyl  $\alpha$ 2-6 transferase from human platelets occurring in the sialylation of the N-glycosylproteins. *Biochim. Biophys. Acta*, 788 (1984) 234-240.
- 837 Ginger, C.D., Wrigglesworth, R., Inglis, W.D., Kulick, R.J., Suckling, C.J. and Wood, H.C.S.: Specific enzyme inhibitors in vitamin biosynthesis. Part 5. Purification of riboflavin synthase by affinity chromatography using 7-oxolumazines. *J. Chem. Soc. Perkin Trans. I*, (1984) 953-958; *C.A.*, 101 (1984) 106179j.
- 838 Leung, F.Y., Niblock, A.E. and Henderson, A.R.: Radioimmunoassay of aspartate aminotransferase isoenzymes in human serum. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1361-1365.
- 839 Rabkin, S.W. and Desjardins, P.: Mitochondrial and cytoplasmic isoenzymes of aspartate aminotransferase in sera of patients after myocardial infarction. *Clin. Chim. Acta*, 138 (1984) 245-257.
- 840 Ram, B.P. and Munjal, D.D.: Isolation and characterization of cancer-associated galactosyltransferase isoenzyme. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1656-1663.
- 841 Selvaraj, P., Rolston, D.D.K. and Balasubramanian, K.A.: Separation of hydrophobic and hydrophilic forms of gamma-glutamyltransferase from human serum by hydrophobic chromatography on phenyl-Sepharose CL-4B: studies on normal sera and sera of patients with liver disease. *Clin. Chim. Acta*, 138 (1984) 141-149.
- 842 To, E.C.A. and Wells, P.G.: Rapid and sensitive assays using high-performance liquid chromatography to measure the activities of phase II drug metabolising enzymes: glucuronyl transferase and sulfotransferase. *J. Chromatogr.*, 301 (1984) 282-287.

For additional information see:  
*C.A.*, 101 (1984) 50726r.

See also 231, 888.

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

- 843 Crabb, J.W. and Heilmeyer, L.M.G., Jr.: High performance liquid chromatography purification and structural characterization of the subunits of rabbit muscle phosphorylase kinase. *J. Biol. Chem.*, 259 (1984) 6346-6350.
- 844 Hayashi, M., Mikami, H. and Ishida, Y.: (Application of an immobilized enzyme column reactor to measurement of creatine kinase isoenzyme activity by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) 381-385.

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

- 845 Blaner, W.S., Prystowsky, J.H., Smith, J.E. and Goodman, D.S.: Rat liver retinyl palmitate hydrolase activity. Relationship to cholestryloleate and triolein hydrolase activities. *Biochim. Biophys. Acta*, 794 (1984) 419-427.
- 846 De Prisco, R., Sorrentino, S., Leone, E. and Libonati, M.: A ribonuclease from human seminal plasma active on double-stranded RNA. *Biochim. Biophys. Acta*, 788 (1984) 356-363.
- 847 Duncan, P.H., van Etten, R.L., MacNeil, M.L. and Shaw, L.M.: Development of stable reference material for prostatic acid phosphatase. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1327-1331.
- 848 Inoue, H., Seyama, Y., Yamashita, S. and Tokudome, S.: Isolation and purification of human pulmonary arylsulfatase B by means of chromatofocusing. *Chem. Pharm. Bull.*, 32 (1984) 628-630.
- 849 Kincaid, R.L., Manganiello, V.C., Odya, Ch.E., Osborne, J.C., Jr., Stith-Coleman, I.E., Danello, M.A. and Vaughan, N.: Purification and properties of calmodulin-stimulated phosphodiesterase from mammalian brain. *J. Biol. Chem.*, 259 (1984) 5158-5166.
- 850 Matsuda, Y., Fujimoto, Y., Akihama, S. and Moriya, H.: Studies on acidic arginine esterase excreted in urine. I. Purification and characterization of dog urinary arginine esterase. *Chem. Pharm. Bull.*, 32 (1984) 2371-2379.
- 851 Oida, S., Sone, M. and Sasaki, S.: Purification of swine kidney alkaline phosphatase by immunoaffinity chromatography. *Anal. Biochem.*, 140 (1984) 117-120 - Sepharose 4B.
- 852 Pen, J., Rongen, H.A.H. and Beintema, J.J.: Purification and properties of esterase-4 from *Drosophila mojavensis*. *Biochim. Biophys. Acta*, 789 (1984) 203-209.
- 853 Rao, G.J.S. and Christe, M.E.: Inhibition of rabbit liver arylsulfatase B by phosphate esters. *Biochim. Biophys. Acta*, 788 (1984) 58-61.
- 854 Witt, W., Schweingruber, M.E. and Mersching, A.: Phospholipase B from the plasma membrane of *Saccharomyces cerevisiae*. Separation of two forms with different carbohydrate content. *Biochim. Biophys. Acta*, 795 (1984) 108-116.

For additional information see:  
*C.A.*, 101 (1984) 106200j.

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

- 855 Bedi, G.S., Shah, R.H. and Bahl, O.P.: Studies on *Turbatrix aceti*  $\beta$ -N-acetylglucosaminidase. I. Purification and physicochemical characterization. *Arch. Biochem. Biophys.*, 233 (1984) 237-250.
- 856 Bhella, R.S. and Altosaar, I.: Large-scale purification of fungal glucoamylases using anion-exchange resin chromatography. *Anal. Biochem.*, 140 (1984) 200-202.
- 857 Galand, G.: Purification and characterization of kidney and intestinal brush-border membrane trichalases from the rabbit. *Biochim. Biophys. Acta*, 789 (1984) 10-19.
- 858 Grabowski, G.A. and Dagan, A.: Human lysosomal  $\beta$ -glucuronidase: purification by affinity chromatography. *Anal. Biochem.*, 141 (1984) 267-279.
- 859 Inoue, S., Nagamatsu, Y. and Hatanaka, C.: Preparation of cross-linked pectate and its application to the purification of endopolysaccharide of *Kluyveromyces fragilis*. *Agric. Biol. Chem.*, 48 (1984) 633-640; *C.A.*, 101 (1984) 2792n.
- 860 Madiyalakan, R., DiCioccio, R.A. and Matta, K.L.: A simple and rapid method for purification of the  $\beta$ -D-galactosidase from bovine testes. *Carbohydr. Res.*, 129 (1984) 298-302; *C.A.*, 101 (1984) 106282n.
- 861 Omichi, K. and Tkenaka, T.: Differential assay of human pancreatic and salivary alpha-amylases in serum using a new fluorogenic substrate. *Clin. Chim. Acta*, 138 (1984) 197-203.

- 862 Van Tilbeurgh, H., Bhikhambhai, R., Pettersson, L.G. and Claeysseus, M.: Separation of endo- and exo-type celluloses using using a new affinity chromatography method. *FEBS Lett.*, 169 (1984) 215-218; *C.A.*, 101 (1984) 19550e.
- 863 White, A.R., Darvill, A.G., York, W.S. and Albersheim, P.: High-performance gel permeation chromatography assay for endoglycanase activities. *J. Chromatogr.*, 298 (1984) 525-530.

For additional information see:  
*C.A.*, 101 (1984) 2782j, 34990s, 125578e.

#### 20f. Other hydrolases

- 864 Harper, L., Scott, G.K. and Seow, H.F.: Antibody affinity chromatography of human proteinases and related proteins. *Comp. Biochem. Physiol., B: Comp. Biochem.*, 78B (1984) 231-235; *C.A.*, 101 (1984) 106189n.
- 865 Hart, D.A., Kramer, R. and Cleplak, W.: Identification of subpopulations of human urinary plasminogen activators. *Thromb. Haemostasis*, 51 (1984) 212-216; *C.A.*, 101 (1984) 52478k.
- 866 Heinemann, F.S. and Ozols, J.: The covalent structure of hepatic microsomal epoxide hydrolase. I. Isolation and characterization of the cyanogen bromide fragments. *J. Biol. Chem.*, 259 (1984) 791-796.
- 867 Heinemann, F.S. and Ozols, J.: The covalent structure of hepatic microsomal epoxide hydrolase. II. The complete amino acid sequence. *J. Biol. Chem.*, 259 (1984) 797-804.
- 868 Inouye, Y., Kawaguchi, Y. and Nakamura, S.: Affinity chromatography of alkinonase A on N-carbobenzoxy-glycyl-leucyl-aminoethyl-Sepharose. *Chem. Pharm. Bull.*, 32 (1984) 2333-2339.
- 869 Katayama, K. and Kuwada, M.: Partial purification and characterization of a rat kidney neutral endopeptidase that hydrolyzes succinyl trialanine-4-nitroanilide. *Biochim. Biophys. Acta*, 787 (1984) 138-145.
- 870 Kizuki, K., Takiguchi, H., Kamada, M., Ikekita, M. and Moriya, H.: Porcine pancreatic prokallikrein. III. Some different forms of kallikrein generated from prokallikrein. *Chem. Pharm. Bull.*, 32 (1984) 3662-3669.
- 871 Lüdi, H. and Hasselbach, W.: State of aggregation of detergent-solubilized sarcoplasmic reticulum adenosine triphosphatase investigated by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 111-117.
- 872 McDermott, J.R. and Kidd, A.M.: Ion-exchange, gel-filtration and reversed-phase high-performance liquid chromatography in the isolation of neurotensin-degrading enzymes from rat brain. *J. Chromatogr.*, 296 (1984) 231-239.
- 873 Morichi, S., Sako, E., Hasegawa, E., Suyama, T. and Moriya, H.: Large-scale purification and characterization of human urinary kallikrein. *Chem. Pharm. Bull.*, 32 (1984) 1152-1162.
- 874 Mortensen, S.B. and Kilian, M.: A rapid method for the detection and quantitation of IgA protease activity by macrobore gel-permeation chromatography. *J. Chromatogr.*, 296 (1984) 257-262.
- 875 Pohl, J., Zaoral, M., Jindra, A., Jr. and Kostka, V.: Purification of pepsins and cathepsin D by affinity chromatography on Sepharose 4B with an immobilized synthetic inhibitor. *Anal. Biochem.*, 139 (1984) 265-271.
- 876 Ryan, T.J., Keegan, M.C., McMartin, D.N. and Dickerman, H.W.: Esterase A is a proteinase from rat urine that can activate plasminogen. *Biochim. Biophys. Acta*, 800 (1984) 87-95.
- 877 Safarik, I.: Rapid isolation of microbial proteases. *J. Chromatogr.*, 298 (1984) 531-533.
- 878 Safarik, I., Laudova, Z. and Kralova, B.: Purification of chymotrypsin and trypsin by column chromatography on agar gel particles. *J. Chromatogr.*, 303 (1984) 283-284.
- 879 Skidgel, R.A., Davis, R.M. and Erdös, E.G.: Purification of a human urinary carboxypeptidase (kininase) distinct from carboxypeptidases A, B or N. *Anal. Biochem.*, 140 (1984) 520-531.
- 880 Soeda, S., Ohyama, M. and Nagamatsu, A.: A succinyl-trialanine p-nitroanilide hydrolase in hog kidney cytosol: its identification as proline endopeptidase. *Chem. Pharm. Bull.*, 32 (1984) 1510-1516.
- 881 Stepanov, V.M. and Rudenskaya, G.N.: Proteinase affinity chromatography on bacitracin-Sepharose. *J. Appl. Biochem.*, 5 (1983) 420-428; *C.A.*, 101 (1984) 50611z.

- 882 Takaoka, M., Akiyama, H., Okamura, H. and Morimoto, S.: Excretion patterns of urinary enzymes having amidolytic and esterolytic activities in the urine of male and female rats. *Chem. Pharm. Bull.*, 32 (1984) 1120-1125.
- 883 Williams, M.V. and Pollack, J.D.: Purification and characterization of a dUTPase from *Acholeplasma laidlawii* B-PG9. *J. Bacteriol.*, 159 (1984) 278-282; *C.A.*, 101 (1984) 86202f.

For additional information see:  
*C.A.*, 100 (1984) 187860d;  
101 (1984) 50560g, 125670d.

#### 20g. Lyases

- 884 Huynh, Q.K., Vaaler, C.L., Recsei, P.A. and Snell, E.E.: Histidine decarboxylase of *Lactobacillus* 30a. Sequences of the cyanogen bromide peptides from the  $\alpha$  chain. *J. Biol. Chem.*, 259 (1984) 2826-2832.
- 885 Sygusch, J., Lehoux, L. and Beaudry, D.: Extreme X-ray sensitive modification of type I aldolases by Blue Dye ligand chromatography. *Biochem. Biophys. Res. Commun.*, 123 (1984) 1069-1075.

For additional information see:  
*C.A.*, 101 (1984) 19589z, 35022q.

#### 20h. Isomerases

- 886 Kurzok, H.-G. and Feierabend, J.: Comparison of a cytosolic and a chloroplast triosephosphate isomerase isoenzyme from rye leaves. I. Purification and catalytic properties. *Biochim. Biophys. Acta*, 788 (1984) 214-221.

For additional information see:  
*C.A.*, 101 (1984) 86165w.

#### 20j. Complex mixtures and incompletely identified enzymes

- 887 Amourache, L. and Vijayalakshmi, M.A.: Affinity chromatography of kid chymosin on histidyl-Sepharose. *J. Chromatogr.*, 303 (1984) 285-290.
- 888 Bell, J.G., Cowery, C.B. and Youngson, A.: Rainbow trout liver microsomal lipid peroxidation. The effect of purified glutathione peroxidase, glutathione S-transferase and other factors. *Biochim. Biophys. Acta*, 795 (1984) 91-99.
- 889 Johansson, G., Andersson, M. and Åkerlund, H.-E.: Counter-current distribution of yeast enzymes with polymer-bound triazine dye affinity ligands. *J. Chromatogr.*, 298 (1984) 483-493.

For additional information see:  
*C.A.*, 101 (1984) 19521w.

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

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

- 890 Bennett, M.J. and Carpenter, K.H.: Experience with a simple high-performance liquid chromatography method for the analysis of purine and pyrimidine nucleosides and bases in biological fluids. *Ann. Clin. Biochem.*, 21 (1984) 131-136; *C.A.*, 101 (1984) 68650w.
- 891 Bennett, M.J., Patchett, B.J. and Worthy, E.: A simple HPLC method for the determination of urate in serum and urine using 8-chlorotheophylline as internal standard. *Med. Lab. Sci.*, 41 (1984) 108-111; *C.A.*, 101 (1984) 3320u.
- 892 Gehrke, Ch.W., McCune, R.A., Gama-Sosa, M.A., Ehrlich, M. and Kuo, K.C.: Quantitative reversed-phase high-performance liquid chromatography of major and modified nucleosides in DNA. *J. Chromatogr.*, 301 (1984) 199-219.
- 893 Hakam, A., McLick, J. and Kun, E.: Separation of poly(ADP-Ribose) by high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 369-377.

- 894 Henderson, R.J., Jr. and Griffin, C.A.: Electrochemical detection of adenosine and other purine metabolites during high-performance liquid chromatographic analysis. *J. Chromatogr.*, 298 (1984) 231-242.
- 895 Herbel, W. and Montag, A.: Determination of individual purine and pyrimidine bases in protein-rich food, by automatic cation exchange chromatography after hydrolytic digestion under pressure. *Z. Lebensm.-Unters. Forsch.*, 178 (1984) 81-85; *C.A.*, 101 (1984) 89027p.
- 896 Huguenin, P.N., Jayaram, H.N. and Kelley, J.A.: Reverse phase HPLC determination of 5,6-dihydro-5-azacytidine in biological fluids. *J. Liq. Chromatogr.*, 7 (1984) 1433-1453.
- 897 Iwamoto, M., Yoshida, S. and Hirose, S.: Fluorescence determination of 5-fluorouracil and 1-(tetrahydro-2-furanyl)-5-fluorouracil in blood serum by high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 151-157.
- 898 Joshua, H. and Goetz, M.: Separation of nucleobases on polar-amino cyano high-performance liquid chromatography columns. *J. Chromatogr.*, 303 (1984) 185-189.
- 899 Miura, G.A., Santangelo, J.R., Gordon, R.K. and Chiang, P.K.: Analysis of S-adenosylmethionine and related sulfur metabolites in animal tissues. *Anal. Biochem.*, 141 (1984) 161-167 - Radical-Pak SAX.
- 900 Miura, J., Takata, Y. and Yamagata, Y.: (Monitoring of allopurinol administration effect by high performance liquid chromatography of urine). *Bunseki Kagaku*, 33 (1984) 376-381.
- 901 Olempska-Beer, Z. and Bautz Fresse, E.: Optimal extraction conditions for high-performance liquid chromatographic determination of nucleotides in yeast. *Anal. Biochem.*, 140 (1984) 236-245.
- 902 Pochard, M.-F., Karageorgis, M. and Chevalier, M.: Dosage du methylthiouracile dans du plasma de bovin par chromatographie liquide haute performance sur phase inverse. *J. Chromatogr.*, 298 (1984) 183-188.
- 903 Pruess-Schwartz, D., Sebti, S.M., Gilham, P.T. and Baird, W.M.: Analysis of benzo[*a*]pyrene: DNA adducts formed in cells in culture by immobilized boronate chromatography. *Cancer Res.*, 44 (1984) 4104-4110.
- 904 Reiss, P.D., Zuurendonk, P.F. and Veech, R.L.: Measurement of tissue purine, pyrimidine, and other nucleotides by radial compression high-performance Liquid chromatography. *Anal. Biochem.*, 140 (1984) 162-171 - Partisil 10-SAX.
- 905 Rossnagel, G. and Wiessler, M.: Der Einfluss des Gegenions auf die Retentionszeiten bei der Ionenpaar-Chromatographie und die Anwendung bei Metabolismus-Untersuchungen. *Fresenius' Z. Anal. Chem.*, 318 (1984) 269-270.
- 906 Sawyer, R.C., Stolfi, R.L., Martin, D.S. and Spiegelman, S.: Incorporation of 5-fluorouracil into murine bone marrow DNA *in vivo*. *Cancer Res.*, 44 (1984) 1847-1851.
- 907 Schott, H. and Eckstein, H.: High-performance liquid chromatographic separations of isomeric pyrimidine oligodeoxynucleotides. *J. Chromatogr.*, 296 (1984) 363-368.
- 908 Schuetz, J.D., Wallace, H.J. and Diasio, R.B.: 5-Fluorouracil incorporation into DNA of CF-1 mouse bone marrow cells as a possible mechanism of toxicity. *Cancer Res.*, 44 (1984) 1358-1363.
- 909 Siaw, M.F.E. and Coleman, M.S.: *In vitro* metabolism of deoxycoformycin in human T lymphoblastoid cells. Phosphorylation of deoxycoformycin and incorporation into cellular DNA. *J. Biol. Chem.*, 259 (1984) 9426-9433.
- 910 Wagner, J., Claverie, N. and Danzin, C.: A rapid high-performance liquid chromatographic procedure for the simultaneous determination of methionine, ethionine, S-adenosylmethionine, S-adenosylethionine, and the natural polyamines in rat tissues. *Anal. Biochem.*, 140 (1984) 108-116.
- 911 Wataya, Y. and Hirackai, O.: 3'-Deoxyinosine as an anti-leishmanial agent: the metabolism and cytotoxic effects of 3'-deoxyinosine in *Leishmania tropica* promastigotes. *Biochem. Biophys. Res. Commun.*, 123 (1984) 677-683.
- 912 Wehling, R.L., Wetzel, D.L. and Pedersen, J.R.: Stored wheat insect infestation related to uric acid as determination by liquid chromatography. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 644-647.
- 913 Wulfson, A.N. and Yakimov, S.A.: HPLC of nucleotides. II. General methods and their development for analysis and preparative separation. An approach to selectivity control. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 442-460 - a review with 29 refs.
- 914 Wung, W.E. and Howell, S.B.: Hypoxanthine concentrations in normal subjects and patients with solid tumors and leukemia. *Cancer Res.*, 44 (1984) 3144-3148.

- 915 Yoshioka, M., Nishidate, K., Iizuka, H., Nakamura, A., El-Merzbani, M.M., Tamura, Z. and Miyazaki, T.: Sensitive fluorimetry of adenine-containing compounds with high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 63-71.

For additional information see:

- C.A., 100 (1984) 203004k;  
101 (1984) 19993b, 20168t.

See also 1303, 1331, 1365.

21b. *Nucleic acids, RNA*

- 916 Bischoff, R. and McLaughlin, L.W.: Nucleic acid resolution by mixed-mode chromatography. *J. Chromatogr.*, 296 (1984) 329-337.
- 917 Colpan, M. and Riesner, D.: High-performance liquid chromatography of high-molecular-weight nucleic acids on the macroporous ion exchanger, Nucleogen. *J. Chromatogr.*, 296 (1984) 339-353.
- 918 Garcia, S. and Liautard, J.P.: Separation of macromolecular RNAs by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 355-362.
- 919 Heyer, W.-D., Thuriaux, P., Kohli, J., Ebert, P., Kersten, H., Gehrke, Ch., Kuo, K.C. and Agris, P.F.: An antisuppressor mutation of *Schizosaccharomyces pombe* affects the post-transcriptional modification of the "wobble" base in the anticodon of tRNAs. *J. Biol. Chem.*, 259 (1984) 2856-2862.
- 920 Jacobson, K.B. and Lee, E.H.: Transfer RNA chromatography on reversed phase five: effect of cadmium ion on a queuine-type tRNA. *Biochem. Biophys. Res. Commun.*, 123 (1984) 1027-1032.
- 921 Russo, T., Salvatore, F. and Cimino, F.: Determination of pseudouridine in tRNA and in acid-soluble tissue extracts by high-performance liquid chromatography. *J. Chromatogr.*, 296 (1984) 387-393.
- 922 Werner, D., Chemla, Y. and Herzberg, M.: Isolation of poly(A)<sup>+</sup> RNA by paper affinity chromatography. *Anal. Biochem.*, 141 (1984) 329-336.
- 923 Yuki, H., Imamura, M. and Kawasaki, H.: (High performance liquid chromatographic determination of 1- and 3-methyladenines and O<sup>6</sup>-methylguanine in deoxyribonucleic acid formed by carcinogenic methylating agents). *Bunseki Kagaku*, 33 (1984) 351-355.

21c. *Nucleic acids, DNA*

- 924 Dornburg, R., Földi, P. and Hofsneider, P.H.: Increase of cloning efficiencies by using high-performance liquid chromatography-purified vectors and linkers. *J. Chromatogr.*, 296 (1984) 379-385.
- 925 Ikuta, S., Chattopadhyaya, R. and Dickerson, R.E.: Reverse-phase polystyrene column for purification and analysis of DNA oligomers. *Anal. Chem.*, 56 (1984) 2253-2256.
- 926 Melikian, A.A., Amin, S., Hecht, S.S., Hoffmann, D., Pataki, J. and Harvey, R.G.: Identification of the major adducts by reaction of 5-methylchrysene anti-dihydrodiol-epoxides with DNA *in vitro*. *Cancer Res.*, 44 (1984) 2524-2529.
- 927 Sofer, G., Seitz, C. and Lasky, M.: Exclusion limits of DNA restriction fragments on gel filtration media. *Am. Biotechnol. Lab.*, 2 (1984) 38-40; C.A., 101 (1984) 106721e.

For additional information see:  
C.A., 101 (1984) 3316x.

21f. *Structural studies of nucleic acids*

See 927.

## 22. ALKALOIDS

- 928 Abraham, I. and Ueda, C.T.: Comparative disposition kinetics of two diastereomeric pairs of cinchona alkaloids in the dog. *J. Pharm. Sci.*, 73 (1984) 452-456.
- 929 Coxon, D.T.: Methodology for glycoalkaloid analysis. *Am. Potato J.*, 61 (1984) 169-183; *C.A.*, 100 (1984) 207935n - a review with 22 refs.
- 930 Derendorf, H., El-Din, A., El-Koussi, A. and Garrett, E.R.: Electrochemical chromatographic determinations of morphine antagonists in biological fluids, with applications. *J. Pharm. Sci.*, 73 (1984) 621-624.
- 931 Duez, P., Vanhaelen, M., Vanhaelen-Fastre, M., Hanocq, M. and Molle, L.: Comparison between high-performance thin-layer chromatography-fluorometry and high-performance liquid chromatography for the determination of sennosides A and B in *Senna* (Cassia ssp.) pods and leaves. *J. Chromatogr.*, 303 (1984) 391-395.
- 932 Gagliardi, L., Cavazzutti, G., Amato, A., Zagarese, V., Chimenti, F. and Tonelli, D.: Simultaneous determination of ajmaline and 17-monochloracetylajmaline by ion-pair reversed-phase HPLC. *Anal. Lett.*, 17 (1984) 423-431.
- 933 Hunter, R.T. and Creekmur, R.E., Jr.: Liquid chromatographic determination of strychnine as poison in domestic animals. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 542-545.
- 934 Leroyer, R., Jarreau, C., Pays, M., Varoquaux, O. and Advenier, C.: Reverse-phase liquid chromatography and pharmacokinetic study of two hydroxylated analogues of quinidine in dogs. *J. Pharm. Sci.*, 73 (1984) 844-846.
- 935 Matsuyama, K., Sawahara, H., Noda, A., Goto, S. and Iguchi, S.: Effect of environmental temperature on the elimination of theophylline. *Chem. Pharm. Bull.*, 32 (1984) 2026-2029.
- 936 Maurer, G. and Frick, W.: Elucidation of the structure and receptor binding studies of the major primary metabolite of dihydroergotamine in man. *Eur. J. Clin. Pharmacol.*, 26 (1984) 463-470.
- 937 McDonald, P.A. and Gough, T.A.: Determination of the distribution of cannabinoids in cannabis resin from the Lebanon using HPLC. Part III. *J. Chromatogr. Sci.*, 22 (1984) 282-284.
- 938 Moriyasu, M., Endo, M., Kanazawa, R., Hashimoto, Y., Kato, A. and Mizuno, M.: High-performance liquid chromatographic determination of organic substances by metal chelate derivatization. III. Analysis of ephedra bases. *Chem. Pharm. Bull.*, 32 (1984) 744-747.
- 939 Nelson, P.E.: High-performance liquid chromatography detection of morphine by fluorescence after post-column derivatization. *J. Chromatogr.*, 298 (1984) 59-65.
- 940 O'Connell, S.E. and Zurzola, F.J.: Rapid quantitative liquid chromatographic determination of caffeine levels in plasma after oral dosing. *J. Pharm. Sci.*, 73 (1984) 1009-1011.
- 941 Rane, A., Säwe, J., Lindberg, B., Svensson, J.-O., Garle, M., Erwald, R. and Jorulf, H.: Morphine glucuronidation in the rhesus monkey: a comparative *in vivo* and *in vitro* study. *J. Pharmacol. Exp. Ther.*, 229 (1984) 571-576.
- 942 Rodriguez, F., Desrousseaux, B., Benkaddour, N. and Lepargneur, J.P.: (Comparison of two methods of determination of theophylline: immunofluoro-enzymic and high-pressure liquid chromatography). *Pharm. Biol.*, 18 (1984) 115-118; *C.A.*, 101 (1984) 65443v.
- 943 Schuebel, H. and Stoeckigt, J.: RLCC-Isolation of raucaffricine from its most efficient source-cell suspension cultures of *Rauvolfia serpentina* Benth. *Plant Cell Rep.*, 3 (1984) 72-74; *C.A.*, 101 (1984) 20600c.
- 944 Segall, H.J.: Recent chromatographic methods to isolate pyrrolizidine alkaloids. *J. Liq. Chromatogr.*, 7 (1984) 377-392 - a review with 34 refs.
- 945 Smith, E.: Analysis of *Cinchona* alkaloids by high-performance liquid chromatography. Application to the analysis of quinidine gluconate and quinidine sulfate and their dosage forms. *J. Chromatogr.*, 299 (1984) 233-244.
- 946 Stahl, E. and Jahn, H.: Hyoscyamin- und Scopolamingehalt in Belladonnablättern, -wurzeln und -zubereitungen. *Dtsch. Apoth.-Ztg.*, 124 (1984) 1706-1707.
- 947 Stavric, B., Klassen, R. and Gilbert, S.G.: Automated high-performance liquid chromatographic assay for monitoring caffeine and its metabolites in biological fluids of monkeys consuming caffeine. *J. Chromatogr.*, 310 (1984) 107-118.
- 948 St-Pierre, M.V., Tesoro, A., Spino, M. and MacLeod, S.M.: An HPLC method for the determination of theophylline and its metabolites in serum and urine. *J. Liq. Chromatogr.*, 7 (1984) 1593-1608.

- 949 Wilson, T.D.: Structural influences on the amperometric detection of opiate in high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 39-46.  
950 Wilson, J.F., Marshall, R.W., Williams, J. and Richens, A.: Accuracy and precision of gas-liquid chromatographic high-pressure liquid chromatographic, and enzyme immunoassay techniques for the measurement of theophylline concentrations in serum : a comparison based on external quality assurance measurements. *Ther. Drug Monit.*, 6 (1984) 243-250; *C.A.*, 101 (1984) 65411h.

For additional information see:

- C.A.*, 100 (1984) 190387k, 190389n;  
101 (1984) 19971t, 32732k, 32743q, 60184b, 71160s, 157569u, 157749c.

See also 230, 1060, 1485.

## 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

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

- 951 Carlson, R.E., Sivasothy, R., Dolphin, D., Bernstein, M. and Shivji, A.: An internal standard for porphyrin analysis. *Anal. Biochem.*, 140 (1984) 360-365.  
952 Gordon, E.R., Meier, P.J., Goresky, C.A. and Boyer, J.L.: Mechanism and subcellular site of bilirubin diglucuronide formation in rat liver. *J. Biol. Chem.*, 259 (1984) 5500-5506.  
953 Lim, C.K. and Peters, T.J.: Urine and faecal porphyrin profiles by reversed-phase high-performance liquid chromatography in the porphyrins. *Clin. Chim. Acta*, 139 (1984) 55-63.  
954 Schwartz, S.J.: High performance liquid chromatography of zinc and copper pheophytins. *J. Liq. Chromatogr.*, 7 (1984) 1673-1583.  
955 Tangeron, A.: Separation of haem compounds by reversed-phase ion-pair high-performance liquid chromatography and its application in the assay of ferrochelatase activity. *J. Chromatogr.*, 310 (1984) 31-39.

### 23c. *Indole derivatives*

- 956 Bottiglieri, T., Lim, C.K. and Peters, T.J.: Isocratic analysis of 3-methoxy-4-hydroxyphenyl glycol, 5-hydroxyindole-3-acetic acid and 4-hydroxy-3-methoxyphenyl-acetic acid in cerebrospinal fluid by high-performance liquid chromatography with amperometric detection. *J. Chromatogr.*, 311 (1984) 354-360.  
957 Hanai, T. and Hubert, J.: Analysis of fluorescent compounds in urine by liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1627-1642.  
958 Iinuma, F., Mawatari, K.-I., Tabara, M. and Watanabe, M.: (Fluorometric determination of 5-hydroxyindole derivatives by high performance liquid chromatography with cobalt(II) chloride, sodium carbonate, and sodium hydroxide). *Bunseki Kagaku*, 33 (1984) E323-E330.  
959 Iinuma, F., Tabara, M., Mawatari, K.-I., Suzuki, M. and Watanabe, M.: (Fluorometric determination of kynurenine derivatives by high performance liquid chromatography with hydrogen peroxide and sodium carbonate). *Bunseki Kagaku*, 33 (1984) E315-E322.  
960 Krstulovic, A.M., Friedman, M.J., Colin, H., Guichon, G., Gaspar, M. and Pajer, K.A.: Analytical methodology for assays of serum tryptophan metabolites in control subjects and newly abstinent alcoholics: preliminary investigation by liquid chromatography with amperometric detection. *J. Chromatogr.*, 297 (1984) 271-281.  
961 Morita, I., Masujima, T., Yoshida, H. and Imai, H.: (Studies on variation of tryptophan metabolites level in rabbit plasma with preparation procedures by high performance liquid chromatography). *Bunseki Kagaku*, 33 (1984) E235-E240.  
962 Suzuki, K., Tabara, M., Iinuma, F. and Watanabe, M.: Enzymatic formation of xanthurenic acid 8-methyl ether, an endogenous carcinogen, in animal tissues. *Chem. Pharm. Bull.*, 32 (1984) 2340-2345.

- 963 Terry, P.H., Grochowska, M.J. and Saftner, R.A.: Comparison of result using HPLC and the *Avena coleoptile* curvature test for the determination of indole-3-acetic acid in plant material. *Proc. Plant Growth Regul. Soc. Am.*, 10 (1983) 126-130; *C.A.*, 101 (1984) 35544m.

For additional information see:  
*C.A.*, 100 (1984) 188417b;  
 101 (1984) 19997f, 33343w.

See also 311, 432, 526, 553, 554.

### 23d. Pyridine derivatives

- 964 Saeki, S., Kondo, S., Hayashi, T. and Hamana, M.: Studies on tertiary amine oxides. LXXVII. The pseudo-Gomberg reaction of 4- and 2-aminopyridine 1-oxides. *Chem. Pharm. Bull.*, 32 (1984) 1780-1789.
- 965 Stephan, U.W. and Rudolph, A.: An improved and standardized method for extraction of nicotianamine from plant tissue. *Biochem. Physiol. Pflanz.*, 179 (1984) 517-523; *C.A.*, 100 (1984) 206064r.
- 966 Tsuruta, Y., Kohashi, K., Ishida, S. and Ohkura, Y.: Determination of nicotinic acid in serum by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 309 (1984) 309-315.

### 23e. Other N-heterocyclic compounds

- 967 Bettero, A., Angi, M.R., Moro, F. and Benassi, C.A.: Histamine assay in tears by fluorescamine derivatization and high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 390-395.
- 968 Bieganowska, M.: Chromatographic retention data of N-alkylamines of benzomorpholine-2-carboxylic acid in the study of structure-activity relationships. *Chromatographia*, 18 (1984) 456-458.
- 969 McMurtrey, K.D., DesLauriers, P.J. and Knight, T.J.: Liquid chromatographic behavior of selected aza-arenes and potential metabolites. *J. Liq. Chromatogr.*, 7 (1984) 1425-1432.
- 970 Rönnberg, A.L., Hansson, C. and Häkanson, R.: High-performance liquid chromatographic determination of histamine in biological samples after derivation with *o*-phthalaldehyde. *Anal. Biochem.*, 139 (1984) 338-344.
- 971 Rönnberg, A.L., Hansson, C., Drakenberg, T. and Hakanson, R.: Reaction of histamine with *o*-phthalaldehyde: isolation and analysis of the fluorophore. *Anal. Biochem.*, 139 (1984) 329-337.
- 972 Schwarz, W., Langer, K. and Haag, A.: High-performance liquid chromatographic determination of (*Z*)- and (*E*)-urocanic acid in human skin. *J. Chromatogr.*, 310 (1984) 188-192.

See also 526, 538.

## 24. ORGANIC SULPHUR COMPOUNDS

- 973 Bear, G.R., Lawley, C.W. and Riddle, R.M.: Separation of sulfonate and carboxylate mixtures by ion-exchange high-performance liquid chromatography. *J. Chromatogr.*, 302 (1984) 65-78.
- 974 Fujita, K., Matsunaga, A. and Imoto, T.: 6A6B-, 6A6C-, and 6A6D-disulfonates of  $\alpha$ -cyclodextrin. *J. Am. Chem. Soc.*, 106 (1984) 5740-5741; *C.A.*, 101 (1984) 131007j.
- 975 Möckel, H.J.: Separation of dihydrogensulphides (polysulphanes) using reversed phase HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 116-120.
- 976 Möckel, H.J.: The reaction of sulphur homocycles in reversed-phase HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 327-334.
- 977 Sheng, L.-S., Horning, E.C. and Horning, M.G.: Synthesis and elimination reactions of methylsulfonium ions formed from styrene oxide and methylthio compounds related to methionine and cysteine. *Drug Metab. Disp.*, 12 (1984) 297-303.

- 978 Spinks, E.A., Sones, K. and Fenwick, G.R.: The quantitative analysis of glucosinates in Cruciferous vegetables, oil seeds and forage crops using high-performance liquid chromatography. *Fette, Seifen, Anstrichm.*, 86 (1984) 228-231.
- 979 Yagen, B., Foureman, G.L., Ben-Zvi, Z., Ryan, A.J., Hernandez, O., Cox, R.H. and Bend, J.R.: The metabolism and excretion of  $^{14}\text{C}$ -styrene oxide-glutathione adducts administered to the winter flounder, *Pseudopleuronectes americanus*, a marine teleost. Identification of the corresponding S-cysteine derivatives as major urinary metabolites. *Drug Metab. Disp.*, 12 (1984) 389-395.
- 980 Yoshizava, I., Kameyama, M. and Watanabe, K.: Preparation of specific antiserum to estradiol 17-sulphate (Clinical analysis on steroids. XXVIII). *Chem. Pharm. Bull.*, 32 (1984) 1885-1890.

For additional information see:  
*C.A.*, 101 (1984) 162992f, 163000t.

See also 523, 1005, 1192.

## 25. ORGANIC PHOSPHORUS COMPOUNDS

- 981 Buglio, B. and Venturella, V.S.: Studies on the LC separation of 9-cis and all-trans  $\beta$ -ionylidenethyltriphenylphosphonium chloride. *J. Chromatogr. Sci.*, 22 (1984) 276-281.
- 982 Kolosky, M., Vialle, J. and Cotel, T.: Determination of trioctylphosphine oxide and its impurities by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 436-444.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

### 26a. Organometallic compounds

- 983 Tajima, K., Fujita, M., Kai, F. and Takamatsu, M.: Differentiation of mercury alkane thiolates by high performance liquid chromatography. *J. Chromatogr. Sci.*, 22 (1984) 244-248.
- 984 Tartar, A., Huvenne, J.P., Gras, H. and Sergheraert, C.: Fourier transform infrared detection in reversed-phase high-performance liquid chromatography of metallocene-amino acid adducts. *J. Chromatogr.*, 298 (1984) 521-524.

For additional information see:  
*C.A.*, 101 (1984) 96726u, 122300x.

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

- 985 Miller, J.D. and Ishida, H.: Exclusion chromatography for reacting organo-functional trialkoxysilanes). *Polym. Mater. Sci. Eng.*, 50 (1984) 435-439; *C.A.*, 101 (1984) 23582j.

For additional information see:  
*C.A.*, 101 (1984) 103340u.

### 26c. Coordination compounds

- 986 Abou-El-Wafa, M.H.M. and Burnett, M.G.: A high performance liquid chromatography investigation of the nucleophilic substitution of trans-bis(thiosulfato)bis-(ethylenediamine)cobaltate(III) in water. *Inorg. Chim. Acta*, 86 (1984) L7-L9; *C.A.*, 101 (1984) 44095t.
- 987 Adamic, M.L. and Bartak, D.E.: Quantitation of metal complexes by reverse-pulse amperometry and molecular-exclusion chromatography. *Anal. Chim. Acta*, 158 (1984) 43-55; *C.A.*, 101 (1984) 16538w.
- 988 Casoli, A., Mangia, A., Predieri, G. and Sappa, E.: High-performance liquid chromatography of mono- and hetero-tetrametallic iron, ruthenium, osmium and nickel clusters. *J. Chromatogr.*, 303 (1984) 404-411.

- 989 Hoffman, T.J., Volkert, W.A., Troutner, D.E. and Holmes, R.A.: Reversed-phase HPLC of technetium-99m-tetraamine complexes. *Int. J. Appl. Radiat. Isot.*, 35 (1984) 223-225; *C.A.*, 101 (1984) 12287r.
- 990 Jalal, M.A.F., Mocharla, R. and van der Helm, D.: Separation of ferrichromes and other hydroxamate siderophores of fungal origin by reversed-phase chromatography. *J. Chromatogr.*, 301 (1984) 247-252.
- 991 Melander, W.R., Lin, H.J., Jacobson, J. and Horvath, C.: Dynamic effect of secondary equilibria in reversed-phase chromatography. *J. Phys. Chem.*, 88 (1984) 4527-4536; *C.A.*, 101 (1984) 137655r.
- 992 Nakajima, K., Kojima, M., Fujita, M. and Fujita, J.: Chromatographic separation of the diastereomers of the bis(2,4-pentanedionato) (2-(methylseleno)ethylamine) cobalt(III) ion on a column of sulphoethyl-Toyopearl and determination of the rate of inversion at the selenium atom. *J. Chromatogr.*, 301 (1984) 241-246.
- 993 Omori, T., Hashimoto, K., Sekine, T. and Yoshihara, K.: Chromatographic separations of fac- and mer-tris( $\beta$ -diketonato)chromium(III)complexes. *J. Chromatogr.*, 299 (1984) 201-214.
- 994 Wada, H., Nezu, S., Ozawa, T. and Nakagawa, G.: Reversed-phase ion-pair partition chromatography of iron, cobalt and nickel chelates with 4-hydroxy-3-(2-pyridylazo)naphthalene-1-sulphonic acid. *J. Chromatogr.*, 295 (1984) 413-421.
- 995 Wenclawiak, B. and Bickmann, F.: Fluid and supercritical  $\text{CO}_2$  as eluent in metal chelate chromatography. *Fresenius' Z. Anal. Chem.*, 319 (1984) 305.

For additional information see:  
*C.A.*, 101 (1984) 98648u, 102984v, 117239e.

## 27. VITAMINS AND VARIOUS GROWTH REGULATORS (NON-PEPTIDIC)

- 996 Abe, K., Kusube, K., Mukasa, K., Ishiguro, Y., Sato, T., Ishikawa, S. and Hoshida, H.: (Determination of vitamins A, E and K and ubiquinones in plasma by very high speed liquid chromatography). *Bunseki Kagaku*, 33 (1984) E309-E314.
- 997 Adami, S., Tartarotti, D., Galvanini, G. and Lo Cascio, V.: Chromatographic separation and assay of the principal metabolites of vitamin  $D_2$  and  $D_3$ . *G. Ital. Chim. Clin.*, 8 (1983) 95-99; *C.A.*, 100 (1984) 205913e.
- 998 Arens, M., Kro 11, S. and Müller-Mulot, W.: Gemeinschaftsarbeiten der DGF, 86. Mitteilung Deutsche Einheitsmethoden zur Untersuchung der Fetten, Fettprodukten und verwandten Stoffen, 63. Mitt.: Analyse von Fettbegleitstoffen VI. *Fette, Seifen, Anstrichm.*, 86 (1984) 148-151.
- 999 Azoulay, M., Desbene, P.-L., Frappier, F. and Georges, I.: Use of liquid chromatography-mass spectrometry for the quantitation of dethiobiotin and biotin in biological samples. *J. Chromatogr.*, 303 (1984) 272-276.
- 1000 Biesalski, H.K. and Hafner, G.: HPLC-Bestimmung von Retinol, Retinal und Retinylestern sowie ihren Isomeren Konfigurationen in biologischen Proben. *Fresenius' Z. Anal. Chem.*, 318 (1984) 253-254.
- 1001 Bontemps, J., Bettendorff, L., Dandrifosse, G., Schoffeniels, E. and Nevejans, F.: Sensitization of thiamine analysis by the peak compression technique. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 490-491.
- 1002 Bontemps, J., Bettendorff, L., Lombet, J., Dandrifosse, G., Schoffeniels, E., Nevejans, F., Yang, Y. and Verzele, M.: Determination of thiamine and thiamine phosphates as thiochrome derivatives by reversed-phase chromatography on polystyrene packing materials. *Chromatographia*, 18 (1984) 424-426.
- 1003 Bontemps, J., Bettendorff, L., Lombet, J., Grandfils, C., Dandrifosse, G., Schoffeniels, E., Nevejans, F. and Crommen, J.: Poly(styrene-divinylbenzene) as reversed-phase adsorbent for the high-performance liquid chromatographic analysis of thiochrome derivatives of thiamine and phosphorylated esters. *J. Chromatogr.*, 295 (1984) 486-491.
- 1004 Bui-Nguejen, M.H.: Direct determination of D-panthenol in pharmaceutical preparations by ion-pair chromatography. *J. Chromatogr.*, 303 (1984) 291-295.
- 1005 Canfield, L.M. and Holzman, R.B.: Reaction of vitamin K and dithiothreitol on reversed-phase  $C_{18}$  high-performance liquid chromatographic columns. *J. Chromatogr.*, 299 (1984) 225-231.
- 1006 Daviaud, R., Fromageot, D. and Tome, D.: (Use of high-pressure liquid chromatography for determination of vitamin A in sheep colostrum). *Revl. Med. Vet.*, 159 (1983) 1097-1101; *C.A.*, 100 (1984) 190401k.

- 1007 Ferre, J. and Jacobson, K.B.: Formation of  $\beta,\gamma$ -methylene-7,8-dihydronoopterin 3'-triphosphate from  $\beta,\gamma$ -methyleneguanosine 5'-triphosphate by GTP cyclohydrolase I of *Escherichia coli*. *Arch. Biochem. Biophys.*, 233 (1984) 475-480.
- 1008 Furr, H.C., Amédée-Manesme, O. and Olson, J.A.: Gradient reversed-phase high-performance liquid chromatographic separation of naturally occurring retinoids. *J. Chromatogr.*, 309 (1984) 299-307.
- 1009 Grossman, S.J. and Hsia, M.T.S.: High-performance liquid chromatographic methods designed for metabolic studies of the proallatocidin precocene II. *J. Chromatogr.*, 299 (1984) 445-449.
- 1010 Halloran, B.P., Bikle, D.D. and Whitney, J.O.: Separation of isotonically labeled vitamin D metabolites by high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 229-233.
- 1011 Holmberg, I., Kristiansen, T. and Sturen, M.: Determination of 25-hydroxyvitamin D<sub>3</sub> in serum by high performance liquid chromatography and isotope dilution-mass spectrometry. *Scand. J. Clin. Lab. Invest.*, 44 (1984) 275-282; C.A., 101 (1984) 68886c.
- 1012 Indyk, H. and Woollard, D.C.: The determination of vitamin D by high performance liquid chromatography. *N.Z.J. Dairy Sci. Technol.*, 19 (1984) 1-6; C.A., 101 (1984) 108975q - a review with 46 refs.
- 1013 Jeng, I. and Soblosky, J.S.: Separation of ubiquinone homologues by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 295 (1984) 515-520.
- 1014 Johannsen, F.H.: (A general applicable method for the determination of vitamin C). *Landwirtsch. Forsch.*, 37 (1984) 70-77; C.A., 101 (1984) 89021g.
- 1015 Katsumi, K., Okano, T., Kobayashi, T., Miyata, O., Naito, T. and Ninomiya, I.: Synthesis of diastereomeric 24,25-dihydroxyvitamin D<sub>2</sub> and separation of its (24R)- and (24S)-isomers. *Chem. Pharm. Bull.*, 32 (1984) 3744-3746.
- 1016 Kester, A.S. and Thompson, R.E.: Computer-optimized normal-phase high-performance liquid chromatographic separation of *Corynebacterium poinsettiae* carotenoids. *J. Chromatogr.*, 310 (1984) 372-378.
- 1017 Krinsky, N.I. and Welankiwar, S.: Assay of carotenoids. *Methods Enzymol.*, 105 (Oxygen Radicals Biol. Syst.) (1984) 155-162; C.A., 101 (1984) 51039f.
- 1018 Lunte, C.E. and Kissinger, P.T.: Study of the tautomerization of quinonoid dihydropterins by liquid chromatography/electrochemistry. *Anal. Chim. Acta*, 158 (1984) 33-41; C.A., 101 (1984) 71984p.
- 1019 Macrae, R., Nicolson, I.A., Richardson, D.P. and Scott, K.J.: Chromatographic determination of vitamins in dairy products. *Spec. Publ.-R. Soc. Chem.*, (1984) 155-166; C.A., 101 (1984) 53441e - (B<sub>2</sub>, B<sub>6</sub>).
- 1020 Mauro, D.J. and Wetzel, D.L.: Simultaneous determination of thiamine and riboflavin in enriched cereal based products by high-performance liquid chromatography using selective detection. *J. Chromatogr.*, 299 (1984) 281-287.
- 1021 Mohanraj, S.: Semi-preparative HPLC separation of E and Z isomers of new aromatic retinoids. *J. Liq. Chromatogr.*, 7 (1984) 1455-1460.
- 1022 Nelis, H.J.C.F., Lavens, P., Moens, L., Sorgeloos, P., Jonckheere, J.A., Criel, G.R. and De Leenheer, A.P.: *Cis*-canthaxanthins. Unusual carotenoids in the eggs and the reproductive system of female brine shrimp *Artemia*. *J. Biol. Chem.*, 259 (1984) 6063-6066.
- 1023 Okabe, T., Ishizuka, S., Fujisawa, M., Watanabe, J. and Takaku, F.: Sarcoid granulomas metabolize 25-hydroxyvitamin D<sub>3</sub> *in vitro*. *Biochem. Biophys. Res. Commun.*, 123 (1984) 822-830.
- 1024 Piironen, V., Varo, P., Syvaaja, E.L., Salminen, K. and Koivistoinen, P.: High-performance liquid chromatographic determination of tocopherols and tocotrienols and its application to diets and plasma to Finnish men. I. Analytical method. *Int. J. Vitam. Nutr. Res.*, 54 (1984) 35-40; C.A., 101 (1984) 37479t.
- 1025 Piironen, V., Varo, P., Syvaaja, E.L., Salminen, K., Koivistoinen, P. and Arvilommi, H.: High-performance liquid chromatographic determination of tocopherols and tocotrienols and its applications to diets and plasma of Finnish men. II. Applications. *Int. J. Vitam. Nutr. Res.*, 54 (1984) 41-46; C.A., 101 (1984) 37480m.
- 1026 Sedrani, S.H.: An improved and rapid high pressure liquid chromatographic assay for quantitation of 25-hydroxyvitamin D<sub>3</sub>. *J. Coll. Sci., King Saud Univ.*, 15 (1984) 205-215; C.A., 101 (1984) 51044d.

- 1027 Shealy, Y.F., Frye, J.L., O'Dell, C.A., Thorpe, M.C., Kirk, M.C., Coburn, W.C., Jr. and Sporn, M.B.: Synthesis and properties of some 13-cis- and all-trans-retinamides. *J. Pharm. Sci.*, 73 (1984) 745-751.
- 1028 Shepherd, H.A., Priddle, J.D., Jenkins, W.J. and Jewell, D.P.: The preparation of human intrinsic factor-cobalamin complex from human gastric juice by immunoadsorption. *Clin. Chim. Acta*, 139 (1984) 155-165.
- 1029 Speek, A.J., Schrijver, J. and Schreurs, S.H.P.: Fluorimetric determination of menadione sodium bisulphite (vitamin K<sub>3</sub>) in animal feed and premixes by high-performance liquid chromatography with post-column derivatization. *J. Chromatogr.*, 301 (1984) 441-447.
- 1030 Sybilska, D., Duszczyk, K. and Przasnyski, M.: Determination of ascorbic acid in its mixtures with thiols by reversed-phase high-performance liquid chromatography with electrochemical detection using a DC-TAST polarograph. *J. Chromatogr.*, 298 (1984) 353-355.
- 1031 Tagliaro, F., Luisetto, G., Dorizzi, R. and Cristofori, P.: Methodological aspects of the determination of vitamin D metabolites. *G. Ital. Chim. Clin.*, 8 (1983) 85-93; *C.A.*, 100 (1984) 206079z.
- 1032 Vandewoude, M., Claeys, M. and De Leemput, I.: Determination of α-tocopherol in human plasma by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 311 (1984) 176-182.
- 1033 Voelter, W., Ebner, B., Kleinmaier, P., Bauer, H., Lippert, T.H., Hirnle, P., Fuchs, U. and Sadowski, P.: (Routine analyzer for determination of neopterin in clinical samples). *Chem.-Ztg.*, 108 (1984) 257-258; *C.A.*, 101 (1984) 106755u.
- 1034 Weber, E.L.: High performance liquid chromatography of the tocots in corn grain. *J. Am. Oil Chem. Soc.*, 61 (1984) 1231-1234.
- 1035 Wiederrecht, G.J., Paton, D.R. and Brown, G.M.: Enzymatic conversion of dihydronoopterin triphosphate to the pyrimidodiazepine intermediate involved in the biosynthesis of the deosopterins in *Drosophila melanogaster*. *J. Biol. Chem.*, 259 (1984) 2195-2200.
- 1036 Williams, J.B., Pramanik, B.C. and Napoli, J.L.: Vitamin A metabolism: analysis of steady-state neutral metabolites in rat tissues. *J. Lipid Res.*, 25 (1984) 638-645.
- 1037 Woolard, D.C.: New ion-pair reagent for the high-performance liquid chromatographic separation of B-group vitamins in pharmaceuticals. *J. Chromatogr.*, 301 (1984) 470-476.
- 1038 Woolard, G.A. and Woolard, D.C.: The determination of serum retinol by high performance liquid chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 466-472.
- 1039 Zeitler, H.J., Andondonskaja-Renz, B., Fink, M. and Wilmanns, W.: Pteridines in blood cells and plasma. Methods for the quantification of free and conjugated (proteinbound) pteridines. *Biochem. Clin. Aspects Pteridines*, 2 (Proc. Winter Workshop Pteridines, 2nd) (1983) 89-104; *C.A.*, 100 (1984) 188194b.
- 1040 Zonta, F. and Stancher, B.: High-performance liquid chromatography of retinals, retinols (vitamin A<sub>1</sub>) and their dehydro homologues (vitamin A<sub>2</sub>): improvements in resolution and spectroscopic characterization of the stereoisomers. *J. Chromatogr.*, 301 (1984) 65-75.

For additional information see:

*C.A.*, 100 (1984) 190390f;  
101 (1984) 3327b, 12272g, 53455n, 71158x, 97535t, 106730g, 109038y, 126156c,  
128979x, 128982t.

See also 965, 1483.

## 28. ANTIBIOTICS

- 1041 Annesley, T., Wilkerson, K., Matz, K. and Giacherio, D.: Simultaneous determination of penicillin and cephalosporin antibiotics in serum by gradient liquid chromatography. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 908-910.
- 1042 Bawdon, R.E., Hemmell, D.L. and Hemmell, P.G.: Serum and pelvic tissue concentrations of ceftriazone and cefazolin at hysterectomy. *J. Liq. Chromatogr.*, 7 (1984) 2011-2020.

- 1043 Bever, F.N., Finley, P.R., Fletcher, C. and Williams, J.: Liquid-chromatographic determination of vancomycin evaluated and improved. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1586-1587.
- 1044 Bird, A.E., Chorsley, Ch.-H., Jennings, K.R. and Marshall, A.C.: High-performance liquid chromatographic assay of temocillin and epimerisation of its diastereoisomers. *Analyst (London)*, 109 (1984) 1209-1212.
- 1045 Brückner, H. and Przybylski, M.: Isolation and structural characterization of polypeptide antibiotics of the peptaibol class by high-performance liquid chromatography with field desorption and fast atom bombardment mass spectrometry. *J. Chromatogr.*, 296 (1984) 263-275.
- 1046 Cassinelli, G., Configliacchi, E., Penco, S., Rivola, G., Arcamone, F., Pacclarini, A. and Ferrari, L.: Separation, characterization, and analysis of epirubicin (4'-epidoxorubicin) and its metabolites from human urine. *Drug Metab. Disp.*, 12 (1984) 506-510.
- 1047 Charles, B.G. and Ravenscroft, P.J.: Rapid HPLC analysis of cefoxitin in plasma and urine. *J. Antimicrob. Chemother.*, 13 (1984) 291-294; *C.A.*, 100 (1984) 185213w.
- 1048 Chiu, S.-H.L., Sestokas, E., Taub, R., Smith, J.L., Arison, B. and Lu, A.Y.H.: The metabolism of avermectin-H<sub>2</sub>B<sub>1b</sub> by pig liver microsomes. *Drug Metab. Disp.*, 12 (1984) 464-469.
- 1049 Claes, P.J., Busson, R. and Vanderhaeghe, H.: Determination of the component ratio of commercial gentamicins by high-performance liquid chromatography using precolumn derivatization. *J. Chromatogr.*, 298 (1984) 445-457.
- 1050 Cummings, J., Stuart, J.F.B. and Calman, K.C.: Determination of adriamycin, adriamycinol and their 7-deoxyaglycones in human serum by high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 125-133.
- 1051 Cummings, K.C., Torres, A.R. and Edberg, S.C.: The analysis of antimicrobial agents in biological fluids by high-performance liquid chromatography: I. Theory. *J. Clin. Lab. Autom.*, 4 (1984) 113-117; *C.A.*, 100 (1984) 202881g - a review with 18 refs.
- 1052 Das Gupta, V.: Stability of cefotaxime sodium as determined by high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 565-567.
- 1053 De Paolis, A.M.: Determination of 4-epi-meclocycline, a tetracycline analog, in cream formulation by HPLC and HPTLC. *J. Liq. Chromatogr.*, 7 (1984) 1367-1381.
- 1054 Dodion, P., Chang, B.K., Egorin, M.J., Olman, E.A., Engisch, K.L. and Bachur, N.R.: The disposition of the new anthracycline antibiotic, menogarol, in mice. *Drug Metab. Disp.*, 12 (1984) 365-370.
- 1055 Elrod, L., Jr., White, L.B., Spanton, S.G., Stroz, D.G., Cugler, P.J. and Luka, L.A.: Determination of fortimicin A and 3-O-demethylfortimicin A as 3,5-di-nitrobenzoyl derivatives by reverse-phase high-performance liquid chromatography. *Anal. Chem.*, 56 (1984) 1786-1790.
- 1056 Fabre, H., Eddine, N.H. and Berge, G.: Degradation kinetics in aqueous solution of cefotaxime sodium, a third-generation cephalosporin. *J. Pharm. Sci.*, 73 (1984) 611-618.
- 1057 Fong, G.W.K., Martin, D.T., Johnson, R.N. and Kho, B.T.: Determination of degradation products and impurities of amoxicillin capsule using ternary gradient elution high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 459-472.
- 1058 Fujita, T. and Koshiro, A.: Kinetics and mechanism of the degradation and epimerization of sodium cefsulodin in aqueous solution. *Chem. Pharm. Bull.*, 32 (1984) 3651-3661.
- 1059 Fujita, T., Takaishi, Y., Matsura, K., Takeda, Y., Yoshioka, Y. and Brückner, H.: Further investigation of peptide antibiotic, hypelcin A: Isolation and structures of hypelcins A-I, A-II, A-III, and A-IV. *Chem. Pharm. Bull.*, 32 (1984) 2870-2873.
- 1060 Gannon, R.H. and Levy, R.M.: Interference of third-generation cephalosporins with theophylline assay by high-performance liquid chromatography. *Amer. J. Hosp. Pharm.*, 41 (1984) 1185-1186; *C.A.*, 101 (1984) 48055c.
- 1061 Gibson, R.A., Lattanzio, L. and McGee, H.: Optimized liquid-chromatographic determination of metronidazole and its metabolites in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 784-787.
- 1062 Coras, J.T. and Lacourse, W.R.: Liquid chromatographic determination of sodium salinomycin in feeds, with post-column reaction. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 701-706.

- 1063 Gravallese, D.A., Musson, D.G., Paulukonis, L.T. and Bayne, W.F.: Determination of imipenem (N-formimidoyl thienamycin) in human plasma and urine by high-performance liquid chromatography, comparison with microbiological methodology and stability. *J. Chromatogr.*, 310 (1984) 71-84.
- 1064 Hagiwaka, J., Yasuda, H., Uno, T. and Nakagawa, T.: Sulbactam: alkaline degradation and determination by high-performance liquid chromatography. *Chem. Pharm. Bull.*, 32 (1984) 2752-2758.
- 1065 Hashimoto, N., Tasaki, T. and Tanaka, H.: Degradation and epimerization kinetics of moxalactam in aqueous solution. *J. Pharm. Sci.*, 73 (1984) 369-373.
- 1066 Howell, H.R., Rhodig, L.L. and Sigler, A.D.: Liquid chromatographic determination of chlortetracycline in premixes. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 572-575.
- 1067 Inchauspé, G. and Samain, D.: Use of perfluorinated carboxylic acids in the separation of aminoglycoside antibiotics by ion-pair reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 277-282.
- 1068 Kates, R.E. and Latini, R.: Simple and rapid high-performance liquid chromatographic analysis of cyclosporine in human blood and serum. *J. Chromatogr.*, 309 (1984) 441-447.
- 1069 Klett, R.P., Chovan, J.P. and Danse, I.H.R.: Reversed-phase paired-ion high-performance liquid chromatographic method for the separation and quantification of multiple bleomycin congeners. *J. Chromatogr.*, 310 (1984) 361-371.
- 1070 Lauback, R.G., Rice, J.J., Bleiberg, B., Muhamad, N. and Hanna, S.A.: Specific high-performance liquid chromatographic determination of ampicillin in bulks, injectables, capsules and oral suspensions by reverse-phase ion-pair chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1243-1265.
- 1071 Malikin, G., Lam, S. and Karmen, A.: Therapeutic drug monitoring by high performance thin-layer chromatography. *Chromatographia*, 18 (1984) 253-259.
- 1072 Margosis, M. and Aszalos, A.: Quantitation of amphotericins by reverse-phase high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 835-838.
- 1073 McGovran, J.P., Hamilton, R.D., Adams, W.J. and Pratt, E.A.: Quantitation of anthracycline antitumor agent menogarol in plasma using liquid chromatography with fluorescence detection. *Anal. Chem.*, 56 (1984) 1587-1590.
- 1074 Nygard, G. and Khalil, S.K.W.: An isocratic HPLC method for the determination of cephalosporins in plasma. *J. Liq. Chromatogr.*, 7 (1984) 1461-1475.
- 1075 Oka, H., Uno, K., Harada, K.-I., Yasaka, K. and Suzuki, M.: Improvement of chemical analysis of antibiotics. V. A simple method for the analysis of tetracyclines using reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 435-443.
- 1076 Pan, S.-S., Andrews, P.A., Glover, C.J. and Bachur, N.R.: Reductive activation of mitomycin C and mitomycin C metabolites catalyzed by NADPH-cytochrome P-450 reductase and xanthine oxidase. *J. Biol. Chem.*, 259 (1984) 959-966.
- 1077 Peters, J.H., Gordon, G.R., Kashiwase, D. and Acton, E.M.: Metabolic disposition of 5-imino daunorubicin in the rat. *Cancer Res.*, 44 (1984) 1453-1459.
- 1078 Purser, C., Baltar, A., Ho, I.K. and Hume, A.S.: New rapid method of analysis of cefoxitin in serum and bone, by high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 135-140.
- 1079 Roets, E., De Pourcq, P., Toppet, S., Hooghmartens, J., Vanderhaghe, H., Williams, D.H. and Smith, R.J.: Isolation and structure elucidation of ampicillin and amoxicillin oligomers. *J. Chromatogr.*, 303 (1984) 117-129.
- 1080 Rogers, M.E., Adlard, M.W., Saunders, G. and Holt, G.: Derivatization techniques for high-performance liquid chromatographic analysis of  $\beta$ -lactams. *J. Chromatogr.*, 297 (1984) 385-391.
- 1081 Schwartz, H.S. and Paul, B.: Biotransformation of daunorubicin aglycones by rat liver microsomes. *Cancer Res.*, 44 (1984) 2480-2484.
- 1082 Shah, J.A. and Weber, D.J.: High-performance liquid chromatographic assay of pirlimycin in human serum and urine using 9-fluorenylmethylchloroformate. *J. Chromatogr.*, 309 (1984) 95-105.
- 1083 Siegel, M.M., Mills, R., Gehrlein, L., Gore, W.E., Morton, G., Chang, T., Cosulich, D., Medwid, J. and Mirando, P.: Isolation and identification of piperacillin amide as an impurity in piperacillin. *J. Pharm. Sci.*, 73 (1984) 498-501.
- 1084 Swami, M.B., Sastry, M.K., Nirgudkar, A.G. and Nanda, R.K.: Correlation of HPLC retention times with structure and functional group of macrolide polyenes. *Hind. Antibiot. Bull.*, 25 (1983) 81-100; *C.A.*, 101 (1984) 23849b.

- 1085 Thomas, A.H., Quinlan, G.J. and Gutteridge, J.M.C.: Assay of doxorubicin and 4'-epidoxorubicin by reversed-phase ion-pair chromatography. *J. Chromatogr.*, 299 (1984) 489-494.

For additional information see:  
*C.A.*, 101 (1984) 78912x, 157534d.

See also 1219.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

### 29a. Chlorinated insecticides

- 1086 Bushway, R.J., Bureau, J.L. and Al-Jerayed, A.: High-performance liquid chromatographic determination of TCNB in potatoes. *J. Liq. Chromatogr.*, 7 (1984) 1185-1193.
- 1087 Chang-Yen, I. and Sampath, M.: Oxalic acid enhancement of recoveries of organochlorine insecticides and polychlorobiphenyls in estuarine sediment using cyclic steam distillation. *Bull. Environ. Contam. Toxicol.*, 32 (1984) 657-660; *C.A.*, 101 (1984) 50014g.
- 1088 Issaq, H.J., Klose, J. and Muschik, G.M.: Separation of polychlorinated biphenyls (Aroclor 1254) by high-performance liquid chromatography. *J. Chromatogr.*, 302 (1984) 159-166.
- 1089 Ryan, J.J., Lizotte, R. and Newsome, W.H.: Study of chlorinated diphenyl ethers and chlorinated 2-phenoxyphenols as interferences in the determination of chlorinated dibenzo-*p*-dioxins and chlorinated dibenzofurans in biological samples. *J. Chromatogr.*, 303 (1984) 351-360.

For additional information see:  
*C.A.*, 101 (1984) 103333u.

### 29b. Phosphorus insecticides

For additional information see:  
*C.A.*, 100 (1984) 187336n.

### 29c. Carbamates

- 1090 Albery, W.J., Fleet, B. and Brett, A.M.O.: The determination of urea and carbamate herbicides using a wall jet electrode. *J. Appl. Electrochem.*, 14 (1984) 550-553; *C.A.*, 101 (1984) 85521x.
- 1091 Cairns, T., Siegmund, E.G., Doose, G.M., Langham, W.S. and Chiu, K.S.: Quantification of carbaryl in pineapples by HPLC and GCMS-Cl-NH<sub>3</sub>. *Bull. Environ. Contam. Toxicol.*, 32 (1984) 310-315; *C.A.*, 100 (1984) 190377g.
- 1092 Lauren, D.R.: Simplified method for liquid chromatographic determination of carbofuran in soils. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 655-657.
- 1093 Miles, C.J. and Delfino, J.J.: Determination of aldicarb and its derivatives in groundwater by high-performance liquid chromatography with UV detection. *J. Chromatogr.*, 299 (1984) 275-280.
- 1094 She, L.K., Brinkman, U.A.Th. and Frei, R.W.: Liquid chromatographic residue analysis of Carbaryl based on a post-column catalytic reactor principle and fluorogenic labelling. *Anal. Lett.*, 17 (1984) 915-931.
- 1095 Slahck, S.C.: Liquid chromatographic determination of methiocarb in technical and formulated products: Collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 492-493.
- 1096 Slahck, S.C.: Liquid chromatographic determination of propoxur in technical and formulated products: Collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 497-499.
- 1097 Tsunoda, N., Marumo, Y. and Kishi, T.: (Reversed-phase chromatography and mass spectrometry of N-methylcarbamate pesticides). *Kagaku Keisatsu Kenkyusho Hokoku Hokagaku Hen*, 37 (1984) 36-44; *C.A.*, 101 (1984) 50016j.

- 1098 Voyksner, R.D. and Bursey, J.T.: Modification and optimization of source and interface parameters for direct liquid introduction liquid chromatography/mass spectrometry of pesticides. *Anal. Chem.*, 56 (1984) 1582-1587.  
 1099 Voyksner, R.D., Bursey, J.T. and Pellizzari, E.D.: Postcolumn addition of buffer for thermospray liquid chromatography/mass spectrometry identification of pesticides. *Anal. Chem.*, 56 (1984) 1507-1514.

*29d. Herbicides*

- 1100 Arkerblom, M. and Alex, G.: Ion-pair extraction cleanup for liquid chromatographic determination of bentazon in crops and soil. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 653-655.  
 1101 Archer, A.W.: Determination of 3-amino-1,2,4-triazole (amitrole) in urine by ion pair high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 267-271.  
 1102 Archer, T.E. and Stokes, J.D.: Residue analysis of glyphosate in blackberries by high-performance liquid chromatography and postcolumn reaction detection. *J. Agric. Food Chem.*, 32 (1984) 586-588.  
 1103 De Kok, A., Van Opstal, M., De Jong, T., Hoogarspel, B., Geerdink, R.B., Frei, R.W. and Brinkman, U.A.T.: The use of various chromatographic techniques for the determination of phenylurea herbicides and their corresponding anilines in environmental samples. II. Applications. *Int. J. Environ. Anal. Chem.*, 18 (1984) 1 01-123; *C.A.*, 101 (1984) 124222x.  
 1104 Draper, W.M. and Crosby, D.G.: Photochemistry and volatility of drepamone in water. *J. Agric. Food Chem.*, 32 (1984) 728-733.  
 1105 Grorud, R.B. and Forrette, J.E.: Liquid chromatography of liquid formulations containing 2,4-D, dicamba, and MCPP as their salts: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 837-839.  
 1106 Jacobson, A. and Shimabukuro, R.H.: Metabolism of diclofop-methyl in root-treated wheat and cat seedlings. *J. Agric. Food Chem.*, 32 (1984) 742-746.  
 1107 Lauren, D.R. and Agnew, M.P.: Anomalies in the high-performance liquid chromatographic determination of diquat in water samples. *J. Chromatogr.*, 303 (1984) 206-210.  
 1108 Ruckendorfer, H. and Lindner, W.: Trace analysis of 2,4,5-TP and other acidic herbicides in wheat using multicolumn-HPLC. *Int. J. Environ. Anal. Chem.*, 18 (1984) 87-99; *C.A.*, 101 (1984) 124719q.  
 1109 Seiber, J.N., McChesney, M.M., Kon, R. and Leavitt, R.A.: Analysis of glyphosate residues in kiwi fruit and asparagus using high-performance liquid chromatography of derivatized glyphosate as a cleanup step. *J. Agric. Food Chem.*, 32 (1984) 678-681.

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

- 1110 Bushway, R.J.: High-performance liquid chromatographic analysis of rotenone and rotenonone in water by direct injection. *J. Chromatogr.*, 303 (1984) 263-266.  
 1111 Ding, X.-D. and Krull, I.S.: Trace analysis for organothiophosphate agricultural chemicals by high-performance liquid chromatography - photolysis - electrochemical detection. *J. Agric. Food Chem.*, 32 (1984) 622-628.  
 1112 Gretsch, F.M. and Rosen, J.D.: Automated sample cleanup for pesticide multi-residue analysis. Part II - design and evaluation of column chromatography module. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 783-789.  
 1113 Moellhoff, E.: Method for determination of Racumin rodenticide in soil and water by high performance liquid chromatography. *Pflanzenschutz-Nachr.*, 36 (1983) 54-62; *C.A.*, 101 (1984) 124710e.  
 1114 Papadopoulou-Mourkidou, E., Iwata, Y. and Gunther, F.A.: Behavior of pyrethroid insecticides under liquid-solid chromatographic conditions. *J. Agric. Food Chem.*, 32 (1984) 800-805.  
 1115 Simonaitis, R.A. and Cail, R.S.: Chromatographic determination of tetramethrin on woolen cloth and in aqueous treatment formulations. *Chromatographia*, 18 (1984) 556-559.

For additional information see:  
*C.A.*, 101 (1984) 53464q.

See also 568.

## 30. SYNTHETIC AND NATURAL DYES

## 30a. Synthetic dyes

- 1116 McDonald, J.J., Breedon, C.R., North, B.M. and Roth, R.W.: Species and strain comparison of the metabolism of gentian violet by liver microsomes. *J. Agric. Food Chem.*, 32 (1984) 596-600.  
1117 Nishizawa, M. and Sejiko, I.: (Analysis of synthetic food dyes by high-performance liquid chromatography). *Hokkaidoritsu Eisei Kenkyushocho*, (1982) 62-64; *C.A.*, 100 (1984) 190388m.  
1118 Wilson, W.W. and Heitz, J.R.: Oxygen consumption during photobleaching of aqueous solutions of rose bengal. *J. Agric. Food Chem.*, 32 (1984) 615-617.

For additional information see:  
*C.A.*, 101 (1984) 11988h, 71147t, 116632r.

See also 152, 1290.

## 30b. Chloroplast and other natural pigments

- 1119 Almendros, G., Polo, A. and Lobo, M.C.: (Application of several types of column chromatography to the fractionation of a P-type humic acid). *An. Edafol. Agrobiol.*, 42 (1983) 955-961; *C.A.*, 101 (1984) 71621t.  
1120 Araki, S., Oohusa, T., Omata, T. and Murata, N.: Column chromatographic separation of chlorophyllide a and pheophorbide a. *Plant Cell Physiol.*, 25 (1984) 841-843; *C.A.*, 101 (1984) 86646d.  
1121 Lippolis, M.T., Concialini, V. and Chiavari, G.: Pulse polarography of nitrosated GPC fractions of humic acids. *Talanta*, 31 (1984) 207-208; *C.A.*, 100 (1984) 190745a.  
1122 Lutz, H., Fuchs, D., Fuith, L., Hausen, A., Reibneger, G. and Wachter, H.: Measurement of urinary 7,8-dihydro-6-hydroxylumazine in healthy and in Ehrlich ascites tumour bearing mice. *Hoppe Seyler's Z. Physiol. Chem.*, 356 (1984) 895-900.  
1123 Shioi, Y., Doi, M. and Sasa, T.: Separation of non-esterified chlorophylls by ion-suppression high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 141-149.

For additional information see:  
*C.A.*, 100 (1984) 207944q;  
101 (1984) 3322w, 35332r.

See also 509, 1000, 1017, 1027, 1035.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 1124 Ayorinde, A.J., Lee, C.H., Timm, D.C. and Humphrey, W.D.: Determination of thermoset resin crosslink architecture by gel permeation chromatography. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 321-331; *C.A.*, 101 (1984) 8035g.  
1125 Barth, H.G., Carlin, F.J., Jr.: A review of polymer shear degradation in size-exclusion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1717-1738.  
1126 Beasley, R.K. and Warner, J.M.: Determination of polymethylenepolyphenylene isocyanate in air by size exclusion chromatography. *Anal. Chem.*, 56 (1984) 1604-1608.  
1127 Beltzung, L. and Strazielle, C.: (Combined exclusion chromatography-light scattering. 2. Application to some particular problems). *Makromol. Chem.*, 185 (1984) 1155-1167; *C.A.*, 101 (1984) 73365m.  
1128 Beltzung, L. and Strazielle, C.: (Combined exclusion chromatography-light scattering. 1. Experimental device and study of "standard" polystyrenes). *Makromol. Chem.*, 185 (1984) 1145-1154; *C.A.*, 101 (1984) 73364k.

- 1129 Chiantore, O. and Guaita, M.: Concentration dependence of elution volumes in size exclusion chromatography of polymer molecules. I. Effect of viscosity and of coil contraction in good solvent. *J. Liq. Chromatogr.*, 7 (1984) 1867-1885.
- 1130 Chiantore, O. and Hamielec, A.E.: Molecular weight calibration of SEC using broad MWD standards-application for poly(p-methyl styrene). *J. Liq. Chromatogr.*, 7 (1984) 1753-1767.
- 1131 Das, P.K., Allen, R.D., Ward, T.C., McGrath, J.E. and Dodson, R.J.: Chain dimensions of poly(alkyl-*b*-alkyl methacrylates) in dilute solution by variable temperature size exclusion chromatography. *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)*, 25 (1984) 185-186; *C.A.*, 100 (1984) 210754h.
- 1132 Dawidowicz, A. and Sokolowski, S.: On the role of interactions of macromolecules with solid network in gel permeation chromatography. *Z. Phys. Chem. (Leipzig)*, 265 (1984) 526-537; *C.A.*, 101 (1984) 60774u.
- 1133 Dawkins, J.V., Guest, M.J. and Jeffs, G.M.F.: Molecular weight calibration in steric exclusion chromatography of diblock copolymers of polystyrene and poly(ethylene oxide). *J. Liq. Chromatogr.*, 7 (1984) 1739-1751.
- 1134 Donard, A. and Kinaudo, M.: Gel permeation chromatography of cationic polymer on cationic porous silica gels. *Polym. Commun.*, 25 (1984) 55-58; *C.A.*, 100 (1984) 210732z.
- 1135 Freeman, D.H. and Xun, L.: Sulfonated poly(styrene-divinylbenzene) networks. Scission study using aqueous size exclusion chromatography. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 355-363; *C.A.*, 101 (1984) 8036r.
- 1136 Frind, H. and Hensel, R.: Bestimmung von monomeren Acrylamid in wasserlöslichen Polymerisaten. *Fresenius' Z. Anal. Chem.*, 318 (1984) 335-338.
- 1137 Glöckner, G.: Straightforward procedure for estimating the spreading factor in SEC. *J. Liq. Chromatogr.*, 7 (1984) 1769-1788.
- 1138 Gloeckner, G.: Adsorption chromatography of flexible polymer molecules. *ACS Symp. Ser.*, 16 (New Approaches Liq. Chromatogr.) (1984) 23-33; *C.A.*, 101 (1984) 131489t.
- 1139 Gloeckner, G. and Ilchmann, D.: (High-pressure precipitation chromatography with gradient generation in the low pressure part). *Acta Polym.*, 35 (1984) 508-510; *C.A.*, 101 (1984) 55760g.
- 1140 Grazulevicius, J.V., Dubininis, N. and Kavaliunas, R.: Application of gel permeation chromatography for investigation of 9-(2,3-epoxypropyl)-carbazole oligomers. *J. Liq. Chromatogr.*, 7 (1984) 1823-1830.
- 1141 Grinshpun, V., O'Driscoll, K.F. and Rudin, A.: High-temperature size exclusion chromatography of polyethylene. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 273-280; *C.A.*, 101 (1984) 7966g.
- 1142 Hagnauer, G.L. and Pearce, P.J.: Size exclusion chromatography analysis of epoxy resin cure kinetics. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 333-354; *C.A.*, 101 (1984) 8100g.
- 1143 Haken, J.K. and Rohanna, M.A.: Chromatographic analysis after chemical degradation of polyester resins in the liquid and cured laminate forms. *J. Chromatogr.*, 298 (1984) 263-271.
- 1144 Howard, W.A., Hsu, T.-B. and Rogers, L.B.: Effects of surface area and pore size upon liquid chromatographic fractionations of polystyrene oligomers using ethylphenyl-derivatized silicas. *Separ. Sci.*, 19 (1984) 95-110.
- 1145 Janca, J.: Note of complexity of concentration effects in SEC. *J. Liq. Chromatogr.*, 7 (1984) 1903-1905.
- 1146 Janca, J., Pokorný, S., Zabransky, J. and Bleha, M.: On the concentration effects in steric exclusion chromatography under stationary equilibrium conditions. *J. Liq. Chromatogr.*, 7 (1984) 1887-1901.
- 1147 Jordan, R.C., Silver, S.F., Sehon, R.D. and Rivard, R.J.: Size exclusion chromatography with low-angle laser light-scattering detection. Application to linear and branched block copolymers. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 295-320; *C.A.*, 101 (1984) 24207c.
- 1148 Kim, D.H. and Johnson, A.F.: Computer model for gel permeation chromatography of polymers. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 25-45; *C.A.*, 101 (1984) 7888h.
- 1149 Kimura, M., Takashima, M., Nakatani, M., Kikkawa, H., Nagao, S. and Itokawa, Y.: Liquid chromatographic determination of the concentration of a vinyl chloride-vinyl acetate copolymer in biological samples. *J. Chromatogr.*, 295 (1984) 503-505.

- 1150 Krishen, A.: High-efficiency gel permeation chromatography. Applications for the analysis of oligomers and small molecules. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 241-255; *C.A.*, 101 (1984) 7841n.
- 1151 Kuo, C.Y., Provder, T. and Kah, A.F.: Liquid and size exclusion chromatography characterization of oligomers and small molecules used in coating. *Org. Coat.*, 6 (1984) 101-124; *C.A.*, 101 (1984) 8748z.
- 1152 Lecacheux, D., Lesee, J., Quivoron, C., Prechner, R. and Panaras, R.: High-temperature coupling of high-speed GPC with continuous viscometry. II. Ethylene-vinyl acetate copolymers. *J. Appl. Polym. Sci.*, 29 (1984) 1569-1579; *C.A.*, 101 (1984) 24212a.
- 1153 Lecourtier, J. and Chauveteau, G.: Xanthan fractionation by surface exclusion chromatography. *Macromolecules*, 17 (1984) 1340-1343; *C.A.*, 101 (1984) 39091j.
- 1154 Lewis, J.J., Rogers, L.B. and Pauls, R.E.: Stationary phase effects in reversed-phase high-performance liquid chromatographic fractionations of stereoisomers of styrene oligomers. *J. Chromatogr.*, 299 (1984) 331-339.
- 1155 McIntyre, D., Shih, A.L., Savoca, J., Seeger, R. and MacArthur, A.: Shear degradation of very high molecular weight polymers in gel permeation chromatography. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 227-240; *C.A.*, 101 (1984) 24205a.
- 1156 Mitsui Petrochemical Industries, Ltd.: Chromatographic fractionation of ethylene- $\alpha$ -olefin copolymers. *Jpn. Kokai Tokkyo Koho Pat.* JP 59 68,307 [84 68,307] (Cl. C08F6/00), 18 Apr. 1984, Appl. 82/178,551, 13 Oct. 1982; 12 pp.; *C.A.*, 101 (1984) 73460p.
- 1157 Mori, S.: Evaluation of Fueze's statistical methods for testing identity of size exclusion chromatography molecular weight distributions of polymers. *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 135-142; *C.A.*, 101 (1984) 7894g.
- 1158 Mori, S. and Suzuki, M.: Semimicro size exclusion chromatography for polymers: Column packing procedure and operational variables. *Anal. Chem.*, 56 (1984) 1708-1711.
- 1159 Mori, S. and Suzuki, M.: Hydrodynamic volume fluctuation of polystyrene by column temperature and its effect to retention volume in size exclusion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1841-1850.
- 1160 Mourey, T.H.: Liquid chromatographic retention of polystyrene oligomers. *Anal. Chem.*, 56 (1984) 1777-1718.
- 1161 Mourey, T.H., Noh, I. and Yu, H.: High-performance liquid-solid adsorption chromatography of spiropyran-end-labelled polystyrenes. *J. Chromatogr.*, 303 (1984) 361-369.
- 1162 Mourey, T.H., Smith, G.A. and Snyder, L.R.: Solvent selectivity in the liquid chromatographic separation of polystyrene oligomers on silica. *Anal. Chem.*, 56 (1984) 1773-1777.
- 1163 Narasimhan, V., Burns, C.M., Huang, R.Y.M. and Lloyd, D.R.: Gel permeation chromatography. Use in the determination of polymer-polymer interaction parameters. *Adv. Chem. Ser.*, 206 (Polym. Blends Compos. Multiphase Syst.) (1984) 3-15; *C.A.*, 101 (1984) 73415c.
- 1164 Nesterov, V.V., Chubarova, E.V. and Belen'kii, B.G.: (Gel permeation chromatography of linear unhydrolyzed polyacrylamides in aqueous eluents on non-modified silica sorbents). *Vysokomol. Soedin., Ser. A*, 26 (1984) 864-868; *C.A.*, 101 (1984) 7897k.
- 1165 Norrild, O., Glad, M. and Mosbach, K.: Acrylic polymer preparations containing recognition sites obtained by imprinting with substrates. *J. Chromatogr.*, 299 (1984) 29-41.
- 1166 Overton, J.R. and Browning, H.L., Jr.: Methylene chloride-hexafluoroisopropyl alcohol (70/30). Use in high-performance gel permeation chromatography of poly(ethylene terephthalate). *ACS Symp. Ser.*, 245 (Size Exclusion Chromatogr.) (1984) 219-226; *C.A.*, 101 (1984) 24204z.
- 1167 Pollack, G.M., Slaughter, R.L., Buchanan, J.F. and Shen, D.D.: High-performance liquid chromatographic procedure for the determination of di-(2-ethylhexyl) phthalate in human blood specimens. Problems of variable-extraction yield and the use of standard addition for calibration. *J. Chromatogr.*, 311 (1984) 101-108.
- 1168 Roy, D.M., Varadi, G., Tamas, F.B., Palyi, G. and Bartha, B.: Application of GPC for the analysis of the oligomer distribution of naphthalene-based superplasticizers. *Cem. Concr. Res.*, 14 (1984) 439-442; *C.A.*, 101 (1984) 11526f.

- 1169 Rudin, A., Grinshpun, V. and O'Driscoll, K.F.: Long chain branching in polyethylene. *J. Liq. Chromatogr.*, 7 (1984) 1809-1821.
- 1170 Sato, M., Adachi, T., Tanaka, A. and Yamaha, T.: Biochemical studies on phthalic esters. IV. Metabolism of diheptylphthalate in rats. *Drug. Metab. Disp.*, 12 (1984) 517-522.
- 1171 Schulz, W.W., Kaladas, J. and Schulz, D.N.: Compositional and molecular weight analysis of polyether macromonomers by chromatographic techniques. *Polym. Prepr. (Am. Chem. Soc., Div. Polym. Chem.)*, 25 (1984) 115-116; *C.A.*, 100 (1984) 210734b.
- 1172 Shi, L.-H., Ye, M.-L., Wang, W. and Ding, Y.-K.: Concentration dependence in gel permeation chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1851-1865.
- 1173 Walker, R.F., Ellwood, P.A., Hardy, H.L. and Goldberg, P.A.: Separation of isocyanate prepolymer components as their urea derivatives by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 485-491.

For additional information see:

*C.A.*, 101 (1984) 24314k, 55756k, 55758n, 55759p, 73132h, 91754s, 91791b, 91869h, 111682x, 111684y, 111684z, 111836a, 111837b, 111839c, 112481t, 131424t, 131427w, 136985m, 143208p, 152714c, 154403z.

See also 107, 297.

### 32. PHARMACEUTICAL AND BIOMEDICAL APPLICATIONS

#### 32a. Synthetic drugs

- 1174 Andermann, G. and Richard, A.: Stability-indicating determination of tetrahydrozoline hydrochloride in ophthalmic solutions by high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 189-192.
- 1175 Argoudelis, C.J.: Isocratic liquid chromatography method for the simultaneous determination of aspartame and other additives in soft drinks. *J. Chromatogr.*, 303 (1984) 256-262.
- 1176 Bevitt, R.N., Mather, J.R. and Sharman, D.C.: Minimisation of salicylic acid formation during preparation of aspirin products for analysis by high-performance liquid chromatography. *Analyst (London)*, 109 (1984) 1327-1329.
- 1177 Brower, J.F.: Liquid chromatographic determination of prednisolone in tablets and bulk drugs. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 674-676.
- 1178 Cramer, S.M., Schornagel, J.H., Kalghatgi, K.K., Bertino, J.R. and Horváth, C.: Occurrence and significance of D-methotrexate as a contaminant of commercial methotrexate. *Cancer Res.*, 44 (1984) 1843-1846.
- 1179 Crommen, J.: Ion-pairing detection technique in reversed-phase high-performance liquid chromatography of drugs and related compounds. *J. Pharm. Biomed. Anal.*, 1 (1983) 549-555; *C.A.*, 101 (1984) 157739z - a review with 22 refs.
- 1180 Daireaux, M.D., Quero, A.M. and German, A.: (Control of the virucidal activities of antiseptics or disinfectants by a Sephadex gel filtration method). *Rev. Inst. Pasteur Lyon*, 16 (1983) 167-180; *C.A.*, 100 (1984) 203019u.
- 1181 Daniels, D.H., Joe, F.L., Jr., Warner, C.R. and Fazio, T.: Liquid chromatographic determination of aspartame in dry beverage bases and sweetener tablets with confirmation by thin layer chromatography. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 513-515.
- 1182 Das Gupta, V.: Quantitation of phenobarbital and phenobarbital sodium in pharmaceutical dosage forms. *J. Pharm. Sci.*, 73 (1984) 1158-1160.
- 1183 Eiden, F. and Braatz-Greeske, K.: (Analysis of calcium antagonists. III. Verapamil, diltiazem, and perhexiline (1)). *Pharm. Ztg.*, 129 (1984) 678-685; *C.A.*, 101 (1984) 78929h.
- 1184 El-Yazigi, A.: Analysis of oxprenolol in formulations by high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 751-754.
- 1185 Gill, R., Abbott, R.W. and Moffat, A.C.: High-performance liquid chromatography systems for the separation of local anaesthetic drugs with applicability to the analysis of illicit cocaine samples. *J. Chromatogr.*, 301 (1984) 155-164.
- 1186 Guechot, C. and Nicolle, P.: Purity assay of niflumic acid by reversed-phase high performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 440-443.

- 1187 Harland, S.J., Newell, D.R., Siddik, Z.H., Chadwick, R., Calvert, A.H. and Harrap, K.R.: Pharmacokinetics of *cis*-diammine-1,1-cyclobutane dicarboxylate platinum(II) in patients with normal and impaired renal function. *Cancer Res.*, 44 (1984) 1693-1697.
- 1188 Hashimoto, K. and Matanaka, H.: (Determination of synthetic drugs illegally enriched to Chinese medicine). *Yakugaku Zasshi*, 104 (1984) 287-292; *C.A.*, 101 (1984) 12302s.
- 1189 Herrmann, R.: (Quality control of drugs with the use of HPLC). *Pharm. Ind.*, 46 (1984) 396-398; *C.A.*, 101 (1984) 137078e - a review with 8 refs.
- 1190 Hermansson, J.: Liquid chromatographic resolution of racemic drugs using a chiral  $\alpha_1$ -acid glycoprotein column. *J. Chromatogr.*, 298 (1984) 67-78.
- 1191 Irwin, W.J., Po, A.L.W. and Stephens, J.S.: Noxythiolin-high-performance liquid chromatographic assay and stability. *J. Clin. Hosp. Pharm.*, 9 (1984) 41-51; *C.A.*, 101 (1984) 12295s.
- 1192 Jonvel, P. and Andermann, G.: Determination of thenoyl peroxide by high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 193-197.
- 1193 Kirsch, L.E. and Notari, R.E.: Aqueous conversion kinetics and mechanism of ancitabine, a prodrug of the antileukemic agent cytarabine. *J. Pharm. Sci.*, 73 (1984) 896-902.
- 1194 Kirschbaum, J. and Perlman, S.: Analysis of captopril and hydrochlorothiazide combination tablet formulations by liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 686-687.
- 1195 Kloster, G. and Laufer, P.: Identification of radiopharmaceuticals by their retention on HPLC: a caveat. *Int. J. Appl. Radiat. Isot.*, 35 (1984) 545; *C.A.*, 101 (1984) 43700z.
- 1196 König, H.: Analyse von Cremes und Lotions unter besonderer Berücksichtigung von Sonnenschutzpräparaten. *Fette, Seifen, Anstrichm.*, 86 (1984) 37-41.
- 1197 Künhold, M. and Liepmann, H.: Trennprobleme bei strukturisomeren 2-Amino-benzophenonen als Zwischenprodukte zur Darstellung anellierter 1,4-Benzodiazepine. *Fresenius' Z. Anal. Chem.*, 318 (1984) 241-242.
- 1198 Kusai, A. and Ueda, S.: The stability of carboquone in aqueous solution. III. Kinetics and mechanisms of degradation of carboquone in aqueous solution. *Chem. Pharm. Bull.*, 32 (1984) 2406-2413.
- 1199 Law, B., Gill, R. and Moffat, A.C.: High-performance liquid chromatography retention data for 84 basic drugs of forensic interest on a silica column using an aqueous methanol eluent. *J. Chromatogr.*, 301 (1984) 165-172.
- 1200 Lodge, B.A. and Vincent, A.: Analysis of flumethasone pivalate formulations by high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 477-480.
- 1201 Lurie, I.S.: Problems in using high-performance liquid chromatography for drug analysis. *J. Forensic Sci.*, 29 (1984) 607-610; *C.A.*, 101 (1984) 18556z.
- 1202 Mahony, C., Brown, J.E., Stargel, W.W., Verghese, C.P. and Bjornsson, T.D.: *In vitro* stability of sodium nitroprusside solutions for intravenous administration. *J. Pharm. Sci.*, 73 (1984) 838-839.
- 1203 Maitre, J.-M., Boss, G. and Testa, B.: High-performance liquid chromatographic separation of the enantiomers of anti-inflammatory 2-arylpropionates: suitability of the method for *in vitro* metabolic studies. *J. Chromatogr.*, 299 (1984) 397-403.
- 1204 Marko, V. and Soltes, L.: (Determination of  $\beta$ -adrenolytics in biological samples. I. Chromatographic methods). *Farm. Obz.*, 53 (1984) 169-177; *C.A.*, 101 (1984) 26s - a review with 67 refs.
- 1205 Mazzo, D.J.: Simultaneous determination of maleic acid and timolol by high-performance liquid chromatography. *J. Chromatogr.*, 299 (1984) 503-507.
- 1206 Mennicke, W.H. and Rittmann, N.: Bestimmung von Aprindin im Serum mittels HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 259-260.
- 1207 Nagai, H., Kikuchi, M., Nagano, H. and Shiba, M.: The stability of nicorandil in aqueous solution. I. Kinetics and mechanism of decomposition of N-(2-hydroxyethyl)nicotinamide nitrate(ester) in aqueous solution. *Chem. Pharm. Bull.*, 32 (1984) 1063-1070.
- 1208 Naviasky, H.: Quantitative analysis of trimethobenzamide hydrochloride by ion-pair column chromatography and semiquantitative analysis of 2,3,4-trimethoxybenzoic acid by thin-layer chromatography. *J. Pharm. Sci.*, 73 (1984) 542-545.
- 1209 Nickel, S.L. and Carroll, Th.F.: Reversed-phase ion-pair high-performance liquid chromatography of naphthazarins. *J. Chromatogr.*, 295 (1984) 521-525.

- 1210 Nishimura, S., Sagisaka, M., Seino, M. and Miyamoto, K.: (High-performance liquid-chromatographic determination of anticonvulsants). *Shinkei Seishin Yakuri*, 6 (1984) 281-288; *C.A.*, 101 (1984) 103445g - a review with 16 refs.
- 1211 Noggle, F.T., Jr. and Clark, R.C.: Liquid chromatographic determination of primary and secondary amines as 8-quinoline-sulfonyl chloride derivatives. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 687-691.
- 1212 Okamoto, M. and Hibi, M.: (High performance liquid chromatographic determination of Warfarin). *Gifu-Ken Eisei Kenkyushocho*, 28 (1983) 38-39; *C.A.*, 101 (1984) 49996x.
- 1213 Pacakova, V., Stulik, K. and Tomkova, H.: Determination of some tricyclic neuroleptics by reversed-phase high-performance liquid chromatography with ultraviolet and polarographic detection. *J. Chromatogr.*, 298 (1984) 309-318.
- 1214 Palmisano, F., Cataldi, T.R.I. and Zambonin, P.G.: Anodic behavior of allopurinol and oxypurinol and their determination by high performance liquid chromatography with electrochemical detection. A preliminary note. *Ann. Chim. (Rome)*, 74 (1984) 187-196; *C.A.*, 101 (1984) 78936h.
- 1215 Reader, M.J.: Influence of isotonic agents on the stability of thimerosal in ophthalmic formulations. *J. Pharm. Sci.*, 73 (1984) 840-841.
- 1216 Richard, A., Elbaz, M. and Andermann, G.: Determination of 4-chloroaniline and chlorhexidine digluconate by ion-pair reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 298 (1984) 356-359.
- 1217 Ross, M.S.F. and Judelman, H.: Separation of E- and Z-isomers of clomiphene citrate by high-performance liquid chromatography using methenamine as mobile phase modifier. *J. Chromatogr.*, 298 (1984) 172-174.
- 1218 Ruud-Christensen, M. and Salvesen, B.: Separation of (R) and (S)-proxyphylline as diastereoisomeric camphanates by reversed-phase liquid chromatography. *J. Chromatogr.*, 303 (1984) 433-435.
- 1219 Salto, F. and Alemany, M.T.: Ion interaction chromatography of clavulanic acid on a poly(styrene-divinylbenzene) adsorbent in the presence of tetra-butylammonium salts. *J. Liq. Chromatogr.*, 7 (1984) 1477-1487.
- 1220 Sása, S., Rashid, A. and Jalal, I.: Simultaneous determination of acetaminophen and dextropropoxyphene napsylate in pharmaceutical preparations by reverse-phase HPLC. *Talanta*, 31 (1984) 397-399; *C.A.*, 101 (1984) 78932d.
- 1221 Sabille, B., Thuaud, N. and Tillement, J.P.: (Measurement of drug binding to proteins by HPLC (high-performance liquid chromatography)). *Inst. Natl. Sante Rech. Med. (Colloq.)*, 115 (Chromatogr. Liq. Haute Perform. Chim. Proteines) (1983) 169-178; *C.A.*, 101 (1984) 16646e - a review with 17 refs.
- 1222 Sengün, F.I., Ari-Ulubelen, A. and Fedai, I.: Possibilities for the determination of some benzodiazepine derivatives and a thienodiazepine by polarographic methods (DPP and DRP) combined by an Extrelut-column extraction in plasma or serum. *Sci. Pharm.*, 52 (1984) 66-72.
- 1223 Shah, G., Bradley, D. and Shek, E.: Liquid chromatographic determination of oxendazole in swine feeds. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 707-709.
- 1224 Shah, K.A., Samuels, S.A., Michaels, M.K. and Warren, J.W.: Liquid chromatographic analysis of dichlorophen and its major impurity. *J. Pharm. Sci.*, 73 (1984) 822-823.
- 1225 Shalaby, A., Budvári-Brány, Z., Szász, G. and Bauer, H.: HPLC of nitrogen-bridged compounds. *J. Liq. Chromatogr.*, 7 (1984) 1151-1168.
- 1226 Soltero, R., Robinson, J. and Adair, D.: Dissolution profile determination of a multicomponent product using a rapid liquid chromatographic analysis. *J. Pharm. Sci.*, 73 (1984) 799-803.
- 1227 Susanto, F. and Reinauer, H.: Quantitative HPLC-Bestimmung von Sulfatiam (Osipolot) im Plasma. *Fresenius' Z. Anal. Chem.*, 318 (1984) 531-532.
- 1228 Tanaka, Y., Nishikawa, Y., Matsuda, K., Yamazaki, M. and Hayashi, R.: Purification and some properties of ketone reductase forming an active metabolite of sodium 2-[4-(2-oxocyclopentylmethyl)-phenyl]-propionate dihydrate (loxoprofen sodium), a new anti-inflammatory agent, in rabbit liver cytosol. *Chem. Pharm. Bull.*, 32 (1984) 1040-1048.
- 1229 Toon, S., Mayer, J. and Rowland, M.: Liquid chromatographic determination of lipophilicity with application to a homologous series of barbiturates. *J. Pharm. Sci.*, 73 (1984) 625-627.
- 1230 Wainer, I.W., Doyle, T.D. and Adams, W.M.: Liquid chromatographic chiral stationary phases in pharmaceutical analysis: determination of trace amounts of the (-)-enantiomer in (+)-amphetamine. *J. Pharm. Sci.*, 73 (1984) 1162-1164.

- 1231 Webb, W.G. and Beckman, D.D.: Reverse phase liquid chromatographic determination of aspartame in beverages and beverage mixes. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 510-513.
- 1232 Weber, A., Opheim, K. and Smith, A.L.: Simplified high performance liquid chromatographic quantitation of antipyrine. *J. Chromatogr. Sci.*, 22 (1984) 239-240.
- 1233 Wilson, T.D.: High-performance liquid chromatographic-amperometric determination of naloxone hydrochloride injection. *J. Chromatogr.*, 298 (1984) 131-139.
- 1234 Woppard, G.A.: Effect of precipitating agents on the analysis of metronidazole by high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 222-224.
- 1235 Yamazaki, M., Suzuka, T., Ito, Y., Itoh, S., Kitamura, M., Ohashi, K., Takeda, Y., Kamada, A., Orita, Y. and Nakahama, H.: Biopharmaceutical studies of thiazide diuretics. I. Determination of  $pK_a$  values and partition coefficients of thiazide diuretics. *Chem. Pharm. Bull.*, 32 (1984) 2380-2386.
- 1236 Yeung, P.K.F., Hubbard, J.W., Baker, B.W., Looker, M.R. and Midha, K.K.: Isotopic fractionation of N-( $[^3H]$ methyl)-chlorpromazine and N-( $[^3H]$ methyl)-7-hydroxy-chlorpromazine by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 412-416.

For additional information see:

- C.A., 100 (1984) 203024s;  
101 (1984) 12291n, 28246n, 60776w, 89030j, 109066f, 137120n, 157737x,  
157740t, 157765e, 157775h.

See also 97, 170, 932, 1285, 1485.

### 32b. Pharmacokinetics studies

- 1237 Adamovics, J.: Rapid determination of metronidazole in human serum and urine using a normal-phase high-performance liquid chromatographic column with aqueous solvents. *J. Chromatogr.*, 309 (1984) 436-440.
- 1238 Allender, W.J. and Archer, A.W.: Liquid chromatographic analysis of promethazine and its major metabolites in human postmortem material. *J. Forensic Sci.*, 29 (1984) 515-526; C.A., 101 (1984) 67163c.
- 1239 Ames, M.M., Kovach, J.S. and Rubin, J.: Pharmacological characterization of teroxirone, a triepoxide antitumor agent, in rats, rabbits, and humans. *Cancer Res.*, 44 (1984) 4151-4166.
- 1240 Barkai, A.I., Suckow, R.F. and Cooper, T.B.: Imipramine and its metabolites: relationship to cerebral catecholamines in rats *in vivo*. *J. Pharmacol. Exp. Ther.*, 230 (1984) 330-335.
- 1241 Barone, S., Stitzel, R.E. and Head, R.J.: Non-radiochemical procedure for the measurement of *o*-methylation of the stereoisomers of isoprenaline. *J. Chromatogr.*, 310 (1984) 283-295.
- 1242 Basseches, P.J. and Powis, G.: Metabolism and disposition of 3-amino-1,5-dihydro-5-methyl-1- $\beta$ -D-ribofuranosyl-1,4,5,6,8-pentaazaacenaphthylene in the rat. *Cancer Res.*, 44 (1984) 3672-3678.
- 1243 Bressolle, F., Bres, J., Blanchin, M.D. and Gomeni, R.: Sulpiride pharmacokinetics in humans after intramuscular administration at three dose levels. *J. Pharm. Sci.*, 73 (1984) 1128-1136.
- 1244 Brodie, R.R., Chasseaud, L.F. and Rooney, L.: Determination of bromopride in human plasma and urine by high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 353-360.
- 1245 Brown, N.D., Stermer-Cox, M.G., Poon, B.T. and Chulay, J.D.: Separation and identification of a plasma and urinary monoacetylated conjugate of chloroquine in man by ion-pair high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 426-430.
- 1246 Caqueret, H. and Bianchetti, G.: Simple method for routine determination of betaxolol in blood and urine by automated high-performance liquid chromatography with fluorimetric detection. *J. Chromatogr.*, 311 (1984) 199-205.
- 1247 Catto, B.A., Valencia, C.I., Hafez, K., Fairchild, E.H. and Webster, L.T., Jr.: 4-Keto-niridazole: a major niridazole metabolite with central nervous system toxicity different than niridazole. *J. Pharmacol. Exp. Ther.*, 228 (1984) 662-668.
- 1248 Chapron, D.J. and White, L.B.: Determination of acetazolamide in biological fluids by reverse-phase high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 985-989.

- 1249 Ching, M.S., Mihaly, G.W., Jones, D.B. and Smallwood, R.A.: Liquid chromatographic analysis of cimetidine with procainamide as internal standard. *J. Pharm. Sci.*, 73 (1984) 1015.
- 1250 Clark, A.M., Baker, J.K. and McChesney, J.D.: Excretion, distribution, and metabolism of primaquine in rats. *J. Pharm. Sci.*, 73 (1984) 502-506.
- 1251 Clozel, J.P., Caille, G., Taeymans, Y., Theroux, P., Biron, P. and Trudel, F.: High-performance liquid chromatographic determination of diltiazem and six of its metabolites in human urine. *J. Pharm. Sci.*, 73 (1984) 771-773.
- 1252 Cooper, T.B., Suckow, R.F. and Glassman, A.: Determination of bupropion and its major basic metabolites in plasma by liquid chromatography with dual-wavelength ultraviolet detection. *J. Pharm. Sci.*, 73 (1984) 1104-1107.
- 1253 Crolla, T., Santini, F., Visconti, M. and Pifferi, G.: High-performance liquid chromatographic separation of cadralazine from its potential metabolites and degradation products. Quantitation of the drug in human plasma and urine. *J. Chromatogr.*, 310 (1984) 139-149.
- 1254 Edelson, J., Shaw, D. and Palace, G.: Pharmacokinetics of iohexol, a new nonionic radio contrast agent, in humans. *J. Pharm. Sci.*, 73 (1984) 993-995.
- 1255 El-Yazigi, A. and Martin, C.R.: Rapid determination of methotrexate and 7-hydroxymethotrexate in serum and cerebrospinal fluid by radial compression liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1579-1591.
- 1256 Fayz, S., Cherry, W.F., Dawson, J.R., Mulder, G.J. and Pang, K.S.: Inhibition of acetaminophen sulfation by 2,6-dichloro-4-nitrophenol in the perfused rat liver preparation. Lack of a compensatory increase of glucuronidation. *Drug Metab. Disp.*, 12 (1984) 323-329.
- 1257 Fielding, R.M., Waschek, J.A., Rubin, G.M., Pond, S.M. and Tozer, T.N.: Analysis of salicylamide and its metabolites in blood and urine by HPLC. *J. Liq. Chromatogr.*, 7 (1984) 1221-1234.
- 1258 Forte, A.J., Wilson, J.M., Slattery, J.T. and Nelson, S.D.: The formation and toxicity of catechol metabolites of acetaminophen in mice. *Drug. Metab. Disp.*, 12 (1984) 484-491.
- 1259 Garrett, E.R.: Bioanalyses and pharmacokinetics of nafronyl in the dog. *J. Pharm. Sci.*, 73 (1984) 635-649.
- 1260 Gento, F.M., Ziemniak, M.A., Kinkel, W.R. and McHugh, W.B.: High-performance liquid chromatographic determination of metoprolol and  $\alpha$ -hydroxymetoprolol concentrations in human serum, urine, and cerebrospinal fluid. *J. Pharm. Sci.*, 73 (1984) 961-963.
- 1261 Gluth, W.P., Soergel, F. and Von Mallinckrodt, M.C.: HPLC-assay of the beta-blocking agents oxprenolol, alprenolol, sotalol and atenolol. *ACS Symp. Ser.*, 20 (Top. Forensic Anal. Toxicol.) (1984) 113-118; *C.A.*, 101 (1984) 65425r.
- 1262 Grech-Bélanger, O., Turgeon, J. and Gilbert, M.: High pressure liquid chromatographic assay for mexiletine in serum. *J. Chromatogr. Sci.*, 22 (1984) 490-492.
- 1263 Griffeth, L.K., Rosen, G.M. and Rauckman, E.J.: Effects of model traumatic injury on hepatic drug metabolism in the rat. II. *In vivo* metabolism of hexobarbital and zoxazolamine. *Drug Metab. Disp.*, 12 (1984) 582-587.
- 1264 Griffeth, L.K., Rosen, G.M. and Rauckman, E.J.: Effects of model traumatic injury on hepatic drug metabolism in the rat. III. Differential responses of cytochrome P-450 subpopulations. *Drug Metab. Disp.*, 12 (1984) 588-595.
- 1265 Guarino, A., Taccone, W., Boffa, G., Perfetto, E. and Giulivo, R.: (Immunochemical methods for the determination of antiepileptic drugs. Statistical evaluation in comparison with chromatographic methods). *Clin. Lab.*, 8 (1984) 38-47; *C.A.*, 101 (1984) 65423p.
- 1266 Hege, H.G., Hollmann, M., Kaumeier, S. and Lietz, H.: The metabolic fate of  $^2\text{H}$ -labelled propafenone in man. *Eur. J. Drug Metab.*, 9 (1984) 41-55.
- 1267 Heizmann, P., Wendt, G., von Alten, R., Zinapoldi, K. and Buser, C.: Determination of tiapamil and of its two main metabolites in plasma and in urine by high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 119-127.
- 1268 Hermes, M. and Malbica, J.O.: High-performance liquid chromatographic determination of tracazolate and its major metabolite in plasma. *J. Pharm. Sci.*, 73 (1984) 667-670.
- 1269 Hilbert, J., Pramanik, B., Symchowicz, S. and Zampaglione, N.: The disposition and metabolism of a hypnotic benzodiazepine, wuszepam, in the hamster and mouse. *Drug Metab. Disp.*, 12 (1984) 452-459.
- 1270 Hinderling, P.H. and Roos, A.: Pharmacokinetics of the antirheumatic proquazone in healthy humans. *J. Pharm. Sci.*, 73 (1984) 332-340.

- 1271 Hunter, K.: Reversed-phase ion-pair liquid chromatographic determination of chlorophacinone residues in animal tissues. *J. Chromatogr.*, 299 (1984) 405-414.
- 1272 Ishizaki, T., Chiba, K., Suganuma, T., Sasaki, T., Kamiyama, H. and Nakano, H.: Pharmacokinetics of nicorandil, a new coronary vasodilator, in dogs. *J. Pharm. Sci.*, 73 (1984) 494-497.
- 1273 Jamali, F., Russell, A.S., Berry, B.W. and Lehmann, C.: High-performance liquid chromatographic analysis of tiaprofenic acid and its metabolites in plasma and urine by direct injection. *J. Chromatogr.*, 310 (1984) 327-333.
- 1274 Jansen, E.H.J.M., Van den Berg, R.H., Van Blitterswijk, H., Both-Miedema, R. and Stephany, R.W.: (Identification of several stilbene derivatives in bovine urine by means of high performance liquid chromatographic fractionation and immunochemical detection). *Vet. Q.*, 6 (1984) 5-7; *C.A.*, 100 (1984) 203761e.
- 1275 Johnson, E.L. and Pachla, L.A.: Improved liquid chromatographic assay for the analysis of pirmenol in plasma and urine. *J. Pharm. Sci.*, 73 (1984) 754-756.
- 1276 Johnson, S.M., Nygard, G. and Khalil, S.K.W.: Isocratic liquid chromatographic method for the determination of amoxapine and its metabolites. *J. Pharm. Sci.*, 73 (1984) 696-699.
- 1277 Kamblawi, M.O., Stevens, R.G. and Nicholls, P.J.: High-performance liquid chromatographic assay for aminoglutethimide and its acetylated metabolite in urine. *J. Chromatogr.*, 309 (1984) 431-435.
- 1278 Kapatanovic, I.M. and Kupferberg, H.J.: Analysis of *p*-hydroxyphenytoin in microsomal reactions by high-performance liquid chromatography with electrochemical detection. *J. Chromatogr.*, 310 (1984) 418-423.
- 1279 Kapatanovic, I.M. and Kupferberg, H.J.: Nafimidone, an imidazole anticonvulsant, and its metabolite as potent inhibitors of microsomal metabolism of phenytoin and carbamazepine. *Drug Metab. Disp.*, 12 (1984) 560-564.
- 1280 Kirsch, L.E. and Notari, R.E.: Pharmacokinetic prodrug modeling: *in vitro* and *in vivo* kinetics and mechanisms of ancitabine bioconversion to cytarabine. *J. Pharm. Sci.*, 73 (1984) 728-732.
- 1281 Klinge, E., Mannisto, P.T., Mantyla, R., Mattila, J. and Hanninen, U.: Simple- and multiple dose pharmacokinetics of pipemidic acid in normal human volunteers. *Antimicrob. Agents Chemother.*, 26 (1984) 69-73; *C.A.*, 101 (1984) 65543c.
- 1282 Kozu, T.: High-performance liquid chromatographic determination of nitrazepam and its metabolites in human urine. *J. Chromatogr.*, 310 (1984) 213-218.
- 1283 Kumps, A.: Simultaneous HPLC determination of oxcarbazepine, carbamazepine and their metabolites in serum. *J. Liq. Chromatogr.*, 7 (1984) 1235-1241.
- 1284 Lagerström, P.-O. and Persson, B.-A.: Determination of omeprazole and metabolites in plasma and urine by liquid chromatography. *J. Chromatogr.*, 309 (1984) 347-356.
- 1285 Lee, M.G. and Chiou, W.L.: Evaluation of potential causes for the incomplete bioavailability of furosemide: gastric first-pass metabolism. *J. Pharmacokin. Biopharm.*, 11 (1983) 623-640.
- 1286 Lewis, P.A., Woodward, A.J. and Maddock, J.: High-performance liquid chromatographic assay for N-acetylcysteine in plasma and urine. *J. Pharm. Sci.*, 73 (1984) 996-997.
- 1287 MacKichan, J.J., Coyle, J.D., Shields, B.J., Boudoulas, H. and Lima, J.J.: Fluoroimmunoassays for procainamide and N-acetylprocainamide compared with a liquid-chromatographic method. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 768-773.
- 1288 Marchiset, D., Aubert, C., Sumirtapura, Y.C., Egre, A. and Cano, J.P.: Mass spectrometric identification of amiodarone N-monodesethyl metabolite and application of an HPLC method to a pharmacokinetic study. *Eur. J. Drug Metab.*, 9 (1984) 123-128.
- 1289 Martin, B.K., Uihlein, M., Ings, R.M.J., Stevens, L.A. and McEwen, J.: Comparative bioavailability of two furosemide formulations in humans. *J. Pharm. Sci.*, 73 (1984) 437-441.
- 1290 McDonald, J.J. and Cerniglia, C.E.: Biotransformation of gentian violet to leucogentian violet by human, rat and chicken intestinal microflora. *Drug Metab. Disp.*, 12 (1984) 330-338.
- 1291 Mihaly, G.W., Ward, S.A., Edwards, G., LeOrme, M. and Breckenridge, A.M.: Pharmacokinetics of primaquine in man: identification of the carboxylic acid derivative as a major plasma metabolite. *Br. J. Clin. Pharmacol.*, 17 (1984) 441-446; *C.A.*, 100 (1984) 203091m.

- 1292 Molokhia, A.M., El-Hoofy, S. and Al-Rahman, S.: A HPLC method for the determination of butaperazine in solutions, tablets, plasma and bile. *J. Liq. Chromatogr.*, 7 (1984) 1643-1649.
- 1293 Mori, Y., Yokoya, F., Sakai, Y., Toyoshi, K. and Baba, S.: Absorption, distribution and excretion of suprofen in mice of both sexes. *Chem. Pharm. Bull.*, 32 (1984) 1106-1112.
- 1294 Moriyasu, M., Endo, M., Hashimoto, Y. and Koeda, T.: High-performance liquid chromatographic determination of organic substances by metal chelate derivatization. II. Microdetermination of methamphetamine and amphetamine. *Chem. Pharm. Bull.*, 32 (1984) 600-608.
- 1295 Nelson, W.L. and Bartels, M.J.: N-Dealkylation of propranolol in rat, dog, and man. Chemical and stereochemical aspects. *Drug Metab. Disp.*, 12 (1984) 345-352.
- 1296 Ng, K.-T., Plutte, J.A. and Galante, L.J.: Determination of bepridil in biological fluids by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 125-131.
- 1297 O'Kruk, R.J., Adams, M.A. and Phily, R.B.: Rapid and sensitive determination of acetylsalicylic acid and its metabolites using reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 343-352.
- 1298 Ou, C.-N. and Rognerud, C.L.: Simultaneous measurement of ethosuximide, primidone, phenobarbital, phenytoin, carbamazepine, and their bioactive metabolites by liquid chromatography. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1667-1670.
- 1299 Pang, K.S., Cherry, W.F., Terrell, J.A. and Ulm, E.H.: Disposition of enalapril and its diacid metabolite, enalaprilat, in a perfused rat liver preparation. Presence of a diffusional barrier for enalaprilat into hepatocytes. *Drug Metab. Disp.*, 12 (1984) 309-313.
- 1300 Pang, K.S., Huang, J.C., Finkle, C., Kong, P., Cherry, W.F. and Fayz, S.: Kinetics of procainamide N-acetylation in the rat *in vivo* and in the perfused rat liver preparation. *Drug Metab. Disp.*, 12 (1984) 314-322.
- 1301 Peng, G.W.: Assay of adinazolam in plasma by liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 1173-1174.
- 1302 Piotrovskii, V.K., Zhirkov, Yu.A. and Metelitsa, V.I.: Ion-exchange high-performance liquid chromatography in drug assay in biological fluids. IV. Nadolol diastereomers; demonstration of pharmacokinetic and binding equivalence. *J. Chromatogr.*, 309 (1984) 421-425.
- 1303 Quebbeman, E.J., Hoffman, N.E., Hamid, A.R. and Ausman, R.K.: An HPLC method for measuring 5-fluorouracil in plasma. *J. Liq. Chromatogr.*, 7 (1984) 1489-1494.
- 1304 Roering, D.L., Dahl, R.R., Dawson, C.A. and Wang, R.I.H.: Effect of plasma protein binding on the uptake of methadone and diazepam in the isolated perfused rat lung. *Drug Metab. Disp.*, 12 (1984) 536-542.
- 1305 Shoemaker, D.D., Cysyk, R.L., Gormley, P.E., DeSouza, J.J.V. and Malspeis, L.: Metabolism of 4'-(9-acridinylamino)methanesulfon-m-aniside by rat liver microsomes. *Cancer Res.*, 44 (1984) 1939-1945.
- 1306 Sidau, B. and Shaw, I.C.: Determination of sodium 2-mercaptopethanesulphonate by high-performance liquid chromatography using post-column reaction colorimetry or electrochemical detection. *J. Chromatogr.*, 311 (1984) 234-238.
- 1307 Simons, K.J., Simons, F.E.R., Luciu, G.H. and Frith, E.M.: Urinary excretion of chlorpheniramine and its metabolites in children. *J. Pharm. Sci.*, 73 (1984) 595-599.
- 1308 Sörgel, F., Lin, E.T., Hasegawa, J. and Benet, L.Z.: Liquid chromatographic analysis of triamterene and its major metabolite, hydroxytriamterene sulfate, in blood, plasma, and urine. *J. Pharm. Sci.*, 73 (1984) 831-833.
- 1309 Spahn, H., Weber, H., Mutschler, E. and Möhrke, W.:  $\alpha$ -Alkyl- $\alpha$ -acylacetatic acid derivatives as fluorescence markers for thin-layer chromatographic and high-performance liquid chromatographic assay of amines and alcohols. *J. Chromatogr.*, 310 (1984) 167-178.
- 1310 Streeter, A.J., Bjorge, S.M., Axworthy, D.B., Nelson, S.D. and Baillie, T.A.: The microsomal metabolism and site of covalent binding to protein of 3'-hydroxyacetanilide, a nonhepatotoxic positional isomer of acetaminophen. *Drug Metab. Disp.*, 12 (1984) 565-576.
- 1311 Valencia, C.I., Catto, B.A., Fairchild, E.H., Wilson, S.B., Maramba, N.C. and Webster, L.T., Jr.: Concentration-time course of niridazole and six metabolites in the serum of four Filipinos with *Schistosoma japonicum* infection. *J. Pharmacol. Exp. Ther.*, 230 (1984) 133-140.

- 1312 Valkó, K., Friedmann, T., Báti, J. and Nagykáldi, A.: Reversed-phase chromatographic system as a model for characterizing the offset rate of action of azidomorphines in guinea-pig ileum. *J. Liq. Chromatogr.*, 7 (1984) 2073-2092.
- 1313 Van der Vijgh, W.J.F., Elferink, F., Postma, G.J., Vermorken, J.B. and Pinedo, H.M.: Determination of ethylenediamineplatinum(II) malonate in infusion fluids, human plasma and urine by high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 335-342.
- 1314 Walmsley, L.M., Brodie, R.R. and Chasseaud, L.F.: Determination of carboxy-bupranolol, the major metabolite of bupranolol, in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 227-233.
- 1315 Ward, J.W., McBurney, A., Farrow, P.R. and Sharp, P.: Pharmacokinetics and hypotensive effect in healthy volunteers of pinacidil, a new potent vasodilator. *Eur. J. Clin. Pharmacol.*, 26 (1984) 603-608.
- 1316 Welsh, J., Stuart, J.F.B., Setanoians, A., Blackie, R.G.G., Billiaert, P., Halbert, G. and Calman, K.C.: The analysis and animal pharmacokinetics of 1,2,4-triglycidyl urazol using a high-pressure liquid chromatographic technique. *Cancer Chemother. Pharmacol.*, 12 (1984) 198-200; *C.A.*, 101 (1984) 65397h - cytostatics.
- 1317 Wilson, M.J. and Walle, T.: Silica gel high-performance liquid chromatography for the simultaneous determination of propranolol and 4-hydroxypropranolol enantiomers after chiral derivatization. *J. Chromatogr.*, 310 (1984) 424-430.
- 1318 Yamazaki, M., Ito, Y., Zuzuka, T., Yaginuma, H., Itoh, S., Kamada, A., Orita, Y., Nakahama, H., Nakanishi, T. and Ando, A.: Biopharmaceutical studies of thiazide diuretics. II. High-performance liquid chromatographic method for determination of hydrochlorothiazide in plasma, urine, blood cells and bile. *Chem. Pharm. Bull.*, 32 (1984) 2387-2394.

For additional information see:

*C.A.*, 100 (1984) 185255m, 185738w;  
101 (1984) 49657n, 103474r.

See also 472, 948, 1398.

### 32c. Drug monitoring

- 1319 Adams, W.J., Bombardt, P.A. and Brewer, J.E.: Normal-phase liquid chromatographic determination of alprazolam in human serum. *Anal. Chem.*, 56 (1984) 1590-1594.
- 1320 Ahr, H.J., Becker, D. and Keller, H.E.: Bestimmung der Serumkonzentrationen von Methothrexat mit einem Säulenschaltverfahren. *Fresenius' Z. Anal. Chem.*, 318 (1984) 251-252.
- 1321 Anders, J.C., Theoharides, A.D., Thomas, L.M., Smyth, M.H. and Chung, H.: High-performance liquid chromatographic method for the analysis of a candidate 8-aminoquinoline antileishmanial drug using oxidative electrochemical detection. *J. Chromatogr.*, 311 (1984) 117-123.
- 1322 Andreolini, F., Borra, C., di Corcia, A. and Samperi, R.: Direct determination of valproate in minute whole blood samples. *J. Chromatogr.*, 310 (1984) 208-212.
- 1323 Assandri, A., Perazzi, A., Fontanella, L., Ferrari, P., Ripamonti, A., Tarzia, G., Tuang, G. and Martinelli, E.: Metabolism of the neuroleptic agent zetidoline in the rat and the dog. *Drug Metab. Disp.*, 12 (1984) 635-640.
- 1324 Au, D.S.L., Kuo, T.H., Mederski-Samoraj, B. and Lee, C.S.: Disposition of ibuprofen in nephrectomized dogs. *J. Pharm. Sci.*, 73 (1984) 705-708.
- 1325 Becker, J.U.: Bestimmung der Konzentration eines neuen Antiarrhythmicums, Flecainid, im Plasma durch Hochleistungsflüssigkeitschromatographie (HPLC): Probenvorbereitung durch Extraktionssäulen. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 389-393.
- 1326 Bernareggi, A., Ratti, B. and Toselli, A.: High-performance liquid chromatography of MDL-035 in the plasma of rats, dogs and humans. *J. Liq. Chromatogr.*, 7 (1984) 2093-2101.
- 1327 Bernareggi, A., Ratti, B. and Toselli, A.: Quantitative determination of premazepam in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 415-420.
- 1328 Borondy, P.E. and Michniewicz, B.M.: Metabolic disposition of isoxicam in man, monkey, dog, and rat. *Drug Metab. Disp.*, 12 (1984) 444-451.

- 1329 Boutagy, J., More, D.G., Munro, I.A. and Shenfield, G.M.: Simultaneous analysis of cimetidine and ranitidine in human plasma by HPLC. *J. Liq. Chromatogr.*, 7 (1984) 1651-1664.
- 1330 Breyer-Pfaff, U., Wiatr, R. and Nill, K.: Measurement of maprotiline and oxaprotiline in plasma by high-performance liquid chromatography of fluorescent derivatives. *J. Chromatogr.*, 309 (1984) 107-114.
- 1331 Burton, N.K., Aherne, G.W. and Marks, V.: A novel method for the quantitation of 6-mercaptopurine in human plasma using high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 309 (1984) 409-414.
- 1332 Chandrasekaran, B. and Ardalani, B.: Determination of 3-deazaguanine in mice plasma by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 403-408.
- 1333 De Groot, G. and Grotenhuis-Mullenders, A.M.L.J.: Combined bonded-phase/liquid-liquid extraction as a rapid, specific sample-pretreatment technique for the determination of benzodiazepines in plasma by RP-HPLC. *ACS Symp. Ser.*, 20 (Top. Forensic Anal. Toxicol.) (1984) 95-103; *C.A.*, 101 (1984) 65424q.
- 1334 Dhar, A.K. and Kutt, H.: Improved liquid-chromatographic determination of haloperidol in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1228-1230.
- 1335 Dixon, J.S., Lowe, J.R. and Galloway, D.B.: Rapid method for the determination of either piroxicam or tenoxicam in plasma using high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 455-459.
- 1336 Fritz, A.K., Benziger, D.P., Peterson, J.E., Park, G.B. and Edelson, J.: Relative bioavailability and pharmacokinetics: a combination of pentazocine and acetaminophen. *J. Pharm. Sci.*, 73 (1984) 326-331.
- 1337 Gerova, Z. and Pashankov, P.: (Liquid chromatographical method for analysis of indomethacin and lonetil in plasma). *Farmatsiya*, 34 (1984) 7-11; *C.A.*, 101 (1984) 103463m.
- 1338 Gruhl, H. and Mayer, H.: Einfache und rasche Bestimmung von Thiopental im Serum mit HPLC. *J. Clin. Clin. Biochem.*, 22 (1984) 385-388.
- 1339 Gupta, R.M. and Connolly, S.: Liquid-chromatographic determination of amiodarone and its N-desethyl metabolite in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1423-1424.
- 1340 Ha, H.R., Funk, B., Berber, H.R. and Pollath, F.: Determination of bupivacaine in plasma by high-performance liquid chromatography. *Anest. Analg.*, 63 (1984) 448-450; *C.A.*, 101 (1984) 111r.
- 1341 Heizmann, P., Geschke, R. and Zinapold, K.: Determination of bromazepam in plasma and of its main metabolites in urine by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 129-137.
- 1342 Hori, R., Okumura, K., Inui, K., Yasuhara, M., Yamada, K., Sakurai, T. and Kawai, C.: Quinidine-induced rise in ajmaline plasma concentration. *J. Pharm. Pharmacol.*, 36 (1984) 202-204; *C.A.*, 101 (1984) 48200w.
- 1343 Johansson, M. and Eklund, M.-L.: Liquid chromatographic determination of meclofenamic acid in equine plasma. *J. Liq. Chromatogr.*, 7 (1984) 1609-1626.
- 1344 Juergens, U.: Routine determination of eight common anti-epileptic drugs and metabolites by high-performance liquid chromatography using a column-switching system for direct injection of serum samples. *J. Chromatogr.*, 310 (1984) 97-106.
- 1345 Keegan, M. and Kay, B.: Detection of nalbuphine in plasma: an improved high-performance liquid chromatographic assay. *J. Chromatogr.*, 311 (1984) 223-226.
- 1346 Krüger, R., Mengel, I. and Kuss, H.J.: Determination of benperidol in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 109-116.
- 1347 Kushida, K., Oka, K., Suganuma, T. and Ishizaki, T.: Simultaneous determination of lidocaine and its principal metabolites by liquid chromatography on silica gel, with aqueous eluent. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 637-640.
- 1348 Lander, C.M., Smith, M.T., Chalk, J.B., de Wytt, C., Symoniw, P., Livingstone, I. and Eadie, M.J.: Bioavailability and pharmacokinetics of phenytoin during pregnancy. *Eur. J. Clin. Pharmacol.*, 27 (1984) 105-110.
- 1349 Levitt, M.J. and Kann, J.: Choline magnesium trisalicylate: comparative pharmacokinetic study of once-daily and twice-daily dosages. *J. Pharm. Sci.*, 73 (1984) 977-979.
- 1350 Lindberg, R.L.P. and Pihlajamäki, N.: High-performance liquid chromatographic determination of bupivacaine in human serum. *J. Chromatogr.*, 309 (1984) 369-374.
- 1351 Loew, D., Barkow, D., Schuster, O. and Knoell, H.E.: Pharmacokinetic and pharmacodynamic study of the combination of furosemide retard and triamterene. *Eur. J. Clin. Pharmacol.*, 26 (1984) 191-195.

- 1352 Mamudu, D., Pashankov, P. and Iosifov, T.: (Analysis of secobarbital, clonazepam, and lonetil in plasma by reversed-phase liquid chromatography). *Farmatsiya*, 34 (1984) 50-55; *C.A.*, 101 (1984) 103472p.
- 1353 Masumoto, K., Matsumoto, K., Yoshida, A., Hayashi, S., Nambu, N. and Nagai, T.: In vitro dissolution profile and in vivo absorption study of sustained-release tablets containing chlorpheniramine maleate with water-insoluble glucan. *Chem. Pharm. Bull.*, 32 (1984) 3720-3723.
- 1354 Matlis, R. and Greenblatt, D.J.: Rapid high-performance liquid chromatographic analysis of oxaprozin, a non-steroidal antiinflammatory agent. *J. Chromatogr.*, 310 (1984) 445-449.
- 1355 McCormick, S.R., Nielsen, J. and Jatlow, P.: Quantification of alprazolam in serum or plasma by liquid chromatography. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1652-1655.
- 1356 Meering, P.G., Baumann, R.A., Zijp, J.J. and Maes, R.A.A.: Determination of misonidazole and desmethylmisonidazole in plasma by high-performance liquid chromatography with reductive electrochemical detection. *J. Chromatogr.*, 310 (1984) 149-166.
- 1357 Menge, G. and Dubois, J.P.: Determination of aminoglutethimide and N-acetyl-aminoglutethimide in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 310 (1984) 431-437.
- 1358 Midha, K.K., Rauw, G., McKay, G., Cooper, J.K. and McVittie, J.: Subnanogram quantitation of chlorpheniramine in plasma by a new radioimmunoassay and comparison with a liquid chromatographic method. *J. Pharm. Sci.*, 73 (1984) 1144-1147.
- 1359 Miner, D.J., Binkley, D.A. and Bechtol, L.D.: Liquid-chromatographic determination of penbutolol and its principal metabolites in plasma and urine. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 717-723.
- 1360 Miners, J., Adams, J.F. and Birke-t, D.J.: A simple HPLC assay for urinary paracetamol metabolites and its use to characterize the C3H mouse as a model for paracetamol metabolism studies. *Clin. Exp. Pharmacol. Physiol.*, 11 (1984) 209-217; *C.A.*, 101 (1984) 16651c.
- 1361 Miyazaki, K., Kohri, N., Arita, T., Shimono, H., Katoh, K., Nomura, A. and Yasuda, H.: High-performance liquid chromatographic determination of nifedipine in plasma. *J. Chromatogr.*, 310 (1984) 219-222.
- 1362 Nakamura, M., Kondo, K., Nishioka, R. and Kawai, S.: Improved procedure for the high-performance liquid chromatographic determination of valproic acid in serum as its phenacyl ester. *J. Chromatogr.*, 310 (1984) 450-454.
- 1363 Nazareth, A., Jaramillo, L., Karger, B.L., Giese, R.W. and Snyder, L.R.: Automated analysis of antiepileptic drugs in serum by column-switching high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 357-368.
- 1364 Nishihara, K., Kohda, Y., Saitoh, Y., Nakagawa, F. and Honda, Y.: Determination of pemoline in plasma, plasma water, mixed saliva, and urine by high-performance liquid chromatography. *Ther. Drug Monit.*, 6 (1984) 232-237; *C.A.*, 101 (1984) 48064e.
- 1365 Obeng, E.K., Wallner, J.J. and Gokhale, R.D.: Determination of the anti-neoplastic agent tiazofurin in plasma by high performance liquid chromatography. *Anal. Lett.*, 17 (1984) 607-615.
- 1366 Odland, B., Hartvig, P., Fjellström, K.E., Lindström, B. and Bengtsson, S.: Steady state pharmacokinetics of trimethoprim (300 mg once daily) in healthy volunteers assessed by two independent methods. *Eur. J. Clin. Pharmacol.*, 26 (1984) 393-397.
- 1367 Oosterhuis, B., Wetsteyn, J.C.F.M. and Van Boxtel, C.J.: Liquid chromatography with electrochemical detection for monitoring mebendazole and hydroxymebendazole in echinococcosis patients. *Ther. Drug Monit.*, 6 (1984) 215-220; *C.A.*, 101 (1984) 103454j.
- 1368 Ostrowski, J., Theumer, J., Gärtner, W., Resag, K. and Passing, H.: Determination of pirlindole in plasma and urine by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 115-123.
- 1369 Ou, Ching-Nan and Frawley, V.L.: Liquid-chromatographic determination of indomethacin in blood from newborns with patent ductus arteriosus. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 898-901.
- 1370 Patterson, S.E.: Rapid and sensitive analysis of terazosin in plasma, peritoneal dialysis solution, and urine using high-performance liquid chromatography with fluorescence detection. *J. Chromatogr.*, 311 (1984) 206-212.

- 1371 Pfadenhauer, E.H., Bankert, C.S., Jensen, J., Jones, C.E., Jenkins, E.E. and McCloskey, J.A.: Identification of the metabolites of erythro-9-(2-hydroxy-3-nonyl)hypoxanthine from laboratory animals. *Drug Metab. Disp.*, 12 (1984) 280-284.
- 1372 Rakhit, A., and Tipnis, V.: Liquid-chromatographic determination of an angiotensin converting enzyme inhibitor, CGS 13945, and its active metabolite (CGS 13934) in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1237-1239.
- 1373 Ratnaraj, N., Golberg, V. and Lescelles, P.T.: Determination of clobazam and desmethylclobazam in serum using HPLC. *Analyst (London)*, 109 (1984) 813-185.
- 1374 Schanze, J.S., Loenning, P.E., Ueland, P.M. and Kvinnslund, S.: Determination of aminoglutethimide and N-acetylaminoglutethimide in human plasma by reversed-phase liquid chromatography. *Ther. Drug Monit.*, 6 (1984) 221-226; *C.A.*, 101 (1984) 83429z.
- 1375 Shipe, J.R.: Liquid-chromatographic determination of amiodarone and its desethyl metabolite in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1259.
- 1376 Soto-Otero, R. and Sierra-Marcuno, G.: Improved simultaneous liquid-chromatographic determination of antiepileptic drugs in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 817-818.
- 1377 Sternson, L.A.: Some strategies for improving specificity and sensitivity in the analysis of anti-cancer drugs. *J. Pharm. Biomed. Anal.*, 1 (1983) 537-547; *C.A.*, 101 (1984) 122435v - a review with 30 refs.
- 1378 Swezey, C.B. and Ponzo, J.L.: Determination of disopyramide phosphate in serum by high-performance liquid chromatography. *Ther. Drug Monit.*, 6 (1984) 211-214; *C.A.*, 101 (1984) 48063d.
- 1379 Tam, Y.K., Ferguson, S.M., Yau, M.L. and Wyse, D.G.: Simple and rapid high-performance liquid chromatographic method for the analysis of sulfinpyrazone and four of its metabolites in human plasma. *J. Chromatogr.*, 310 (1984) 438-444.
- 1380 Tanioka, Y., Yasuda, Y., Aoyagi, N., Ogata, H., Kaniwa, N. and Ejima, A.: Chronic blood vessel catheterization in Göttingen miniature pigs and application to a preliminary bioavailability study of nalidixic acid. *Chem. Pharm. Bull.*, 32 (1984) 2851-2854.
- 1381 Terry, M.D., Hisayaw, G.H., Kern, J.W. and Cohen, J.L.: High-performance liquid chromatographic analysis of naloxone in human serum. *J. Chromatogr.*, 311 (1984) 213-217.
- 1382 Umeda, T., Matsuzawa, A., Ohnishi, N., Yokoyama, T., Kuroda, K. and Kuroda, T.: Physico-chemical properties and bioavailability of benoxaprofen polymorphs. *Chem. Pharm. Bull.*, 32 (1984) 1637-1640.
- 1383 Viala, A., Hou, N., Durand, A., Ba, B., Aaes-Joergensen, T. and Joergensen, A.: (Determination of *cis*-(Z)-clopenthixol and fluphenazine in whole blood and plasma by high-performance liquid chromatography using an internal standard). *J. Pharm. Belg.*, 38 (1983) 299-303; *C.A.*, 100 (1984) 185208y.
- 1384 Visser, T., Oostelbos, M.C.J.M. and Toll, J.M.M.: Reliable routine method for the determination of antidepressant drugs in plasma by high-performance liquid chromatography. *J. Chromatogr.*, 309 (1984) 81-93.
- 1385 Wiegand, U.-W., Chow, R.C., Lanz, E. and Jähnchen, E.: Determination of bupivacain in human plasma by high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 218-222.
- 1386 Wiens, R.E., Runser, D.J., Lacz, J.P. and Dommitt, D.C.: Quantitation of diltiazem and desacetyldiltiazem in dog plasma by high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 688-689.

For additional information see:

*C.A.*, 101 (1984) 16653x, 16676q, 32730h, 122453z.

See also 942, 950, 1061, 1287, 1451.

### 32d. Toxicological applications

- 1387 Crouch, D.J., Moran, D.M., Finkle, B.S. and Peat, M.A.: Quantitative analysis of emetine and cephaeline by reversed-phase high performance liquid chromatography with fluorescence detection. *J. Anal. Toxicol.*, 8 (1984) 63-65; *C.A.*, 101 (1984) 18540q.

See also 1185.

## 32e. Plant extracts

- 1388 Dalgaard, L. and Brimer, L.: Electrochemical detection of cyanogenic glycosides after enzymatic post column cleavage. *J. Chromatogr.*, 303 (1984) 67-76.
- 1389 Ergun, F., Küsmenoglu, S. and Sener, B.: High-performance liquid chromatographic determination of iridoids in *Cruciata Taurica*. *J. Liq. Chromatogr.*, 7 (1984) 1685-1689.
- 1390 Kubo, I. and Matsumoto, A.: Molluscicides from olive *Olea europaea* and their efficient isolation by countercurrent chromatographics. *J. Agric. Food Chem.*, 32 (1984) 687-688.
- 1391 Martelli, P., Bovalini, L., Ferri, S. and Franchi, G.G.: Rapid separation and quantitative determination of khellin and visnagin in *Anthr visnaga* (L.) Lam. fruits by high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 297-302.
- 1392 Miyamoto, E., Odashima, S., Kitagawa, I. and Tsuji, A.: Stability kinetics of ginsenosides in aqueous solution. *J. Pharm. Sci.*, 73 (1984) 409-410.
- 1393 Roumeliotis, P. and Unger, K.K.: Direkte Kopplung der Hochdruckextraktion mit verflüssigten und Überkritischen Gasen mit der Hochdruckflüssig-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 305-306.
- 1394 Suortti, T.: Improved analytical and preparative methods for necatorin from *Lactarius necator* (Fr.) Karst mushroom. *J. Chromatogr.*, 301 (1984) 303-307.
- 1395 Weaver, K.M., Luker, R.G. and Neale, M.E.: Rapid quality control procedure for the determination of Scoville heat units and the detection of chillies in black pepper, via high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 288-291.

For additional information see:

- C.A.*, 100 (1984) 205947u;  
101 (1984) 12274j, 12281j, 28357z, 126124r, 157744x.

See also 365, 508, 931, 978, 1110.

## 32f. Clinico-chemical applications and profiling body fluids

- 1396 Asahi Chemical Industry Co. Ltd.: (Determination of orotidine in body fluids in the diagnosis of kidney disease). *Jpn. Kokai Tokkyo Koho Pat. JP 59 50,363 [84 50,363] (Cl. GO1N33/70)*, 23 Mar. 1984, Appl. 82/160,791, 17 Sep. 1982, 4 pp.; *C.A.*, 100 (1984) 188418c.
- 1397 Chung, T.G., Saito, A., Ogawa, H., Moriyama, A., Ohkubo, I. and Sasaki, M.: Isolation and purification of human serum  $\beta_2$ -microglobulin from the hemodialysis ultrafiltrate of patients with chronic renal failure. *Clin. Chim. Acta*, 141 (1984) 247-251.
- 1398 Hoogeijns, G. and Massart, K.L.: Development of a standardized analysis strategy for basic drugs, using ion-pair extraction and high-performance liquid chromatography. VI. Drug level determination in saliva. *J. Chromatogr.*, 309 (1984) 329-337.
- 1399 Kawanishi, H., Nishiki, M., Sugiyama, M., Kimura, S., Tsuchiya, T. and Ezaki, H.: Analysis of hepatic failure by high performance gel-chromatography. *Hirosshima J. Med. Sci.*, 32 (1983) 451-454; *C.A.*, 101 (1984) 3297s.
- 1400 Neue, U.D., Ludolf, K. and Waraska, J.: (HPLC in clinical chemistry). *GIT-Suppl.*, (1984) 42-44; *C.A.*, 101 (1984) 126143w.
- 1401 Takai, N.: (Analysis of body fluids). *Kagaku, Zokan*, (1984) 193-199; *C.A.*, 101 (1984) 19878t - a review with 20 refs.
- 1402 Tyman, J.H.P., Tychopoulos, V. and Chan, P.: Long-chain phenols. XXV. Quantitative analysis of natural cashew nut-shell liquid (*Anacardium occidentale*) by high-performance liquid chromatography. *J. Chromatogr.*, 303 (1984) 137-150.

For additional information see:

- C.A.*, 101 (1984) 157518b.

See also 336, 434, 474, 500, 541, 556, 600, 749, 840, 841, 914, 953, 1051, 1419, 1420, 1423, 1437.

## 33. INORGANIC COMPOUNDS

## 33a. Cations

- 1403 Bond, A.M. and Wallace, G.G.: Liquid chromatography with electrochemical and/or spectrophotometric detection for automated determination of lead, cadmium, cobalt, nickel, and copper. *Anal. Chem.*, 56 (1984) 2085-2090.
- 1404 Cassidy, R.M. and Fraser, M.: Equilibria effects in the dynamic ion-exchange separation of metal ions. *Chromatographia*, 18 (1984) 369-373.
- 1405 Corbin, J.L.: Liquid chromatographic-fluorescence determination of ammonia from nitrogenase reactions: a 2-min assay. *Appl. Environ. Microbiol.*, 47 (1984) 1027-1030; *C.A.*, 101 (1984) 19998g.
- 1406 DeLigny, C.L.: The gel chromatographic behaviour of eluent ions on Sephadex G-10. *J. Chromatogr.*, 295 (1984) 543-546.
- 1407 Eggers, H. and Rüssel, H.A.: Chromatographische Untersuchungen von Xanthogenatkomplexen des As, Sb, Bi, Se, Te und Ni. *Fresenius' Z. Anal. Chem.*, 318 (1984) 278-279.
- 1408 Hayakawa, K., Ebina, R., Matsumoto, M. and Miyazaki, R.: (Determination of inorganic ions in some vegetables by ultraviolet photometric ion chromatography). *Bunseki Kagaku*, 33 (1984) 390-392.
- 1409 Hoover, T.B. and Yager, G.D.: Comparison of collection procedures for the reinjection ion chromatography of water. *J. Chromatogr. Sci.*, 22 (1984) 435-437.
- 1410 Hoshino, H. and Yotsuyanagi, T.: Spectrophotometric studies on ion-pair extraction equilibria of the iron(II) and iron(III) complexes with 4-(2-pyridylazo)resorcinol. *Talanta*, 31 (1984) 525-530; *C.A.*, 101 (1984) 138121a.
- 1411 Ishii, H.: Ion-exchanger analogue-derivative spectrophotometry. Determination of copper, chromium and iron. *Fresenius' Z. Anal. Chem.*, 319 (1984) 23-28.
- 1412 Ivanov, V.M., Gorbunova, G.N., Kudryavtsev, G.V., Lisichkin, G.V. and Shurupova, T.I.: (Sorption of palladium, iridium, and platinum on chemically modified silica gel). *Zh. Anal. Khim.*, 39 (1984) 504-509; *C.A.*, 101 (1984) 16364m.
- 1413 Korobeinikova, E.G., Luginin, V.A. and Tserkovnitskaya, I.A.: (Extraction chromatography as a method for the concentration of elements). *Probl. Sovrem. Khim. Koord. Soedin.*, 7 (1983) 162-177; *C.A.*, 101 (1984) 83020j - a review with 65 refs.
- 1414 Krull, I.S.: Trace metal analysis by high performance liquid chromatography. In: *Liq. Chromatogr. Environ. Anal.*, J.F. Lawrence (Editor), Humana, Clifton, 1984, 169-262 pp.; *C.A.*, 101 (1984) 142891u - a review with 206 refs.
- 1415 Liu, C.Y. and Sun, P.J.: Separation and concentration of molybdenum(IV) with chelating ion exchange resins containing sulfur ligands. *Talanta*, 31 (1984) 353-356; *C.A.*, 101 (1984) 47765x.
- 1416 Loskutova, I.M., Fadeeva, V.I., Tikhomirova, T.I. and Kudryavtsev, G.V.: (Preconcentration of zirconium and its separation from titanium using chemically modified silica gel). *Zh. Anal. Khim.*, 39 (1984) 471-475; *C.A.*, 101 (1984) 16363k.
- 1417 Lu, D., Chen, Q., Su, Y., Li, S., Jiang, G. and Zhang, C.: (Ion exchange chromatographic separation of uranium isotopes). *He Huaxue Yu Fangshe Huaxue*, 6 (1984) 71-77; *C.A.*, 101 (1984) 45173d.
- 1418 Nadkarni, M.N., Mayankutty, P.C. and Pillay, N.S.: Separation of thorium(IV) and uranium(VI) by extraction chromatography. *J. Radioanal. Nucl. Chem.*, 86 (1984) 275-280; *C.A.*, 101 (1984) 47766y.
- 1419 Nordmeyer, F.R., Chan, G.M. and Ash, K.O.: A microassay for serum dialyzable calcium and magnesium by ion chromatography. *Clin. Physiol. Biochem.*, 2 (1984) 159-165; *C.A.*, 101 (1984) 126145y.
- 1420 Pakarinen, P., Pallon, J. and Akselsson, R.: Ion exchange chromatography as a selective preconcentration method for PIXE analysis of urine. *Nucl. Instrum. Methods Phys. Res., Sect. B*, 231 (1984) 168-171; *C.A.*, 101 (1984) 68903f.
- 1421 Rocklin, R.D.: Determination of gold, palladium, and platinum at the parts-per billion level by ion chromatography. *Anal. Chem.*, 56 (1984) 1959-1962.
- 1422 Shen, Z. and Chen, Y.: (Ion exchange separation of lithium from a concentrated salt solution with a double column). *Fenxi Huaxue*, 12 (1984) 441-444; *C.A.*, 101 (1984) 65064x.
- 1423 Shintani, H., Tsuji, K. and Oba, T.: (Determination of serum cations by ion chromatography: comparison with other methods). *Bunseki Kagaku*, 33 (1984) 347-351.

- 1424 Smith, R.L., Iskandarani, Z. and Pietrzyk, D.J.: Comparison of reversed stationary phases for the chromatographic separation of inorganic analyses using hydrophobic ion mobile phase additives. *J. Liq. Chromatogr.*, 7 (1984) 1935-1959.
- 1425 Strelow, F.W.E.: Separation of tellurium from gold(III), indium, cadmium, and other elements by cation exchange chromatography in hydrochloric acid-acetone. *Anal. Chem.*, 56 (1984) 2069-2073.
- 1426 Ujimoto, K.: The gel chromatographic behaviour of eluent ions on Sephadex G-10. Reply to the letter by C.L. de Ligny. *J. Chromatogr.*, 295 (1984) 547-548.
- 1427 Victor, A.H.: Behavior of chromium during the selective separation of cobalt by cation exchange chromatography in hydrochloric acid-acetone. *S. Afr. J. Chem.*, 37 (1984) 67-73; *C.A.*, 101 (1984) 65060t.

For additional information see:

- C.A.*, 100 (1984) 220754x;  
 101 (1984) 3336d, 12312v, 16359p, 16360g, 22108x, 32467c, 32468d, 32494j, 47762u, 47768a, 65053t, 65054u, 65057x, 65067a, 65093f, 99660d, 99751j, 103109a, 103162n, 117360n, 117372t, 117416k, 117700y, 122066a, 122072z, 122073a, 122074b, 122076d, 122161c, 137690y, 139227b, 142997h, 143006b, 143013n, 143025b, 143058g, 143141m, 143143p, 162971y.

See also 121, 181, 184, 185, 1449, 1462, 1502.

### 33b. Anions

- 1428 Andrew, B.E.: Non-suppressed ion chromatography of carbonate and nitrite on steel surfaces. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 580-581.
- 1429 Barber, W.E. and Carr, P.W.: Ultra-violet visualization of inorganic anions by reversed-phase ion-interaction chromatography; factors that control retention and selectivity. *J. Chromatogr.*, 301 (1984) 25-38.
- 1430 Boselli, T., Mangia, A., Pelizzi, C. and Predieri, G.: Separation of aryl isocyanates and their cyclic oligomers by means of high-performance liquid chromatography. *Ann. Chim. (Rome)*, 74 (1984) 325-329; *C.A.*, 101 (1984) 143211j.
- 1431 Brassard, P. and Auclair, J.C.: A rapid method for separating phosphorus compounds by molecular weight using exclusion gels and centrifugation. *Water Res.*, 18 (1984) 1181-1183; *C.A.*, 101 (1984) 136701r.
- 1432 Burno, I.W.: Separation and determination of anions using reversed-phase HPLC columns. *Anal. Proc. (London)*, 21 (1984) 200-203; *C.A.*, 101 (1984) 143051g.
- 1433 Domazetis, G.: Determination of anions by non-suppressed ion chromatography using an amine column. *Chromatographia*, 18 (1984) 383-386.
- 1434 Fritz, J.S., DuVal, D.L. and Barron, R.E.: Organic acid eluents for single-column ion chromatography. *Anal. Chem.*, 56 (1984) 1177-1182.
- 1435 Heckenberg, A.L. and Haddad, P.R.: Determination of inorganic anions at parts per billion levels using single-column ion chromatography without sample preconcentration. *J. Chromatogr.*, 299 (1984) 301-305.
- 1436 Hertz, J. and Baltensperger, U.: Determination of nitrate and other inorganic anions ( $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$ ) in salad and vegetables by ion chromatography. *Fresenius' Z. Anal. Chem.*, 318 (1984) 121-123.
- 1437 Hurst, W.J., Stefovci, J.W. and White, W.J.: HPLC determination of iodide in serum using paired ion chromatography with electrochemical detection. *J. Liq. Chromatogr.*, 7 (1984) 2021-2030.
- 1438 Jackson, P.E., Haddad, P.R. and Dilli, S.: Determination of nitrate and nitrite cured meats using high-performance liquid chromatography. *J. Chromatogr.*, 295 (1984) 471-478.
- 1439 Jenke, D.R. and Pagenkopf, G.K.: Effect of analyte concentration on retention behavior in non-suppressed ion chromatography. *J. Chromatogr. Sci.*, 7 (1984) 231-233.
- 1440 Johnson, E.L. and Haak, K.K.: Anion analysis by ion chromatography. Recent developments. In: *Liq. Chromatogr. Environ. Anal.*, J.F. Laurence (Editor), Humana, Clifton, 1984, 263-300 pp.; *C.A.*, 101 (1984) 121977m - a review with 23 refs.

- 1441 Kawanishi, T., Togawa, T., Ishigami, A., Tanabe, S. and Imanari, T.: (Determination of thiosulfate in human urine and plasma by high performance liquid chromatography with a dual electrochemical detector). *Bunseki Kagaku*, 33 (1984) E295-E300.
- 1442 Korth, W. and Ellis, J.: Ion-chromatographic determination of chloride and fluoride in electrolyte from the halogen tin-plating process. *Talanta*, 31 (1984) 467-468; *C.A.*, 101 (1984) 65131s.
- 1443 Lai, S.-T., Nishina, M.M. and Sangermano, L.: Multidimensional column ion chromatographic determination of tetrafluoroborate and phosphate. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 336-337.
- 1444 Leeuwenkamp, O.R., van der Mark, E.J., van der Kaluw, P.M., van Bennikom, W.P. and Bult, A.: Reversed-phase ion-pair chromatographic method for the determination of nitroprusside in photolyzed solution. *Anal. Chim. Acta*, 161 (1984) 211-219.
- 1445 Luckas, B.: Bestimmung von  $\text{NO}_2^-$  und  $\text{NO}_3^-$  in Lebensmitteln mit Hilfe chromatographischer Methoden. *Fresenius' Z. Anal. Chem.*, 318 (1984) 428-433.
- 1446 Lulla, H., Chen, S.S. and Sena, F.J.: Simultaneous determination of nitrate and nitrite in toothpastes by high-performance liquid chromatography. *J. Pharm. Sci.*, 73 (1984) 1004-1006.
- 1447 Maish, P.J.: Indirect ultraviolet detection for ion chromatography - its optimisation and application. *Analyst (London)*, 109 (1984) 809-815.
- 1448 Marko-Varga, G., Csiky, I. and Jönsson, J.A.: Ion chromatographic determination of nitrate and sulfate in natural waters containing humic substances. *Anal. Chem.*, 56 (1984) 2066-2069.
- 1449 Maslowski, B., Zmaczynski, K., Chojnacki, R., Urban, M. and Cibis, E.: (Application of ion-exchange resins to complex analysis of products in ammonium nitrate manufacture). *Przem. Chem.*, 63 (1984) 206-208; *C.A.*, 101 (1984) 47778d.
- 1450 Miller, D.P.: Ion chromatographic analysis of Palmes tubes for nitrite. *Atmos. Environ.*, 18 (1984) 891-892; *C.A.*, 101 (1984) 136019z.
- 1451 Miller, M.E. and Cappon, Ch.J.: Anion-exchange chromatographic determination of bromide in serum. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 781-783.
- 1452 Miyashita, M., Kaji, K., Seyama, Y. and Yamashita, S.: Studies on iodinated compounds. III. High-performance liquid chromatographic determination of iodide [ $\text{I}^-$ ]. *Chem. Pharm. Bull.*, 32 (1984) 2430-2432.
- 1453 Moses, C.O., Nordstrom, D.K. and Mills, A.L.: Sampling and analyzing mixtures of sulfate, sulfite, thiosulfate and polythionate. *Talanta*, 31 (1984) 331-339; *C.A.*, 101 (1984) 47844x.
- 1454 Mullins, F.G.P. and Kirkbright, G.F.: Determination of inorganic anions by high-performance liquid chromatography using a micellar mobile phase. *Analyst (London)*, 109 (1984) 1217-1221.
- 1455 Schmidt, B. and Schwedt, G.: (Comparison of an HPLC procedure to determine nitrate in vegetable foods with photo- and potentiometric analyses). *Dtsch. Lebensm.-Rundsch.*, 80 (1984) 137-140; *C.A.*, 101 (1984) 109037x.
- 1456 Schmuckler, G., Rössner, B. and Schwedt, G.: Methods for the analysis of inorganic anions. IV. Reversed-phase high-performance liquid chromatography with aqueous hydrophobic ion pairs as eluents. *J. Chromatogr.*, 302 (1984) 15-20.
- 1457 Takano, B., McKibben, M.A. and Barnes, H.L.: Liquid chromatographic separation and polarographic determination of aqueous polythionates and thiosulfate. *Anal. Chem.*, 56 (1984) 1594-1600.
- 1458 Tarter, J.G.: Gradient elution ion chromatographic determination of inorganic anions using a continuous gradient. *Anal. Chem.*, 56 (1984) 1264-1268.
- 1459 Tarter, J.G.: The determination of non-oxidizable species using electrochemical detection in ion chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1559-1566.

For additional information see:

*C.A.*, 101 (1984) 103225k, 116487x, 122172g, 143108f, 162884x.

See also 161, 170, 181, 205, 980, 1408, 1424.

### 33d. Volatile inorganic compounds

See 1405, 1497.

## 34. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 1460 Albro, P.W., Lorenzo, J. and Schroeder, J.: Simultaneous monitoring of hydrogen-3 and carbon-14 and determination of the  $^3\text{H}/^{14}\text{C}$  ratio in the effluent of a liquid chromatograph using solid scintillators. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 310-312; *C.A.*, 101 (1984) 47911s.
- 1461 Berthold, F.: (Measurement systems for radiochromatography). *GIT-Kappel.*, (1984) 24-28; *C.A.*, 101 (1984) 118360z - a review with 11 refs.
- 1462 Jepson, B.E. and Shockley, G.C.: Calcium hydroxyde isotope effect in calcium isotope enrichment by ion exchange. *Separ. Sci.*, 19 (1984) 173-181.

For additional information see:  
*C.A.*, 101 (1984) 139229d, 162762f.

See also 625, 1195.

## 35. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

## 35a. Surfactants

- 1463 Aserin, A., Garti, N. and Frenkel, M.: HPLC analysis of non-ionic surfactants - Part V; ethoxylated fatty acids. *J. Liq. Chromatogr.*, 7 (1984) 1545-1557.
- 1464 Jandera, P.: HPLC determination of surfactants and related compounds. In: *Liq. Chromatogr. Environ. Anal.*, J.F. Lawrence (Editor), Humana, Clifton, 1984, 115-167 pp.; *C.A.*, 101 (1984) 112779w - a review with 185 refs.
- 1465 Nakamura, K. and Morikawa, Y.: Determination of surfactant mixtures in shampoos and detergents by HPLC. *J. Am. Oil Chem. Soc.*, 61 (1984) 1130-1135.

For additional information see:  
*C.A.*, 101 (1984) 60593j, 103314p.

## 35b. Antioxidants and preservatives

- 1466 Aitzetmueller, K. and Arzberger, E.: (Analysis of preservatives in fatty foods by HPLC). *Z. Lebensm.-Unters. Forsch.*, 178 (1984) 279-283; *C.A.*, 101 (1984) 89026n.
- 1467 Kitada, Y., Tamase, K., Mizobuchi, M., Sasaki, M., Tanigawa, K., Mokuyava, S. and Nakazawa, H.: (Determination of food additives by high performance liquid chromatography. IV. Determination of tert.-butylhydroquinone in oily foods and dried fish). *Shokuhin Eiseigaku Zasshi*, 25 (1984) 209-213; *C.A.*, 101 (1984) 109061a.
- 1468 Pujo Forn, M. and Lopez Sabater, M.C.: (Analysis of food antioxidants. 1. Colorimetric determination of BHA. 2. Separation and determination of gallates, BHT, BHA, TBHQ, PA and ethoxyquin by high-pressure liquid chromatography). *Circ. Farm.*, 42 (1984) 3-23; *C.A.*, 101 (1984) 71156v.

For additional information see:  
*C.A.*, 101 (1984) 22109y.

See also 1474, 1485.

## 35c. Food analysis

- 1469 Boley, N.P.: Chromatographic techniques for the analysis of food additives and contaminants. *Anal. Proc.*, 21 (1984) 67-68; *C.A.*, 100 (1984) 190349z - a review with 5 refs.
- 1470 Bosi, F., Scolari, G., Bottazzi, V. and Dellaglio, F.: (Morphology of spores DNA-DNA hybridization and HPLC tests of fermentation products from grana cheese clostridia). *Sci. Tec. Latt.-Casearia*, 35 (1984) 7-19; *C.A.*, 101 (1984) 53576c.

- 1471 Bradbury, J.H., Baines, J., Hammer, B., Anders, M. and Millar, J.S.: Analysis of sweet potato (*Ipomoea batatas*) from the highlands of Papua, New Guinea: Relevance to the incidence of *Enteritis necroticans*. *J. Agric. Food Chem.*, 32 (1984) 469-473.
- 1472 Buzila, L., Mihail, C., Andrei, D., Pandele, E. and Motas, C.: The simultaneous preparation of the active components from human milk. *Rev. Roum. Biochim.*, 21 (1984) 81-91; *C.A.*, 101 (1984) 106741m.
- 1473 Coppola, E.D.: Use of HPLC to monitor juice authenticity. *Food Technol.*, 38 (1984) 88-91; *C.A.*, 101 (1984) 37261r.
- 1474 Donhauser, S., Glas, K. and Gruber, B.: (Detection of preservatives in beer using HPLC and isotachophoresis). *Monatsschr. Brauerei*, 37 (1984) 252-258; *C.A.*, 101 (1984) 108866e.
- 1475 Ezeala, D.O.: Changes in the nutritional quality of fermented cassava tuber meal. *J. Agric. Food Chem.*, 32 (1984) 467-469.
- 1476 Frank, E., Kai nz, G. and Sontag, G.: (Determination of naringin in grapefruit juices by HPLC with electrochemical detection). *Ernährung*, 8 (1984) 195-197; *C.A.*, 101 (1984) 71163v.
- 1477 Galensa, R.: (Determination of food ingredients and additives by benzoylation using high performance liquid chromatography). *Z. Lebensm.-Unters. Forsch.*, 178 (1984) 475-478; *C.A.*, 101 (1984) 109073f.
- 1478 Gil de la Pena, M.L., Garcia Morono, E., Garrido Cintado, D. and Garrido Marquez, J.: (Application of high-performance liquid chromatography to the study of beer worts. II. Separation and quantification of wort oligosaccharides). *Cerveza Malta*, 21 (1984) 11-14; *C.A.*, 101 (1984) 88765r.
- 1479 Knudson, E.J. and Siebert, K.J.: Application of ion chromatography to beer, wort, and brewing water. *J. Amer. Soc. Brew. Chem.*, 42 (1984) 65-70; *C.A.*, 101 (1984) 70906c.
- 1480 Lego, M.C.: HPLC in the flavor/spice industry. *Food Technol.*, 38 (1984) 84-87; *C.A.*, 101 (1984) 37236m.
- 1481 Morawski, J.: Analysis of dairy products by HPLC. *Food Technol.*, 38 (1984) 70-78; *C.A.*, 101 (1984) 37260q.
- 1482 Piergiovanni, L., Volonterio, G. and Conti, G.: (Studies on the substances responsible for aroma formation in grana cheeses. II. Methods for the study of alcohois). *Ind. Latte*, 19 (1983) 89013f; *C.A.*, 101 (1984) 89013f.
- 1483 Sell, U.: Einsatz der HPLC bei der Bestimmung vitaminwirksamer Stoffe in Lebensmitteln. *Fresenius' Z. Anal. Chem.*, 318 (1984) 287-288.
- 1484 Simonaitis, R.A.: Recovery of piperonyl butoxide residues from bread made from cornmeal and wheat flour. *Pyrethrum Post*, 15 (1983) 66-70; *C.A.*, 100 (1984) 190373c.
- 1485 Tyler, T.A.: Liquid chromatographic determination of sodium saccharin, caffeine, aspartame, and sodium benzoate in cola beverages. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 745-751.
- 1486 Yamada, T., Aoki, H. and Akari, M.: Determination of residual thiabendazole in citrus fruits and bananas by high performance liquid chromatography. *Agric. Biol. Chem.*, 48 (1984) 1883-1885; *C.A.*, 101 (1984) 109070c.

For additional information see:

*C.A.*, 101 (1984) 22091m, 53456p, 53463p, 70911a.

See also 311, 356, 392, 396, 400, 413, 414, 416, 424, 538, 795, 895, 1062, 1175, 1455, 1466, 1467.

### 35d. Various technical products

- 1487 Beck, K.R., Pasad, D.M., Springer, K.S. and Player, C.M.: High-performance liquid chromatographic analysis of durable press finishes. *Text. Chem. Color.*, 16 (1984) 96-99; *C.A.*, 101 (1984) 74158h - a review with 27 refs.
- 1488 Bertoniere, N.R., Rowland, S.P., Kabir, M. and Rahman, A.: Gel permeation characteristics of jute and cotton. *Text. Res. J.*, 54 (1984) 434-437; *C.A.*, 101 (1984) 132307u.
- 1489 Bogatzki, B.F. and Marth, J.: (Liquid chromatographic characterization of spin finishes applied in the preparation of polyester fibers). *Textiltechnik (Leipzig)*, 34 (1984) 300-307; *C.A.*, 101 (1984) 132273e - a review with 49 refs.

- 1490 Elie, P. and Renaud, M.: (Application of capillary hydrodynamic chromatography to fiber classification and to fiber-microparticle separation). *Entropie*, 20 (1984) 27-31; *C.A.*, 101 (1984) 40090q.

For additional information see:

*C.A.*, 101 (1984) 27592k, 75429j, 75626w, 93778b, 113522w, 154432h, 154437p.

See also 141, 1168.

*35f. Complex mixtures and non-identified compounds*

See 286.

**36. CELLS AND CELLULAR PARTICLES**

- 1491 Ferenczi, T.: Genetic manipulation of bacterial surfaces through affinity-chromatographic selection. *Trends Biochem. Sci.*, 9 (1984) 44-48; *C.A.*, 100 (1984) 188203d.

- 1492 Margel, S.: Agarose-polyaldehyde microsphere beads: synthesis and biomedical applications, cell labeling, cell separation, affinity chromatography, and hemoperfusion. *Appl. Biochem. Biotechnol.*, 8 (1983) 523-539; *C.A.*, 101 (1984) 50902v - a review with 25 refs.

- 1493 Simion, F.A., Winek, D., Brandan, E., Fleischer, B. and Fleischer, S.: Isolation and characterization of coated vesicles from rat liver. *Methods Enzymol.*, 98 (Biomembranes, Pt. L) (1983) 326-336; *C.A.*, 100 (1984) 188209k.

See also 232, 799, 822.

**37. ENVIRONMENTAL ANALYSIS**

*37a. General papers and reviews*

- 1494 Das, B.S.: Applications of HPLC to the analysis of polycyclic aromatic hydrocarbons in environmental samples. *Liq. Chromatogr. Environ. Anal.*, (1984) 19-75; *C.A.*, 101 (1984) 143191c - a review with 165 refs.

- 1495 James, R.H., Dillon, H.K. and Miller, H.C.: Survey methods for the determination of principal organic hazardous constituents (POHCs). I. Methods for laboratory analysis. *U.S. Environ. Prot. Agency, Res. Dev.*, [Rep.] EPA, (1983) 159-173; *C.A.*, 100 (1984) 202797j.

- 1496 Kraak, J.C.: Analysis of organic micropollutants by HPLC. *Comm. Eur. Communities*, [Rep.] EUR 1984, EUR 8518, Anal. Org. Micropollut. Water, 110-119; *C.A.*, 101 (1984) 143182 - a review with 36 refs.

See also 32, 1440, 1450.

*37b. Air pollution*

- 1497 Andersson, K., Hallgren, C., Levin, J.-O. and Nilsson, C.-A.: Liquid chromatographic determination of hydrazine at sub-parts-per-million levels in workroom air as benzaldazine with the use of chemosorption on benzaldehyde-coated Amberlite XAD-2. *Anal. Chem.*, 56 (1984) 1730-1731.

- 1498 Gudehn, A.: Improved chromatographic procedure for determination of 9-(N-methylaminomethyl)anthracene isocyanate derivatives by high-performance liquid chromatography. *J. Chromatogr.*, 301 (1984) 481-484.

- 1499 Nishikawa, Y. and Kuwata, K.: Liquid chromatographic determination of low molecular weight aliphatic amines in air via derivatization with 7-chloro-4-nitro-2,1,3-benzoxaziazone. *Anal. Chem.*, 56 (1984) 1790-1793.

See also 209, 274, 283, 399, 519, 1126.

*37c. Water pollution*

- 1500 Geil, J.V., Schaefer, J. and Kraenzler, H.: (Use of HPLC (high-performance liquid chromatography with electrochemical detection in water analysis). *Gewaesserschutz, Wasser, Abwasser*, 67 (1983) 229-248; *C.A.*, 101 (1984) 59708u.
- 1501 Powell, D.H., Shroads, A.L., Mouse, J.J. and Whitlock, S.A.: Use of detector ratios for contaminant screening by high-pressure liquid chromatography. *Natl. Conf. Manage. Uncontrolled Hazard. Waste Sites*, 1983, 86-93; *C.A.*, 100 (1984) 197505f.
- 1502 Resch, G. and Gruenschlaeger, E.: (Ion chromatography - an analytical method for the study of water and wastewater). *Vom Wasser*, 62 (1984) 207-217; *C.A.*, 101 (1984) 97212k - a review with 6 refs.
- 1503 United Kingdom Dept. of the Environment (UK): High performance liquid chromatography, ion chromatography, thin layer and column chromatography of water samples 1983. Methods for the examination of waters and associated materials. *Methods Exam. Waters Assoc. Mater.*, (High Perform. Liq. Chromatogr. Ion Chromatogr., Thin Layer Column Chromatogr. Water Samples 1983), 99 pp.; *C.A.*, 101 (1984) 78392c.

For additional information see:  
*C.A.*, 101 (1984) 59624p, 78579u, 97401w, 159300y.

See also 520, 1104, 1107, 1409, 1431, 1448.

*37d. Soil pollution*

- 1504 Gregson, S.K. and Alloway, B.J.: Gel permeation chromatography studies on the speciation of lead in solutions of heavily polluted soils. *J. Soil Sci.*, 35 (1984) 55-61; *C.A.*, 100 (1984) 186764p.

See also 1092.

## Gas Chromatography

### 1. REVIEWS AND BOOKS

- 1 Ahuja, S. (Editor): *Ultrahigh Resolution Chromatography*. ACS Symp. Ser., 250. American Chemical Society, Washington, DC, 1984, VIII and 231 pp. - 13 contributions.
- 2 Blomberg, L.G.: Contemporary capillary columns for gas chromatography. *J. High Resolut. Chromatogr. Commun.*, 7 (1984) 232-244 - 146 refs.
- 3 Carr, T.W.: *Plasma Chromatography*. Plenum, New York, 1984, XIV and 259 pp.
- 4 Huber, L.: Natural gas analysis by gas chromatography instrumentation and applications. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 249-257 - 22 refs.
- 5 Ioffe, B.V. and Vitenberg, A.G.: *Head-space Analysis and Related Methods in Gas Chromatography*. Wiley, New York, 1984, XVIII and 276 pp.
- 6 Novotny, M.: Capillary separation methods: a key to high efficiency and improved detection capabilities. *Analyst (London)*, 109 (1984) 199-206 - 81 refs.
- 7 Odham, G., Larsson, L. and March, P.A. (Editors): *Gas Chromatography/Mass Spectrometry Applications in Microbiology*. Plenum Press, New York, 1984, 444 pp.
- 8 Poole, C.F. and Schuette, S.A.: *Contemporary Practice of Chromatography*. Elsevier, Amsterdam, 1984, IX and 708 pp. - also GC.
- 9 Rawdon, M.G. and Norris, T.A.: Supercritical fluid chromatography as a routine analytical technique. *Int. Lab.*, 14, No. 5 (1984) 12-23 - 22 refs.
- 10 Roth, M.: (Formation of complexes in gas-liquid chromatography). *Chem. Listy*, 78 (1984) 604-625.
- 11 Schindlbauer, H. and Zander, M.: Neuere Entwicklungen in der Mess- und Analysentechnik auf dem Mineralöl- und Kohlegebiet. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 206-211 - 60 refs.
- 12 Schreier, P.: *Chromatographic Studies of Biogenesis of Plant Volatiles*. Hüthig Verlag, Heidelberg, 1984, 180 pp.
- 13 Wagman, G.H. and Weinstein, M.J. (Editors): *Chromatography of Antibiotics*, Second completely revised edition. Elsevier, Amsterdam, 1984, XVIII and 504 pp. - also GC.
- 14 Weber, R. and Schurig, V.: Complexation gas chromatography. A valuable tool for the analysis of pheromones. *Naturwissenschaften*, 71 (1984) 408-413.

See also 116, 162, 245.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 15 Ali, S.G.A.H., Purnell, J.H. and Williams, P.S.: Window analysis optimization of gas chromatographic separations using mixed Porapaks. *J. Chromatogr.*, 302 (1984) 119-133.
- 16 Anderson, D.J. and Walters, R.R.: Effect of baseline errors on the calculation of statistical moments of tailed chromatographic peaks. *J. Chromatogr. Sci.*, 22 (1984) 353-359.
- 17 Berridge, J.C., Andrews, K.S.: Variable time-constant differentiation in chromatography. *Analyst (London)*, 109 (1984) 287-289.
- 18 Blumberg, L.M.: Minimization of errors in measurement of chromatographic retention time. *Anal. Chem.*, 56 (1984) 1726-1729.
- 19 Chaumont, P.R. and Merrill, E.W.: Analytical solution for the area under chromatographic peaks obtained from the deconvolution method of Vaidya and Hester. *J. Chromatogr.*, 303 (1984) 177-178.
- 20 Chen, S.-Y. and Peng, S.-Y.: (A theoretical approach to the correlation of retention time with peak half-width for SCOT column). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 6-10.

- 21 Chretien, J.R., Szymoniak, K., Dubois, J.E., Hirsch, R.F. and Gaydosh, R.J.: Quantitative study of structural parameters of specific adsorption of alkenes on zinc ions using gas-solid chromatography and topological data-processing technique. *J. Chromatogr.*, 294 (1984) 1-14.
- 22 Dawson, J.B. and Chilvers, D.C.: Procedure for the semi-quantitative analysis of chromatographic traces containing overlapping peaks. *Analyst (London)*, 109 (1984) 473-475.
- 23 Dellely, R.: The peak width of nearly Gaussian peaks. *Chromatographia*, 18 (1984) 374-382.
- 24 Jönsson, J.A.: Elution curves and statistical moments in non-ideal, linear chromatography. *Chromatographia*, 18 (1984) 427-433.
- 25 Laub, R.J.: Variation of gas chromatographic retentions with carrier pressure and composition. *Anal. Chem.*, 56 (1984) 2115-2119.
- 26 Rosenbaum, M., Hancil, V. and Komers, R.: Indirect method for the resolution of overlapping chromatographic peaks. *J. Chromatogr.*, 294 (1984) 31-39.
- 27 Scott, D.M. and Fritz, J.S.: Model for chromatographic separations based on renewal theory. *Anal. Chem.*, 56 (1984) 1561-1566.
- 28 Toth, A. and Zala, E.: Calculation of constants of logarithmic adjusted retention time versus carbon number function used in gas-liquid chromatography. *J. Chromatogr.*, 258 (1984) 381-387.
- 29 Weber, S.G.: Chromatographic band broadening theory using a random walk with a step-length distribution. *Anal. Chem.*, 56 (1984) 2104-2109.

See also 72, 145.

#### 2b. Thermodynamics and theoretical relationships

- 30 Hou, J.D. and Fang, Z.: (Correlation of activity coefficients at infinite dilution determined by gas chromatography using solution theory). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 46-48.
- 31 Huang, J.C. and Maday, R.: Free volume effect in the thermodynamics of gas-liquid chromatography. *J. Chromatogr.*, 298 (1984) 494-498.
- 32 Naito, K., Ogawa, H., Moriguchi, S. and Takei, S.: Adsorption effects in gas-liquid chromatography: solute retention in the hydrocarbon solute-polar liquid stationary phase (Triton X-100) system. *J. Chromatogr.*, 299 (1984) 73-85.
- 33 Novak, J.: (LeRosen's model of retention in gas-liquid chromatography involving the concomitant adsorption mechanisms). *Chem. Listy*, 78 (1984) 531-535.
- 34 Novak, J.: (Retention in linear elution gas-liquid chromatography with a real gaseous phase and non-constant capacity ratio along the column). *Chem. Listy*, 78 (1984) 536-548.
- 35 Ogan, K. and Scott, R.P.W.: Optimization of capillary parameters for gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 382-388.

See also 169.

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

- 36 Chmil', L.Ya. and Sakodynskii, K.I.: (Interrelation between retention indices and molecular structure of chlorophenoxyalkanecarboxylic acid esters). *Zh. Anal. Khim.*, 39 (1984) 1105-1111.
- 37 Garcia-Raso, A., Saura-Calixto, F. and Raso, M.A.: Study of gas chromatographic behaviour of alkenes based on molecular orbital calculations. *J. Chromatogr.*, 302 (1984) 107-117.
- 38 Golovnya, R.V. and Grigoryeva, D.N.: A thermodynamic criterion for the identification of the functional group of aliphatic compounds by gas chromatography. *Chromatographia*, 18 (1984) 449-455.
- 39 Ishida, M., Suyama, K. and Adachi, S.: Gas-liquid chromatographic retention of phthalates and their transesterified products in terms of equivalent chain length values of fatty acid methyl esters. *J. Chromatogr.*, 294 (1984) 339-343.
- 40 Priboth, I., Engewald, W., Schulze, K. and Schulze, B.: Gas chromatographic retention behaviour of Z/E-isomeric chloroallyl and chlorovinyl compounds. *J. Chromatogr.*, 294 (1984) 334-338.

- 41 Udarov, B.G.: Relation between retention parameters of methane series hydrocarbons and their molecular structure. *Zh. Anal. Khim.*, 39 (1984) 526-528.

See also 10, 199, 279.

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

- 42 Ambrus, L.: Simple and accurate determination of column dead time in gas chromatography. *J. Chromatogr.*, 294 (1984) 328-333.  
43 Domingo-Garcia, M., Fernandez-Morales, I., Lopez-Garzon, F.J. and Moreno-Castilla, C.: Adsorption of hydrocarbons on graphites and graphitized carbon black at zero surface coverage. *J. Chromatogr.*, 294 (1984) 41-50.  
44 Kopacka-Kozak, Z. and Waclawek, W.: Thermodynamic data for H-complexes of some pyridine bases with lower alcohols as determined from gas-liquid partition chromatographic measurements. *J. Chromatogr.*, 298 (1984) 319-325.  
45 Laub, R.J.: Prediction of second and cross virial coefficients of blended mobile phases in gas chromatography. *Anal. Chem.*, 56 (1984) 2110-2115.  
46 Maslowska, J. and Bazylak, G.: Chromatographic study of donor-acceptor complexes. Association between aliphatic amines or alcohols and tetradeionate  $\beta$ -ketoamine nickel(II) chelates. *J. Chromatogr.*, 298 (1984) 211-216.  
47 Parcher, J.F. and Hyver, K.J.: Gas chromatographic determination of binary adsorption isotherms. *J. Chromatogr.*, 302 (1984) 195-204.  
48 Paryjczak, T., Zielinski, P. and Farbotko, M.J.: Effect of activated sorption processes on the results of thermoprogrammed reduction investigations of Fe-Al<sub>2</sub>O<sub>3</sub> catalysts. *J. Chromatogr.*, 301 (1984) 270-272.  
49 Sugiyama, T.: Entropy of solution at infinite dilution of 1-halogenoalkanes in n-alkane solvents determined by gas-liquid chromatography. *J. Chromatogr.*, 295 (1984) 387-393.  
50 Valko, K., Papp, O. and Darvas, F.: Selection of gas chromatographic stationary phase pairs for characterization of the 1-octanol-water partition coefficient. *J. Chromatogr.*, 301 (1984) 355-364.  
51 Zygmunt, B. and Przyjazny, A.: Application of headspace gas chromatography for the investigation of kinetics of oxidation of thiols by dimethyl sulphoxide in aqueous medium. *J. Chromatogr.*, 294 (1984) 117-125.

See also 21.

**3. GENERAL TECHNIQUES**

*3a. Apparatus and accessories*

- 52 Abbott, D.J.: Valveless flow switching using constant flow controllers. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 577.  
53 Arrendale, R.F., Severson, R.F. and Chortyk, O.T.: Open split interface for capillary gas chromatography/mass spectrometry. *Anal. Chem.*, 56 (1984) 1533-1537.  
54 Card, T.W., Al-Saigh, Z.Y. and Munk, P.: Diffusion in the bubble flow meter in inverse gas chromatography experiments. *J. Chromatogr.*, 301 (1984) 261-264.  
55 Cohen, J.D.: Convenient apparatus for the generation of small amounts of diazo-methane. *J. Chromatogr.*, 303 (1984) 193-196.  
56 Etzweiler, F.: Flexible capillary effluent splitter of the "all-glass" type. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 578-579.  
57 Gao, Y.-F., Zhang, G.-Q. and Chen, T.-Y.: (Flexible glass capillary gas chromatography column). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 37-39.  
58 Grob, K., Jr. and Neukom, H.P.: Glass wool in the injector insert of quantitative analysis in splitless injection. *Chromatographia*, 18 (1984) 517-519.  
59 Hopper, M.L.: Capillary fused-silica on-column injection of chlorinated pesticides with an ultra-low volume rotary valve. *J. Chromatogr.*, 302 (1984) 205-219.  
60 Kirschmer, P. and Oehme, M.: Large sample injection method ( $>100 \mu\text{l}$ ) for capillary GC using a commercial thermodesorption unit as injection device. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 306-311.  
61 Lagesson, V. and Lagesson-Andrasko, L.: Gas flow cell with a built-in gas chromatograph for ultraviolet detection and identification. *Analyst (London)*, 109 (1984) 867-870.

- 62 Langlois, D., Mielle, P. and Etievant, P.: Device for injection of absorbent-trapped compounds on to a WCOT column. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 477-479.
- 63 Lin, K., Wang, Y.-R., Yuan, A.-Y. and Chen, S.-Y.: (Application of two-dimensional gas chromatography). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 2-5.
- 64 Okla, L. and Wesen, C.: A simple on-column injector for capillary gas chromatography. *J. Chromatogr.*, 299 (1984) 420-423.
- 65 Olesik, S.V., French, S.B. and Novotny, M.: Development of capillary supercritical fluid chromatography/Fourier transform infrared spectrometry. *Chromatographia*, 18 (1984) 489-495.
- 66 Pretorius, V., Rohwer, E.R., Hulse, G.A., Lawson, K.H. and Apps, P.J.: Deactivation of thin-walled nickel capillary columns for gas-liquid chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 429-430.
- 67 Roeraade, J., Blomberg, S. and Flodberg, G.: Miniature connector with a low dead volume for fused-silica capillary columns. *J. Chromatogr.*, 301 (1984) 454-460.
- 68 Squillaro, G.J.: A method of accessing the microprocessor of a Model Four HP 5880A Gas Chromatograph by an automated amino acid analyzer. *J. Chromatogr. Sci.*, 22 (1984) 335-338.
- 69 Takayama, Y.: (Performance of the newly-designed capillary on-column gas chromatograph). *Bunseki Kagaku*, 33 (1984) 450-452.
- 70 Whiting, L.F. and Langvardt, P.W.: On-column sampling device for thermogravimetry/capillary gas chromatography/mass spectrometry. *Anal. Chem.*, 56 (1984) 1755-1758.
- 71 Wicar, S.: Mass flow control and temperature programming in gas chromatography. I. Precise digital mass flow controller. *J. Chromatogr.*, 295 (1984) 395-403.
- 72 Wicar, S.: Mass flow control and temperature programming in gas chromatography. II. Flow continuity equation and its consequences in programmed-temperature gas chromatography. *J. Chromatogr.*, 298 (1984) 373-380.
- 73 Yang, F.J., Guidinger, D., Matthews, R., DeFord, D., Iwao, R., Ray, C. and Ogden, G.: Design and performance of a compact, economical GC. *Int. Lab.*, 14, No.6 (1984) 48-61.
- 74 Yasuoka, T., Biguchi, H., Kidokoro, T., Mitsuzawa, S. and Zimmerman, P.R.: A splitless injection technique by cold trapping on capillary column. *Bunseki Kagaku*, 33 (1984) 528-532.
- 75 Zaikin, I.D., Shakhrai, S.A. and Moissenko, V.G.: (Device for chromatographic determination of the gas component in inclusions in minerals. *Zh. Anal. Khim.*, 39 (1984) 861-865.

See also 140, 146.

### 3b. Detectors and detection reagents

- 76 Adams, A.A., Van Engelen, D.L. and Thomas, L.C.: Detection of gas chromatography eluates by simultaneous absorbance and fluorescence measurements. *J. Chromatogr.*, 303 (1984) 341-349.
- 77 Baim, M.A. and Hill, H.H., Jr.: Effects of contamination on ion mobility detection after gas chromatography. *J. Chromatogr.*, 299 (1984) 309-319.
- 78 Brazell, R.S. and Todd, R.A.: New design for helium ionization detection. *J. Chromatogr.*, 302 (1984) 257-268.
- 79 Cooper, J.R. and Taylor, L.T.: Establishing identification limits of model compounds in capillary gas chromatography/Fourier transform infrared spectrometry. *Anal. Chem.*, 56 (1984) 1989-1993.
- 80 Driscoll, J.N., Conron, D.W. and Perioli, P.: Comparison of a new electrochemical detector for gas chromatographic analysis with the electrolytic conductivity detector. *J. Chromatogr.*, 302 (1984) 269-276.
- 81 Foley, J.P. and Dorsey, J.G.: Clarification of the limit of detection in chromatography. *Chromatographia*, 18 (1984) 503-511 - applicable also to GC.
- 82 Frohne, J.C.: Ein sauerstoffspezifischer gaschromatographischer Detektor - O-FID. Erfahrungen und Einsatzmöglichkeiten. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 123-124.
- 83 Grimsrud, E.P.: Effect of positive ion/molecule reactions on the response of the electron capture detector to anthracene. *Anal. Chem.*, 56 (1984) 1797-1803.
- 84 Grimsrud, E.P. and Valkenburg, C.A.: New schemes for the electron-capture sensitization of aromatic hydrocarbons. *J. Chromatogr.*, 302 (1984) 243-256.

- 85 Grob, K.: Further development of direct aqueous injection with electron-capture detection in gas chromatography. *J. Chromatogr.*, 299 (1984) 1-11.
- 86 Hansen, D.R. and Hill, H.H., Jr.: Ionization quenching of a hydrogen atmosphere flame as a detection method for gas chromatography. *J. Chromatogr.*, 303 (1984) 331-340.
- 87 Imaoka, T., Shigezumi, T. and Ishibashi, N.: Gas chromatographic determination of aromatic molecules by supersonic jet spectrometry with resonance multiphoton ionization. *Analyst (London)*, 109 (1984) 277-279.
- 88 Lasa, J., Rosiek, J. and Sliwka, I.: Measuring circuit for automatic measurement of electron-capture detector characteristics. *J. Chromatogr.*, 299 (1984) 97-107.
- 89 Lubman, D.M.: Temperature dependence of plasma chromatography of aromatic hydrocarbons. *Anal. Chem.*, 56 (1984) 1298-1302.
- 90 Marshall, J.L. and Crowe, B.: Linearity of a flame ionisation detector for capillary gas chromatography. *Chromatographia*, 18 (1984) 393-395.
- 91 McMinn, D.G., Eatherton, R.L. and Hill, H.H., Jr.: Multiple-parameter optimization of a hydrogen-atmosphere flame ionization detector. *Anal. Chem.*, 56 (1984) 1293-1298.
- 92 Olah, K., Patonay, G. and Noszticzius, Z.: A fully linear construction of thermal conductivity detector. *J. Chromatogr. Sci.*, 22 (1984) 444-448.
- 93 Polotnyuk, V.O., Revel'skii, I.A., Leont'eva, S.A. and Grinberg, A.A.: Use of a photoionization detector for identification of components of complex hydrocarbon mixtures. *Zh. Anal. Khim.*, 39 (1984) 529-532.
- 94 Proctor, C.J. and Todd, J.F.J.: Alternative reagent ions for plasma chromatography. *Anal. Chem.*, 56 (1984) 1794-1797.
- 95 Rossiter, V.: A practical GC/FTIR detector. *Int. Lab.*, 14, No. 4 (1984) 70-75.
- 96 Rotocki, P. and Lasa, J.: Optimum conditions in constant-frequency electron-capture detection. *J. Chromatogr.*, 294 (1984) 51-63.
- 97 Simon, R. and Wells, G.: Bipolar pulsed microvolume electron-capture detector for capillary gas chromatography. *J. Chromatogr.*, 302 (1984) 221-241.
- 98 Slatkavitz, K.J., Uden, P.C., Hoey, L.D. and Barnes, R.M.: Atmospheric-pressure microwave-induced helium plasma spectroscopy for simultaneous multielement gas chromatographic detection. *J. Chromatogr.*, 302 (1984) 277-287.
- 99 Tong, H.Y. and Karasek, F.W.: Flame ionization detector response factors for compound classes in quantitative analysis of complex organic mixtures. *Anal. Chem.*, 56 (1984) 2124-2128.
- 100 Tsitsishvili, G.V., Berezkin, V.G., Andronikashvili, T.G. and Gvelesiani, Z.A.: (A modified thermionic detector with carbon monoxide as flammable agent). *Zh. Anal. Khim.*, 39 (1984) 1665-1673.
- 101 Verner, P.: Photoionization detection and its application in gas chromatography. *J. Chromatogr.*, 300 (1984) 249-264.
- 102 Zerezghi, M., Mulligan, K.J. and Caruso, J.A.: Application of a rapid scanning plasma emission detector and gas chromatography for multi-element quantification of halogenated hydrocarbons. *J. Chromatogr. Sci.*, 22 (1984) 348-352.

See also 3, 65, 140, 175, 177, 201, 238, 242, 266, 295, 361, 362, 365, 370, 426, 444.

### 3c. Sorbents, carriers, column and layer performance, packing procedures

- 103 Balla, J. and Balint, M.: Polyimide capillary column for gas-liquid chromatography. *J. Chromatogr.*, 299 (1984) 139-149.
- 104 Benedek, P., Jozsa, L. and Ettre, L.S.: Open tubular columns: The influence of changing the liquid phase film thickness on column efficiency. *Chromatographia*, 18 (1984) 367-373.
- 105 Bhagat, S.D., Panthak, M.G., Roth, M. and Novak, J.: Evaluation of tertiary phosphate esters as stationary phases for gas-liquid chromatography. *J. Chromatogr.*, 294 (1984) 167-173.
- 106 Buijten, J., Blomberg, L., Hoffmann, S., Markides, K. and Wänman, T.: Use of poly(silylene-methylphenylsiloxane) block copolymer as a thermostable stationary phase in capillary column gas chromatography. *J. Chromatogr.*, 301 (1984) 265-269.
- 107 Ceulemans, J.: The number of theoretical plates at infinite capacity: a better measure of the efficiency of gas chromatographic columns. *J. Chromatogr. Sci.*, 22 (1984) 296-299.

- 108 Charles, R. and Watabe, K.: Gas chromatographic resolution of optical isomers on two new diamide stationary phases, N-lauroyl-L-valine *tert.*-octylamide and N-docosanoyl-L-leucine *tert.*-octylamide. *J. Chromatogr.*, 298 (1984) 253-261.
- 109 Ettre, L.S.: Performance of open tubular columns as a function of tube diameter and liquid phase film thickness. *Chromatographia*, 18 (1984) 477-488.
- 110 Ettre, L.S. and Di Cesare, J.L.: GC using very thick film capillary columns. *Int. Lab.*, 14, No. 5 (1984) 44-49.
- 111 Fernandes Sanchez, E., Garcia Dominguez, J.A., Garcia Munoz, J. and Molera, M.J.: Determination of the liquid loading in gas chromatographic packings by an extraction method. *J. Chromatogr.*, 299 (1984) 151-158.
- 112 Fields, S.M., Kong, R.C., Lee, M.L. and Peaden, P.A.: Effect of stationary phase film thickness on efficiency in capillary supercritical fluid chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 423-428.
- 113 Fukuzawa, A., Moriguchi, S., Naito, K. and Takei, S.: Characterization of modified alumina as an adsorbent for gas-solid chromatography. Modification of alumina with alkali metal chloride. *J. Chromatogr.*, 295 (1984) 63-71.
- 114 Gaget, C., Morel, D. and Serpinet, J.: Kinetic properties of bonded silicas as stationary phase supports in gas chromatography: improvement of packed column efficiency. *J. Chromatogr.*, 299 (1984) 119-137.
- 115 Gaget, C., Morel, D., Traore, M. and Serpinet, J.: Analyse des silices greffées par attaque au moyen d'acide fluorhydrique aqueux et chromatographie en phase gazeuse. *Analusis*, 12 (1984) 386-392.
- 116 Görnerova, T.: (Standardisation of liquid stationary phases in GLC). *Chem. Listy*, 78 (1984) 950-959 - 32 refs.
- 117 Grob, K.: The role of column technology in capillary gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 252-257.
- 118 Grob, K. and Schilling, B.: The length of the zone flooded by the injection of large volumes onto retention gaps in capillary GC. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 531-532.
- 119 Grob, K. and Schilling, B.: Maximum column temperature during on-column injections of large sample volumes in capillary gas chromatography. *J. Chromatogr.*, 299 (1984) 415-419.
- 120 Grob, K., Jr.: Peak broadening in isothermal runs due to large retention gaps in capillary GC? *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 461-465.
- 121 Hoffmann, S., Blomberg, L.G., Buijten, J., Markides, K. and Wänman, T.: Gas chromatographic-mass spectrometric analysis of compounds generated upon thermal degradation of some stationary phases in capillary gas chromatography. *J. Chromatogr.*, 302 (1984) 95-106.
- 122 Hubball, J.A., DiMauro, P.R., Smith, S.R. and Barry, E.F.: Preliminary investigation of the effects of gamma-radiation on the surface of raw fused-silica tubing. *J. Chromatogr.*, 302 (1984) 341-350.
- 123 Huber, J.F.K. and Reich, G.: Characterization and selection of stationary phases for gas-liquid chromatography by pattern recognition methods. *J. Chromatogr.*, 294 (1984) 15-29.
- 124 Jones, B.A., Kuei, J.C., Bradshaw, J.S. and Lee, M.L.: Characterization and evaluation of cyanopropyl polysiloxane stationary phases for gas chromatography. *J. Chromatogr.*, 298 (1984) 389-397.
- 125 Kong, R.C., Woolley, C.L., Field, S.M. and Lee, M.L.: Deactivation of small-diameter fused-silica capillary columns for gas and supercritical fluid chromatography. *Chromatographia*, 18 (1984) 362-366.
- 126 Lee, M.L., Kuei, J.C., Adams, N.W., Tarbet, B.J., Nishioka, M., Jones, B.A. and Bradshaw, J.S.: Polarizable polysiloxane stationary phases for capillary column gas chromatography. *J. Chromatogr.*, 302 (1984) 303-318.
- 127 Mangani, F. and Bruner, F.: Chromatographic properties and analytical applications of a low-surface-area graphitized carbon black. *J. Chromatogr.*, 289 (1984) 85-94.
- 128 Markides, K., Blomberg, L., Hoffmann, S., Buijten, J. and Wänman, T.: Cyano-silicones as stationary phases in gas chromatography. III. Synthesis, characterization and evaluation. *J. Chromatogr.*, 302 (1984) 319-340.
- 129 Moriguchi, S. and Takei, S.: Characterization of modified alumina as an adsorbent for gas-solid chromatography. Modification with ammonium fluoride. *J. Chromatogr.*, 295 (1984) 73-80.
- 130 Poole, C.F., Butler, H.T., Coddens, M.E., Dhanesar, S.C. and Pacholec, F.: Survey of organic molten salt phases for gas chromatography. *J. Chromatogr.*, 289 (1984) 299-320.

- 131 Rudenko, B.A. and Bulycheva, Z.Yu.: (Modification of polysiloxane stationary phases by inhibitors as additives in gas chromatographic analysis of polycyclic aromatic hydrocarbons). *Zh. Anal. Khim.*, 39 (1984) 341-343.
- 132 Schomburg, G., Husmann, H., Hübinger, E. and König, W.A.: Multidimensional capillary gas chromatography-enantiomeric separations of selected cuts using a chiral second column. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 404-410.
- 133 Sterkhov, N.V., Litvin, E.F. and Chizhkov, V.P.: (High-resolution circulation gas chromatography with glass capillary columns). *Zavod. Lab.*, 50 (1984) 17-19.
- 134 Tesarik, K., Komarek, K., Skacelova, L., Janak, K. and Churacek, J.: (Capillary columns in gas chromatography. V. Treatment of glass capillary surface by etching with water vapor). *Chem. Listy*, 78 (1984) 549-556.
- 135 Witkiewicz, Z., Rudnicka, I., Szulc, J. and Dabrowski, R.: Synthesis and testing of new high-temperature liquid crystalline stationary phases. *J. Chromatogr.*, 294 (1984) 127-137.
- 136 Xu, B. and Vermeulen, N.P.E.: Free release static coating of glass capillary columns; static coating at elevated pressure: theoretical considerations and practice. *Chromatographia*, 18 (1984) 520-524.
- 137 Ziolek, A., Witkiewicz, Z. and Dabrowski, R.: Comparison of diphenylethane derivatives with lateral substituents as liquid-crystalline stationary phases in gas chromatography. *J. Chromatogr.*, 299 (1984) 159-173.
- 138 Ziolek, A., Witkiewicz, Z. and Dabrowski, R.: Effect of lateral substituents on the properties of liquid crystal molecules as stationary phases in gas chromatography. *J. Chromatogr.*, 294 (1984) 139-154.

See also 35, 50, 142, 173, 212, 218, 277, 374.

#### 3d. Quantitative analysis

- 139 Grob, K., Jr. and Bossard, M.: Effect of dirt on quantitative analyses by capillary gas chromatography with splitless injection. *J. Chromatogr.*, 294 (1984) 65-75.
- 140 Pacholec, F. and Poole, C.F.: Evaluation of a calibration marker scheme for open tubular column gas chromatography with on-column injection and electron-capture detection. *J. Chromatogr.*, 302 (1984) 289-301.
- 141 Zhan, Y.-X.: (Studies on the correction factor on peak height in gas chromatographic quantification). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 27-31.

See also 99, 412.

#### 3e. Preparative scale chromatography

- 142 Semkin, V.I., Garusov, A.V. and Vigdergauz, M.S.: (Twice-finely divided packing for preparative gas chromatography). *Zh. Prikl. Khim. (Leningrad)*, 57 (1984) 557-561.

See also 232, 262.

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

- 143 Grob, K. and Kuhn, S.: Speed of temperature increase when using large retention gaps in capillary gas chromatography. *J. Chromatogr.*, 301 (1984) 1-9.
- 144 Saxton, W.L.: Threshold temperatures for solute mobility. Their determination and effect on programmed temperature gas chromatographic separations. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 245-251.
- 145 Zenkevich, I.G.: (Generalized retention indices for gas chromatographic temperature-programmed analysis). *Zh. Anal. Khim.*, 39 (1984) 1297-1307.

See also 71, 72, 431.

**4. SPECIAL TECHNIQUES****4a. Automation and computerization**

- 146 Frank, H., Gerhardt, J., Nicholson, G.J. and Bayer, E.: Automated derivatization and gas chromatographic analysis. *Fresenius' Z. Anal. Chem.*, 317 (1984) 688-689.  
147 Wittkowski, W. and Lüthe, J.: Optimierung durch Rasteranalyse mehrdimensionalen Zielgebiete eine Anwendung in der Gaschromatographie. *Chem. Tech. (Leipzig)*, 36 (1984) 117-119.  
148 Ziegler, E. and Schomburg, G.: The application of COLACHROM, a new command language for chromatographic data processing. *J. Chromatogr.*, 290 (1984) 339-350.

**4b. Combination of various chromatographic techniques**

- 149 Grob, K., Jr., Fröhlich, D., Schilling, B., Neukom, H.P. and Nägeli, P.: Coupling of high-performance liquid chromatography with capillary gas chromatography. *J. Chromatogr.*, 295 (1984) 55-61.

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

- 150 Grinberg, A.A., Tokarev, M.I., Bigdash, T.V., Kogan, L.O. and Leont'eva, S.A.: (The use of Kovats retention indexes to chromatography-mass spectrometry analysis). *Zh. Anal. Khim.*, 39 (1984) 1127-1129.  
151 Ligon, W.V., Jr. and May, R.J.: Target compound analysis by two-dimensional gas chromatography-mass spectrometry. *J. Chromatogr.*, 294 (1984) 77-86.  
152 Meyer, T. and Christie, O.H.J.: Aspects of biomarker analysis by gas chromatography/mass spectrometry with selective metastable ion monitoring. Part 1. Experimental techniques. *Anal. Chim. Acta*, 161 (1984) 64-74.  
153 Zaikin, V.G. and Mikaya, A.I.: Reaction gas chromatography-mass spectrometry. VI. Use of deuterium as the carrier and reagent gas in reaction gas chromatography-mass spectrometry. *J. Chromatogr.*, 301 (1984) 77-91.

See also 7, 53, 70, 87, 176, 221, 222, 223, 234, 235, 237, 254, 258, 325, 327, 409, 426.

**4d. Affinity chromatography**

See 430.

**4e. Functional analysis**

- 154 Castello, G.: Gas chromatographic identification of alkyl radicals formed in plasma radiofrequency discharges by using iodine as a scavenger. *J. Chromatogr.*, 303 (1984) 61-66.

See also 298.

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

- 155 Avgul, T.V. and Belousova, M.Ya.: (Preconcentration of organic substances from aqueous solutions using Polysorb 2-6). *Zh. Anal. Khim.*, 39 (1984) 560-563.  
156 Habich, A. and Grob, K.: Filter extraction in closed loop stripping analysis (CLSA). *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 492-494.  
157 Ishikawa, K., Hobo, T., Suzuki, S. and Watabe, K.: Generation of trace amounts of alkanethiol standard gases using reaction gas chromatography. *J. Chromatogr.*, 295 (1984) 445-452.  
158 Nunez, A.J. and Bemelmans, J.M.H.: Recoveries from an aqueous model system using a semi-micro steam distillation-solvent extraction procedure. *J. Chromatogr.*, 294 (1984) 361-365.  
159 Su, H. and Bernauer, K.: Quantitation of the enantiomers of  $\beta$ -hydroxyamino acids by gas chromatographic resolution on an optically active packed column. *J. Chromatogr.*, 301 (1984) 461-464.

- 160 Vitenberg, A.G. and Kostkina, M.I.: (Absorption enrichment of volatile solution impurities by continuous gas extraction). *Zh. Anal. Khim.*, 39 (1984) 1679-1685.

See also 112, 238, 242, 271, 351, 361.

#### 4g. Separation of enantiomers

- 161 König, W.A., Steinbach, E. and Ernst, K.: Phosgene - a versatile reagent for enantiomer separation by capillary gas chromatography. *J. Chromatogr.*, 301 (1984) 129-135.  
162 Oi, N.: Enantiomer separation by chromatography with novel chiral stationary phases. *Bunseki Kagaku*, 33 (1984) E401-E411 - also GC, 43 refs.

See also 108, 333.

#### 4h. Other special techniques

- 163 Andrawes, F., Holzer, G., Roedder, E., Gibson, E.K., Jr. and Oro, J.: Gas chromatographic analysis of volatiles in fluid and gas inclusions. *J. Chromatogr.*, 302 (1984) 181-193.  
164 Breault, R., Libs, S., Hindermann, J.P. and Kiennemann, A.: Use of the head space technique to detect chemisorbed species on catalytic surfaces. *J. Chromatogr. Sci.*, 22 (1984) 449-451.  
165 Chester, T.L.: Capillary supercritical-fluid chromatography with flame-ionization detection: reduction of detection artifacts and extension of detectable molecular weight range. *J. Chromatogr.*, 299 (1984) 424-431.  
166 Gower, J.L., Risbridger, G.D. and Redrup, M.J.: tert.-Butyldimethylsilylation of ethyl 3-bromo-2-hydroxyiminopropanoate and analysis of the products by gas chromatography-mass spectrometry. *J. Chromatogr.*, 299 (1984) 259-262.  
167 Guillemin, C.L., Millet, J.L. and Hamon, E.: Steam gas-solid chromatography: a flexible separation technique. *J. Chromatogr.*, 301 (1984) 11-23.  
168 Jones, S.T.: Application of pyrolysis gas chromatography in an industrial research laboratory. *Analyst (London)*, 109 (1984) 823-828.  
169 Springston, S.R. and Novotny, M.: Mobile-phase solute mass transfer in supercritical fluid chromatography. *Anal. Chem.*, 56 (1984) 1762-1766.  
170 Vitenberg, A.G. and Reznik, T.L.: (Headspace analysis with pneumatic introduction of gas into the chromatograph). *Zh. Anal. Khim.*, 39 (1984) 683-692.

See also 158, 177.

### 5. HYDROCARBONS AND HALOGEN DERIVATIVES

#### 5a. Aliphatic hydrocarbons

- 171 Cooke, M. and Morton, C.E.: Use of thick film capillary column to determine volatile hydrocarbons produced by organometallic reactions. *J. Chromatogr.*, 298 (1984) 159-163.  
172 Lubeck, A.J. and Sutton, D.L.: Kovats retention indices of selected olefins on bonded phase fused silica capillaries. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 542-544 - 85 C<sub>4</sub>-C<sub>8</sub> olefins.  
173 Sojak, L., Kraus, G., Farkas, P. and Ostrovsky, I.: Hochleistungs-gaschromatographie an Flüssigkristallglaskapillaren. VII. Einfluss der Struktur mesogener stationärer Phasen auf die Selektivität und auf die Trennung isomerer C<sub>15</sub>-C<sub>17</sub>-n-Alkene. *J. Chromatogr.*, 294 (1984) 155-165.  
174 Wu, J. and Lu, W.-Z.: (Kovats indices of C<sub>4</sub>-C<sub>10</sub> hydrocarbons on spolar quartz capillary). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 11-16.  
175 Zharov, V.P., Montanari, S.G. and Tumanova, L.M.: (Laser-chromatographic identification of methylcyclopentadienes). *Zh. Anal. Khim.*, 39 (1984) 551-554.

See also 4, 43, 74, 152, 354, 367, 440.

*5b. Cyclic hydrocarbons*

- 176 Chiu, K.S., Biemann, K., Krishnan, K. and Hill, S.L.: Structural characterization of polycyclic aromatic compounds by combined gas chromatography/mass spectrometry and gas chromatography/Fourier transform infrared spectrometry. *Anal. Chem.*, 56 (1984) 1610-1615.
- 177 Norris, T.A. and Rawdon, M.G.: Determination of hydrocarbon types in petroleum liquids by supercritical fluid chromatography with flame ionization detection. *Anal. Chem.*, 56 (1984) 1767-1769.
- 178 Novrocík, J., Novrocíková, M. and Foniok, J.: (Preparation and capillary gas chromatography of polymethyl- and ethylmethylbiphenyls and polymethyldiphenylmethanes). *Collect. Czech. Chem. Commun.*, 49 (1984) 218-230.
- 179 Pankow, J.F. and Rosen, M.E.: The analysis of volatile compounds by purge and trap with whole column cryotrapping (WCC) on a fused silica capillary column. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 504-508.

See also 84, 89, 411, 414, 417, 446, 460.

*5c. Halogen derivatives*

- 180 Zlatkis, A., Ghaoui, L., Wang, F.-S. and Shanfield, H.: Direct gas chromatographic analysis of halogenated hydrocarbons at the part-per-trillion level. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 370-374.

See also 49, 102, 279, 391, 409, 438, 451, 452, 466.

## 6. ALCOHOLS

- 181 Smith, N.B.: Determination of volatile alcohols and acetone in serum by non-polar capillary gas chromatography after direct sample injection. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1672-1674.

See also 344, 368, 408, 410, 441.

## 7. PHENOLS

- 182 Butte, W.: Determination of free and total pentachlorophenol in urine. *Presenius' Z. Anal. Chem.*, 317 (1984) 659.
- 183 Du, Y., Oshima, R., Iwatsuki, H. and Kumanotani, J.: High-resolution gas-liquid chromatographic analysis of urushiol of the lac tree, *Rhus vernicifera*, without derivatization. *J. Chromatogr.*, 295 (1984) 179-186.
- 184 Kalman, D.A.: Determination of pentachlorophenol and 2,3,4,5-tetrachlorophenol in human urine by high resolution gas chromatography. *J. Chromatogr. Sci.*, 22 (1984) 452-455.
- 185 Korhonen, I.O.O.: Gas-liquid chromatographic analyses. XXVIII. Capillary column studies of chlorinated anisoles. *J. Chromatogr.*, 294 (1984) 99-116.
- 186 Korhonen, I.O.O.: Gas-liquid chromatographic analyses. XXIX. Separation of free chlorophenol isomers on non-polar and polar quartz capillary columns. *J. Chromatogr.*, 303 (1984) 197-205.

See also 189, 191, 311, 377, 386, 434, 449, 458, 468.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

8b. *Aflatoxins and other mycotoxins*

- 187 Schmidt, R., Lenz, K., Flesch, P. and Dose, K.: Analysis of T-2 toxin by HPLC and GC in samples of corn and oats. *Fresenius' Z. Anal. Chem.*, 317 (1984) 665-666.

See also 398.

8c. *Other compounds with heterocyclic oxygen*

- 188 Ligon, W.V., Jr. and May, R.J.: Isomer specific analysis of selected chlorodibenzofurans. *J. Chromatogr.*, 294 (1984) 87-98.  
189 Ryan, J.J., Lizotte, R. and Newsome, W.H.: Study of chlorinated diphenyl ethers and chlorinated 2-phenoxyphenols as interferences in the determination of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans in biological samples. *J. Chromatogr.*, 303 (1984) 351-360.

See also 457, 464.

## 9. OXO COMPOUNDS, ETHERS AND EPOXIDES

- 190 Harvey, T.G. and Matheson, T.W.: 1,3-Dithiolane derivatives for gas chromatographic and gas chromatographic-mass spectrometric determination of acyclic carbonyl compounds. *J. Chromatogr.*, 298 (1984) 273-277.  
191 Korhonen, I.O.O.: Gas-liquid chromatographic analyses. XXX. Separation and retention increments of chlorinated salicylaldehydes (2-hydroxybenzaldehydes) on low-polarity (SE-30) and polar (OV-351) capillary columns. *J. Chromatogr.*, 298 (1984) 101-114.  
192 Van Eijk, G.W. and Roeijmans, H.J.: Separation and identification of naturally occurring anthraquinones by capillary gas chromatography-mass spectrometry. *J. Chromatogr.*, 295 (1984) 497-502.

See also 181, 189, 292, 299, 304, 348, 410, 432, 443.

## 10. CARBOHYDRATES

10a. *Mono and oligosaccharides. Structural studies*

- 193 Alen, R., Niemelä, K. and Sjöström, E.: Gas-liquid chromatographic separation of hydroxy monocarboxylic acids and dicarboxylic acids on a fused-silica capillary column. *J. Chromatogr.*, 301 (1984) 273-276.  
194 Johnson, S.L., Bliss, M., Mayersohn, M. and Conrad, K.A.: Phloroglucinol-based colorimetry of xylose in plasma and urine compared with a specific gas-chromatographic procedure. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1571-1574.  
195 Lehrfeld, J.: Gas chromatographic analysis of mixtures containing aldonic acids, alditols, and glucose. *Anal. Chem.*, 56 (1984) 1803-1806.  
196 Molnar-Perl, I., Pinter-Szakacz, M., Kővago, A. and Petroczy, J.: Gas-liquid chromatographic determination of the raffinose family of oligosaccharides and their metabolites present in soybeans. *J. Chromatogr.*, 295 (1984) 433-443.  
197 Odam, E.M., Wardall, H.P., Bailey, S. and Findlay, E.: Determination of  $\alpha$ -chloralose residues in vertebrate tissues by gas-liquid chromatography. *Analyst (London)*, 109 (1984) 1335-1338.  
198 Tanner, G.R. and Morrison, I.M.: Gas chromatography-mass spectrometry of partially methylated glucoses as their aldononitrile peracetates. *J. Chromatogr.*, 299 (1984) 252-258.  
199 Tomori, E. and Kuszmánn, J.: Capillary gas chromatography of D-mannitol acetals. Correlation between structure and retention. *J. Chromatogr.*, 299 (1984) 87-96.

- 200 Traitler, H., Del Vedovo, S. and Schweizer, T.F.: Gas chromatographic separation of sugars by on-column injection on glass capillary columns. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 558-562.
- 201 Whenham, R.J.: Sensitive assay for amino sugars using capillary gas chromatography with nitrogen-selective detection. *J. Chromatogr.*, 303 (1984) 380-385.
- 10b. *Polysaccharides, mucopolysaccharides, lipopolysaccharides*
- 202 Brondz, I. and Olsen, I.: Differentiation between *Actinobacillus actinomycetemcomitans* and *Haemophilus aphrophilus* based on carbohydrates in lipopolysaccharide. *J. Chromatogr.*, 310 (1984) 261-272.

## 11. ORGANIC ACIDS AND LIPIDS

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

- 203 Bauer, S., Neupert, M. and Spiteller, G.: Characterization of artefacts produced by treatment of organic acids with diazomethane. *J. Chromatogr.*, 309 (1984) 243-259.
- 204 Binder, H., Weis, L. and Janz, P.: Reaktions-gaschromatographische Untersuchungen an 3-Oxocarbonsäureestern mit tautomerer Enolform. I. Eine halbquantitative Studie. *J. Chromatogr.*, 303 (1984) 375-379.
- 205 Early, R.J., Thompson, J.R., McAllister, T., Fenton, T.W. and Christopherson, R.J.: Branched-chain  $\alpha$ -keto acid analysis in biological fluids: preparative clean-up by anion-exchange and analysis by capillary gas chromatography. *J. Chromatogr.*, 310 (1984) 1-10.
- 206 Haken, J.K. and Korhonen, I.O.O.: Gas chromatography of homologous esters. XXV. Capillary column studies of monochlorinated C<sub>5</sub>-C<sub>18</sub> n-carboxylic esters. *J. Chromatogr.*, 298 (1984) 89-100.
- 207 Haken, J.K., Madden, B.G. and Korhonen, I.O.O.: Gas chromatography of homologous esters. XXVI. Capillary column studies of the chloromethyl esters of C<sub>5</sub>-C<sub>12</sub> n-carboxylic acids. *J. Chromatogr.*, 298 (1984) 150-158.
- 208 Koch, E., Nicholson, G.J. and Bayer, E.: Enantiomeric separation of halocarboxylic acids by capillary gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 398-403.
- 209 Körtvelyessy, G., Szoradi, S., Sztruha, I. and Ladanyi, L.: Gas chromatography of 3,7,11-trimethyl-11-hydroxy-(or-methoxy)-2,4-dodecadienoic acids and related compounds as their methyl or trimethylsilyl esters. *J. Chromatogr.*, 303 (1984) 370-374.
- 210 Liebich, H.M. and Först, C.: Hydroxycarboxylic and oxocarboxylic acids in urine: products from branched-chain amino acid degradation and from ketogenesis. *J. Chromatogr.*, 309 (1984) 225-242.
- 211 Mayr, M., Prantz, E. and Kratzl, K.: Gas chromatographic separation of diterpene acids modified with maleic anhydride and fumaric acid. *J. Chromatogr.*, 295 (1984) 423-432.
- 212 Pörschmann, J., Welsch, T., Engewald, W. and Vigh, G.: Characterization of OV-1/FFAP-mixture coated glass capillary columns used for the separation of free fatty acids. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 509-514.
- 213 Saito, S., Miki, T., Ito, H. and Kamoda, M.: (Studies on the separation of organic acid butyl esters by gas-liquid chromatography). *Bunseki Kagaku*, 33 (1984) 209-212.
- 214 Steverink, A.T.G.: Gas-chromatographic method for the determination of volatile fatty acids (C<sub>1</sub>-C<sub>7</sub>) and lactic acid. *Analyst (London)*, 109 (1984) 179-180.
- 215 Wang, C., Frank, H., Bayer, E. and Lu, P.: Derivatization of 2-hydroxyalkanoic acids for gas chromatographic enantiomer separation. *Chromatographia*, 18 (1984) 387-388.

See also 36, 39, 193, 314, 376, 389, 404.

*11b. Prostaglandins*

- 216 Pace-Asciak, C.R. and Micallef, S.: Gas chromatographic-mass spectrometric profiling with negative-ion chemical ionization detection of prostaglandins and their 15-keto and 15-keto-13,14-dihydrocatabolites in rat blood. *J. Chromatogr.*, 310 (1984) 233-242.

*11c. Lipids and their constituents*

- 217 Allen, K.G., MacGee, J., Fellows, M.E., Tornheim, P.A. and Wagner, K.R.: A new procedure to analyze free fatty acids. Application to 20-mg brain tissue samples. *J. Chromatogr.*, 309 (1984) 33-42.
- 218 Golovnya, R.V., Kuz'menko, T.E. and Vasil'ev, A.V.: Stable and reproducible selective glass capillary columns with polysiloxane stationary phases for the analysis of fatty acid methyl esters. *J. Chromatogr.*, 292 (1984) 49-55.
- 219 Viden, I. and Kubelka, V.: (Analysis of complex polar lipids. III. Gas chromatography-mass spectrometry). *Chem. Listy*, 78 (1984) 369-399.

See also 345, 350, 407, 453, 455.

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

- 220 Curvers, J., Maris, F., Cramers, C., Schutjes, C. and Rijks, J.: Increased speed of steroid analysis by capillary GC and GC-MS; effects of sample pretreatment and sample introduction. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 414-422.
- 221 Gaskell, S.J., Brownsey, B.G. and Groom, G.V.: Analyses for progesterone in serum by gas chromatography/mass spectrometry: target data for external quality assessment of routine assays. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1696-1700.
- 222 Roughton, E., Teale, P. and Dumasia, M.C.: Improved capillary gas chromatographic-mass spectrometric method for the determination of anabolic steroid and corticosteroid metabolites in horse urine using on-column injection with high-boiling solvents. *Analyst (London)*, 109 (1984) 273-275.
- 223 Krause, W. and Jakobs, U.: Determination of 17 $\beta$ -hydroxy-1 $\alpha$ -methyl-17 $\alpha$ -propyl-5 $\alpha$ -androstan-3-one in plasma by gas chromatography-mass spectrometry with single-ion detection. *J. Pharm. Sci.*, 73 (1984) 563-564.
- 224 Uralets, V.P., Semenova, V.A. and Semonov, V.A.: (Selective gas chromatographic determination of ketosteroids with a thermionic detector). *Zh. Anal. Khim.*, 39 (1984) 938-941.

See also 347.

*13c. Sterols*

See 346.

*13d. Bile acids and alcohols*

- 225 Koopman, B.J., Wolthers, B.G., Van der Molen, J.C., Nagel, G.T., Waterreus, R.J. and Oosterhuis, H.J.G.H.: Capillary gas chromatographic determination of urinary bile acids and bile alcohols in CTX patients proving the ineffectivity of ursodeoxycholic acid treatment. *Clin. Chim. Acta*, 142 (1984) 103-111.
- 226 Tandon, R., Axelson, M. and Sjövall, J.: Selective liquid chromatographic isolation and gas chromatographic-mass spectrometric analysis of ketonic bile acids in faeces. *J. Chromatogr.*, 302 (1984) 1-14.

## 13f. Other steroids

- 227 Ikekawa, N., Takatsuo, S., Kitsuwa, T., Saito, H., Morishita, T. and Abe, H.: Analysis of natural brassinosteroids by gas chromatography and gas chromatography-mass spectrometry. *J. Chromatogr.*, 290 (1984) 289-302.

## 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

## 15a. Terpenes

See 41.

## 15b. Essential oils

- 228 Analytical Method Committee: Application of gas-liquid chromatography to the analysis of essential oils. Part X. Fingerprinting of specified essential oils by standardised procedures. *Analyst (London)*, 109 (1984) 1339-1341.
- 229 Analytical Methods Committee: Application of gas-liquid chromatography to the analysis of essential oils. Part XI. Monographs for seven essential oils. *Analyst (London)*, 109 (1984) 1343-1360 - many retention data.
- 230 Betts, T.J.: Comparison of relative retention times of volatile oil constituents on capillary columns with those from packed columns. *J. Chromatogr.*, 294 (1984) 370-374.
- 231 Bicchi, C., D'Amato, A., Nano, G.M. and Frattini, C.: Capillary GLC controls of some alpine *Artemisiae* and of the related liqueurs. *Chromatographia*, 18 (1984) 560-566.
- 232 Bonmati, R., Chapelet-Letourneux, G. and Guiochon, G.: Gas chromatography: a new industrial process of separation. Application to essential oils. *Separ. Sci.*, 19 (1984) 113-155.
- 233 Fang, H.-J., Yu, J.-G., Fang, Q.-N., Chen, Y.-H. and Hu, Q.: (Studies on the medicinal plants of Chinese Zingiberaceae. VI. Analysis of essential oil from *Stahlianthus involucratus*). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 35-36.
- 234 Zamureenko, V.A., Kluyev, N.A., Dmitriev, L.B. and Grandberg, I.I.: Gas-liquid chromatography-mass spectrometry in the analysis of essential oils. *J. Chromatogr.*, 303 (1984) 109-115.

See also 211, 388, 400.

## 16. NITRO AND NITROSO COMPOUNDS

- 235 Korfomacher, W.A. and Miller, D.W.: Analysis of 1- and 4-nitropyrene and 1-nitro-pyrene-d<sub>9</sub> via fused silica GC combined with negative ion atmospheric pressure ionization mass spectrometry. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 581-583.
- 236 Kühn, R., Luckow, V. and Keppeler, D.: Kapillar-gas-chromatographische Bestimmung von Nitroglycerine in Plasma. *Fresenius' Z. Anal. Chem.*, 317 (1984) 668-669.

See also 374, 384, 394, 439.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

## 17a. Amines and polyamines

- 237 Muskiet, F.A.J., Van den Berg, G.A., Kingma, A.W., Fremouw-Ottevangers, D.C. and Halie, M.R.: Total polyamines and their non- $\alpha$ -amino acid metabolites simultaneously determined in urine by capillary gas chromatography, with nitrogen-phosphorus detector; and some clinical applications. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 687-695.

- 238 Skarping, G., Smith, B.E.F. and Dalene, M.: Trace analysis of amines and iso-cyanates using glass capillary gas chromatography and selective detection. III. Determination of aliphatic and alicyclic amines as perfluoro fatty acid amides using electron-capture and nitrogen-selective detection. *J. Chromatogr.*, 303 (1984) 89-98.
- 239 Svetlova, N.I., Grigor'eva, D.N., Zhuravleva, I.L. and Golovnya, R.V.: (Allowable errors for retention indices in gas chromatographic identification of amines). *Zh. Anal. Khim.*, 39 (1984) 1292-1296.
- 240 Yamamoto, S., Iwado, A., Hashimoto, Y., Aoyama, Y. and Makita, M.: Gas chromatography-mass spectrometry of polyamines as their N-ethyloxycarbonyl derivatives and identification of sym-homospermidine and sym-norspermine in mosses and ferns. *J. Chromatogr.*, 303 (1984) 99-108.

See also 46, 272, 326.

#### *17b. Catecholamines and their metabolites*

- 241 Tas, A.C., Odink, J., Ten Noever de Brauw, M.C., Schrijver, J. and Jonk, R.J.G.: Derivatization and mass spectrometric behaviour of catecholamines and their 3-O-methylated metabolites. *J. Chromatogr.*, 310 (1984) 243-250.

#### *17c. Amine derivatives and amides (excluding peptides)*

- 242 Kashihira, N., Makino, K., Kirita, K. and Watanabe, Y.: (Determination of acetonitrile and acrylonitrile in air by gas chromatography with adsorptive enrichment and chemiluminescent nitrogen detector). *Bunseki Kagaku*, 33 (1984) 402-406.
- 243 Makogon, A.M., Bubentsova, I.V., Trostyanteskaya, V.L., Skripko, L.A. and Samosudov, I.N.: (Gas chromatographic behavior of secondary aromatic amines). *Zh. Anal. Khim.*, 39 (1984) 353-356.

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

#### *18a. Amino acids and their derivatives*

- 244 Frank, H., Thiel, D. and Langer, K.: Determination of N-acetyl-L-cysteine in biological fluids. *J. Chromatogr.*, 309 (1984) 261-267.
- 245 Labadarios, D., Moodie, I.M. and Shephard, G.S.: Critical review. Gas chromatographic analysis of amino acids in physiological fluids: a critique. *J. Chromatogr.*, 310 (1984) 223-231.
- 246 Labadarios, D., Shephard, G.S., Moodie, I.M. and Botha, E.: The effect of the presence of glucose on the determination of amino acids by gas chromatography. *J. Chromatogr.*, 309 (1984) 375-378.
- 247 Labadarios, D., Shephard, G.S., Moodie, I.M. and Botha, E.: Effect of the presence of glucose on the determination of amino acids by gas-liquid chromatography. *J. Chromatogr.*, 294 (1984) 419-422.
- 248 MacKenzie, S.L. and Holme, K.R.: Analysis of conifer leaf free amino acids by gas-liquid chromatography. *J. Chromatogr.*, 299 (1984) 387-396.
- 249 Marcucci, F., Colombo, L., De Ponte, G., Cani, D., Cobelli, L., Frigerio, A. and Mussini, E.: Gas chromatographic-mass spectrometric characterization of N-methylated basic amino acids in human urine. *J. Chromatogr.*, 309 (1984) 132-138.
- 250 Okano, Y., Kadota, T., Nagata, J., Matsuda, A., Iijima, S., Takahama, K. and Miyata, T.: Quantification by selected ion monitoring of pipecolic acid, proline, γ-aminobutyric acid and glycine in rat brain. *J. Chromatogr.*, 310 (1984) 251-259.

See also 68, 108, 159, 260, 381, 382.

#### *18b. Peptides and peptidic and proteinous hormones*

- 251 Büser, W. and Erbersdobler, H.F.: Determination of lysinoalanine as the hepta-fluorobutyryl isobutyl ester derivative by gas-liquid chromatography. *J. Chromatogr.*, 303 (1984) 234-237.

See also 252.

## 19. PROTEINS

## 19k. Urinary proteins

- 252 Charpentier, C., Johnstone, R.A.W., Lemonnier, A., Myara, I., Rose, M.E. and Tuli, D.: Analysis of dipeptides in urine by gas chromatography/mass spectrometry: implications for collagen breakdown in iminodipeptiduria following a study of the dipeptides by electron impact and chemical ionization. *Clin. Chim. Acta*, 138 (1984) 299-308.

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

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

- 253 Shuker, D.E.G., Bailey, E., Gorf, S.M., Lamb, J. and Farmer, P.B.: Determination of N-7-[<sup>2</sup>H<sub>5</sub>]methylguanine in rat urine by gas chromatography-mass spectrometry following administration of trideuteromethylating agents or precursors. *Anal. Biochem.*, 140 (1984) 270-275.

## 21c. Nucleic acids, DNA

- 254 Dizdaroglu, M.: The use of capillary gas chromatography-mass spectrometry for identification of radiation-induced DNA base damage and DNA base-amino acid cross-links. *J. Chromatogr.*, 295 (1984) 103-121.

## 22. ALKALOIDS

- 255 Bushway, R.J., McGann, D.F. and Bushway, A.A.: Gas chromatographic method for the determination of solanidine and its application to a study of feed-milk transfer in the cow. *J. Agric. Food Chem.*, 32 (1984) 548-551; *C.A.*, 100 (1984) 207943p.  
256 Dybowski, R. and Gough, T.A.: A study of transacetylation between 3,6-diacetyl-morphine and morphine. *J. Chromatogr. Sci.*, 22 (1984) 465-469.  
257 Sperling, A.R.: Analysis of alkaloids in opium. *J. Chromatogr.*, 294 (1984) 297-302.

See also 323, 330, 425.

## 23. OTHER SUBSTANCES CONTAINING HETERO CYCLIC NITROGEN

## 23a. Porphyrins and other pyrroles

- 258 Marriott, P.J., Gill, J.P., Evershed, R.P., Hein, C.S. and Eglinton, G.: Computerized gas chromatographic-mass spectrometric analysis of complex mixtures of alkyl porphyrins. *J. Chromatogr.*, 301 (1984) 107-128.

See also 425.

## 23d. Pyridine derivatives

- 259 Bhattacharjee, A. and Guha, D.: Gas chromatography of low-boiling pyridine bases. *J. Chromatogr.*, 298 (1984) 164-168.

See also 44.

*23e. Other N-heterocyclic compounds*

- 260 Schunk, H., Hayashi, T. and Shibamoto, T.: Analysis of mutagenic amino acid pyrolyzates with a fused silica capillary column. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 563-565.

See also 254, 264, 313, 318, 322, 324, 422.

## 24. ORGANIC SULPHUR COMPOUNDS

- 261 Di Furia, F., Prato, M., Quintilly, U., Salvagno, S. and Scorrano, G.: Gas-liquid chromatographic method for the determination of peracids in the presence of a large excess of hydrogen peroxide. *Analyst (London)*, 109 (1984) 985-987.
- 262 Guiochon, G., Hilaireau, P., Chapelet, G. and Lowy, G.: Purification of industrial 2,5-dibromothiophene. *Int. Lab.*, 14, No. 8 (1984) 33-43.
- 263 Karabanov, N.T., Vetrova, Z.P., Ivanova, L.A., Olefirenko, N.M. and Devyat'yarov, A.Yu.: Quantitative gas-chromatographic determination of impurities in diethyl sulfide by using a liquid-crystal stationary phase). *Zh. Anal. Khim.*, 39 (1984) 749-751.
- 264 Matarese, R.M., Pecci, L., Ricci, G. and Cavallini, D.: Gas chromatographic determination of thiamine and thiazepine derivatives of biological interest. *J. Chromatogr.*, 294 (1984) 413-418.

See also 51, 153, 157, 324, 329, 360, 411, 415, 444.

## 25. ORGANIC PHOSPHORUS COMPOUNDS

- 265 De Bisschop, H.C. and Michiels, E.: Assay of the nerve agent soman in serum by capillary gas chromatography with nitrogen-phosphorus detection and splitless injection. *Chromatographia*, 18 (1984) 427-433.

## 26. ORGANOMETALLIC AND RELATED COMPOUNDS

*26a. Organometallic compounds*

- 266 Ballantine, D.S., Jr. and Zoller, W.H.: Collection and determination of volatile organic mercury compounds in the atmosphere by gas chromatography with microwave plasma detection. *Anal. Chem.*, 56 (1984) 1288-1293.
- 267 Denham, E.L. and Clark, R.J.: Gas chromatographic studies on group VIIB organometallic complexes. The analytical and preparative separation of chromium, molybdenum and tungsten trifluorophosphine carbonyl complexes. *J. Chromatogr.*, 301 (1984) 253-260.
- 268 Dyagileva, L.M., Tsyanova, E.I. and Aleksandrov, Yu.A.: (Pulsed gas-chromatographic method in the kinetics of the thermal decomposition of volatile organometallic compounds). *Zh. Fiz. Khim.*, 58 (1984) 1030-1032.
- 269 Fujiwara, K., Tamaura, Y. and Ujihara, Y.: Determination of methyl mercuric chloride at low concentration by gas chromatography. *Bunseki Kagaku*, 33 (1984) T87-T91.
- 270 Lorbeer, E. and Widholm, M.: Advantages and limits of the quantitative determination of  $\alpha$ -ferrocenyl carbinols with capillary GC. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 536-537.

See also 370.

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

- 271 Dilli, S. and Sutikno, I.: Investigation of two fluorinated reagents for the analysis of selenium by gas chromatography. *J. Chromatogr.*, 298 (1984) 21-40.  
272 Rybina, T.I., Trukhanova, O.I., Kirichenko, E.A. and Kopylov, V.M.: (Study of monofunctional organosilicon amines using gas-liquid chromatography). *Zh. Anal. Khim.*, 39 (1984) 542-546.

See also 463.

*26c. Coordination compounds*

See 267.

## 27. VITAMINS AND VARIOUS GROWTH REGULATORS (NON-PEPTIDIC)

- 273 Coldwell, R.D., Trafford, D.J.H., Makin, H.L.J., Varley, M.J. and Kirk, D.N.: Specific estimation of 24,25-dihydroxyvitamin D in plasma by gas chromatography-mass spectrometry. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1193-1198.

## 28. ANTIBIOTICS

- 274 McMurray, C.H., Blanchflower, W.J. and Rice, D.A.: Gas chromatographic-mass spectrometric detection and quantitation of lincomycin in animal feedingstuffs. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 582-588.

See also 13.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

*29a. Chlorinated insecticides*

- 275 Bottomley, P. and Baker, P.G.: Multi-residue determination of organochlorine, organophosphorus and synthetic pyrethroid pesticides in grain by gas-liquid and high-performance liquid chromatography. *Analyst (London)*, 109 (1984) 85-90.  
276 Dunn, W.J., III, Stalling, D.L., Schwartz, T.R., Hogan, J.W., Petty, J.D., Johansson, E. and Wold, S.: Pattern recognition for classification and determination of polychlorinated biphenyls in environmental samples. *Anal. Chem.*, 56 (1984) 1308-1313.  
277 Pehringer, N.V. and Walters, S.M.: Evaluation of capillary gas chromatography for pesticide and industrial chemical residue analysis. I. Comparison of retention ratios obtained on methyl silicone-coated capillary columns with published values for packed columns. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 91-95.  
278 Schulte, E. and Malish, R.: Calculation of the real PCB content in environmental samples. II. Gas chromatographic determination of the PCB concentration in human milk and butter. *Fresenius' Z. Anal. Chem.*, 319 (1984) 54-59.  
279 Schwartz, T.R., Campbell, R.D., Stalling, D.L., Little, R.L., Petty, J.D., Hogan, J.W. and Kaiser, E.M.: Laboratory data base for isomer-specific determination of polychlorinated biphenyls. *Anal. Chem.*, 56 (1984) 1303-1309.  
280 Zenon-Roland, L., Agneessens, R. and Nangniet, P.: Analysis of pesticide residues by high resolution gas chromatography. Part 1: Comparison between packed and capillary columns in pesticide residue determination. Practical considerations for routine use of capillary gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 480-484.

See also 59, 371, 413, 429, 454, 468.

**29b. Phosphorus insecticides**

- 281 Lee, H.-S., Weng, L.-D. and Chau, A.S.Y.: Confirmation of pesticide residue identity. XI. Organophosphorus pesticides. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 553-556.  
282 Singh, A.K.: Improved analysis of acephate and methamidophos in biological samples by selective ion monitoring gas chromatography-mass spectrometry. *J. Chromatogr.*, 301 (1984) 465-469.

See also 275, 369, 383.

**29c. Carbamates**

- 283 De Kok, A., Van Opstal, M., De Jong, T., Hoogcarspel, B., Geerdink, R.B., Frei, R.W. and Brinkman, U.A.T.: The use of various chromatographic techniques for the determination of phenylurea herbicides and their corresponding anilines in environmental samples. II. Application. *J. Environ. Anal. Chem.*, 18 (1984) 101-123.  
284 Kossmann, A. and Ebing, W.: Methode zur gaschromatographischen Rückstandsbestimmung von Aldicarb und dessen toxikologische bedeutsamen Metaboliten Aldicarb-sulfoxid und -sulfon in Erdbeeren, Erdbeerfarnzen, Zuckerrüben und Boden. *Nachrichtenbl. Deutsch. Pflanzenschutzd.*, 36, No. 3 (1984) 36-39.  
285 Kropscott, B.E., Kastl, P.E. and Hermann, E.A.: Determination of 2-ethylhexyl 2,4-dichlorophenoxyacetate in rat blood and urine by electron-capture gas chromatography and gas chromatography-mass spectrometry. *J. Chromatogr.*, 299 (1984) 263-268.  
286 Zhong, W.Z., Lemley, A.T. and Spalik, J.: Quantitative determination of ppb levels of carbamate pesticides in water by capillary gas chromatography. *J. Chromatogr.*, 299 (1984) 269-274.

See also 465.

**29d. Herbicides**

- 287 Bardalaye, P.C. and Wheeler, W.B.: Improved derivatization method for the gas-liquid chromatographic determination of the herbicide oryzalin. *Analyst (London)*, 109 (1984) 255-258.  
288 Betker, W.R.: Gas chromatographic determination of metribuzin in formulations: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 840-843.  
289 Bland, P.D.: Gas chromatographic determination of fluazifop-butyl in formulations: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 499-502.

See also 372, 386, 396, 397.

**29e. Fungicides**

- 290 Agneessens, R., Zenon-Roland, L. and Nangniet, P.: Analysis of pesticide residues by high resolution gas chromatography. Part 2: Determination of fungicide and insecticide residues in various crops. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 533-536.  
291 Nejitscheva, A., Wassileva-Alexandrova, P. and Marudov, G.: Bestimmung von Rubigan in pflanzlichen Produkten unter Anwendung der Gas-Flüssigkeitchromatographie. *J. Chromatogr.*, 298 (1984) 508-512.

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

- 292 Griffiths, C.J.: The determination of metaldehyde in biological material by head-space gas chromatography. *J. Chromatogr.*, 295 (1984) 240-247.  
293 Haase-Strey, H., Heidemann, W. and Rüssel, H.A.: GC-MS-Bestimmung N-haltiger Pesticide in biologischem Material. *Fresenius' Z. Anal. Chem.*, 318 (1984) 111-115.  
294 Klisenko, M.A. and Girenko, D.B.: (Chromatographic determination of trace amounts of synthetic pyrethroids in water). *Zh. Anal. Khim.*, 39 (1984) 1132-1134.

- 295 Malissa, H., Jr. and Winsauer, K.: Erfassung von chlorierten Phenolen in Herbicid-Säuren mit der kapillar-GC/FTIR-Spektroskopie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 103-110.
- 296 Okuno, I., Connolly, G.E., Savarie, P.J. and Breidenstein, C.P.: Gas chromatographic analysis of coyote and magpie tissues for residues of compound 1080 (sodium fluoroacetate). *J. Assoc. Off. Anal. Chem.*, 67 (1984) 549-553.
- 297 Simonaitis, R.A. and Cail, R.S.: Chromatographic determination of tetramethrin on woolen cloth and in aqueous treatment formulations. *Chromatographia*, 18 (1984) 556-559.

See also 182, 275, 280, 290, 377, 378, 434, 456, 458.

### 31. PLASTICS AND THEIR INTERMEDIATES

- 298 Attygalle, A.B. and Morgan, E.D.: Determination of oxirane ring position in epoxides at the nanogram level by reaction gas chromatography. *Anal. Chem.*, 56 (1984) 1530-1533.
- 299 De Rudder, D., Remon, J.P., De Graeve, E., Van Severen, R. and Braeckman, P.: Gas chromatographic determination of residual ethylene oxide in gas-sterilized medical-grade plastics. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 587-589.
- 300 Di Pasquale, G. and Galli, M.: Determination of additives in polyolefins by capillary gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 484-486.
- 301 Haken, J.K. and Rohanna, M.A.: Chromatographic analysis after chemical degradation of polyester resins in the liquid and cured laminate forms. *J. Chromatogr.*, 298 (1984) 263-271.
- 302 McFadden, J. and Scheuing, D.R.: Determination of polyols in silicone-polyester resins and paint films. *J. Chromatogr. Sci.*, 22 (1984) 310-312.
- 303 Startin, J.R. and Gilbert, J.: Single ion monitoring of butadiene in plastics and foods by coupled mass spectrometry-automatic headspace gas chromatography. *J. Chromatogr.*, 294 (1984) 427-430.
- 304 Utterback, D.F., Millington, D.S. and Gold, A.: Characterization and determination of formaldehyde oligomers by capillary column gas chromatography. *Anal. Chem.*, 56 (1984) 470-473.
- 305 Varner, S.L. and Breder, C.V.: Determination of residual levels and migration of benzene from styrene-containing polymers. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 516-520.

See also 168.

### 32. PHARMACEUTICAL AND BIOMEDICAL APPLICATIONS

#### 32a. Synthetic drugs

- 306 Horowitz, W. and Albert, R.: Performance characteristics of methods of analysis used for regulatory purposes. I. Drug dosage forms. B. Gas chromatographic methods. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 648-652.
- 307 Majlat, P. and Barthos, E.: Quantitative gas and thin-layer chromatographic determination of methylparaben in pharmaceutical dosage forms. *J. Chromatogr.*, 294 (1984) 431-435.
- 308 Russeva, N., Dimova, N., Spyrov, G. and Jurovska, M.: Gas chromatography of the acetate and nitrate esters of 1,4:3,6-dianhydro-D-sorbitol (isosorbide). *J. Chromatogr.*, 295 (1984) 255-258.
- 309 Vincent, G., Desage, M., Comet, F., Brazier, J.L. and Lecompte, D.: Gas chromatographic determination of tris(hydroxymethyl)aminomethane in pharmaceutical preparations after silylation. *J. Chromatogr.*, 295 (1984) 248-254.

See also 209.

**32b. Pharmacokinetic studies**

- 310 Acheampong, A.A., Abbott, F.S., Orr, J.M., Ferguson, S.M. and Burton, R.W.: Use of hexadeuterated valproic acid and gas chromatography-mass spectrometry to determine the pharmacokinetics of valproic acid. *J. Pharm. Sci.*, 73 (1984) 489-494.
- 311 Gyllenhaal, O. and Hoffmann, K.-J.: Simultaneous determination of metoprolol and metabolites in urine by capillary gas chromatography as oxazolidineone and trimethylsilyl derivatives. *J. Chromatogr.*, 309 (1984) 317-328.
- 312 Hilbert, J.M., Ning, J.M., Murphy, G., Jimenez, A. and Zampaglione, N.: Gas chromatographic determination of quazepam and two major metabolites in human plasma. *J. Pharm. Sci.*, 73 (1984) 516-519.
- 313 Marzo, A., Treffner, E., Neggiani, P.P. and Staibano, G.: Gas-liquid chromatographic evaluation of lofemizole in biological samples for pharmacokinetic investigations. *J. Chromatogr.*, 310 (1984) 51-59.
- 314 Rege, A.B., Lertora, J.J.L., White, L.E. and George, W.J.: Rapid analysis of valproic acid by gas chromatography. *J. Chromatogr.*, 309 (1984) 397-402.
- 315 Roy, S.D., McKay, G., Hawes, E.M. and Midha, K.K.: Gas chromatographic quantitation of methoxyphenamine and three of its metabolites in plasma. *J. Chromatogr.*, 310 (1984) 307-317.

See also 253, 285.

**32c. Drug monitoring**

- 316 Achari, R. and Mayersohn, M.: Analysis of 4-methylpyrazole in plasma and urine by gas chromatography with nitrogen-selective detection. *J. Pharm. Sci.*, 73 (1984) 690-692.
- 317 Bailey, E., Farmer, P.B., Hoskins, J.A., Lamb, J.H. and Peal, J.A.: Determination of plasma phenytoin by capillary gas chromatography with nitrogen-phosphorus detection and with selective ion monitoring. *J. Chromatogr.*, 310 (1984) 199-203.
- 318 Bauza, M.T., Smith, R.V., Knutson, D.E. and Witter, F.R.: Gas chromatographic determination of pentoxyfilline and its major metabolites in human breast milk. *J. Chromatogr.*, 310 (1984) 61-69.
- 319 Bialer, M., Friedman, M. and Rubinstein, A.: Rapid gas chromatographic assay for monitoring valproic acid and valpromide in plasma. *J. Pharm. Sci.*, 73 (1984) 991-993.
- 320 Coutts, R.T., Prelusky, D.B. and Baker, G.B.: Determination of amphetamine, norephedrine, and their phenolic metabolites in rat brain by gas chromatography. *J. Pharm. Sci.*, 73 (1984) 808-812.
- 321 Degel, F., Heidrich, R., Schmid, R.D. and Weidemann, G.: Quantitative determination of valproic acid by means of gas chromatographic headspace analysis. *Clin. Chim. Acta*, 139 (1984) 29-36.
- 322 Douse, J.M.F.: Trace analysis of benzodiazepine drugs in blood using deactivated Amberlite XAD-7 porous polymer beads and silica capillary column gas chromatography with electron-capture detection. *J. Chromatogr.*, 301 (1984) 137-154.
- 323 Drost, R.H., Van Ooijen, R.D., Ionescu, T. and Maes, R.A.A.: Determination of morphine in serum and cerebrospinal fluid by gas chromatography and selected ion monitoring after reversed-phase column extraction. *J. Chromatogr.*, 310 (1984) 193-198.
- 324 Fourtillan, J.-B., Girault, J., Bouquet, S. and Lefebvre, M.-A.: Determination of mequitazine in human plasma and urine by capillary column gas-liquid chromatography-mass spectrometry. *J. Chromatogr.*, 309 (1984) 391-396.
- 325 Gaudry, D., Gerardin, A., Briand, C. and Wantiez, D.: Quantitative determination of nitroglycerol in human plasma by gas chromatography negative ion mass spectrometry using nitrogen-15-labeled nitroglycerol as internal standard. *Biomed. Mass Spectrom.*, 11 (1984) 276-277; *C.A.*, 101 (1984) 65454z.
- 326 Grech-Belanger, O.: Gas chromatographic method for the routine serum monitoring of mexiletine. *J. Chromatogr.*, 309 (1984) 165-169.
- 327 Ibrahim, K.E., Couch, M.W., Williams, C.M., Budd, M.B., Yost, R.A. and Midgley, J.M.: Quantitative measurement of octopamines and synephrines in urine using capillary column gas chromatography negative ion chemical ionization mass spectrometry. *Anal. Chem.*, 56 (1984) 1695-1699.

- 328 Ivashikiv, E., McKinstry, D.N. and Cohen, A.I.: Determination of total captopril in human plasma by gas chromatography-mass spectrometry with selected-ion monitoring after reduction of disulfides. *J. Pharm. Sci.*, 73 (1984) 1113-1117.
- 329 Jacob, P., III, Savanapridi, C., Yu, L., Wilson, M., Shulgin, A.T., Benowitz, N.L., Elias-Baker, B.A., Hall, S.M., Herning, R.I. and Jones, R.T.: Ion-pair extraction of thiocyanate from plasma and its gas chromatographic determination using on-column alkylation. *Anal. Chem.*, 56 (1984) 1692-1695.
- 330 Jones, A.W., Blom, Y., Bondesson, U. and Anggard, E.: Determination of morphine in biological samples by gas chromatography-mass spectrometry. Evidence for persistent tissue bonding in rats twenty-two days post-withdrawal. *J. Chromatogr.*, 309 (1984) 73-80.
- 331 Keyzer, J.J., Wolthers, B.G., Muskiet, F.A.J., Breukelman, H., Kauffman, H.V. and De Vries, K.: Measurement of plasma histamine by stable isotope dilution gas chromatography-mass spectrometry: methodology and normal values. *Anal. Biochem.*, 139 (1984) 474-481.
- 332 Kochak, G. and Honc, F.: Improved gas-liquid chromatographic method for the determination of baclofen in plasma and urine. *J. Chromatogr.*, 310 (1984) 319-326.
- 333 König, W.A., Ernst, K. and Vessman, J.: Improved gas chromatographic enantiomer separation of pharmaceutically relevant amino alcohols as oxazolidinones. *J. Chromatogr.*, 294 (1984) 423-426.
- 334 Krebs, H.A., Cheng, L.K. and Wright, G.J.: Determination of fenfluramine and norfenfluramine in plasma using a nitrogen-sensitive detector. *J. Chromatogr.*, 310 (1984) 412-417.
- 335 Külpmann, W.R., Kloppenborg, A. and Kohl, B.: Drug monitoring by gas-chromatography. A) Tocainide. B) Etomidate. *Fresenius' Z. Anal. Chem.*, 317 (1984) 667-668.
- 336 Lartigue-Mattei, C., Chabard, J.L., Touzet, C., Bargnoux, H., Petit, J. and Berger, J.A.: Plasma cyclophosphamide assay by selective ion monitoring. *J. Chromatogr.*, 310 (1984) 407-411.
- 337 Mathieu, P., Greffe, J., Lemoine, P. and Szestak, M.: Determination of urinary homovanillic acid (HVA) using capillary gas chromatography. *Clin. Chim. Acta*, 139 (1984) 99-105.
- 338 Maurer, H. and Pfleger, K.: Screening procedure for the detection of opioids, other potent analgesics and their metabolites in urine using a computerized gas chromatographic-mass spectrometric technique. *Fresenius' Z. Anal. Chem.*, 317 (1984) 42-52.
- 339 Potts, B.D., Martin, C.A. and Vore, M.: Gas-chromatographic quantification of methylphenidate in plasma with use of solid-phase extraction and nitrogen-sensitive detection. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1374-1377.
- 340 Skrinska, V., Ohman, J., Wellstead, C. and Rahn, K.: Gas chromatography-mass spectrometry of maprotiline in serum. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1276-1277.
- 341 Sun, C.Y. and Yacobi, A.: Gas chromatographic-mass spectrometric assay for the ultra-short-acting  $\beta$ -blocker esmolol. *J. Pharm. Sci.*, 73 (1984) 1177-1179.

See also 236, 250.

#### 32d. Toxicological applications

- 342 Budd, R.D.: Comparison of methods of analysis for phenyclidine. *J. Chromatogr.*, 295 (1984) 492-496.

See also 182, 184, 189, 256, 296, 356, 378.

#### 32f. Clinico-chemical applications and profiling body fluids

- 343 Andreolini, F., Borra, C., Di Corcia, A. and Samperi, R.: Direct determination of valproate in minute whole blood samples. *J. Chromatogr.*, 310 (1984) 208-212.
- 344 Brooks, J.B., Basta, M.T., Alley, C.C., Holler, J.S. and El Kholy, A.M.: Identification of diethylene glycol in sera from Egyptian children by frequency-pulsed electron-capture gas-liquid chromatography. *J. Chromatogr.*, 309 (1984) 269-277.
- 345 Harvey, D.J. and Tiffany, J.M.: Identification of meibomian gland lipids by gas-chromatography-mass spectrometry: application to the meibomian lipids of the mouse. *J. Chromatogr.*, 301 (1984) 173-187.

- 346 Koopman, B.J., Van der Molen, J.C., Wolthers, B.G., De Jager, A.E.J., Walterreus, R.J. and Gips, C.H.: Capillary gas chromatographic determination of cholestanol/cholesterol ratio in biological fluids. Its potential usefulness for the follow-up of some liver diseases and its lack of specificity in diagnosing CTX (cerebro-tendinous xanthomatosis). *Clin. Chim. Acta*, 137 (1984) 305-315.
- 347 Kwan, T.K., Taylor, N.F. and Gower, D.B.: The use of steroid profiling in the resolution of pregnenolone metabolites from porcine testicular preparations. *J. Chromatogr.*, 301 (1984) 189-197.
- 348 Miles, J.M., Schwenk, W.F., McClean, K.L. and Haymond, M.W.: Determination of ketone body turnover *in vivo* with stable isotopes utilizing gas chromatography/mass spectrometry. *Anal. Biochem.*, 141 (1984) 110-115.
- 349 Shigematsu, Y., Kikawa, Y., Sudo, M., Kikuchi, K., Ohta, S. and Okamoto, M.: A simple method of determining 4-hydroxyisovaleric acid and its level in a patient with isovaleric acidemia. *Clin. Chim. Acta*, 138 (1984) 333-336.
- 350 Thoma, H., Reiner, J. and Spitteler, G.: Profiles of strongly polar and less polar acids obtained from human blood, plasma and serum by two-step ultrafiltration. *J. Chromatogr.*, 309 (1984) 17-32.

See also 7, 205, 210, 217, 220, 225, 237, 244, 249, 252, 278.

### 33. INORGANIC COMPOUNDS

#### 33a. Cations

- 351 Dilli, S. and Sutikno, I.: Analysis of selenium at the ultra-trace level by gas chromatography. *J. Chromatogr.*, 300 (1984) 265-301.

#### 33b. Anions

- 352 Porshnev, N.V. and Bondarev, V.B.: (Reaction gas chromatographic determination of trace sulfuric acid). *Zh. Anal. Khim.*, 39 (1984) 642-647.

#### 33c. Permanent and rare gases

- 353 Frunzke, K. and Zumft, W.G.: Rapid, single sample analysis of  $H_2$ ,  $O_2$ ,  $N_2$ , NO, CO,  $N_2O$  and  $CO_2$  by isothermal gas chromatography: applications to the study of bacterial denitrification. *J. Chromatogr.*, 299 (1984) 477-483.
- 354 Palo, R.T., Walters, J.D., March, E.W. and Ette, L.S.: Analysis of gases containing inorganic compounds and light hydrocarbons on fused-silica open-tubular columns prepared with a thick liquid phase film. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 358-369 - 17 refs.
- 355 Pollock, G.E., O'Hara, D. and Hollis, O.L.: Gas chromatographic separation of nitrogen, oxygen, argon, and carbon monoxide using custom-made porous polymers from high purity divinyl-benzene. *J. Chromatogr. Sci.*, 22 (1984) 343-347.
- 356 Vreman, H.J., Kwong, L.K. and Stevenson, D.K.: Carbon monoxide in blood: an improved microliter blood-sample collection system, with rapid analysis by gas chromatography. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1382-1386.

See also 367, 437.

#### 33d. Volatile inorganic compounds

- 357 Berezkin, V.G. and Drugov, Yu.S.: (Gas chromatographic determination of volatile sulphur fluorides in air). *Zh. Anal. Khim.*, 39 (1984) 1249-1254.
- 358 Borchardt, L.G. and Easty, D.B.: Gas chromatographic determination of elemental and polysulfide sulfur in kraft pulping liquors. *J. Chromatogr.*, 299 (1984) 471-476.
- 359 Chikamoto, T. and Maitani, T.: (Rapid determination of cyanide ion by gas chromatography). *Bunseki Kagaku*, 33 (1984) 325-328.
- 360 De Souza, T.L.C.: Supelpak-S: the GC separating column for sulphur gases. *J. Chromatogr. Sci.*, 22 (1984) 470-472.
- 361 Dumas, T.: Determination of carbon dioxide at the ppm level: a statistical comparison of a single-filament and a four-filament thermal conductivity detector. *J. Chromatogr.*, 299 (1984) 432-435.

- 362 Fernandez, S.J., Murphy, L.P. and Rankin, R.A.: Determination of elemental iodine by gas chromatography with electron capture detection. *Anal. Chem.*, 56 (1984) 1285-1288.
- 363 Gren, V.V., Kovaleva, E.P. and Leonova, V.V.: (Gas-chromatographic monitoring of gaseous impurities in nitrogen tetroxide). *Zavod. Lab.*, 50, No. 3 (1984) 12-13.
- 364 Heim, C., Devai, I. and Harangi, J.: Gas chromatographic method for the determination of elemental sulphur in sediments. *J. Chromatogr.*, 295 (1984) 259-263.
- 365 Krylov, V.A., Gonina, V.A., Barushkov, S.E., Krasotskii, S.G., Gur'yanov, A.N., Khopin, V.F. and Vechkanov, N.N.: (Application of quartz capillary columns for gas chromatographic analysis of tin tetrachloride). *Zh. Anal. Khim.*, 39 (1984) 1112-1114.
- 366 Krylov, V.A., Makarov, V.E., Salganskii, Yu.M. and Sokolova, G.V.: (Gas chromatographic analysis of high purity trichlorosilane). *Zh. Anal. Khim.*, 39 (1984) 890-893.

See also 163, 283, 364, 427.

#### 34. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 367 Hut, G., Begemann, M.J.S. and Weerkamp, H.R.: Determination of isotope ratios in the natural gas components methane and nitrogen separated by gas chromatography. *Isot. Geosci.*, 2 (1984) 75-83; *C.A.*, 101 (1984) 57359g.

See also 325.

#### 35. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

##### 35b. Antioxidants and preservatives

- 368 Miazek-Kula, M.: (Determination of 2-ethoxyethyl alcohol in air by gas chromatography). *Pr. Cent. Inst. Ochr. Pr.*, 33 (1984) 143-150; *C.A.*, 100 (1984) 196974w.

See also 11, 187, 197, 214, 283, 302, 303.

##### 35c. Food analysis

- 369 Adachi, K., Ohokuni, N. and Mitsuhashi, T.: Simple analytical method for organophosphorus pesticide determination in unpolished rice, using removal of fat by zinc acetate. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 798-800.
- 370 Alvarez, G.H., Hight, S.C. and Capar, S.G.: Evaluation of electron capture gas chromatographic method for determination of methyl mercury in freezer-case seafoods. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 715-717.
- 371 Ault, J.A. and Spurgeon, T.E.: Multiresidue gas chromatographic method for determining organochlorine pesticides in poultry fat: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 284-289.
- 372 Bardalaye, P.C. and Wheeler, W.B.: Gas chromatographic determination of ametryn and its metabolites in tropical root crops. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 280-284.
- 373 Bassette, R.: Measuring flavor changes with vapor sampling and GLC analysis. *J. Food Prot.*, 47 (1984) 410-413; *C.A.*, 101 (1984) 88888h.
- 374 Billedieu, S.M., Thompson, H.C., Jr., Hansen, E.B., Jr. and Miller, B.J.: High temperature purge and trap procedure for determining seven volatile N-nitrosamines in animal feed, using gas chromatography/thermal energy analyzer. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 557-562.
- 375 Bogod, L.M., Ermakova, T.P., Zhuravleva, I.L., Grigor'eva, D.N. and Golovnya, R.V.: (Gas chromatographic identification of volatile compounds in chocolate). *Khlebopек. Konditer. Prom-st.*, No. 2 (1984) 36-38; *C.A.*, 100 (1984) 208157x.
- 376 Bolin, H.R., Stafford, A.E. and Flath, R.A.: Increased specificity in sorbic acid determination in stored dried prunes. *J. Agric. Food Chem.*, 32 (1984) 683-685; *C.A.*, 100 (1984) 207950p.

- 377 Borsetti, A.P. and Thurston, L.S.: Gas chromatographic determination of penta-chlorophenol in gelatin. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 275-277.
- 378 Cairns, T., Siegmund, E.G., Doose, G.M., Langham, W.S. and Chiu, K.S.: Quantification of carbaryl in pineapples by HPLC and GCMS-Cl-NH<sub>3</sub>. *Bull. Environ. Contam. Toxicol.*, 32 (1984) 310-315; *C.A.*, 100 (1984) 190377g.
- 379 Chernyaga, B.S. and Shatirishvili, I.Sh.: (Qualimetric models for estimation of the quality of wine production on the basis of data of gas chromatographic analysis). *Sooobshch. Akad. Nauk Gruz. SSR*, 112 (1984) 537-540; *C.A.*, 100 (1984) 190298g.
- 380 Dixmier, M.B. and Tchapla, A.: (Qualitative analysis of some volatile substances of wines in GLC [gas-liquid chromatography]). *Actual. Chim.*, No. 6 (1983) 45-48; *C.A.*, 100 (1984) 190919K.
- 381 Duncan, A., Ellinger, G.M. and Glennie, R.T.: Determination of methionine by gas-liquid chromatography: methods for the elimination of an interfering component present in some fish meals. *J. Sci. Food Agric.*, 35 (1984) 385-388; *C.A.*, 101 (1984) 5628z.
- 382 Duncan, A., Ellinger, G.M. and Glennie, R.T.: Determination of methionine by gas-liquid chromatography: modifications in its application to legumes and cereals. *J. Sci. Food Agric.*, 35 (1984) 381-384; *C.A.*, 101 (1984) 5627y.
- 383 Hill, A.R.C., Wilkins, J.P.G., Findlay, N.R.I. and Lontay, K.E.M.: Organophosphorus sulfides, sulfoxides and sulfones. Part I. Determination of residues in fruit and vegetables by gas-liquid chromatography. *Analyst (London)*, 109 (1984) 483-487.
- 384 Kimoto, W.I., Silbert, L.S. and Fiddler, W.: Confirmation of N-nitrosodimethylamine and N-nitrosopyrrolidine in foods by conversion to their nitramines with pentafluoroperoxybenzoic acid. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 751-756.
- 385 Lawrence, J.F. and Weber, D.F.: Determination of polycyclic aromatic hydrocarbons in some Canadian commercial fish, shellfish, and meat products by liquid chromatography with confirmation by capillary gas chromatography-mass spectrometry. *J. Agric. Food Chem.*, 32 (1984) 789-794; *C.A.*, 101 (1984) 53423a.
- 386 Lee, B.E., Lacroix, M.D., Dupont, G.A.J. and Scott, J.A.: Capillary gas chromatographic determination of pentachlorophenol residues in tallow following automated gel permeation cleanup. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 546-548.
- 387 Liardon, R. and Ott, U.: (Application of multivariate statistics for the classification of coffee headspace profiles). *Lebensm.-Wiss. Technol.*, 17 (1984) 32-38; *C.A.*, 100 (1984) 190534f.
- 388 Moshonas, M.G. and Shaw, P.E.: Direct gas chromatographic analysis of aqueous citrus and other fruit essences. *J. Agric. Food Chem.*, 32 (1984) 526-530; *C.A.*, 100 (1984) 207951q.
- 389 Nassos, P.S., Schade, J.E., King, A.D., Jr. and Stafford, A.E.: Comparison of HPLC and GC methods for measuring lactic acid in ground beef. *J. Food Sci.*, 49 (1984) 671-674; *C.A.*, 101 (1984) 89009j.
- 390 Oyamada, N., Kubota, K., Ueno, S. and Ishizaki, M.: (Determination of bromate in foods by gas chromatography). *Shokuhin Eiseigaku Zasshi*, 24 (1983) 563-568; *C.A.*, 100 (1984) 190402m.
- 391 Page, B.D. and Charbonneau, C.F.: Headspace gas chromatographic determination of methylene chloride in decaffeinated tea and coffee, with electrolytic conductivity detection. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 757-761.
- 392 Purcell, J.M. and Magidman, P.: Analysis of the aroma of the intact fruit of Coffea arabica by GC-FT-IR. *Appl. Spectrosc.*, 38 (1984) 181-184; *C.A.*, 100 (1984) 208159z.
- 393 Schreier, P. and Mick, W.: (Analytical differentiation of two black tea quantities by capillary gas chromatography-mass spectrometry). *Chem. Mikrobiol., Technol. Lebensm.*, 8 (1984) 97-104; *C.A.*, 100 (1984) 208164x.
- 394 Sen, N.P., Seaman, S. and Karpinsky, K.: Determination of N-nitrosodimethylamine in nonfat dry milk: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 232-236.
- 395 Skierska, D. and Martinek, W.: (Determination of patulin in apple juice by gas-liquid chromatography with an electron-capture detector). *Roczn. Panstw. Zakl. Hig.*, 35 (1984) 69-75; *C.A.*, 101 (1984) 5633x.
- 396 Smith, A.E.: Gas chromatographic method for analysis of 2,4-D in wheat: inter-laboratory study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 794-798.

- 397 Spittler, T.D., Argauer, R.J., Lisk, D.J., Mumma, R.O., Winnett, G. and Terro, D.N.: Gas chromatographic determination of fenvalerate insecticide residues in processed tomato products and by-products. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 824-826.
- 398 Ware, G.M., Carman, A., Francis, O. and Kuan, S.: Gas chromatographic determination of deoxynivalenol in wheat with electron capture detection. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 731-734.
- 399 Yu, L.Z., Inoko, M. and Matsuno, T.: A gas chromatographic method for rapid determination of food additives in vegetable oils. *J. Agric. Food Chem.*, 32 (1984) 681-683; *C.A.*, 100 (1984) 207948u.

See also 11, 187, 197, 214, 283, 302, 303.

*35d. Various technical products*

- 400 Anac, O.: Gas chromatographic analysis on Turkish rose oil, absolute and concrete. *Perfum. Flavor.*, 9 (1984) 1-14; *C.A.*, 101 (1984) 28098r.
- 401 Bittrich, H.H. and Zychlinski, W.: Gaschromatographische Klassifizierung von Pyrolyseinsatzprodukten. *Chem. Tech. (Leipzig)*, 36 (1984) 196-197.
- 402 Chelmu, L., Craciun, C. and Ciucă, G.: (Use of the gas-chromatographic method in the determination of phthalide and maleic anhydride from phthalic anhydride). *Rev. Chim. (Bucharest)*, 35 (1984) 244-248; *C.A.*, 101 (1984) 47919a.
- 403 Dong, Y.-Y., Gu, W.-H., Li, J.-B., Sun, L.-C. and Lu, Z.-F.: (Analysis of oil- and water-phase products of one-step synthesis isoprene from isobutene and formaldehyde). *Chinese J. Chromatogr.*, 1, No. 1 (1984) 17-21.
- 404 Galletti, G.C. and Piccaglia, R.: (Rapid gas-chromatographic determination of lactic acid and other volatile organic acids in corn silage). *Zootec. Nutr. Anim.*, 9 (1983) 347-356; *C.A.*, 100 (1984) 190397p.
- 405 Glinzer, O., Lübke, M. and Severin, D.: Gaschromatographische Charakterisierung von Erdölrückständen. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 221.
- 406 Hayes, P.C., Jr. and Pitzer, E.M.: Rapid monitoring of hydrocarbon bleeding stocks in modified aviation turbine fuels. *J. Chromatogr.*, 22 (1984) 456-461.
- 407 Itabashi, Y. and Takagi, T.: Gas chromatographic resolution on polar open-tubular columns of saturated and unsaturated wax ester isomers differing in combination of acyl and alcoholic groups. *J. Chromatogr.*, 299 (1984) 351-363.
- 408 Johansen, N.G.: The analysis of C<sub>1</sub>-C<sub>4</sub> alcohols, MTBE, and DIPE in motor gasolines by multi-dimensional capillary column gas chromatography. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 487-489.
- 409 Liu, R.H., Ramesh, S., Liu, J.Y. and Kim, S.: Qualitative and quantitative analyses of commercial polychlorinated biphenyl formulation mixtures by single ion monitoring gas-liquid chromatography/mass spectrometry and multiple regression. *Anal. Chem.*, 56 (1984) 1808-1812.
- 410 Luke, L.A. and Ray, J.E.: Gas-chromatographic method for the determination of low relative molecular mass alcohols and methyl tert.-butyl ether in gasoline. *Analyst (London)*, 109 (1984) 989-992.
- 411 McKague, A.B. and Meier, H.P.: Analysis of thianaphthene in commercial naphthalene. *J. Chromatogr.*, 299 (1984) 487-488.
- 412 Matisova, E., Krupcik, J., Cellar, P. and Garaj, J.: Quantitative analysis of hydrocarbons in gasolines by capillary gas-liquid chromatography. I. Isothermal analysis. *J. Chromatogr.*, 303 (1984) 151-163.
- 413 Miles, J.W. and Mount, D.L.: Gas chromatographic methods for determination of γ-BHC in technical emulsifiable concentrates and water-dispersible powder formulations and in lindane shampoo and lotion: collaborative study. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 834-837.
- 414 Poirier, M.A. and Das, B.S.: Characterization of polynuclear aromatic hydrocarbons in bitumen, heavy oil fractions boiling above 350°C by GC-MS. *Fuel*, 63 (1984) 361-367; *C.A.*, 100 (1984) 194702g.
- 415 Poirier, M.A. and Smiley, G.T.: A novel method for separation and identification of sulphur compounds in naphtha (30-200°C) and middle distillate (200-350°C) fractions of Lloydmminster heavy oil by GC/MS. *J. Chromatogr. Sci.*, 22 (1984) 304-309.
- 416 Rosenberg, C.: Direct determination of isocyanates and amines as degradation products in the industrial production of polyurethane-coated wire. *Analyst (London)*, 109 (1984) 859-866.

- 417 Rowland, S.J., Alexander, R. and Kagi, R.I.: Analysis of trimethylnaphthalenes in petroleum by capillary gas chromatography. *J. Chromatogr.*, 294 (1984) 407-412.  
418 Schliefer, K. and Heidemann, G.: (Head-space analysis, a technique for detection of volatile substances in textile finishing agents). *Meel und Textilber.*, 65 (1984) 357-358; *C.A.*, 101 (1984) 92644t.  
419 Schon, M., Schulz, H., Dao Vong D. and Van Hung, N.: Kapillargaschromatographische Bewertung von Kohlehydrideröl und katalytische Raffination. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 222.  
420 Searle, E., Cass, M.W., Phipps, A.J. and Thompson, C.M.: Analysis of used lubricating oils for Diesel fuel dilution by multidimensional gas chromatography. *Analyst (London)*, 109 (1984) 1223-1224.  
421 Sonchik, S., Madeleine, D. and Macek, P.: Evaluation of sample preparation techniques for the analysis of PCBs in oil. *J. Chromatogr. Sci.*, 22 (1984) 265-271 - 35 refs.  
422 Stephens, R.: Determination of 1-methyl-2-pyrrolidone in refinery hydrocarbons and waters by gas chromatography. *Anal. Chem.*, 56 (1984) 1608-1610.

See also 93, 192, 262, 297.

### 36e. Compounds with distinct biological activity and diverse chemical nature

- 423 Goel, S.C. and Pamment, M.B.: Direct injection technique for gas chromatographic determination of ethanol and other volatiles in concentrated cell suspensions. *Biotechnol. Lett.*, 6 (1984) 177-182; *C.A.*, 101 (1984) 53197e.  
424 Guichard, E.A. and Ducruet, V.J.: Quantitative study of volatiles in a model system by a headspace technique. *J. Agric. Food Chem.*, 32 (1984) 838-840; *C.A.*, 101 (1984) 53203d.  
425 Liu, L., Liu, J. and Cheng, J.: (Determination of trace cobalt by gas chromatography). *Fenxi Huaxue*, 12 (1984) 439-441; *C.A.*, 101 (1984) 65161b.  
426 Schwenk, W.F., Berg, P.J., Beaufreire, B., Miles, J.M. and Haymond, M.W.: Use of tert.-butyldimethylsilylation in the gas chromatographic/mass spectrometric analysis of physiologic compounds found in plasma using electron-impact ionization. *Anal. Biochem.*, 141 (1984) 101-109.

See also 40, 163.

## 37. ENVIRONMENTAL ANALYSIS

### 37a. General papers and reviews

- 427 Gurka, D.F., Warner, J.S., Silvon, L.E., Bishop, T.A. and McKown, M.M.: Interim method for determination of volatile organic compounds in hazardous wastes. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 776-782.  
428 Sevcik, J.: Thermal desorption of environmental samples. *Int. Lab.*, 14, No. 5 (1984) 62-75 - 15 refs.

See also 276.

### 37b. Air pollution

- 429 Bidleman, T.F., Simon, C.G., Burdick, N.F. and Feng, Y.: Theoretical plate measurements and collection efficiencies for high-volume air samplers using polyurethane foam. *J. Chromatogr.*, 301 (1984) 448-453.  
430 Ciccioli, P., Brancaleoni, E., Possanzini, M., Brachetti, A. and Di Palo, C.: Sampling and determination of natural and anthropogenic hydrocarbons in air by GC-MS. *Sci. Total Environ.*, 36 (1984) 255-260; *C.A.*, 101 (1984) 96725t.  
431 Crough, R.L., Hawley-Fedder, R.A., Parsons, M.L. and Karasek, F.W.: Preliminary evaluation of thermal desorption-gas chromatographic analysis of airborne particulate matter on dichotomous filters. *J. Chromatogr.*, 303 (1984) 53-60.  
432 Esposito, G.C., Williams, K. and Bongiovanni, R.: Determination of ethylene oxide in air by gas chromatography. *Anal. Chem.*, 56 (1984) 1950-1953.

- 433 Galland, R.: Nachweis der Abluft-Geruchsverbesserung durch Gaschromatographie. *Erdöl Kohle, Erdgas, Petrochem.*, 37 (1984) 315.
- 434 Grob, K., Jr. and Neukom, H.P.: Concept for the sampling and derivatization of pentachlorophenol from air in a capillary pre-column, followed by gas chromatographic determination. *J. Chromatogr.*, 295 (1984) 49-54.
- 435 Hütte, R.S., Williams, E.J., Staehelin, J., Hawthorne, S.B., Barkley, R.M. and Sievers, R.E.: Chromatographic analysis of organic compounds in the atmosphere. *J. Chromatogr.*, 302 (1984) 173-179.
- 436 Kawamura, K. and Kaplan, I.R.: Capillary gas chromatography determination of volatile organic acids in rain and fog samples. *Anal. Chem.*, 56 (1984) 1616-1620.
- 437 Kedik, L.M. and Novikova, I.S.: (Use of gas chromatography for detecting carbon monoxide in air). *Gig. Sanit.*, No. 4 (1984) 45-46; *C.A.*, 101 (1984) 27605s.
- 438 Leiber, M.A. and Berk, H.C.: Development and validation of an air monitoring method for 1,3-dichloropropene, *trans*-1,2,3-trichloropropene, *cis*-1,2,3-trichloropropene, 1,1,2,3-tetrachloropropene, 2,3,3-trichloro-2-propen-1-ol, and 1,1,2,2,3-pentachloropropane. *Anal. Chem.*, 56 (1984) 2134-2137.
- 439 Liberti, A., Ciucigli, P., Cecinato, A., Brancaleoni, E. and Di Palo, C.: Determination of nitrated-polyaromatic hydrocarbons (Nitro-PAHs) in environmental samples by high resolution chromatographic techniques. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 389-397.
- 440 Mankowska, W. and Kijenska, D.: (Determination of butadiene in air by gas chromatography). *Pr. Cent. Inst. Ochr. Pr.*, 33 (1983) 151-158; *C.A.*, 100 (1984) 196973v.
- 441 Posniak, M. and Krynska, A.: (Determination of epichlorohydrin and methyl algonol in air by gas chromatography). *Pr. Cent. Inst. Ochr. Pr.*, 33 (1983) 219-230; *C.A.*, 100 (1984) 196972u.
- 442 Price, J.A. and Saunders, K.J.: Determination of airborne methyl *tert*.-butyl ether in gasoline atmosphere. *Analyst (London)*, 109 (1984) 829-834.
- 443 Shefter, V.E., Zav'yalov, V.G., Slutskovskaya, L.P. and Prokopenko, G.P.: (Calibration and metrological certification of a procedure for gas chromatographic determination of 2-ethylhexanal in air). *Zh. Anal. Khim.*, 39 (1984) 557-560.
- 444 Steudler, P.A. and Kijowski, W.: Determination of reduced sulfur gases in air by solid adsorbent preconcentration and gas chromatography. *Anal. Chem.*, 56 (1984) 1432-1436.
- 445 Yasuhara, A., Mizoguchi, T., Fuwa, K., Nakayama, S. and Ishiguro, T.: Identification of odorous compounds in air and gas from painting and printing industries by gas chromatography-mass spectrometry and library search system. *Chemosphere*, 13 (1984) 469-482; *C.A.*, 100 (1984) 214754f.

See also 74, 357, 415.

### 37c. Water pollution

- 446 Bruner, F., Furlani, G. and Mangani, F.: Sample enrichment for gas chromatographic-mass spectrometric analysis of polynuclear aromatic hydrocarbons in water and in organic mixtures. *J. Chromatogr.*, 302 (1984) 167-172.
- 447 Buisson, R.S.K., Kirk, P.W.W. and Lester, J.N.: Determination of chlorinated phenols in water, wastewaters, and wastewater sludge by capillary GC/ECD. *J. Chromatogr. Sci.*, 22 (1984) 339-342 - 33 refs.
- 448 Chladek, E. and Harano, R.S.: Use of bonded phase silica sorbents for the sampling of priority pollutants in wastewaters. *J. Chromatogr. Sci.*, 22 (1984) 313-320 - 32 refs.
- 449 Chmil, V.D.: (Determination of chlorophenoxyalkanecarboxylic acids and chlorophenols in water as 2,2,2-trichloroethyl and pentafluorobenzyl esters using gas-liquid chromatography). *Zh. Anal. Khim.*, 39 (1984) 711-714.
- 450 Coleman, W.E., Munch, J.W., Taylor, W.H., Streicher, R.P., Ringhand, H.P. and Meier, J.R.: Gas chromatographic/mass spectroscopy analysis of mutagenic extracts of aqueous chlorinated humic acid. A comparison of the byproducts to drinking water contaminants. *Environ. Sci. Technol.*, 18 (1984) 674-681; *C.A.*, 101 (1984) 78601v.
- 451 Cooper, W.J., Mehran, M.F., Slifker, R.A. and Savoie, D.L.: Elimination of ammonia interference in the purge-and-trap GC determination of organohalogens in water. *J. Chromatogr. Sci.*, 22 (1984) 462-464.

- 452 Daishima, S., Iida, Y. and Kajiki, T.: (Determination of halocarbons in drinking water by gas chromatography mass spectrometry using negative ion chemical ionization). *Nippon Kagaku Kaishi*, (1984) 1146-1150; *C.A.*, 101 (1984) 97393v.
- 453 Geeraert, E. and Sandra, P.: On the potential of CGC in triglyceride analysis. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 431-432.
- 454 Golovkin, G.V., Smol'chenko, A.I., Fedorov, K.P. and Rudenko, B.A.: (Gas chromatographic determination of chlorine-containing pesticides in surface waters of the Atlantic ocean). *Zh. Anal. Khim.*, 39 (1984) 723-728.
- 455 Janda, V., Pehal, F. and Hrivnak, J.: Isolation, concentration, and gas chromatographic determination of C<sub>4</sub>-C<sub>12</sub> fatty acids in water and sludge. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 540-541.
- 456 Klisenko, M.A. and Girenko, D.B.: (Chromatographic determination of trace amounts of synthetic pyrethroids in water). *Zh. Anal. Khim.*, 39 (1984) 1132-1134.
- 457 Korfomacher, W.A., Moler, G.F., Delongchamp, R.R., Mitchum, R.K. and Harless, R.L.: Validation study for the gas chromatographic-atmospheric pressure ionization-mass spectrometric method for the isomer-specific determination of 2,3,7,8-tetrachlorodibenzo-p-dioxin. *Chemosphere*, 13 (1984) 669-685; *C.A.*, 101 (1984) 85014j.
- 458 Lee, H.-B., Weng, L.-D. and Chau, A.S.Y.: Chemical derivatization analysis of pesticide residues. VIII. Analysis of 15 chlorophenols in natural water by *in situ* acetylation. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 789-794.
- 459 Martinsen, D.P., Tobin, F.L. and Song, B.H.: GC/MS monitoring of the organic pollutants in water samples. *Pollut. Eng.*, 16 (1984) 36-38; *C.A.*, 101 (1984) 43266n.
- 460 Ryzhova, G.L., Kravtsova, S.S., Slizhov, Yu.G., Prokopova, E.I. and Solomatina, I.P.: (Gas chromatographic investigation of polycyclic aromatic hydrocarbons in Karachi lake brine). *Zh. Anal. Khim.*, 39 (1984) 931-935.
- 461 Scott, S.P., Sutherland, N. and Vincent, R.J.: The application of preconcentration and GC-MS techniques to the analysis of water samples: problems and significance. *Anal. Proc. (London)*, 21 (1984) 179-184; *C.A.*, 101 (1984) 59871s.
- 462 Simmonds, P.G.: Analysis of trace halocarbons in natural waters by simplified purge and cryotrap method. *J. Chromatogr.*, 289 (1984) 117-127.
- 463 Siu, K.W.M. and Berman, S.S.: Determination of selenium(IV) in seawater by gas chromatography after coprecipitation with hydrous iron(III) oxide. *Anal. Chem.*, 56 (1984) 1806-1808.
- 464 Smith, L.M., Stalling, D.L. and Johnson, J.L.: Determination of part-per-trillion levels of polychlorinated dibenzofurans and dioxins in environmental samples. *Anal. Chem.*, 56 (1984) 1830-1842.
- 465 Trehy, M.L., Yost, R.A. and McCreary, J.J.: Determination of aldicarb, aldicarb oxime, and aldicarb nitrile in water by gas chromatography/mass spectrometry. *Anal. Chem.*, 56 (1984) 1281-1285.
- 466 Wang, T. and Lenehan, R.: Determination of volatile halocarbons in water by purge-closed loop gas chromatography. *Bull. Environ. Contam. Toxicol.*, 32 (1984) 429-438; *C.A.*, 100 (1984) 197515j.
- 467 Warner, J.M. and Beasley, R.K.: Purge and trap chromatographic method for the determination of acrylonitrile, chlorobenzene, 1,2-dichloroethane, and ethylbenzene in aqueous samples. *Anal. Chem.*, 56 (1984) 1953-1956.

See also 4, 180, 283, 286, 294, 446.

### 37d. Soil pollution

- 468 Stein, V.B. and Narang, R.S.: Chlorinated compounds and phenols in tissue, fat, and blood from rats fed industrial waste site soil extract: methods and analysis. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 111-116.

See also 163, 283, 364, 427.



## Planar Chromatography

### 1. REVIEWS AND BOOKS

- 1 Angele, H.-P. (Editor): *Dictionary of Chromatography: English, German, French, Russian*. Hüthig, Heidelberg, Basel, New York, 2nd edition, 1984, 132 pp.
- 2 Belenkii, B.G. and Vilenchik, L.Z.: *Modern Liquid Chromatography of Macromolecules*. J. Chromatogr. Libr., 25, Elsevier, Amsterdam, Oxford, New York, Tokyo, 1983, XVIII + 432 p. - TLC in Chapter 7, general theory in Chapter 1.
- 3 Ebel, S.: Datenverarbeitung in TLC/HPTLC und HPLC. Fresenius' Z. Anal. Chem., 318 (1984) 201-205 - a review with 44 refs.
- 4 Giddings, J.C.: Two-dimensional separations: Concept and promise. Anal. Chem., 56 (1984) 1258A-1270A.
- 5 Giddings, J.C., Grushka, E., Cazes, J. and Brown, P.R. (Editors): *Advances in Chromatography*, Vol. 23. Marcel Dekker, New York, Basel, 1984, XVIII + 249 pp.
- 6 Kalasz, H. (Editor): *New Approaches in Liquid Chromatography*. Proceedings of the 2nd Annual American-Eastern European Symposium on Advances in Liquid Chromatography, Szeged, Hungary, June 16-18, 1982 (Analytical Chemistry Symposia Series, Vol. 16), Akademiai Kiado, Budapest and Elsevier, Amsterdam, 1984, X + 292 pp.
- 7 Tikitani, S., Sano, A. and Suzuki, M.: (Thin-layer chromatography of organic compounds.) *Bunseki*, (1984) 267-274; C.A., 100 (1984) 18503!k - a review with 133 refs.

See also 33, 39, 133, 142, 147, 290, 326, 441, 445, 476.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 8 Cserhati, T. and Bordas, B.: Classifying eluents in reversed-phase thin-layer chromatography by spectral mapping. J. Chromatogr., 286 (1984) 131-137.
- 9 Jaroniec, M., Jaroniec, J.A. and Rozylo, J.K.: Determination of solvation effects in liquid adsorption chromatography with mixed mobile phases. J. Liq. Chromatogr., 7 (1984) 1289-1300.
- 10 Kakoulidou, A. and Rekker, R.F.: A critical appraisal of log P fragmental procedure and connectivity indexing for reversed-phase thin-layer chromatographic and high-performance liquid chromatographic data obtained for a series of benzophenones. J. Chromatogr., 295 (1984) 341-353.
- 11 Rozylo, J.K., Gross, J., Poniewaz, M., Lodziak, R. and Buszewski, B.: The correlations between capacity factors  $k'$  and  $R_M$  values in liquid column and thin-layer chromatography. J. Liq. Chromatogr., 7 (1984) 1301-1312.
- 12 Tecklenburg, R.-E., Jr. and Nurok, D.: Correlation in continuous development thin-layer chromatography. Chromatographia, 18 (1984) 249-252.

#### 2b. Thermodynamics and theoretical relationships

- 13 Petrovic, S.M. and Lomic, S.M.: (Mobile phase flow in thin-layer chromatography.) Zb. Prir. Nauke, 64 (1983) 69-77; C.A., 100 (1984) 86598g.

See also 41.

## 3. GENERAL TECHNIQUES

## 3a. Apparatus and accessories

- 14 Buncak, P.: Die "MOBIL-R<sub>P</sub>" Kammer für die Sequenz-Dünnenschichtchromatographie (SDC) in der Routine-Analytik. *Fresenius' Z. Anal. Chem.*, 318 (1984) 289-290.
- 15 Buncak, P.: Einsatz der Sequenz-Dünnenschichtchromatographie zur schnellen präparativen Substanzerkennung. *Fresenius' Z. Anal. Chem.*, 318 (1984) 291-292.
- 16 Burger, K.: DC-PMD, Dünnenschicht-Chromatographie mit gradienten-Elution im Vergleich zur Säulenflüssigkeits-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 228-233.
- 17 Issaq, H.J.: Antiradial chromatography device. *U.S. Pat. US 4,430,217* (Cl. 210-198.3; B01D15/08), 07 Feb. 1984, Appl. 264,751, 18 May 1981; 5 pp.; *C.A.*, 100 (1984) 131759k.
- 18 Lobanov, V.I., Zavolokin, A.A. and Kuzmin, B.V.: (Device for thin-layer chromatography.) *U.S.S.R. Pat. SU 1,052,998* (Cl. G01N31/08), 07 Nov. 1983, App. 3,476,208, 26 July 1982; *C.A.*, 100 (1984) 13173iv.
- 19 Toyo Soda Mfg. Co., Ltd.: (Sandwich-type thin-layer chromatography chamber.) *Jpn. Kokai Tokkyo Koho Pat. JP 59 34,150* [84 34,150] (Cl. G01N31/08), 24 Feb. 1984, Appl. 82/143,362, 20 Aug. 1982; 6 pp.; *C.A.*, 101 (1984) 47927b.
- 20 Witkiewicz, Z. and Rattay, S.: (Design and preliminary investigations of properties of a pressure thin-layer chromatographic chamber.) *Farm. Pol.*, 39 (1983) 407-410; *C.A.*, 100 (1984) 167407h.

See also 136.

## 3b. Detectors and detection reagents

- 21 Agarwal, S.P. and Nwaiwu, J.: Dimethyl sulphoxide as a spray reagent for the detection of triterpenoids and some steroids on thin-layer plates. *J. Chromatogr.*, 295 (1984) 537-542 - detections of 12 triterpenoids and 16 steroids are tabulated.

## 3c. Sorbents, carriers, column and layer performance, packing procedures

- 22 Ackman, R.G.: Liquid carbon dioxide as a chromatographic eluent. Preliminary thin-layer chromatographic experiments. *J. Chromatogr.*, 295 (1984) 312-313.
- 23 Armstrong, D.W., Bui, K.H. and Barry, R.M.: Use of pseudophase TLC in teaching laboratories. *J. Chem. Educ.*, 61 (1984) 457-458; *C.A.*, 101 (1984) 6146c.
- 24 Do Trong On and Nguyen Huu Phu: (Study of the structure of silica gel used in thin-layer chromatography.) *Tap Chi Hoa Hoc*, 21, No. 3 (1983) 16-18; *C.A.*, 100 (1984) 79007x.
- 25 Funakoshi Pharmaceutical Co., Ltd.: (Preparation of thin-layer chromatography plate.) *Jpn. Kokai Tokkyo Koho Pat. JP 58, 187,856* [83,187,856] (Cl. G01N31/08), 02 Nov. 1983, Appl. 82/70,147, 26 Apr. 1982; 3 pp.; *C.A.*, 100 (1984) 114218r.
- 26 Hauck, H.E., Eisenbeiss, F. and Krebs, K.-F.: Sorbentien in der DC und HPTLC-Gemeinsamkeiten und Unterschiede zur Säulenflüssigkeits-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 181-186.
- 27 Imaeda, K.: (Method for the preparation of a chromatographic thin layer.) *Jpn. Kokai Tokkyo Koho Pat. JP 58 57,709* [83 57,709] (Cl. G01N31/08), 21 Dec. 1983, Appl. 76/36,833, 02 Apr. 1976; 2 pp.; *C.A.*, 101 (1984) 16557b.
- 28 Nota, G., Impronta, C. and Cannata, A.: Liquid carbon dioxide as a chromatographic eluent. Preliminary thin-layer chromatographic experiments. *J. Chromatogr.*, 285 (1984) 194-197 - a modified calorimetric bomb was used as the chromatographic tank; *R<sub>F</sub>* values for 24 compounds.
- 29 Sirbu, C. and Hegedus, Z.: (Chromatographic plate from silica gel or alumina.) *Rom. Pat. RO 80,820* (Cl. G01N31/06), 30 Nov. 1982, Appl. 102,516, 06 Nov. 1980, 2 pp.; *C.A.*, 100 (1984) 186100g.
- 30 Somanathan, R.: Investigating a mixture of polar and nonpolar compounds using the same thin-layer chromatography plate. *J. Chem. Educ.*, 61 (1984) 456; *C.A.*, 101 (1984) 16526r.
- 31 Toyo Soda Mfg. Co., Ltd.: (Thin-layer chromatographic plate.) *Jpn. Kokai Tokkyo Koho Pat. JP 59 34,149* [84 34,149] (Cl. G01N31/08), 24 Feb. 1984, Appl. 82/143,361, 20 Aug. 1982; 4 pp.; *C.A.*, 101 (1984) 65274r.

- 32 Wilson, I.D.: Normal-phase thin-layer chromatography on silica gel with simultaneous paraffin impregnation for subsequent reversed-phase thin-layer chromatography in a second dimension. *J. Chromatogr.*, 287 (1984) 183-188.

#### *3d. Quantitative analysis*

- 33 Anonymous: Quantitation in high-performance thin-layer chromatography. *Liq. Chromatogr. HPLC Mag.*, 1 (1983) 282-289; *C.A.*, 100 (1984) 114266e - a review with 16 refs.
- 34 Coddens, M.E. and Poole, C.F.: A protocol for measuring the sensitivity of slit-scanning densitometers. *Liq. Chromatogr. HPLC Mag.*, 2 (1984) 34-36; *C.A.*, 100 (1984) 131810v.
- 35 Ebel, S. and Hocke, J.: Einführung in die quantitative DC: Grundlagen, Möglichkeiten, Automatisierung (Teil 9). *Kontakte*, No. 2 (1984) 20-24 - a review with 11 refs.
- 36 Hummel, S.: (Evaluation of thin-layer chromatograms by digital image analysis.) *Z. Chem.*, 24 (1984) 38-39; *C.A.*, 100 (1984) 150404g.
- 37 Ni, M. and Wang, X.: (Calculation of percentage recovery in quantitative pharmaceutical analysis.) *Yaoxue Tongbao*, 19, No. 3 (1984) 185-186; *C.A.*, 100 (1984) 215588s.
- 38 Zieloff, K.: Quantitative Dünnschichtchromatographie - eine Ergänzung der chromatographischen Trennmethoden. *Pharmazie*, 39 (1984) 357-363 - a review with 54 refs.

See also 22, 46, 136, 137, 147.

#### *3e. Preparative scale chromatography*

See 15.

### 4. SPECIAL TECHNIQUES

#### *4a. Automation and computerization*

See 136.

#### *4b. Combination of various chromatographic techniques*

- 39 Jork, H.: Thin-layer chromatography - liquid-column chromatography: Partners or competitors? *Fresenius' Z. Anal. Chem.*, 318 (1984) 177-178 - a review.
- 40 Jost, W., Hauck, H.E. and Eisenbeiss, F.: Möglichkeiten und Grenzen der Übertragung von DC-Trennsystemen auf die HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 300-301.
- 41 Rozylo, J.K., Malinowska, I. and Poniewaz, M.: Inwieweit kann die Dünnschicht-Chromatographie als Pilotverfahren für die Säulenflüssigkeits-Chromatographie im Bereich der Adsorption-Chromatographie gelten? *Fresenius' Z. Anal. Chem.*, 318 (1984) 307-308.
- 42 Specker, H. and Hufnagel, A.: Dünnschicht-Chromatographie-Säulenflüssigkeits-Chromatographie, eine ideale Ergänzung, dargestellt am Beispiel der Lanthanoide. *Fresenius' Z. Anal. Chem.*, 318 (1984) 198-200.

See also 3, 16, 26, 77, 93, 135, 171, 177, 279, 306, 361, 405, 410, 417.

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

- 43 Mildau, G. and Jork, H.: Vergleich wichtiger Clean-up-Schritte in Bereich der chromatographischen Spurenanalytik. *Fresenius' Z. Anal. Chem.*, 318 (1984) 302-304.
- 44 Pfandl, A., Kuehen, N. and Vreven, F.: (Using a universally usable data system in chromatographic analysis of drugs.) *GIT Fachz. Lab.*, 27 (1983) 848-850; *C.A.*, 100 (1984) 39665d.

See also 3, 423.

*4g. Separation of enantiomers*

See 209, 219.

*4h. Other special techniques*

- 45 Funk, W.: Derivatisierungsreaktionen im Bereich der quantitativen Dünnschicht-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 206-219 - a review with 59 refs.  
 46 Spahn, H., Weber, H., Mutschler, E. and Möhrke, W.:  $\alpha$ -Alkyl- $\alpha$ -arylacetic acid derivatives as fluorescence markers for thin-layer chromatographic and high-performance liquid chromatographic assay of amines and alcohols. *J. Chromatogr.*, 310 (1984) 167-178.

See also 17.

## 5. HYDROCARBONS AND HALOGEN DERIVATIVES

*5b. Cyclic hydrocarbons*

- 47 Alak, A., Heilweil, E., Hinze, W.L., Oh, H. and Armstrong, D.W.: Effects of different stationary phases and surfactant or cyclodextrin spray reagents on the fluorescence densitometry of polycyclic aromatic hydrocarbons and dansylated amino acids. *J. Liq. Chromatogr.*, 7 (1984) 1273-1288.  
 48 Duane, W.C., Behrens, J.C., Kelly, S.G. and Levine, A.S.: A method for measurement of nanogram quantities of 3-methylcholanthrene in stool samples. *J. Lipid Res.*, 25 (1984) 523-526.  
 49 Ling, Y., Xu, B., Wang, M. and Liang, B.: (Qualitative analysis of 6-methoxy-tetrahydronaphthalene.) *Yiyao Gongye*, No. 11 (1983) 22-26; *C.A.*, 101 (1984) 47907v.  
 50 Matsumoto, M., Ueda, E. and Itano, T.: (Determination of benzo[a]pyrene in atmosphere by thin-layer chromatography-densitometry.) *Zenkoku Kogaiken Kaishi*, 8, No. 2 (1983) 73-76; *C.A.*, 100 (1984) 196944m.  
 51 Mori, Y. and Naito, S.: (Usefulness of a commercial plate for determination of polynuclear aromatic hydrocarbon.) *Kanagawa-ken Eisei Kenkyusho Kenkyu Hokoku*, No. 13 (1983) 29-31; *C.A.*, 101 (1984) 42699u.  
 52 Obuchi, A., Aoyama, H., Ohi, A. and Ohuchi, H.: Application of thin-layer chromatography with flame ionization detection to the characterization of organic extracts from diesel exhaust particulates. *J. Chromatogr.*, 288 (1984) 187-194 -  $R_F$  values for 5 hydrocarbons and anthraquinone in 8 systems are tabulated.  
 53 Todres, Z.V., Buzlanoca, M.M. and Dyusengaliev, K.I.: (Determination of methyl-stilbene cis- and trans-isomers when they are both present in a mixture.) *U.S.S.R. Pat. SU 1,081,531 (Cl. G01N31/08)*, 23 Mar. 1984, Appl. 3,490,044, 06 Sep. 1982; *C.A.*, 101 (1984) 65277u.  
 54 Zoccolillo, L., Liberti, A., Cocciali, F. and Ronchetti, M.: Routine determination of polycyclic aromatic hydrocarbons in carbon black by chromatographic techniques. *J. Chromatogr.*, 288 (1984) 347-355.

*5d. Complex hydrocarbon mixtures*

- 55 Schmededel, R.: (Determination of the oil behaviour of white petrolatum DAB 8.) *Acta Pharm. Technol.*, 30, No. 1 (1984) 78-84; *C.A.*, 101 (1984) 43447x.

## 7. PHENOLS

- 56 Dondi, F., Blo, G., Lodi, G., Bighi, C., Benfenati, L. and Moncalvo, E.: Applications of high performance liquid chromatography in the analysis of cosmetics and toiletries. *Ann. Chim. (Rome)*, 74 (1984) 117-127; *C.A.*, 100 (1984) 126704j.  
 57 Gracza, L. and Ruff, P.: Hochleistungs-Flüssigkeitschromatographische Trennung und quantitative Bestimmung von pflanzlichen Stilbenderivaten. *J. Chromatogr.*, 287 (1984) 462-465.

- 58 Kozubek, A.: Thin-layer chromatographic mapping of 5-n-alk(en)ylresorcinol homologues from cereal grains. *J. Chromatogr.*, 295 (1984) 304-307.  
 59 Martin, J.A.R., Chechile, H.M. and Lufrano, P.: (Study on the stability of parenteral phenol solutions.) *Acta Farm. Bonaerense*, 2, No. 1 (1983) 11-18; *C.A.*, 100 (1984) 180012v.

See also 49, 315.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

### 8a. Flavonoids

- 60 Akhmedkhodzhaev, N.M., Svechnikova, A.N., Khalmatov, Kh.Kh., Khagi, M.S. and Kambarova, D.M.: (Determination of kaempferol glycosides in a *Sophora japonica* tincture.) *Khim.-Farm. Zh.*, 17 (1983) 1478-1480; *C.A.*, 100 (1984) 91460x.  
 61 Bingöl, S. and Cubukcu, B.: Flavonoids of *Helichrysum noecanum* Boiss. (Asteraceae). *Sci. Pharm.*, 52 (1984) 127-130.  
 62 Cappelletti, E.M., Trevisan, R. and Caniato, R.: A simple device allowing UV-detection of the active substances of *Silybum marianum* (L.) Gaertner on TLC plates devoid of fluorescent indicator. *G. Bot. Ital.*, 116, No. 3-4 (1982) 131-133; *C.A.*, 101 (1984) 12271f.  
 63 Ficarra, P., Ficarra, R., Tommasini, A., De Pasquale, A., Guarniera Fenech, C. and Iauk, L.: High performance liquid chromatography of flavonoids in *Crataegus oxyacantha* L. *Farmaco, Ed. Prat.*, 39, No. 5 (1984) 148-157; *C.A.*, 101 (1984) 60191b.  
 64 Hiller, K., Jähnert, W. and Habisch, D.: Zur Struktur der Flavonoide von *Astrantia major* L. 36. Mitteilung: Zur Kenntnis der Inhaltsstoffe einiger Saniculoideae. *Pharmazie*, 39 (1984) 51-53.  
 65 Kostennikova, Z.P. and Panova, G.A.: (Qualitative analysis of biologically active substances in Arnica infusions.) *Farmatsiya (Moscow)*, 33, No. 1 (1984) 72-74; *C.A.*, 101 (1984) 12268k.  
 66 Lou, Z.: (Determination of 5,7-dihydroxyflavonoids by the alkali fusion method.) *Fenxi Huaxue*, 12, No. 2 (1984) 158-159; *C.A.*, 101 (1984) 12270e.  
 67 Pratt, D.E. and Miller, E.E.: A flavonoid antioxidant in Spanish peanuts (*Arachis hypogaea*). *J. Am. Oil Chem. Soc.*, 61 (1984) 1064-1067.  
 68 Prum, N., Mure, C., Raynaud, J. and Reynaud, J.: Les aglycones flavoniques et anthocyaniques de *Ceanothus americanus* L. (Rhamnaceae). *Pharmazie*, 39 (1984) 353.  
 69 Sobczewska, M. and Mucharska, A.: (Methods for determination of active principles in drugs of plant origin. IV. Application of densitometric measurements of rutin determination in pharmaceutical preparations.) *Acta Pol. Pharm.*, 40 (1983) 193-197; *C.A.*, 100 (1984) 91459d.  
 70 Toth, L., Szigeti, J. and Bulyaki, M.: (Study of flavone derivatives by polyamide layer chromatography.) *Acta Pharm. Hung.*, 54 (1984) 15-20; *C.A.*, 100 (1984) 205939t.  
 71 Whittern, C.C., Miller, E.E. and Pratt, D.E.: Cottonseed flavonoids as lipid anti-oxidants. *J. Am. Oil Chem. Soc.*, 61 (1984) 1075-1078.  
 72 Zhang, Y., Cui, J. and Zhao, S.: (TLC densitometric determination of flavonoid contents in the leaves and tablets of *Rhododendron micranthum* Turcz.) *Yaoxu Fenxi Zaishi*, 4, No. 1 (1984) 1-4; *C.A.*, 100 (1984) 126967x.

### 8b. Aflatoxins and other mycotoxins

- 73 Bata, A., Vanyi, A. and Lasztity, R. and Galacz, J.: Determination of trichothecene toxins in foods and feeds. *J. Chromatogr.*, 286 (1984) 357-362 -  $R_F$  values for 14 fusarotoxins.  
 74 Hu, W., Tian, C., Luo, X. and Wang, Y.: (Two-dimensional thin-layer chromatographic determination of sterigmatocystin in cereal grains.) *Weishengwuxue Tongbao*, 10 (1983) 265-266; *C.A.*, 100 (1984) 173239w.  
 75 Jansen, Ch. and Dose, K.: Quantitative determination of moniliformin in vegetable foods and feeds. *Fresenius' Z. Anal. Chem.*, 319 (1984) 60-62.

- 76 Le Tutour, B., Tantaoui-Elaraki, A. and Aboussalim, A.: Simultaneous thin-layer chromatographic determination of aflatoxin B<sub>1</sub> and ochratoxin A in black olives. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 611-612.
- 77 Majerus, P. and Woller, R.: Die Dünnschicht-Chromatographie und Hochdruckflüssigkeits-Chromatographie in der Mycotoxinanalytik. *Fresenius' Z. Anal. Chem.*, 318 (1984) 281-282.
- 78 Swanson, S.P., Corley, R.A., White, D.G. and Buck, W.B.: Rapid thin-layer chromatographic method for determination of zearalenone and zearalenol in grains and animal feeds. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 580-582.
- 79 Zennie, T.M.: Instrumental HPTLC of aflatoxins: fluorescence enhancement by corn free fatty acids. *J. Liq. Chromatogr.*, 7 (1984) 1383-1391.

#### 8c. Other compounds with heterocyclic oxygen

- 80 Guo, X. and Zhang, Y.: (Quantitative TLC-densitometry of coumarins in Qin Pi (*Fraxinus stylosa*).) *Yaotue Xuebao*, 18 (1983) 446-452; *C.A.*, 100 (1984) 56903x.
- 81 Norman, R.L. and Wood, A.W.:  $\alpha$ -Hydroxyphenylethanol, a novel lactone ring-opened metabolite of coumarin. *Drug Metab. Disp.*, 12 (1984) 536-542.
- 82 Vanhaelen, M., Vanhaelen-Fastre, R., Niebes, P. and Jans, M.: Thin-layer chromatography densitometry and high-performance liquid chromatography of catechin in cube gambir. *J. Chromatogr.*, 294 (1984) 476-479.
- 83 Zhang, X. and Xu, L.: (Determination of coumarins in Qian Hu.) *Zhongyao Tongbao*, 9, No. 2 (1984) 79-81; *C.A.*, 100 (1984) 215601r.

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

- 84 Cao, L. and Hu, K.: (Determination of vanillin in synthetic vanilla extract.) *Yiyao Gongye*, No. 8 (1983) 38-40; *C.A.*, 100 (1984) 91132s.
- 85 Khmel'nitskaya, E.Yu., Voronina, L.G. and Cherkasskii, A.A.: (Determination of 2,2'-dichloroacephenalene-1,3-dione in an industrial product.) *Zavod. Lab.*, 50, No. 3 (1984) 16-17; *C.A.*, 101 (1984) 65262k.
- 86 Okamoto, M., Hibi, M. and Yamada, F.: (Evaluation of (3-aminopropyl)triethoxysilane treated thin-layer chromatographic plates. Application to free formaldehyde analysis in commercial clothes.) *Gifu-ken Eisei Kenkyushoho*, 28 (1983) 34-37; *C.A.*, 100 (1984) 193434j.
- 87 Varma, P.N., Lohar, D.R. and Satsangi, A.K.: Cupric acetate spray reagent for thin-layer chromatography of anthraquinones. *Pharm. Weekbl.*, 118 (1983) 432-434; *C.A.*, 101 (1984) 12278p.

See also 10, 52, 186.

#### 10. CARBOHYDRATES

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

- 88 Athinasios, A.K.: Isolation and determination of trace levels of D-arabino-2-hexosulose (D-glucosone) by microcolumn, thin layer and high performance liquid chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1991-2001.
- 89 Cheetham, P.S.J.: The extraction and mechanism of a novel isomaltulose-synthesizing enzyme from *Erwinia rhamontici*. *Biochem. J.*, 220 (1984) 213-220.
- 90 Cummings, R.D. and Kornfeld, S.: The distribution of repeating (Gal $\beta$ 1,4GlcNAc $\beta$ 1,3) sequences in asparagine-linked oligosaccharides of the mouse lymphoma cell lines BWS147 and PHA $P$ 2.1. Binding of oligosaccharides containing these sequences to immobilized *Datura stramonium* agglutinin. *J. Biol. Chem.*, 259 (1984) 6253-6260.
- 91 Doner, L.W., Fogel, C.L. and Biller, L.M.: 3-Aminopropyl-bonded-phase silica, thin-layer chromatographic plates: their preparation and application to sugar resolution. *Carbohydr. Res.*, 125 (1984) 1-11; *C.A.*, 100 (1984) 114283h.
- 92 Doner, L.W. and Biller, L.M.: High-performance thin-layer chromatographic separation of sugars: preparation and application of aminopropyl bonded-phase silica plates impregnated with monosodium phosphate. *J. Chromatogr.*, 287 (1984) 391-398 -  $R_f$  for 56 sugars.

- 93 Guardiola, J. and Schultze, K.W.: DC- und LC-Einsatz in Rahmen der Qualitäts-sicherung bei der Herstellung von Infusionslösungen. *Fresenius' Z. Anal. Chem.*, 318 (1984) 237-238.
- 94 Wang, W.T., LeDonne, N.C., Jr., Ackerman, B. and Sweeney, C.C.: Structural characterization of oligosaccharides by high-performance liquid chromatography, fast-atom bombardment-mass spectrometry and exoglycosidase digestion. *Anal. Biochem.*, 141 (1984) 366-381.

See also 95, 126.

## 11. ORGANIC ACIDS AND LIPIDS

### 11a. Organic acids and simple esters

- 95 Asif, M., Siddiqi, M.T.A. and Ahmad, M.U.: Fatty acid and sugar composition of *Acorus calamus* Linn. *Fette, Seifen, Anstrichm.*, 86 (1984) 24-25.
- 96 Chapelle, C.C.S. and Ellis, B.E.: Preparative and analytical liquid chromatography of complex caffeoyl esters. *J. Chromatogr.*, 285 (1984) 171-177.
- 97 Dix, C.J., Habberfield, A.D., Sullivan, M.H.F. and Cooke, B.A.: Inhibition of steroid production Leydig cells by non-steroidal anti-inflammatory and related compounds: evidence for the involvment of lipoxygenase products in steroidogenesis. *Biochem. J.*, 219 (1984) 529-537.
- 98 Erciyas, A.T. and Civelekoglu, H.: On the argentation thin-layer chromatography of some conjugated trienoic fatty acids. *Buil. Tech. Univ. Istanbul.*, 36 (1983) 381-396; *C.A.*, 100 (1984) 153268b.
- 99 Gupta, S., Rathore, H.S., Ali, I. and Ahmed, S.R.: Thin-layer chromatographic studies of 30 organic acids on calcium sulphate. *J. Liq. Chromatogr.*, 7 (1984) 1321-1340.
- 100 Horňá, A., Pechová, H., Tumova, A. and Churacek, J.: Thin-layer chromatography of homologous series of aliphatic C<sub>2</sub>-C<sub>18</sub> alkyl esters of acrylic and methacrylic acids. *J. Chromatogr.*, 288 (1984) 230-232 - R<sub>F</sub> values for twice 13 homologues; 3 straight-phase and 2 paraffin-oil impregnated silica gel.
- 101 Jost, W., Hauck, H.E. and Herbert, H.: Reversed-phase thin-layer chromatography of 2-substituted-benzoic acids with ammonium compounds as ion-pair reagents. *Chromatographia*, 18 (1984) 512-516.
- 102 Krasnova, N.S., Babich, V.V., Kozub, G.I. and Gershkovich, I.A.: (Efficient separation of di- and hydroxycarboxylic acids using paper chromatography.) *Zh. Anal. Khim.*, 38 (1983) 2220-2223; *C.A.*, 100 (1984) 95820n.
- 103 Kuchar, M., Brunova, B., Rejholec, V., Jelinkova, M., Holubek, J. and Nemecek, O.: Quantitative relations between structure and activation of fibrinolysis in selected series of arylaliphatic acids. *Collect. Czech. Chem. Commun.*, 49 (1984) 122-136.
- 104 Lieblich, H.M. and Först, C.: Hydroxycarboxylic and oxocarboxylic acids in urine: products from branched-chain amino acid degradation and from ketogenesis. *J. Chromatogr.*, 309 (1984) 225-242.
- 105 Schliemann, W.: Synthese von 3-O-β-D-Glucopyranosylgibberellin A<sub>3</sub>-p-brom-phenacylester. *Pharmazie*, 39 (1984) 353-354.
- 106 Seher, A., Ellinghaus, L., Werner, G. and Petersen, U.: Ernährungsphysiologische Wirkung unterschiedlicher Gemische von Ol-, Linol- und Linolensäure bei wachsenden Schweinen. 4. Einfluss auf die Lipide der Leber. *Fette, Seifen, Anstrichm.*, 86 (1984) 47-51.

See also 120, 206, 368.

### 11b. Prostaglandins

- 107 Beneytout, J.L., Greuet, D., Tixier, M. and Rigaud, M.: Separation of arachidonic acid metabolites by thin-layer chromatography using new silicone-bonded plates. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 538-539.
- 108 Bruno, P., Caselli, M., Garappa, C. and Traini, A.: HPTLC separation of PGF<sub>2α</sub>, PGE<sub>1</sub>, PGE<sub>2</sub>, PGA<sub>1</sub> Prostaglandins and quantitative determination *in situ* by induced fluorescence. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 593-595.

- 109 Riuutta, A., Seppälä, E. and Vapaatalo, H.: A rapid, sensitive method for detecting different arachidonic acid metabolites by thin-layer chromatography: the use of autoradiography. *J. Chromatogr.*, 307 (1984) 185-189.
- 110 Rydzik, R., Terragno, N.A. and Terragno, A.: Separation of eicosanoids by reverse-phase thin-layer chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1313-1320.

*11e. Lipids and their constituents*

- 111 Albach, R.F. and Guerra, A.A.: Rapid isolation and thin-layer chromatographic screening of extracts from boll weevil (*Anthonomus grandis Boheman*). *J. Agric. Food Chem.*, 32 (1984) 797-800.
- 112 Batabyal, S.K., Deb, S. and Bose, S.N.: A quick method of two dimensional thin-layer chromatographic separation of human serum phospholipids and their identification. *J. Indian Chem. Soc.*, 61 (1984) 176-178; *C.A.*, 101 (1984) 68676j.
- 113 Blank, M.L., Robinson, M., Fitzgerald, V. and Snyder, F.: Novel quantitative method for determination of molecular species of phospholipids and diglycerides. *J. Chromatogr.*, 298 (1984) 473-482.
- 114 Bleiber, R., Muhlack, D. and Eggert, W.: (Quality of the determinations of phospholipids by two dimensional thin-layer chromatography.) *Z. Med. Laboratoriumsdiagn.*, 25 (1984) 216-222; *C.A.*, 101 (1984) 68680f.
- 115 Bouhours, J.-F. and Bouhours, D.: Identification of free ceramide in human erythrocyte membrane. *J. Lipid Res.*, 25 (1984) 613-619.
- 116 Bulawa, C.E. and Raetz, C.R.H.: The biosynthesis of Gram-negative endotoxin. Identification and function of UDP-2,3-diacylgucosamine in *Escherichia coli*. *J. Biol. Chem.*, 259 (1984) 4846-4851.
- 117 Cerbulis, J., Parks, O.W., Liu, R.H., Piotrowski, E.G. and Farrell, H.M., Jr.: Occurrence of diesters of 3-chloro-1,2-propanediol in the neutral lipid fraction of goats' milk. *J. Agric. Food Chem.*, 32 (1984) 474-476.
- 118 Crossman, M.W. and Hirschberg, C.B.: Conversion of erythro-D-sphinganine to its (1-<sup>2</sup>H<sub>1</sub>) and (1-<sup>3</sup>H<sub>1</sub>) derivatives. *J. Lipid Res.*, 25 (1984) 729-737.
- 119 Delmas, R.P., Parrish, C.C. and Ackman, R.G.: Determination of lipid class concentrations in seawater by thin-layer chromatography with flame ionization detection. *Anal. Chem.*, 56 (1984) 1272-1277.
- 120 Freedman, B., Pryde, E.H. and Kwolek, W.F.: Thin-layer chromatography/flame ionization analysis of transesterified vegetable oils. *J. Am. Oil Chem. Soc.*, 61 (1984) 1215-1220.
- 121 Goppelt, M. and Resch, K.: Densitometric quantitation of individual phospholipids from natural sources separated by one-dimensional thin-layer chromatography. *Anal. Biochem.*, 140 (1984) 152-155.
- 122 Hakomori, S., Nudelman, E., Levery, S.B. and Kannagi, R.: Novel fucolipids accumulating in human adenocarcinoma. I. Glycolipids with di- or trifucosylated type 2 chain. *J. Biol. Chem.*, 259 (1984) 4672-4680.
- 123 Ito, K., Isayama, K. and Niwa, M.: (A simple modified method for erythrocyte membrane lipid analysis by thin-layer chromatography with flame-ionization detection.) *Rinsho Byori*, 31 (1983) 1351-1356; *C.A.*, 100 (1984) 153251r.
- 124 Kaimal, T.N.B. and Shantha, N.C.: Quantitative analysis of lipids on copper(II) sulphate-impregnated Chromarods. *J. Chromatogr.*, 288 (1984) 177-186 - improved response (function of mass), baseline stability; reduced variability; visualization of front.
- 125 Kiuchi, K., Mutoh, T. and Naoi, M.: A fluorometric microassay procedure for monitoring the enzymatic activity of GM<sub>1</sub>-ganglioside  $\beta$ -galactosidase by use of high-performance liquid chromatography. *Anal. Biochem.*, 140 (1984) 146-151.
- 126 Kopytov, Yu.P.: (New variation in thin-layer chromatography of lipids and carbohydrates.) *Ekol. Morya, Kiev*, No. 13 (1983) 76-80; *C.A.*, 101 (1984) 20005n.
- 127 Lang, W.C.: Glycoprotein biosynthesis in *Chlamydomonas*. A mannosid intermediate with the properties of a short-chain  $\alpha$ -saturated polypropenyl monophosphate. *Biochem. J.*, 220 (1984) 747-754.
- 128 Leskawa, K.C., Dasgupta, S., Chien, J.-L. and Hogan, E.L.: A simplified procedure for the preparation of tritiated GM<sub>1</sub> ganglioside and other glycosphingolipids. *Anal. Biochem.*, 140 (1984) 172-177.
- 129 Mallet, A.I., Cunningham, F.M. and Daniel, R.: Rapid isocratic high-performance liquid chromatographic purification of platelet activating factor (PAF) and lyso-PAF from human skin. *J. Chromatogr.*, 309 (1984) 160-164.

- 130 Miller-Prodraza, H. and Fishman, P.H.: Effect of drugs and temperature on bio-synthesis and transport of glycosphingolipids in cultured neurotumor cells. *Biochim. Biophys. Acta*, 804 (1984) 44-51.
- 131 Moschidis, M.C.: Thin-layer chromatographic and infrared spectral evidence for the presence of phosphonolipids in ground apricot kernel. *J. Chromatogr.*, 294 (1984) 519-524 -  $R_f$  values (1 system) and 5 detections for 41 substances.
- 132 Moschidis, M.D.: Sheep and goat brain phosphonolipids: isolation by thin-layer chromatography, identification and column chromatography. *J. Chromatogr.*, 298 (1984) 366-371.
- 133 Okumura, S.: (Thin-layer chromatography of glycerides.) *Kagaku to Kogyo (Osaka)*, 57 (1983) 476-479; *C.A.*, 100 (1984) 202759y - a review.
- 134 Rao, Y.N., Prasad, R.B.N. and Rao, S.V.: Phospholipid composition of Karanja (*Pongamia glabra*) seeds. *Fette, Seifen, Anstrichm.*, 86 (1984) 107-109.
- 135 Rivnay, B.: Combined analysis of phospholipids by high-performance liquid chromatography and thin-layer chromatography. Analysis of phospholipid classes in commercial soybean lecithin. *J. Chromatogr.*, 294 (1984) 303-315.
- 136 Schmitz, G., Assmann, G. and Bowyer, D.E.: A quantitative densitometric method for the rapid separation and quantitation of the major tissue and lipoprotein lipids by high-performance thin-layer chromatography. I. Sample preparation, chromatography and densitometry. *J. Chromatogr.*, 307 (1984) 76-79 - automatic application, automatic fluorimetric or absorptiometric (reflection mode) scanning.
- 137 Schmitz, G., Lencyk, M., Ord, D., Bowyer, D.E. and Assmann, G.: A quantitative densitometric method for the rapid separation and quantitation of the major lipids of tissues and lipoproteins by high-performance thin-layer chromatography. II. Reduction of the densitometric data. *J. Chromatogr.*, 307 (1984) 81-89 - BASIC program for evaluation of densitometric data.
- 138 Shaffer, R.B.: Measurement of the substantivity of cosmetic lotions by thin-layer chromatography. *Cosmet. Toiletries*, 99, No. 3 (1984) 85-87; *C.A.*, 101 (1984) 59972a.
- 139 Siddiqui, B. and Kim, Y.S.: Effects of sodium butyrate, dimethyl sulfoxide and retinoic acid on glycolipids of human rectal adenocarcinoma cells. *Cancer Res.*, 44 (1984) 1648-1652.
- 140 Spillman, T., Cotton, D.B., Lynn, S.C. and Bretaudiere, J.-P.: Removal of a component interfering with phosphatidylglycerol estimation in the "Helena" system for amniotic fluid phospholipids. *Clin. Chem. (Winston Salem, N.C.)*, 30 (1984) 737-740.
- 141 Touchstone, J.C., Levin, S.S. and Levin, E.J.: Effect of phosphor on thin-layer chromatography of phospholipids. *J. Chromatogr.*, 298 (1984) 198-199.
- 142 Viden, I.: (Analysis of complex polar lipids. II. Thin-layer chromatography.) *Chem. Listy*, 78 (1984) 158-185; *C.A.*, 100 (1984) 170836c - a review with 362 refs.
- 143 Vioque, A. and Ventura, M.: (Detection and quantification of mineral oils contaminating vegetable oils related to the "toxic syndrome".) *Grasas Aceites (Seville)*, 35, No. 2 (1984) 106-113; *C.A.*, 101 (1984) 89039u.
- 144 Watanabe, K. and Tomono, Y.: One-step fractionation of neutral and acidic glycosphingolipids by high-performance liquid chromatography. *Anal. Biochem.*, 139 (1984) 367-372.
- 145 Wollbeck, D., Kleist, E.V., Elmada, I. and Funk, W.: Quantitative determination of phospholipids in mitochondria using HPTLC and fluorimetric assay *in situ*. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 473-476.

See also 146.

#### 11d. Lipoproteins and their constituents

- 146 Homberg, E. and Bielefeld, B.: Freie und gebundene Sterine in rohen und raffinierten Palmölen. Teil II: Sterinhaltige Lipoproteine. *Fette, Seifen, Anstrichm.*, 86 (1984) 135-139.

## 13. STEROIDS

- 147 Görög, S.: Quantitative analysis of steroids (Studies in Analytical Chemistry Series, Vol. 5) Elsevier, Amsterdam, Oxford, New York, Tokyo, 1983, 440 pp.

See also 21.

13a. *Pregnane and androstane derivatives*

- 148 Gonzalez, H., Soberon, E., Gutierrez, C. and Garzon, A.: (Comparison of specific analytical methods for the determination of fluocinolone acetonide acetate in a topical formulation.) *Rev. Mex. Cienc. Farm.*, 14, No. 1 (1984) 16-21; *C.A.*, 101 (1984) 28359b.
- 149 Heinisch, G. and Matous, H.: Beiträge zur Differenzierung von Arzneistoffen. 5. Mitteilung. *Sci. Pharm.*, 52 (1984) 82-90.
- 150 Knopp, Ch.: Akzelerierte Stabilitätsuntersuchungen mit Prednisolon in Lösung. *Sci. Pharm.*, 52 (1984) 247-253.
- 151 Mattox, V.R., Nelson, A.N., Vrieze, W.D. and Jardine, I.: Synthesis of mono- and diglucosiduronates of metabolites of deoxycorticosterone and corticosterone and analysis by a new mass spectrometric technique. *Steroids*, 42 (1983) 349-364.
- 152 O'Shannessy, D.J.: Separation of the steroid pairs 5 $\alpha$ -androstenediol-5 $\alpha$ -androstenediol and dehydroepiandrosterone-5 $\alpha$ -dihydrotestosterone by thin-layer chromatography. *J. Chromatogr.*, 295 (1984) 308-311.
- 153 Perel, E., Stolee, K.J., Kharlip, L., Blackstein, M.E. and Killinger, D.W.: Androstenedione metabolism in epithelial cells derived from early-lactation human milk. *Steroids*, 42 (1983) 389-399.

13b. *Estrogens*

- 154 Abul-Hajj, Y.J. and Nurieddin, A.: Significance of lipoidal estradiol in human mammary tumors. *Steroids*, 42 (1983) 417-426.
- 155 Agbaba, D., Zivanov-Stakic, D. and Kovacevic, M.: (Determination of conjugated estrogens in pharmaceuticals.) *Arh. Farm.*, 33, No. 4 (1983) 159-165; *C.A.*, 100 (1984) 74040t.
- 156 Göber, B., Seiferth, S. and Franke, P.: Zur Struktur, Analytik und Stabilität von Ethynodiolisopropylsulfonat und steroidalen Begleitsubstanzen. *Pharmazie*, 39 (1984) 27-29.
- 157 Tsang, C.P.W.: Thin-layer chromatographic separation of oestrogen sulphates. *J. Chromatogr.*, 294 (1984) 517-518.

13c. *Sterols*

- 158 Akopova, O., Shavarina, M. and Maidachenko, G.: (Thin-layer chromatography of cholesteric liquid crystals on aluminium oxide.) *Zhidk. Kristally i ikh Prakt. Primenenie*, Ivanovo, (1982) 116-123; *C.A.*, 100 (1984) 185066a.
- 159 Patel, D.D., Pullinger, C.R. and Knight, B.L.: The absolute rate of cholesterol biosynthesis in monocyte-macrophages from normal and familial hypercholesterolemia subjects. *Biochem. J.*, 219 (1984) 461-470.
- 160 Pruna, L.B., Henriques, R.D., Huneck, S., Schreiber, K. and Preiss, A.: Chemical studies of Cuban Georganians. Part 10: Di- and tri-hydroxysteroids from *Plexaura grisea*. *Pharmazie*, 39 (1984) 117-120.
- 161 Siedel, J. and Ziegenhorn, J.: A new high performance test kit for the determination of serum cholesterol: verification of complete cholesterol ester hydrolysis by high-performance thin-layer chromatography. *Recent Adv. Lipid Lipoprotein Anal.*, Boehringer Mannheim Diagn. Workshop, Natl. Meet., Am. Assoc. Clin. Chem., 35th, 1983, pp. 8-10; *C.A.*, 101 (1984) 51253w.

See also 146, 163.

## 13d. Bile acids and alcohols

- 162 Lepri, L., Heimler, D. and Desideri, P.G.: Reversed-phase high-performance thin-layer chromatography of free and conjugated bile acids. *J. Chromatogr.*, 288 (1984) 461-468 - *R<sub>f</sub>* for 20 acids in 6 systems on RP-18 plates.
- 163 Liu, H.: (Quality control of cattle and sheep bile preparations.) *Zhongyao Tongbao*, 9, No. 1 (1984) 24-25; *C.A.*, 100 (1984) 161846d.
- 164 Robb, T.A. and Davidson, G.P.: Analysis of individual bile acids and their glycine/taurine conjugates by high-performance thin-layer chromatography and densitometry. *Ann. Clin. Biochem.*, 21 (1984) 137-140; *C.A.*, 101 (1984) 35347z.
- 165 Yan, X., Shao, W., Shen, X. and Zuo, L.: (Analysis of bile acids in musk bile.) *Zhongcaoyao*, 14 (1983) 542-545; *C.A.*, 100 (1984) 126965v.

## 13e. Ecdysones and other insect steroid hormones

- 166 Mamatkhanov, A.U., Shamsutdinov, M.I. and Shakirov, T.T.: (Extraction and purification of ecdysterone.) *Khim. Prir. Soedin.*, (1983) 601-605; *C.A.*, 100 (1984) 126763c.

## 13f. Other steroids

- 167 Pouzar, V., Drasar, P., Cerny, I. and Havel, M.: Preparation of 21,26,27-trinor-5 $\alpha$ -cholest-23-en-25+20-olide from a propargyl synthon. *Collect. Czech. Chem. Commun.*, 49 (1984) 871-880.

## 14. STEROID GLYCOSIDES AND SAPONINS

- 168 Debska, W. and Saskowska, A.: (Method for the determination of lanatoside C in *Digitalis lanata* Ehrh. leaves.) *Herba Pol.*, 28 (1982) 139-144; *C.A.*, 100 (1984) 56901v.
- 169 Meng, Z. and Sun, Y.: (Analysis of ginseng sapogenin in ginseng preparations.) *Nanjing Yaoxueyuan Xuebao*, No. 2 (1983) 7-12; *C.A.*, 100 (1984) 180003t.
- 170 Pasich, B., Terminska, K. and Przygoda, U.: (Spectrophotometric determination of diosgenin and yamogenin in seeds of fenugreek - *Trigonella foenum-graecum* L.) *Farm. Pol.*, 39 (1983) 599-602; *C.A.*, 100 (1984) 215598v.
- 171 Reh, E. and Jork, H.: Bestimmung von Digitoxin in Serum (pg/ml). Ein Vergleich der HPLC und HPTLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 264-266.
- 172 Shao, C., Kuang, H. and Xu, J.: (Quantitative determination of saponins of ginseng extract.) *Yaoxue Tongbao*, 18 (1983) 734-736; *C.A.*, 100 (1984) 180164w.
- 173 Wang, C., Wei, Y. and Xu, J.: (Analysis of the chemical constituents of Ren Shen Gao.) *Baichiuen Yike Daxue Xuebao*, 9, No. 6 (1983) 60-62; *C.A.*, 100 (1984) 126976z.
- 174 Yang, T., Wu, M. and Zhou, J.: (A simple technological process for the extraction and isolation of the saponins of ginseng and San Chi Ginseng.) *Yunnan Zhiwu Yanjiu*, 6, No. 1 (1984) 98; *C.A.*, 100 (1984) 180002s.
- 175 Yoon, K.-R. and Wrolstad, R.E.: Investigation of Marion blackberry, strawberry and plum fruit for the presence of saponins. *J. Agric. Food Chem.*, 32 (1984) 691-693.
- 176 Zhao, B., Wang, R. and Guo, J.: (Determination of total ginseng saponins in Ren Sen Jing, a ginseng preparation.) *Zhongcaoyao*, 15, No. 3 (1984) 142; *C.A.*, 100 (1984) 161848f.

See also 434, 437.

## 15. TERPENES AND OTHER VOLATILE AROMATIC COMPOUNDS

See 21.

*15a. Terpenes*

- 177 Koch, V. and Kubeczka, K.-H.: Dünnschicht-chromatographische Optimierung der mobilen Phase für die Säulen-chromatographische Trennung oxygenierter Terpene. *Fresenius' Z. Anal. Chem.*, 318 (1984) 243-244.
- 178 Kohli, J.C., Badaisha, K.K. and Gautam, V.K.: Reduction of terpenoids on thin-layer chromatographic plates. *J. Chromatogr.*, 288 (1984) 489-494 -  $R_f$  tables for 16 terpenoids and their NaI, Al isopropoxide and NaBH<sub>4</sub> reaction products.
- 179 Safranova, T.O., Popov, D.M. and Uglova, T.G.: (Chromatographic-photometric determination of menthol.) *Farmatsiya (Moscow)*, 33, No. 1 (1984) 70-72; *C.A.*, 100 (1984) 180157w.
- 180 Zhu, P., Peng, N. and Jiang, W.: (TLC-UV spectrophotometric determination of andrographolide in the leaves and stems of *Andrographis paniculata*.) *Yaoxu Fenxi Zashi*, 4, No. 1 (1984) 34-36; *C.A.*, 100 (1984) 126970t.

See also 440.

*15b. Essential oils*

- 181 Codony Salcedo, R.: (Use of instrumental analysis in evaluation of the quality of lemon oil. VI.) *Circ. Farm.*, 41 (1983) 217-282; *C.A.*, 101 (1984) 11977d - a review with 94 refs.
- 182 Enjalbert, F., Bessiere, J.M., Pellecuer, J., Privat, G. and Doucet, G.: (Analysis of essential oil of balm.) *Fitoterapia*, 54, No. 2 (1983) 59-65; *C.A.*, 100 (1984) 91119t.
- 183 Villar, A., Caldach, M.L. and Zafra-Polo, M.C.: (Essential oils from different *Artemisia* species.) *Acta Pharm.*, 24 (1983) 149-159; *C.A.*, 101 (1984) 11989j.
- 184 Hasegawa, S., Dillberger, A.M. and Choi, G.Y.: Metabolism of limonoids: Conversion of nomilin to obacunone in *Corynebacterium fascians*. *J. Agric. Food Chem.*, 32 (1984) 457-459.

See also 439.

## 16. NITRO AND NITROSO COMPOUNDS

- 185 Brown, K.K. and Poole, C.F.: Determination of 1-nitropyrene by thin-layer chromatography in a diesel exhaust particulate extract. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 520-524.
- 186 Gagliardo, E., Mantegazza, G., Origgì, P. and Lazzari, E.: Thin-layer and high-performance liquid chromatographic identification of some nitrohydroxyacyl-phenones. *J. Chromatogr.*, 295 (1984) 299-303 -  $R_f$  values for 12 phenone derivatives.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

*17a. Amines and polyamines*

- 187 Botez, L. and Ponoran, I.: (Separation and identification of (carbalkoxy)-methyltrialkylammonium chlorides by thin-layer chromatography.) *Rev. Chim. (Bucharest)*, 35, No. 1 (1984) 66-67; *C.A.*, 101 (1984) 16512h.
- 188 Cserhati, T.: Determination of the lipophilicity of some aniline derivatives by reversed-phase thin-layer chromatography. The effect of the organic phase in the eluent. *Chromatographia*, 18 (1984) 318-322.
- 189 Hutson, D.H., Logan, C.J. and Regan, P.D.: Evidence for the formation of a novel glutathione conjugate in the metabolism of an aromatic amine derivative. *Drug Metab. Disp.*, 12 (1984) 523-524.
- 190 Karawya, M.S., Khayyal, S.E., Farrag, N.M. and Ayad, M.M.: Quantitative determination of diphenylamine in certain edible plant organs. *Sci. Pharm.*, 52 (1984) 147-151.

- 191 Kremmer, T., Holcinger, L., Boldizsar, M., Selmeci, L. and Bardocz, S.: Thin-layer and high-performance liquid chromatographic determination of P388/S tumor cell and host liver polyamines. *J. Chromatogr.*, 286 (1984) 371-379.
- 192 Muras, C. and Tomczyk, D.: (Detection and determination of small quantities of free 1-naphthylamine in azo dyes.) *Biuł. Inf.: Barwniki Środki Pomocnicze*, 27 (1983) 64-66; *C.A.*, 100 (1984) 193512h.
- 193 Okamoto, M., Hibi, M. and Yamada, F.: (High-performance thin-layer chromatographic analysis for some aromatic amines on 3-aminopropyltriethoxysilane-treated plates.) *Gifu-ken Eisei Kenkyusho Ho*, 27 (1982) 30-31; *C.A.*, 100 (1984) 114303q.
- 194 Sistovaris, N. and Bartsch, W.: Quantitative thin-layer chromatography for cost-effective, sensitive and selective assaying of aromatic amines in urine. *Fresenius' Z. Anal. Chem.*, 318 (1984) 271-272.
- 195 Zavorovskaya, N.A., Artem'eva, L.P. and Kotovskaya, N.P.: (Determination of aromatic amines in air by a thin-layer chromatographic method.) *Nauch.-tekhn. Progress i Ohrana Truda*, M., (1983) 82-86; *C.A.*, 100 (1984) 73184f.

See also 46, 315, 345.

#### 17b. Catecholamines and their metabolites

- 196 Quimpere, M. and Volpe, Y.: Detection of catecholamines and metabolites by fluorescence on thin-layer chromatograms. *J. Chromatogr.*, 294 (1984) 513-516 - fluorescence on heating without or with borate (pH 8) treatment.
- 197 Ufer-Weiss, M., Jork, H. and Keller, H.E.: Quantitative TLC-spektroskopische Bestimmung wichtiger Catecholamin-Metaboliten in Urin. *Fresenius' Z. Anal. Chem.*, 318 (1984) 273-275.

#### 17c. Amine derivatives and amides (excluding peptides)

- 198 Andary, C., Privat, G. and Bourrier, M.J.: Microdosage spectrofluorimétrique sur couches minces de la monomethylhydrazine chez *Gyromitra esculenta*. *J. Chromatogr.*, 287 (1984) 419-424.
- 199 Bieniek, G., Karmanska, K. and Wilczok, T.: Thin-layer chromatography of *p*-aminophenol in urine after mixed exposure to aniline and toluene. *Br. J. Ind. Med.*, 41 (1984) 272-274; *C.A.*, 101 (1984) 67145y.
- 200 Ma, Y.: (Paper chromatographic determination of urea in foods.) *Shipin Xuece (Beijing)*, 46 (1983) 38-39; *C.A.*, 100 (1984) 190385h.
- 201 Peters, F.P.A.M.N. and Hafenscheid, J.C.M.: Kits for enzyme determinations compared: relation between composition and quality. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1625-1630.
- 202 Quareshi, M.A., Tomer, R.K., Prakash, O. and Dhawan, S.N.: Identification of some new isomeric Schiff bases by thin-layer chromatography. *Acta Cienc. Indica, (Ser.) Chem.*, 9, No. 1-4 (1983) 91-92; *C.A.*, 100 (1984) 220910v.

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

#### 18a. Amino acids and their derivatives

- 203 Barnekow, A. and Bauer, H.: The differential expression of the cellular src-gene product pp60<sup>src</sup> and its phosphokinase activity in normal chicken cells and tissues. *Biochim. Biophys. Acta*, 782 (1984) 94-102.
- 204 Bondarenko, B.N.: (Quantitative determination of amino acids by thin-layer chromatography.) *Lab. Delo*, No. 2 (1984) 118-120; *C.A.*, 100 (1984) 170919g.
- 205 Buly, R.L. and Mumma, R.O.: Excretion and metabolism of ((2,4-dichlorophenoxy)-acetyl)aspartic acid and ((2,4-dichlorophenoxy)acetyl)valine in the rat. *J. Agric. Food Chem.*, 32 (1984) 571-577.
- 206 Chikin, G.A., Lovchionovskaya, T.A. and Stepanishcheva, N.A.: (Determination of organic acid in molasses by chromatographic methods.) *Sakh. Prom-st.*, No. 4 (1984) 45-48; *C.A.*, 101 (1984) 25306w.
- 207 Di Donato, S., Romoldi, M., Garavaglia, B. and Uziel, G.: Propionylcarnitine excretion in propionic and methylmalonic acidurias: a cause of carnitine deficiency. *Clin. Chim. Acta*, 139 (1984) 13-21.

- 208 Falter, S. and Mincsovics, E.: Separation of phenylthiohydantoin-amino acids by overpressured-layer chromatography. *J. Chromatogr.*, 298 (1984) 534-538.
- 209 Guenther, K.J. and Schickedanz, M.: (Thin-layer chromatographic enantiomer separation by using ligand exchange.) *Angew. Chem.*, 96 (1984) 514-515; *C.A.*, 101 (1984) 65245g.
- 210 Kanwar, U., Kaur, P. and Brar, N.: Paper chromatographic analysis of free amino acids in the venom gland of the scorpion, *Palamnaeus bengalensis*. *Res. Bull. Panjab Univ., Sci.*, 34, No. 1-2 (1983) 235-237; *C.A.*, 101 (1984) 35358d.
- 211 Kelly, G.J., Murphy, R.F., Bridges, J.M. and Elmore, D.T.: A radiochemical assay for lysosomal carboxypeptidase A in human B- and T-lymphocytes. *Clin. Chim. Acta*, 139 (1984) 107-111.
- 212 Mizrakh, L.I., Sukhoruchkin, A.G. and Gvozdetskii, A.N.: (Polyaminopolycarboxylic and polyaminopolyphosphonic complexon determination.) *U.S.S.R. Pat. SU 1,059,506 (Cl. G01N31/08)*, 07 Dec. 1983, Appl. 3,422,420, 20 May 1982; *C.A.*, 100 (1984) 95881h.
- 213 Ogata, M. and Taguchi, T.: (Quantitative determination of urinary metabolites of toluene and xylene by thin-layer chromatography.) *Igaku to Seibutsugaku*, 107, No. 3 (1983) 157-160; *C.A.*, 100 (1984) 152018h.
- 214 Parajkova, M. and Polacek, I.: (Determination of feed lysine content by thin-layer chromatography on ion exchangers.) *Agrochémia (Bratislava)*, 24 (1984) 53-58; *C.A.*, 100 (1984) 207960s.
- 215 Pastor-Anglada, M., Lopez-Tejero, D. and Remesar, X.: Thin-layer chromatography of  $^{14}\text{C}$ -dansyl amino acids for the quantification of plasma amino acid levels. *IRCS Med. Sci.*, 12 (1984) 538-539; *C.A.*, 101 (1984) 86851s.
- 216 Srivastava, S.P., Bhushan, R. and Chauhan, R.S.: TLC separations of amino acids on silica gel impregnated layers. *J. Liq. Chromatogr.*, 7 (1984) 1359-1365.
- 217 Tokmakova, V.N., Lyanaya, A.I., Golovnya, R.V. and Misharina, T.A.: (Rapid method for determining amino acid content by thin-layer chromatography on ion-exchange resins.) *Konservn. Ovoshchesush. Prom-st.*, No. 5 (1984) 29-30; *C.A.*, 101 (1984) 68671d.
- 218 Wang, T.R., Lee, M.I. and Toke, D.A.: A micro thin-layer chromatography technique for urinary and serum amino acids using fluorescamine as a staining reagent. *Jinrui Idengaku Zasshi*, 28 (1983) 273-284; *C.A.*, 101 (1984) 19984z.
- 219 Weinstein, S.: Resolution of optical isomers by thin-layer chromatography. *Tetrahedron Lett.*, 25 (1984) 985-986; *C.A.*, 100 (1984) 185063x.
- 220 Xiao, R., Tao, S. and Ma, Y.: (Study on the extraction of amino acids from silkworm pupae.) *Zhongyao Tongbao*, 8, No. 5 (1983) 28-31; *C.A.*, 100 (1984) 91203r.

See also 47, 189, 365.

#### 18b. Peptides and peptidic and proteinous hormones

- 221 Barbaro, A.M., Pietrogrande, M.C., Guerra, M.C., Cantelli Forti, G., Borea, P.A. and Biagi, G.L.: Relationship between the chromatographic behaviour of dermorphin-related oligopeptides and the composition of the mobile phase in reversed-phase thin-layer chromatography: comparison of extrapolated  $R_M$  values. *J. Chromatogr.*, 287 (1984) 259-270 - 23 peptides.
- 222 Folkers, K., Bowars, C.Y., Stepinski, J., Plucinski, T., Sakagami, M. and Kubiak, T.: Analogs of the luteinizing hormone releasing hormone having the Azagly<sup>10</sup> moiety with antiovulatory activity. *Z. Naturforsch.*, 39B (1984) 528-532.
- 223 Prochazka, Z., Lebl, M., Barth, T., Hlavacek, J., Trka, A., Budesinsky, M. and Jost, K.: Synthesis and properties of oxytocin analogues modified in the tri-peptide side chain. *Collect. Czech. Chem. Commun.*, 49 (1984) 642-652.
- 224 Sziegoleit, A.: A novel proteinase from human pancreas. *Biochem. J.*, 219 (1984) 735-742.

See also 226.

*18c. General techniques of elucidation of structure of proteins*

- 225 Ramaswamy, S.G.: Hydroxyproline 2-epimerase of *Pseudomonas*. Subunit structure and active site studies. *J. Biol. Chem.*, 259 (1984) 249-254.

See also 208.

**19. PROTEINS***19d. Proteins of blood, serum and blood cells*

- 226 Kelly, Ch.: Physicochemical properties and N-terminal sequence of eel lectin. *Biochem. J.*, 220 (1984) 221-226.

**20. ENZYMES***20a. Oxidoreductases*

- 227 Sams, C.F. and Matthews, K.S.: Chemical modification of dopamine  $\beta$ -hydroxylase. *Biochim. Biophys. Acta*, 787 (1984) 61-70.

**21. PURINES, PYRIMIDINES, NUCLEIC ACIDS AND THEIR CONSTITUENTS***21a. Purines, pyrimidines, nucleosides, nucleotides*

- 228 Baker, J.C. and Jacobson, M.K.: Determination of diadenosine 5',5'',-P<sup>1</sup>,P<sup>4</sup>-tetraphosphate levels in cultured mammalian cells. *Anal. Biochem.*, 141 (1984) 451-460.  
229 Schmidt, K. and Baer, H.P.: Purification of radiiodinated succinyl cyclic nucleotide tyrosine methyl esters by anion-exchange thin-layer chromatography. *Anal. Biochem.*, 141 (1984) 499-502.  
230 Traut, T.W. and Loeschel, S.: Pyrimidine catabolism: individual characterization of the three sequential enzymes with a new assay. *Biochemistry*, 23 (1984) 2533-2539; *C.A.*, 100 (1984) 205447f.

*21f. Structural studies of nucleic acids*

- 231 Shlyapnikov, M.G., Kaliman, A.V., Kazantsev, S.I., Kryukov, V.M. and Bayev, A.A.: The nucleotide sequence of bacteriophage T5 glutamine transfer RNA. *Biochim. Biophys. Acta*, 782 (1984) 313-319.

**22. ALKALOIDS**

- 232 Bhattacharyya, P. and Jash, S.S.: Benzoyl peroxide as a spray reagent for carbazole alkaloids. *J. Chromatogr.*, 298 (1984) 200-201.  
233 Bushway, R.J., McGann, D.F. and Bushway, A.A.: Gas chromatographic method for the determination of solanidine and its application to a study of feed-milk transfer in the cow. *J. Agric. Food Chem.*, 32 (1984) 548-551.  
234 Dvorackova, S., Sedmera, P., Potesilova, H., Santavy, F. and Simanek, V.: Alkaloids of *Gloriosa superba* L. *Collect. Czech. Chem. Commun.*, 49 (1984) 1536-1542.  
235 Guo, Y. and Lu, Y.: (Studies on the transformation of gentiopicroside to gentianal.) *Yaowu Fenxi Zazhi*, 3 (1983) 268-271; *C.A.*, 100 (1984) 197840m.  
236 Gurkan, E.: The radio-assay of some opium alkaloids in *Papaver somniferum* L. capsule latex. *Turk. J. Nucl. Sci.*, 10, No. 2 (1983) 99-104; *C.A.*, 101 (1984) 43670q.

- 237 Hayakawa, J., Noda, N., Yamada, S. and Uno, K.: (Studies on physical and chemical quality evaluation of crude drug preparations. II. Analysis of pharmaceutical preparations including *Nux vomica* extracts by high performance liquid chromatography.) *Yakugaku Zasshi*, 104, No. 1 (1984) 57-61; *C.A.*, 100 (1984) 180156v.
- 238 Miao, H. and Liu, O.: (Method for the detection of dimorphine in morphine hydrochloride injection.) *Yaoxu Fenxi Zazhi*, 3 (1983) 344-346; *C.A.*, 100 (1984) 74033t.
- 239 Perera, P., van Beek, T.A. and Verpoorte, R.: High-performance liquid chromatography of some *Tabernaemontana* alkaloids. *J. Chromatogr.*, 285 (1984) 214-220 - *R<sub>F</sub>* values for 21 alkaloids in two systems.
- 240 Pohloudek-Fabini, R., Döge, G. and Kottke, D.: Zur Stabilität von Oxyethyltheophyllin-Injektionslösungen. *Pharmazie*, 39 (1984) 24-26.
- 241 Ponert, J.: (Removal of alkaloids obtained from *Berberis*, *Magnolia* and *Crataegus* plants containing a tertiary atom of nitrogen from their quaternary salts and/or impurities. *U.S.S.R. Pat. SU 1,049,485* (Cl. C07D217/00), 23 Oct. 1983, Appl. 3,279,912, 17 Apr. 1981; *C.A.*, 100 (1984) 56828b.
- 242 Rippinger, H., Schreiber, K. and Symon, D.: Solanum alkaloids. Part 113: Soladulcidine from *Solanum shanesii*. *Pharmazie*, 39 (1984) 125.
- 243 Sharma, P.N. and Brossi, A.: Reaction of alcohols and amines with diacetylhydrofluorescein (DADF); conversion into erythrosine-derivatives on TLC-plates by ammonia and iodine vapors. *Helv. Chim. Acta*, 67 (1984) 301-304; *C.A.*, 100 (1984) 175098y.
- 244 Sjöberg, A.-M. and Rajama, J.: Simple method for the determination of alkaloids in cocoa using paper chromatography and UV spectrometry. *J. Chromatogr.*, 295 (1984) 291-294.
- 245 Slavík, J. and Slavíková, L.: Minor alkaloids from *Stylophorum diphyllum* (Michx.) Nutt. *Collect. Czech. Chem. Commun.*, 49 (1984) 704-711.
- 246 Slavík, J., Slavíková, L. and Dolejs, L.: Additional alkaloids from *Glaucium squamigerum* Kar. et Kir. *Collect. Czech. Chem. Commun.*, 49 (1984) 1318-1324.
- 247 Szigeti, J., Mezey, G. and Bulyaki, M.: (Pharmacopeial grade morphine hydrochloride.) *Acta Pharm. Hung.*, 54, No. 2 (1984) 58-63; *C.A.*, 100 (1984) 215405e.
- 248 Teshima, D., Tsuchiya, T., Aoyama, T. and Horioka, M.: (Quantitative determination of main emetic components (emetine and cephaeline) in Ipecac.) *Iyakuhin Kenkyu*, 15, No. 1 (1984) 63-71; *C.A.*, 100 (1984) 145055q.
- 249 Van Beek, T.A., Verpoorte, R. and Baerheim Svendsen, A.: Identification of *Tabernaemontana* alkaloids by means of thin-layer chromatography and chromatographic reactions. *J. Chromatogr.*, 298 (1984) 289-307 - 100 alkaloids.
- 250 Wang, M. and Zhu, M.: (Determination of alkaloids in *Coptis* by high-performance thin-layer chromatography.) *Yaoxu Fenxi Zazhi*, 4, No. 1 (1984) 12-15; *C.A.*, 100 (1984) 126968y.
- 251 Zhang, C., Ran, Z. and Wang, Z.: (Chemical analysis of cuscohygrinol α-acetoxyphenylacetate.) *Yaoxu Fenxi Zazhi*, 4, No. 1 (1984) 19-21; *C.A.*, 100 (1984) 145052m.

See also 46, 341, 355, 367, 411, 430.

### 23. OTHER SUBSTANCES CONTAINING HETEROCYCLIC NITROGEN

#### 23b. Bile pigments

- 252 Bonnett, R., Buckley, D.G., Hamzetash, D., Hawkes, G.E., Ioannou, S. and Stoll, M.S.: Photobilirubin II. *Biochem. J.*, 219 (1984) 1053-1056.

#### 23d. Pyridine derivatives

- 253 Pilenkova, I.I., Yurkova, R.G., Fat'yanova, A.D. and Yakupova, F.S.: (Determination of compounds containing 1,1'-dimethyl-4,4'-dipyridinium cation.) *U.S.S.R. Pat. SU 1,062,600* (Cl. C01N31/08), 23 Dec. 1983, Appl. 3,433,908, 23 March 1982; *C.A.*, 100 (1984) 114329c.

- 254 Yu, D. and Das, B.C.: Structure of hydroxymuscopyridine A and hydroxymuscopyridine B, two new constituents of musk. *Planta Med.*, 49 (1983) 183-184; *C.A.*, 100 (1984) 144875v.

See also 403.

*23e. Other N-heterocyclic compounds*

- 255 Bieganowska, M.: Chromatographic retention data of N-alkylamines of benzomorpholine-2-carboxylic acid in the study of structure-activity relationships. *Chromatographia*, 18 (1984) 456-458.
- 256 Fischer, H., Möller, H., Budnowski, M., Atassi, G., Dumont, P., Venditti, J. and Yoder, O.C.: Investigation of the antitumor activity of new epoxide derivatives. Part II: N-glycidylated oxo-nitrogen heterocycles. *Arzneim.-Forsch.*, 34 (I) (1984) 663-668.
- 257 Lei, S., Bian, Y., Liu, S. and Zhao, X.: (Separation and identification of benz[a]acridine and benz[c]acridine in groundwater.) *Huanjing Kexue*, 5, No. 1 (1984) 33-34; *C.A.*, 100 (1984) 161611y.
- 258 Szokan, G., Bezeredy, E. and Matolcsy, G.: Chromatographic investigation of herbicide antidotes with spiro-oxazolidine structures. *J. Chromatogr.*, 286 (1984) 193-205.

See also 370.

**24. ORGANIC SULPHUR COMPOUNDS**

- 259 Gatica, H.S.E., Pieroni de Domancich, O.I., Tomas, M.A. and Frontara, M.A.: Thin-layer chromatography of biologically active agents. I. Thiosemicarbazones. *J. Chromatogr.*, 287 (1984) 225-227.
- 260 Jerzak, B. and Kotarski, A.: (Thiram impurities and their potential influence on the results of analytical determination.) *Organika*, 1981 (Pub. 1982) 41-49; *C.A.*, 100 (1984) 185076d.

See also 209, 375, 378.

**25. ORGANIC PHOSPHORUS COMPOUNDS**

- 261 Breccia, A., Fini, A., Girotti, S. and Salatelli, E.: TLC separation and detection of creatine phosphate from other naturally occurring phosphorus compounds. *Boll. Chim. Farm.*, 122 (1983) 556-559; *C.A.*, 101 (1984) 3303r.
- 262 Gandhe, B.R., Danikhel, R.K. and Purnanand: Reversed-phase thin-layer chromatographic behaviour of some diethyl phenylphosphates. *J. Chromatogr.*, 288 (1984) 233-235 -  $R_F$ ,  $R_M$  and  $\Delta R_M$  values of 10 compounds in normal-phase and octanol- and silicone oil-impregnated silica gel.

See also 203, 212.

**26. ORGANOMETALLIC AND RELATED COMPOUNDS**

*26a. Organometallic compounds*

- 263 Devi, Y.P. and Kumar, N.V.N.: Simple and rapid portable chromatographic method for separation and detection of phenylmercuric acetate in seeds and water. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 771-775.
- 264 Yang, X., Hao, B., Wang, G., Ouyang, T., Liu, Q., Chen, S. and Wang, J.: (Analysis of organometallic compounds. III. Thin-layer chromatography of bis(alkylcyclopentadienyl)di(aryloxy)titanium, -zirconium and -hafnium compounds.) *Fenxi Huaxue*, 12, No. 2 (1984) 93-98; *C.A.*, 100 (1984) 185065z.

See also 460.

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

- 265 Stibr, B., Janousek, Z., Base, K., Plesek, J., Sointsev, K.A., Butman, L.A., Kuznetsov, I.I. and Kuznetsov, N.T.: Synthesis of ten-vertex closo-metalla-carboranes from 4-C<sub>8</sub>H<sub>14</sub>. *Collect. Czech. Chem. Commun.*, 49 (1984) 1660-1664.

*26c. Coordination compounds*

- 266 Janjic, T.J., Tesic, Z.Lj. and Celap, M.B.: Effect of geometrical configuration of square-planar metal complexes on their *R<sub>f</sub>* values obtained by paper chromatography. *J. Chromatogr.*, 294 (1984) 366-369 - 10 pairs of Pt complexes tested in 18 systems.
- 267 Zhang, C., Luo, Q., Yu, X. and Zeng, Y.: (Purification and identification of the new colorforming reagent - carboxylacetylazo.) *Huaxue Shiji*, 5, No. 3 (1983) 159-161, 130; *C.A.*, 100 (1984) 44529s.

See also 443, 450, 454.

## 27. VITAMINS AND VARIOUS GROWTH REGULATORS (NON-PEPTIDIC)

- 268 Proksa, B. and Skoda, A.: Isolation and identification of some degradation products of tocopherol and its acetate. *Pharmazie*, 39 (1984) 279.
- 269 Sackett, P.H.: High-performance thin-layer chromatography of gibberellins in fermentation broths. *Anal. Chem.*, 56 (1984) 1600-1603.
- 270 Sawicka, J.: (Effect of solvents and adsorbents on the stability of cholecalciferol.) *Farm. Pol.*, 39 (1983) 591-593; *C.A.*, 101 (1984) 12272g.
- 271 Spiegel, P. and Teply, O.: Chromatographische Verfahren zur Bestimmung der hydrophilen Vitamine. (Eine Literaturübersicht). 1. Teil: Dünnschichtchromatographische Verfahren. *Sci. Pharm.*, 52 (1984) 183-196.

## 28. ANTIBIOTICS

- 272 Baciu, E. and Medianu, M.: (Identification of cephapirin.) *Rom. Pat.* RO 80,819 (Cl. G01N31/08), 30 Nov. 1982, Appl. 102,191, 22 Sep. 1980; 2 pp.; *C.A.*, 101 (1984) 12313w.
- 273 Baciu, E. and Medianu, M.: (Identification of cephadrine.) *Rom. Pat.* RO 80,818 (Cl. G01N31/08), 30 Nov. 1982, Appl. 102,192, 22 Sep. 1980; 2 pp.; *C.A.*, 100 (1984) 161867m.
- 274 Cassinelli, G., Configliacchi, E., Penco, S., Rivola, G., Arcamone, F., Pacciarini, A. and Ferrari, L.: Separation, characterization and analysis of epirubicin (4'-epidoxorubicin) and its metabolites from human urine. *Drug Metab. Disp.*, 12 (1984) 506-510.
- 275 Debono, M., Merkel, K.E., Molloy, R.M., Barnhart, M., Presti, E., Hunt, A.H. and Hamill, R.L.: Actaplanin, new glycopeptide antibiotics produced by *Actinoplanes missouriensis*. The isolation and preliminary chemical characterization of actaplanin. *J. Antibiot.*, 37 (1984) 85-95.
- 276 DePaolis, A.M.: Determination of 4-epi-meclocycline, a tetracycline analog, in cream formulation by HPLC and HPTLC. *J. Liq. Chromatogr.*, 7 (1984) 1367-1381.
- 277 Dyatlovitskaya, F.G., Maktaz, E.D., Botvinova, L.E., Gorshkova, L.I. and Kruchinina, A.A.: (Determination of intermediate products from levomycetin synthesis and the study of their chemical stability in natural waters.) *Khim. Tekhnol. Vody*, 5 (1983) 441-442; *C.A.*, 100 (1984) 108842y.
- 278 Fukagawa, Y., Mutoh, Y., Ishikura, T. and Lein, J.: Deepoxidation of 16-membered epoxyenone macrolide antibiotics. I. Microbial deepoxidation and subsequent isomerization of deltamycins A<sub>1</sub>,A<sub>2</sub>,A<sub>3</sub>,A<sub>4</sub>(carbomycin A) and X. *J. Antibiot.*, 37 (1984) 118-126.
- 279 Holzer, A. and Geimer, G.: Qualitätskontrolle bei der Herstellung von Augentropfen. Beispiel: Gentamycin - POS Augentropfen. *Fresenius' Z. Anal. Chem.*, 318 (1984) 239-240.
- 280 Jacobs, G.P.: Stability of cefazolin and other new cephalosporins following gamma irradiation. *Int. J. Pharm.*, 17, No. 1 (1983) 29-38; *C.A.*, 100 (1984) 56752x.

- 281 Konishi, M., Ohkuma, H., Naruse, N. and Kawaguchi, H.: Chicamycin, a new anti-tumor antibiotic. II. Structure determination of chicamycins A and B. *J. Antibiot.*, 37 (1984) 200-206.
- 282 Martinez, E.E. and Shimoda, W.: Identification and semiquantitation of monensin sodium in liver tissue. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 845-846.
- 283 Mutoh, Y., Shimauchi, Y., Fukagawa, Y., Ishikura, T. and Lein, J.: Deepoxidation of 16-membered epoxyenone macrolide antibiotics. II. Chemical deepoxidation by dissolving metal reduction. *J. Antibiot.*, 37 (1984) 127-129.
- 284 Nikitina, N.A., Barakhtyan, P.L., Vetrugina, L.A. and Tulemisova, K.A.: (Study of the component composition of an antibiotic complex 1618-306 produced by *Streptomyces griseoruber* and identification of component A.) *Deposited Doc.* (1982), VINITI 6051-6082, 9 pp.; *C.A.*, 100 (1984) 144866t.
- 285 Nishizawa, N., Kondo, Y., Koyama, M., Omoto, S., Iwata, M., Tsuruoka, T. and Inouye, S.: Studies on a new nucleoside antibiotic, dapiramicin. II. Isolation, physico-chemical and biological characterization. *J. Antibiot.*, 37 (1984) 1-5.
- 286 Oka, H., Uno, K., Harada, K.-I., Hayashi, M. and Suzuki, M.: Improvement of chemical analysis of antibiotics. VI. Detection reagents for tetracyclines in thin-layer chromatography. *J. Chromatogr.*, 295 (1984) 129-139.
- 287 Ovcharova, G. and Nacheva, R.: (Kinetics of ampicillin degradation in the solid state.) *Antibiotiki (Moscow)*, 29, No. 3 (1984) 166-170; *C.A.*, 101 (1984) 43450t.
- 288 Pollino, G. and Marini, D.: (Identification of sisomicin sulfate by thin-layer chromatography.) *Boll. Chim. Farm.*, 122 (1983) 512-514; *C.A.*, 100 (1984) 161843a.
- 289 Prikrylova, V., Sedmera, P., Jizba, J.V., Vokoun, J., Lipavska, H., Podojil, M. and Vanek, Z.: 7-O-Alkylderivatives of daunomycinone. *Collect. Czech. Chem. Commun.*, 49 (1984) 313-319.
- 290 Saito, T. and Kaneshima, H.: (Thin-layer chromatography of antibiotics.) *Hokkaidoritsu Eisei Kenkyushocho*, No. 32 (1982) 73-76; *C.A.*, 100 (1984) 173058m - a review with 10 refs.
- 291 Szilagyi, I., Mincsovics, E. and Kulcsar, G.: Separation of the homologous components (A<sub>1</sub>, A<sub>3</sub> and B) of primycin by thin-layer chromatography. *J. Chromatogr.*, 295 (1984) 141-151.
- 292 Trtik, B.: (Mucidermin determination.) *Czech. Pat. CS 200,720. (Cl. G01N21/00)*, 30 Nov. 1982, Appl. 78/2,914, 6 May 1978; 3 pp.; *C.A.*, 100 (1984) 39697r.
- 293 Ueno, H., Nishikawa, M., Suzuki, S. and Muranaka, M.: Chromatographic separation and chemical analysis of polymers formed by penicillin G. *J. Chromatogr.*, 288 (1984) 117-126.
- 294 Verbuta, A. and Marinescu, P.: (Chromatographic studies on the stability of some antibiotic ointments.) *Rev. Med.-Chir.*, 86 (1982) 481-483; *C.A.*, 100 (1984) 73844w.
- 295 Werner, G., Hagelmaier, H., Drautz, H., Baumgartner, A. and Zähner, H.: Metabolic products of microorganisms. 224. Bafilomycins, a new group of macrolide antibiotics. Production, isolation, chemical structure and biological activity. *J. Antibiot.*, 37 (1984) 110-117.

See also 349, 411.

## 29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

- 296 Korsos, I. and Lantos, J.: (Thin-layer chromatographic identification of pesticides.) *Növenyvedelem (Budapest)*, 20, No. 1 (1984) 30-34; *C.A.*, 100 (1984) 204855a.

### 29a. Chlorinated insecticides

- 297 Stahr, H.M.: Analysis of PCB'S by thin-layer chromatography. *J. Liq. Chromatogr.*, 7 (1984) 1393-1402.

### 29b. Phosphorus insecticides

See 262.

## 29c. Carbamates

- 298 Jaglan, P.S. and Arnold, T.S.: Metabolism of the insecticidal carbamate methyl N-[[[[(1,1-dimethylethyl) (5,5-dimethyl-2-thioxo-1,3,2-dioxaphosphorinan-2-yl)-amino]thio]methylamino]carbonyl]oxy]ethanimidothioate in rats. *J. Agric. Food Chem.*, 32 (1984) 618-622.
- 299 Umetsu, N., Nishioka, T. and Fukuto, T.R.: Formation of alkoxysulfenyl derivatives of carbofuran by acid-catalyzed alcoholysis of carbosulfan. *J. Agric. Food Chem.*, 32 (1984) 765-768.

## 29d. Herbicides

- 300 Atabekyan, V.G.: (Thin-layer chromatography determination of trace quantities of linuron in the air.) *Gig. Sanit.*, No. 11 (1983) 69; *C.A.*, 100 (1984) 38829y.
- 301 Bleeke, M.S. and Casida, J.E.: Metribuzin metabolites in mammals and liver microsomal oxidase systems: Identification, synthesis and reactions. *J. Agric. Food Chem.*, 32 (1984) 749-755.
- 302 De Kok, A., Vos, Y.J., van Garderen, C., de Jong, T., van Opstal, M., Frei, R.W., Geerdink, R.B. and Brinkman, U.A.Th.: Chromatographic determination of phenylurea herbicides and their corresponding aniline degradation in environmental samples. *J. Chromatogr.*, 288 (1984) 71-89.
- 303 Draper, W.M. and Crosby, D.G.: Photochemistry and volatility of drepamone in water. *J. Agric. Food Chem.*, 32 (1984) 728-733.
- 304 Jacobson, A. and Shimabukuro, R.H.: Metabolism of diclofop-methyl in root-treated wheat and oat seedlings. *J. Agric. Food Chem.*, 32 (1984) 742-746.
- 305 Lienig, D., Wiemer, B. and Zoelfel, I.: (Thin-layer chromatographic determination of triazine herbicides in water.) *Acta Hydrochim. Hydrobiol.*, 12, No. 1 (1984) 29-37; *C.A.*, 100 (1984) 169809q.

See also B, 205, 253, 263.

## 29e. Fungicides

- 306 Becker, G.: Quantitative fluorimetriche Bestimmung von Thiabendazol mittels Dünnenschicht-Chromatographie im Vergleich zur Gas-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 276-277.
- 307 Giri, S. and Mishra, A.K.: Fungicidal and molluscicidal activity of some heteroarylcarbinols and ethylenes. *J. Agric. Food Chem.*, 32 (1984) 762-765.
- 308 Sing, N., Agarwal, P., Gupta, V. and Saran, B.R.: Thin-layer chromatographic analysis and characterization of some substituted maleanilic acids. *J. Indian Chem. Soc.*, 60 (1983) 907-909; *C.A.*, 100 (1984) 209314h.

See also 263.

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

- 309 Gitsova, G. and Bratanova, Z.: (Determination of the residue of glyphosate and its metabolite in waters by thin-layer chromatography.) *Khig. Zdraveopaz.*, 27 (1984) 172-176; *C.A.*, 101 (1984) 85522y.
- 310 Knyr, L.L. and Filin-Koldakov, B.V.: (Determination of glyphosate in water and soil by photometry and thin-layer chromatography.) *Agrokhimiya*, No. 6 (1984) 109-112; *C.A.*, 101 (1984) 85524a.

See also 306.

## 30. SYNTHETIC AND NATURAL DYES

## 30a. Synthetic dyes

- 311 Barek, J., Berka, A. and Borek, V.: The analysis of dyes and dye intermediates by physicochemical methods. II. Thin-layer chromatographic and spectrophotometric behaviour of some water-insoluble azo pigments. *Mikrochim. J.*, 29 (1984) 311-317; *C.A.*, 101 (1984) 92765h.

- 312 Chen, D., Li, S. and He, C.: (Determination of synthetic dyes in foods by silica gel chromatographic filter paper.) *Zhonghua Yufangyizus Zashi*, 17 (1983) 360-361; *C.A.*, 101 (1984) 22080g.
- 313 Etournaud, A. and Aubort, J.D.: (Analysis of synthetic dyes in cosmetics. I. Lipsticks and make-up.) *Mitt. Geb. Lebensmittelunters. Hyg.*, 74 (1983) 372-382; *C.A.*, 100 (1984) 126702g.
- 314 Imaeda, K., Ohsawa, K. and Uchiyama, K.: (Application of light scanning photo-acoustic densitometer to thin-layer chromatography.) *Bunseki Kagaku*, 33 (1984) 320-325.
- 315 Kijima, K., Saito, E., Teshirogi, N. and Honda, M.: (Analysis of oxidative dyes in hair dye.) *Eisei Shikensho Hokoku*, No. 101 (1983) 32-37; *C.A.*, 101 (1984) 11988h.
- 316 Lehmann, G., Binkle, B. and Bell, V.: Isolierung und Identifizierung der Farbstoffen in Nagellacken. *Fette, Seifen, Anstrichm.*, 86 (1984) 208-210.
- 317 Lehmann, G., Binkle, B. and Faller, H.: Isolierung und Identifizierung von Farbstoffen in Seifen. *Fette, Seifen, Anstrichm.*, 86 (1984) 286-288.
- 318 Pindar, A.G. and Tinsley, H.M.: Identification by thin-layer chromatography of dyestuffs based on benzidine, o-tolidine or o-dianisidine in consumer fabric dye products. *Analyst (London)*, 109 (1984) 1101-1102.
- 319 Richfield-Fratz, N.: Thin-layer chromatographic detection and spectrophotometric determination of the trisodium salt of 1,3,6-pyrenetrisulfonic acid in D&C green No. 8. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 762-763.
- 320 Steele, J.A.: High-performance thin-layer chromatographic identification of synthetic food dyes in alcoholic products. *J. Assoc. Off. Anal. Chem.*, 67 (1984) 540-541.
- 321 Vesela, D. and Portych, J.: (Evaluation of the quality of diagnostic dyes by thin-layer chromatography.) *Farm. Obs.*, 53 (1984) 73-78; *C.A.*, 100 (1984) 188204e.
- 322 Zeng, H. and Fan, Ch.: (Determination of synthetic dyes in foods by paper chromatography and thin-layer chromatography.) *Shipin Yu Fajiso Gongye*, No. 2 (1984) 35-42; *C.A.*, 101 (1984) 71129p.

30b. Chloroplast and other natural pigments

- 323 Janssen, A. and Gole, Th.: Thin-layer chromatographic determination of curcumin (turmeric) in spices. *Chromatographia*, 18 (1984) 546-549.
- 324 Painter, T.J.: Carbohydrate origin of aquatic humus from peat. *Carbohydr. Res.*, 124 (1983) C22-C26; *C.A.*, 100 (1984) 161480e.
- 325 Zhao, L.: (Paper chromatographic separation and spectrophotometric determination of indirubin in Qing Dai (crude natural indigo).) *Zhongyao Tongbao*, 9, No. 2 (1984) 78-79; *C.A.*, 101 (1984) 60188f.

See also 442.

31. PLASTICS AND THEIR INTERMEDIATES

- 326 Glöckner, G.: *Polymercharakterisierung durch Flüssigkeits-Chromatographie*. Hüthig, Heidelberg, Basel, New York, 1982, 427 pp.
- 327 Ludwig, F.J., Sr. and Bailie, A.G., Jr.: Liquid chromatographic separation of p-alkylphenol-formaldehyde cyclic and linear oligomers. *Anal. Chem.*, 56 (1984) 2081-2085.
- 328 Shvagireva, N.A., Tarasova, N.A. and Belyatskaya, O.N.: (Determination of ε-caprolactam content in food by thin-layer chromatography.) *Vopr. Pitani.*, No. 2 (1984) 61-63; *C.A.*, 101 (1984) 22112u.

See also 2.

## 32. PHARMACEUTICAL AND BIOMEDICAL APPLICATIONS

- 329 Fairbrother, J.E.: Pharmaceutical analysis. Advances in TLC: Part I - Techniques. *Pharm. J.*, 232 (1984) 293-297; *C.A.*, 100 (1984) 215584n - a review with 123 refs.

See also 44.

## 32a. Synthetic drugs

- 330 Aaron, J.J., Fidanza, J. and Gaya, M.D.: Photochemical analysis studies. V. Photochemical enhancement of the fluorescence signal of the antimalarial plasmocid in liquid solution and on silica-gel thin layers. *Talanta*, 30 (1983) 649-654; *C.A.*, 100 (1984) 56919g.
- 331 Balestrieri, P. and Jirillo, R.: (Purification of flunarizine by HPLC (high-performance liquid chromatography).) *Racc. Chim.*, 35 (1983) 341-344; *C.A.*, 101 (1984) 28246n.
- 332 Baltova, E. and Shishkov, A.: Separation and identification of the antidepressants imipramine, amitriptyline and nomifensine by thin-layer chromatography. *Folia Med. (Plovdiv)*, 25, No. 3 (1983) 36-41; *C.A.*, 101 (1984) 12299w.
- 333 Barnhart, B.V. and Schumacher, R.J.: PETN homolog analysis and large-scale preparation of pure PETN homologs by high-performance liquid chromatography. *Report* (1983) MLM-3103, Order No. DE84002169, 9 pp.; *C.A.*, 100 (1984) 167425n.
- 334 Bhargava, Nandan., Tambi, S.B. and Mital, R.L.: Thin-layer chromatographic studies of some possible metabolites of phenothiazine drugs. *Acta Cient. Indica (Ser.) Chem.*, 9, No. 1-4 (1983) 212-215; *C.A.*, 101 (1984) 32758y.
- 335 Blagojevic, Z. and Markovic, S.: (Determination of adiphenine, drofenine, tolazoline and phenobarbitone in pharmaceutical preparations after TLC separation.) *Arh. Farm.*, 33 (1983) 173-180; *C.A.*, 100 (1984) 56947q.
- 336 Budd, R.D.: Comparison of methods of analysis for phenycyclidine. *J. Chromatogr.*, 295 (1984) 492-496 - relative advantages and disadvantages of 5 methods of screening.
- 337 Cai, H., Yang, X., Cheng, Y., Zhao, J. and Zu, Y.: (Quality control of hydroxyphenylbutazone.) *Yaochu Fenxi Zaishi*, 4, No. 1 (1984) 48-50; *C.A.*, 100 (1984) 127007w.
- 338 Canelo Calle, G., Lewkowycz Kysil, R. and De la Torre Boronat, M.C.: (Analysis of the sodium salt of 2,7-dibromo-4-hydroxymercurifluorescein.) *Circ. Farm.*, 41 (1983) 189-210; *C.A.*, 100 (1984) 91468f.
- 339 Causon, R.C., Desjardins, R., Brown, M.J. and Davies, D.S.: Determination of d-isoproterenol sulphate by high-performance liquid chromatography with amperometric detection. *J. Chromatogr.*, 306 (1984) 257-268.
- 340 Chen, Z. and Wang, L.: (Spectrophotometric method for the detection of a keto ester in cyclandelate.) *Nanjing Yaoxueyuan Xuebao*, No. 2 (1983) 67-68; *C.A.*, 100 (1984) 197862v.
- 341 Chichiro, V.E., Arzamastsev, A.P., Suranova, A.V., Trius, N.V., Luttseva, A.I., Evdokimova, V.V. and Gerasimova, G.A.: (Analysis of ocular films of complex composition.) *Khim.-Farm. Zh.*, 17 (1983) 1389-1392; *C.A.*, 100 (1984) 39688p.
- 342 Cserhati, T., Bordas, B., Ekiert, L. and Bojarski, J.: Effect of layer and eluent characteristics on the reversed-phase thin-layer chromatographic behaviour of some barbituric acid derivatives. *J. Chromatogr.*, 287 (1984) 385-390 - 7 kinds of commercial reversed-phase layers and various modifiers were tested (21 systems) for 7 barbiturates.
- 343 Dimov, N., Agapova, N., Levy, Sh. and Yanachkov, Iv.: Separation of nitrate esters and nitrate-acetate esters of isosorbide. *J. Chromatogr.*, 285 (1984) 515-517.
- 344 Dobrecky, J., Monkowski, A. and Vojacek, S.M.: (Analytical study of sunscreens in cosmetic products.) *Rev. Farm. (Buenos Aires)*, 124, No. 1-12 (1982) 37-40; *C.A.*, 100 (1984) 91110h.
- 345 Drandarov, K. and Hais, I.M.: Group-specific detection reagents for some 5- and/or 8-substituted 2-amino-3-hydroxytetralin derivatives. *J. Chromatogr.*, 285 (1984) 373-379.
- 346 Ejima, A., Tatsuzawa, M. and Matsuda, R.: (Chromatographic methods for analysis of pharmaceutical preparations. (II) Analysis of indomethacin pharmaceutical preparations.) *Iyakuhiin Kenkyu*, 15, No. 1 (1984) 93-108; *C.A.*, 100 (1984) 161854e.

- 347 Ellaithy, M.M., El-Bardicy, M.G., Ibrahim, M.W. and Ahmad, A.K.S.: A proposed stability indicating method for the analysis of certain phenothiazines. *J. Pharm. Belg.*, 38 (1983) 309-313; *C.A.*, 101 (1984) 12290m.
- 348 Georgievskii, V.P., Khovanskaya, N.P., Mikhailova, I.Yu. and Muratova, T.L.: (Purity monitoring of the preparation Acemin by chromatography on Silufol plates.) *Farm. Zh. (Kiev)*, No. 6 (1983) 35-37; *C.A.*, 100 (1984) 74063c.
- 349 Gutierrez, C.R., Martinez, M.C., Soberon, E., Avila, M. and Garzon, A.: (Studies on the stability of iodochlorohydroxyquinoline, oxyphenbutazone and cephalixin monohydrate reference substances.) *Rev. Mex. Cienc. Farm.*, 14, No. 1 (1984) 4-11; *C.A.*, 100 (1984) 215608y.
- 350 Haagsma, N., Dieleman, B. and Gortenaker, B.G.M.: A rapid thin-layer chromatographic screening method for five sulfonamides in animal tissues. *Tijdschr. Diergeneeskda.*, 109, No. 2 (1984) 8-12; *C.A.*, 101 (1984) 5598q.
- 351 Haller, A. and Safarik, L.: Purity testing of N-ethylaminoacetylmesidine using thin-layer chromatography. *J. Chromatogr.*, 285 (1984) 242-243.
- 352 He, M. and Li, X.: (Thin-layer chromatographic assay of 3,3,5-trimethylcyclohexyl mandelate as cyclandiolate oxidation product.) *Yaoxu Fenxi Zashi*, 4, No. 1 (1984) 40-42; *C.A.*, 100 (1984) 145075w.
- 353 Hermann, T., Grzeskowiak, E. and Stypinski, Z.: (Kinetics and mechanism of fтораfуr decomposition. I. Estimation of the expiration date for injection solutions of fтораfуr.) *Acta Pol. Pharm.*, 40 (1983) 349-356; *C.A.*, 100 (1984) 161747x.
- 354 Jarzebinski, J., Szrajber, Z. and Daniec, M.: (Chromatography and densitometric measurements of sulfanilamides. II. Chromatography of sulfanilamides on polyamide.) *Acta Pol. Pharm.*, 40 (1983) 187-191; *C.A.*, 100 (1984) 91480d.
- 355 Jarzebinski, J., Ciszewska-Jedrasik, M. and Mank, U.: (Densitometry in determining active components of medicinal preparations. X. Determination of the active components in preparations containing purine alkaloids.) *Acta Pol. Pharm.*, 40 (1983) 455-461; *C.A.*, 100 (1984) 215613w.
- 356 Khattab, F.I., Hassan, N.Y.M. and Amer, M.M.: Thermal analysis of pharmaceutical compounds. III. Characterization of sulfonamides by thermal analysis. *J. Therm. Anal.*, 22 (1981) 41-51; *C.A.*, 100 (1984) 109193z.
- 357 Kishi, T., Inoue, T., Suzuki, S., Yasuda, T., Oikawa, T. and Niwaguchi, T.: (Analysis of impurities in methamphetamine.) *Eisei Kagaku*, 29 (1983) 400-406; *C.A.*, 100 (1984) 180174z.
- 358 Knopp, Ch. and Berndt, E.: Zur Stabilität von N-Allyl-N-(3-methoxy-3,3-diphenylpropyl)-ammoniumchlorid. 1. Mitteilung: Praeformulierungsuntersuchungen mit N-Allyl-N-(3-methoxy-3,3-diphenylpropyl)ammoniumchlorid. *Sci. Pharm.*, 52 (1984) 240-246.
- 359 Korityuk, R.S., Tureeva, G.M., Shishkova, L.A., Lipkan, G.N. and Stepanenko, V.V.: (Chromatographic analysis of potassium glutamate.) *Farm. Zh. (Kiev)*, No. 6 (1983) 42-44; *C.A.*, 100 (1984) 74065e.
- 360 Kovar, K.A. and Abdel-Hamid, M.: (Charge-transfer complexes. Part 2. Molecular complexes and radical formation of drugs with the imidazoline structure.) *Arch. Pharm. (Weinheim)*, 317 (1984) 246-256; *C.A.*, 100 (1984) 197714y.
- 361 Lamparter, E., Brandt, K. and Pook, K.H.: Anforderungen an Methoden in der Stabilitätsprüfung von pharmazeutischen Darreichungsformen. Ein Vergleich der Hochleistungs-Dünnschicht-Chromatographie - insbesondere der anticircularen Varianten- und der Hochleistungs-Flüssigkeits-Chromatographie. *Fresenius' Z. Anal. Chem.*, 318 (1984) 187-197.
- 362 Loewe, W., Soliva, M. and Speiser, P.P.: Decomposition of nitrazepam in tablets in the presence of silica and dicalcium phosphate ( $\text{CaHPO}_4$ ). *Drugs Made Ger.*, 26 (1983) 158 and 160-164; *C.A.*, 100 (1984) 56729v.
- 363 Luna, J.M. and Lareo, J.M.: (Selective determination of Triac in the presence of synthetic by-products.) *SAFYBI*, 23 (1983) 1807-1814; *C.A.*, 101 (1984) 12275k.
- 364 Majlat, P. and Barthos, E.: Quantitative gas and thin-layer chromatographic determination of methylparaben in pharmaceutical dosage forms. *J. Chromatogr.*, 294 (1984) 431-435.
- 365 Minina, S.A., Efimova, L.S., Raisyan, V.D., Gromova, N.A., Tsebenko, T.V., Zozulya, R.N., Bril, A.S. and Seleznev, L.G.: (Shellac film coating for glutamic acid tablets.) *Khim.-Farm. Zh.*, 18 (1984) 215-219; *C.A.*, 101 (1984) 12129r.
- 366 Mokrosz, J.L. and Ekiert, L.: Linear free energy relationship in thin-layer chromatography of 5-arylidenebarbiturates. *Chromatographia*, 18 (1984) 401-405 - mobilities for 33 compounds and their N,N-dimethyl analogs.

- 367 Musumara, G., Scarlata, G., Girma, G., Romano, G., Palazzo, S., Clementi, S. and Giulietti, G.: Application of principal components analysis to the evaluation and selection of eluent systems for the thin-layer chromatography of basic and neutral drugs. *J. Chromatogr.*, 295 (1984) 31-47 - 55 compounds, 40 solvent systems tested ( $hR_F$  values tabulated) and computed.
- 368 Naviasky, H.: Quantitative analysis of trimethobenzamide hydrochloride by ion-pair column chromatography and semiquantitative analysis of 3,4,5-trimethoxybenzoic acid by thin-layer chromatography. *J. Pharm. Sci.*, 73 (1984) 542-545.
- 369 Nicolas, A., Mirjolet, M. and Ziegler, J.M.: (Separation and identification of products of tetryzolin hydrolysis.) *Talanta*, 31 (1984) 229-231; *C.A.*, 100 (1984) 180049n.
- 370 Pelegrino, E. and Covalschi, E.: (Spectrophotometric method for the determination of allantoin.) *Farmacia (Bucharest)*, 31 (1983) 179-184; *C.A.*, 100 (1984) 145043j.
- 371 Pfandl, A. and Mayer, H.: (Quantitative analysis of a heparin-containing analgesic.) *Pharm. Ztg.*, 128 (1983) 2822-2828; *C.A.*, 100 (1984) 91458c.
- 372 Piekarz, H. and Kiss, E.: (Saccharin detection in certain cosmetics.) *Roczn. Państw. Zakł. Hig.*, 34 (1983) 285-288; *C.A.*, 100 (1984) 39429e.
- 373 Rene, E., Farinotti, R., Mignon, M., Cerf, M., Dauphin, A. and Bonfils, S.: (5-Aminosalicylic acid preparation for enema use.) *Gastroenterol. Clin. Biol.*, 7 (1983) 935; *C.A.*, 100 (1984) 73901n.
- 374 Soine, W.H., Thomas, M.N., Shark, R.E., Scott, J. and Agee, D.T.: Differentiation of side-chain positional isomers of amphetamine. *J. Forensic. Sci.*, 21 (1984) 177-184; *C.A.*, 100 (1984) 169455w.
- 375 Soviar, K., Springer, V., Medvecky, R., Knazko, L. and Tran Duc Hau: (Quantitative evaluation of some thiosamides of 4-quinolinecarboxylic acid. I.) *Farm. Obz.*, 53 (1984) 67-72; *C.A.*, 100 (1984) 215605v.
- 376 Takla, P.G. and Joshi, S.R.: The identification, assay and purity determination of chlorpropamide, glibenclamide and tolbutamide and their tablet preparations by thin-layer chromatography. *J. Pharm. Biomed. Anal.*, 1, No. 2 (1983) 189-193; *C.A.*, 100 (1984) 56936k.
- 377 Tammilehto, S., Sysmäläinen, M. and Mäkinen, P.: High-performance thin-layer chromatographic determination of *cis*- and *trans*-chlorprothixene and two oxidation products. *J. Chromatogr.*, 285 (1984) 235-241.
- 378 Trokhimchuk, V.V., Chakchir, B.A., Khveshchuk, P.F. and Alekseev, V.V.: (Quality monitoring of cystamine dihydrochloride tablets during storage.) *Farmatsiya (Moscow)*, 33, No. 1 (1984) 33-35; *C.A.*, 100 (1984) 145078z.
- 379 Vrabel, M. and Machovicova, F.: (Evaluation of the stability of Septonex by thin-layer and gas chromatography.) *Farm. Obz.*, 53 (1984) 105-110; *C.A.*, 100 (1984) 215391x.
- 380 Wang, W.: (Identification and determination of impurity in diphenidol hydrochloride.) *Yaowu Fenxi Zashi*, 4, No. 1 (1984) 8-12; *C.A.*, 100 (1984) 145073u.
- 381 Weglowska, W.: (Thiophosphamide decomposition products.) *Acta Pol. Pharm.*, 40 (1983) 175-179; *C.A.*, 100 (1984) 91236d.
- 382 Xia, G., Zou, J., Yang, X. and Dong, S.: (Determination of salicylic acid in aspirin by thin-layer chromatography-colorimetry.) *Yiyao Gongya*, No. 12 (1983) 10-13; *C.A.*, 100 (1984) 109197d.
- 383 Yang, X., Xia, G. and Dong, S.: (Thin-layer fluorescence densitometric determination of salicylic acid in aspirin.) *Yaowu Fenxi Zashi*, 3 (1983) 361-362; *C.A.*, 100 (1984) 56946p.
- 384 Sommer-Urbanska, S. and Lehman, W.: (Identification of some phenothiazine derivatives by their colored oxidation products in water and nitromethane.) *Farm. Pol.*, 39 (1983) 587-590; *C.A.*, 101 (1984) 12294r.

See also 46, 55, 149, 464, 465, 467.

### 32b. Pharmacokinetic studies

- 385 Baumgärtner, M.G., Cautreels, W. and Langenbahn, H.: Biotransformation and pharmacokinetics of tetrazepam in man. *Arzneim. Forsch.*, 34 (I) (1984) 724-729.
- 386 Cleveland, P.A. and Ueda, C.T.: Effects of salicylate on maternal and fetal phenytoin pharmacokinetics in rats. *Drug Metab. Disp.*, 12 (1984) 285-290.

- 387 Diksic, M., Sako, K., Feindel, W., Kato, A., Yamamoto, L., Farrokhzad, S. and Thompson, C.: Pharmacokinetics of positron-labeled 1,3-bis(2-chloroethyl)nitroso-urea in human brain tumors using positron emission tomography. *Cancer Res.*, 44 (1984) 3120-3124.
- 388 Dross, K., Sillmann, P. and Küster, J.: Absorption, metabolism and excretion of <sup>14</sup>C-sultopride in the rat. *Eur. J. Drug Metab.*, 9 (1984) 1-9.
- 389 Gerlach, K., Büge, A., Peinhardt, G. and Fürst, W.: Zur pharmazeutischen und bio-pharmazeutischen Begutachtung von Acetylaminonitropropoxybenzol (Falimint). 4. Mitteilung: Biotransformation des Wirkstoffes. *Pharmazie*, 39 (1984) 42-45.
- 390 Hege, H.G., Hollmann, M., Kaumeier, S. and Lietz, H.: The metabolic fate of <sup>2</sup>H-labelled propafenone in man. *Eur. J. Drug Metab.*, 9 (1984) 41-55.
- 391 Helia, O. and Cizmarik, J.: Biotransformation des Heptacainhydrochlorids *in vitro*. *Pharmazie*, 39 (1984) 189.
- 392 Hilbert, J., Pramanik, B., Symchowicz, S. and Zampaglione, N.: The disposition and metabolism of a hypnotic benzodiazepine, quazepam, in the hamster and mouse. *Drug Metab. Disp.*, 12 (1984) 452-459.
- 393 King, S.-Y.P. and Fung, H.-L.: Rapid microbial degradation of organic nitrates in rat excreta. Re-examination of the urinary and fecal metabolite profiles of pentaerythritol tetranitrate in the rat. *Drug. Metab. Disp.*, 12 (1984) 353-357.
- 394 Kvasnickova, E., Nobilis, M. and Hais, I.M.: Chromatographic characterization of *in vitro* metabolites of 5-(2-(N,N-dimethylamino)ethoxy)-7-oxo-7H-benzo[c]fluorophene. *J. Chromatogr.*, 295 (1984) 201-209.
- 395 Ng, L.L., Bevill, R.F., Jr. and Perkins, E.C.: *In vivo* and *in vitro* pharmacokinetics and fate of furaltadone in meat- and milk-producing animals. *J. Pharm. Sci.*, 73 (1984) 293-297.
- 396 Paeme, G., Grimme, R. and Vercruyse, A.: Isolation and identification of eight procyclidine metabolites from rat urine. *Eur. J. Drug Metab.*, 9 (1984) 103-108.
- 397 Pang, K.S., Cherry, W.F., Terrell, J.A. and Ulm, E.H.: Disposition of enalapril and its diacid metabolite, enalaprilat, in a perfused rat liver preparation. Presence of a diffusional barrier for enalaprilat into hepatocytes. *Drug Metab. Disp.*, 12 (1984) 309-313.
- 398 Plänitz, V. and Jähnchen, E.: Effect of enzyme induction on the disposition of lorcainide in rats following intravenous and oral administration. *Arzneim.-Forsch.*, 34 (I) (1984) 669-671.
- 399 Ruenitz, P.C., Bagley, J.R. and Pape, C.W.: Some chemical and biochemical aspects of liver microsomal metabolism of tamoxifen. *Drug Metab. Disp.*, 12 (1984) 478-483.
- 400 Sarhan, S., Kolb, M. and Seiller, N.: The amplification of the anticonvulsant effect of vinyl GABA (4-aminohexenoic acid) by esters of glycine. *Arzneim.-Forsch.*, 34 (I) (1984) 687-690.
- 401 Schütz, H. and Suphachearabhan, S.: Screening und Nachweis des Analgetikums Zomepirac. *Arzneim.-Forsch.*, 34 (I) (1984) 293-297.
- 402 Yoshikawa, T., Sugiyama, Y., Sawada, Y., Iga, T. and Hanano, M.: Effect of pregnancy on tissue distribution of salicylate in rats. *Drug Metab. Disp.*, 12 (1984) 500-505.

### 32c. Drug monitoring

- 403 Allen, H.W. and Sedgwick, B.: Detection of ritalinic acid in urine by thin-layer chromatography and gas chromatography. *J. Anal. Toxicol.*, 8, No. 2 (1984) 61-62; *C.A.*, 100 (1984) 186777v.
- 404 Assandri, A., Perazzi, A., Fontanella, L., Ferrari, P., Ripamonti, A., Tarzia, G., Tuan, G. and Martinelli, E.: Metabolism of the neuroleptic agent zetidoline in the rat and the dog. *Drug Metab. Disp.*, 12 (1984) 635-640.
- 405 Breyer-Pfaff, U., Wiatr, R. and Nill, K.: Measurement of maprotiline and oxa-protiline in plasma by high-performance liquid chromatography of fluorescent derivatives. *J. Chromatogr.*, 309 (1984) 107-114.
- 406 Chan, K.Y., Ohlweiler, D.F., Lang, J.F. and Okerholm, R.A.: Simultaneous analysis of a new cardiotonic agent, MDL 17,043, and its major sulfoxide metabolite in plasma by high-performance liquid chromatography. *J. Chromatogr.*, 306 (1984) 249-256.
- 407 Davie, N.W., Veronese, M.E. and McLean, S.: Mass spectrophotometric determination of N-hydroxyphenacetin in urine using multiple metastable peak monitoring following thin-layer chromatography. *J. Chromatogr.*, 310 (1984) 179-187.

- 408 Foster, A.B., Griggs, L.J., Howe, I., Jarman, M., Leung, C.-S., Manson, D. and Rowlands, M.G.: Metabolism of aminoglutethimide in humans. Identification of four new urinary metabolites. *Drug Metab. Disp.*, 12 (1984) 511-516.
- 409 Kelly, E.C., Doshier, I.A. and Rubin, H.R.: A convenient thin-layer chromatographic screening method for acetaminophen in serum. *J. Anal. Toxicol.*, 8, No. 2 (1984) 54-58; *C.A.*, 100 (1984) 186776u.
- 410 Laufen, H., Riedel, K.-D., Räder, K. and Schwedass, A.: Vergleichende Bestimmung von Piroxicam in Plasmaproben mittels HPTLC und HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 257-258.
- 411 Malikin, G., Lam, S. and Karmen, A.: Therapeutic drug monitoring by high-performance thin-layer chromatography. *Chromatographia*, 18 (1984) 253-259.
- 412 McQuinn, R.L., Quaforth, G.J., Johnson, J.D., Banitt, E.H., Pathre, S.V., Chang, S.F., Ober, R.E. and Conrad, G.J.: Biotransformation and elimination of <sup>14</sup>C-flecainide acetate in humans. *Drug Metab. Disp.*, 12 (1984) 414-420.
- 413 Melgar, M.D., Zuleski, F.R. and Malbica, J.O.: Metabolism, disposition and pharmacokinetics of tracazolate in rat and dog. *Drug Metab. Disp.*, 12 (1984) 396-402.
- 414 Mori, Y., Yokoya, F., Sakai, Y., Toyoshi, K. and Baba, S.: Absorption, distribution and excretion of suprofen in mice of both sexes. *Chem. Pharm. Bull.*, 32 (1984) 1106-1112.
- 415 Müller, T., Steinbach, I. and Kapp, S.: Eine wirtschaftliche HPTLC-Methode zur simultanen Bestimmung von Antiepileptica in kleinen Serien. *Fresenius' Z. Anal. Chem.*, 318 (1984) 261-263.
- 416 Pfadenhauer, E.H., Bankert, C.S., Jensen, J., Jones, C.E., Jenkins, E.E. and McCloskey, J.A.: Identification of the metabolites of erythro-9-(2-hydroxy-3-nonyl)hypoxanthine from laboratory animals. *Drug Metab. Disp.*, 12 (1984) 280-284.
- 417 Ritter, W.: Quantitative Bestimmung von Nafazatrom in Blutplasma und Urin durch HPTLC und HPLC. *Fresenius' Z. Anal. Chem.*, 318 (1984) 267-268.
- 418 Shirota, F.N., Nagasawa, H.T., Kwon, C.H. and Demaster, E.G.: N-acetylcyanamide, the major urinary metabolite of cyanamide in rat, rabbit, dog and man. *Drug. Metab. Disp.*, 12 (1984) 337-344.
- 419 Weber, H., Spahn, H., Mutschler, E. and Möhrke, W.: Activated  $\alpha$ -alkyl- $\alpha$ -aryl-acetic acid enantiomers for stereoselective thin-layer chromatographic and high-performance liquid chromatographic determination of chiral amines. *J. Chromatogr.*, 307 (1984) 145-153.
- 420 Wysocka-Paruszewska, B., Gazdik, W. and Nowakowska, D.: (Detection of amitriptyline and imipramine in urine by means of thin-layer chromatography.) *Przegl. Lek.*, 41 (1984) 231-234; *C.A.*, 101 (1984) 83461d.

### 32d. Toxicological applications

- 421 Dzhalalov, D.D.: (Study of semen and hair for detecting the presence of blood by thin-layer chromatography method.) *Aktual. Vopr. Sud.-Med. Ekspert. Verhchestv. Dokazatel'stv.*, (1982) 5-9; *C.A.*, 101 (1984) 67171d.
- 422 Haagsma, N., Dieleman, B. and Gortemaker, B.G.M.: A rapid thin-layer chromatographic screening method for five sulfonamides in animal tissues. *Vet. Q.*, 6, No. 1 (1984) 8-12; *C.A.*, 100 (1984) 173251u.
- 423 Käferstein, H. and Sticht, G.: Dünnschicht-Chromatographie und Hochdruckflüssigkeits-Chromatographie in forensisch-toxikologischen und klinisch-toxikologischen Labor. *Fresenius' Z. Anal. Chem.*, 318 (1984) 255-256.
- 424 Kogan, M.J., Newman, E. and Willson, N.J.: Detection of marijuana metabolite 11-nor- $\Delta^9$ -tetrahydrocannabinol-9-carboxylic acid in human urine by bonded-phase adsorption and thin-layer chromatography. *J. Chromatogr.*, 306 (1984) 441-443.
- 425 Kuchkinov, A.T.: (Determination of ABO groups antigens of putrefied blood by paper chromatography.) *Aktual. Vopr. Sud.-Med. Ekspert. Veshchestv. Dokazatel'stv.*, (1982) 38-44; *C.A.*, 101 (1984) 67173f.
- 426 Musumarra, G., Scariata, G., Romano, G. and Clementi, S.: Identification of drugs by principal components analysis of *R<sub>f</sub>* data obtained by TLC in different eluent systems. *J. Anal. Toxicol.*, 7 (1983) 286-292; *C.A.*, 100 (1984) 39692k.
- 427 Willson, N.J., Kogan, M.J., Pierson, D.J. and Newman, E.: Confirmation of EMIT cannabinoid assay results by bonded phase adsorption with thin-layer chromatography. *J. Toxicol., Clin. Toxicol.*, 20 (1983) 465-473; *C.A.*, 101 (1984) 1904p.

## 32e. Plant extracts

- 428 Bacchi, E.M. and De Oliveira, F.: (Chemical characterization of the drug and fluid extract of *Phyllanthus tenellus roxb.*-quebra-pedra.) *An. Farm. Quim. São Paulo*, 23, No. 1-2 (1983) 19-27; *C.A.*, 101 (1984) 28148g.
- 429 Chou, C. and Sheu, S.J.: (Analysis and processing in Chinese Herbs. V. Quantitative study of Moutan cortex.) *T'ai-wan Yao Hsueh Tsa Chih*, 35, No. 2 (1983) 184-189; *C.A.*, 101 (1984) 43671r.
- 430 Combaz, D., Morand, J.M. and Alary, J.: (Quality control of a syrup containing plant extracts (dry *Hyoscyamus* extract and liquid *Crataegus* extract).) *Bull. Trav. Soc. Pharm. Lyon*, 26, No. 1-4 (1982) 67-75; *C.A.*, 100 (1984) 109178y.
- 431 Domokos, J., Varga, B., Verzar Petri, G., Marczal, G., Bakos, P. and Szoke, E.: (Mouthwash containing *Cotinus coggygria* scopi extract as an active ingredient.) *Hung. Teljes Pat. HU 29,847* (Cl. A61K7), 28 Feb. 1984, Appl. 81/4,029, 30 Dec. 1981; 16 pp.; *C.A.*, 100 (1984) 215329h.
- 432 Glasl, H. and Ihrig, M.: (Determination of capsaicinoids in cayenne pepper using direct TLC.) *Pharm. Ztg.*, 129 (1984) 609-612; *C.A.*, 101 (1984) 43662p.
- 433 Hayakawa, J., Noda, N., Yamada, S. and Uno, K.: (Studies on physical and chemical quality evaluation of crude drug preparations. I. Analysis of *Pueraria radix* and *Puerariae* species.) *Yaku-gaku Zasshi*, 104, No. 1 (1984) 50-56; *C.A.*, 100 (1984) 180155u.
- 434 Jolliffe, G.H. and Din, M.M.: Differentiation of Korean and Siberian ginseng extracts by thin-layer chromatography. *Pak. J. Sci. Ind. Res.*, 26, No. 2 (1983) 76-78; *C.A.*, 100 (1984) 39680e.
- 435 Paul, S.C. and Nandy, A.: A comparison of prepared tincture of *Eugenia jambolana* Lam (fam. Myrtaceae) with market tincture by thin-layer chromatography. *East. Pharm.*, 27 (1983) 143-145; *C.A.*, 101 (1984) 43666t.
- 436 Shibata, S.: (Component analysis of herb medicines.) *Gekkan. Yakuji*, 26 (1984) 807-813; *C.A.*, 100 (1984) 180151q - a review.
- 437 Shou, C. and Xu, J.: (Quantitative and qualitative determination of ginseng tea - a ginseng tonic.) *Baichiu'en Yike Daxue Xuebao*, 9, No. 3 (1983) 93-95; *C.A.*, 100 (1984) 39679m.
- 438 Song, C. and Ma, X.: (Analysis of the chemical constituents of Ren Shen Lu.) *Baichiu'en Yike Daxue Xuebao*, 9, No. 6 (1983) 56-59, 55; *C.A.*, 100 (1984) 126975y.
- 439 Wang, X. and Zhang, Y.: (Rapid thin-layer densitometric determination of artemisinin in injections.) *Yaoxu Fenxi Zashi*, 3 (1983) 353-354; *C.A.*, 100 (1984) 74036w.
- 440 Zenyaku Kogyo Co., Ltd.: (Kuanone I.) *Jpn. Kokai Tokkyo Koho Pat. JP 58,150,538* [83 150,538] (Cl. C07C49/83J), 07 Sep. 1983, Appl. 82/33,455, 03 March 1982; 5 pp.; *C.A.*, 100 (1984) 39588f.

See also 62, 65, 69, 80, 172, 173.

## 32f. Clinico-chemical applications and profiling body fluids

See 104, 112, 114, 140, 147, 154, 161, 171, 191, 194, 197, 207, 211, 218.

## 33. INORGANIC COMPOUNDS

- 441 Shibukawa, M., Shimizu, T. and Kuroda, R.: (Inorganic thin-layer chromatography.) *Bunsaki*, No. 1 (1984) 88-96; *C.A.*, 100 (1984) 114000p - a review with 181 refs.

## 33a. Cations

- 442 Asatov, Z.I.: (Use of thin-layer chromatography for detecting magnesium chlorate in a toxicological analysis.) *Aktual. Vopr. Sud.-Med. Ekspert. Veshchestv. Dokazatel'stv.*, (1982) 68-72; *C.A.*, 101 (1984) 49647j.
- 443 Bruno, P., Caselli, M., Fracassi, F. and Traini, A.: HPTLC separation and densitometric determination of some metallic dithiozonates at subnanogram level: applications to real samples. *Anal. Lett.*, 17 (1984) 397-412.
- 444 Deshmukh, B.K.: Paper chromatographic separation of copper(II), nickel(II), palladium(II) and iron(III) as their 2'-hydroxy-4-methoxy-5'-methylchalcone oxime chelates. *Indian J. Chem.*, Sect. A 23A, No. 1 (1984) 52-54; *C.A.*, 101 (1984) 16367q.

- 445 Ding, W.: (Progress in thin-layer chromatography of rare earths.) *Fenxi Huaxue*, 11 (1983) 945-948; *C.A.*, 100 (1984) 131495w - a review with 32 refs.
- 446 Fez Pujol, S., Clement Morato, M.D., Carrasco Dorrien, J.M. and Beltran Porter, D.: (Applications of chloranilic acid as a chromatographic reagent. Identification of chloranilates by diffuse reflectance spectrophotometry.) *An. Quim., Ser. B*, 80, No. 1 (1984) 15-18; *C.A.*, 101 (1984) 65072y.
- 447 Gaibakyan, D.S. and Bagdasaryan, S.D.: (Separation and identification of rhodium(VII), molybdenum(VI), vanadium(V) and tungsten(VI) ions by paper chromatography.) *Arm. Khim. Zh.*, 37, No. 1 (1984) 9-14; *C.A.*, 101 (1984) 16362j.
- 448 Gallego, R., Bernal, J.L. and Arranz, J.F.: (Paper chromatography of cations. III.) *An. Quim., Ser. B*, 80, No. 1 (1984) 97-100; *C.A.*, 101 (1984) 65062v.
- 449 Kavetskii, V.N., Karnaukhov, A.I. and Palienko, I.M.: (Heavy metal content of the water and some aquatic plants in the Don and Dnieper estuaries.) *Gidrobiol. Zh.*, 20, No. 2 (1984) 65-68; *C.A.*, 101 (1984) 43247g.
- 450 Kobayashi, M., Saitoh, K. and Suzuki, N.: High-performance thin-layer chromatography of metal complexes of meso-tetrakis(p-tolyl)porphyrin on cellulose and silica gel. *Chromatographia*, 18 (1984) 441-444.
- 451 König, K.-H., Schuster, M., Schneeweis, G. and Steinbrech, B.: Zur Chromatographie von Metallchelaten XIV. Dünnsschicht-Chromatographie von N,N-Dialkyl-N'-benzoylthioharnstoff-Chelaten. *Fresenius' Z. Anal. Chem.*, 319 (1984) 66-69.
- 452 Misovets, V.G.: (Thin-layer chromatographic determination of salts and hydroxides of alkali metals.) *Zh. Anal. Khim.*, 38 (1983) 2087-2090; *C.A.*, 100 (1984) 61041u.
- 453 Nabivanets, B.I. and Gaibakyan, D.S.: (Evaluation of the efficiency of separation of ions by paper and thin-layer chromatography.) *Zh. Anal. Khim.*, 38 (1983) 2085-2087; *C.A.*, 100 (1984) 60999a.
- 454 Nerin, C., Cacho, J. and Calvo, A.: (Synthesis and spectrophotometric study of 6-(tetrazolylazo)-2,4-dimethylphenol and its metal complexes.) *Rev. Latinoam. Quim.*, 14, No. 2 (1983) 89-92; *C.A.*, 100 (1984) 44530k.
- 455 Packter, A. and Doherty, W.O.S.: Studies on alkaline-earth metal polymetaphosphates prepared by precipitation and dehydration. *Phosphorus Sulfur*, 17, No. 2 (1983) 125-133; *C.A.*, 100 (1984) 60802f.
- 456 Pfendt, L.B., Petrovic, S. and Pasajlic, V.Z.: Determination of microamounts of zirconium(IV) and titanium(IV) with preliminary TLC separation. *Microchem. J.*, 29 (1984) 296-303; *C.A.*, 101 (1984) 32470y.
- 457 Qureshi, M., Sethi, B.M. and Sharma, S.D.: Thin-layer chromatography of metal ions in oxalic acid-oxalate systems. *J. Liq. Chromatogr.*, 7 (1984) 1345-1357.
- 458 Seth, N.S. and Rajput, R.P.S.: Thin-layer chromatography of metal ions on titanium(IV) antimonate in aqueous and mixed solvent systems containing DMF: quantitative separation of palladium(II) from several metal ions. *Indian J. Chem., Sect. A*, 22A (1983) 1088-1090; *C.A.*, 101 (1984) 47767z.
- 459 Srivastava, S.P., Bhushan, R. and Chauhan, R.S.: TLC separation of some metal ions on impregnated layers. *J. Liq. Chromatogr.*, 7 (1984) 1341-1344.
- 460 Weber, G. and Schwendt, G.: Radio-Dünnsschicht-Verfahren zur Ermittlung von freien Bindungszentren für Eisen und Nickel in Kaffee und Tee. *J. Chromatogr.*, 285 (1984) 380-384.
- 461 Yole, C.G. and Shide, V.M.: Separation of some transition metals by reversed-phase paper chromatography. *Analyst (London)*, 109 (1984) 993-995.

See also 42, 266, 470.

### 33b. Anions

- 462 Maneva, D.: (Separation and simultaneous detection of hexacyanoferrate(II) and hexacyanoferrate(III) ions by precipitation chromatography.) *Nauchni Tr., Vissh Inst. Khranit, Vkusova Prom-st., Plovdiv*, 29, No. 2 (1982) 55-59; *C.A.*, 101 (1984) 65052s.
- 463 Selevich, A.F. and Lyutsko, V.A.: (Manganese(III) phosphates.) *Zh. Neorg. Khim.*, 29 (1984) 629-636; *C.A.*, 100 (1984) 184683n.

See also 455.

## 34. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 464 Bzenic, J. and Jovanovic, V.: (Technical procedure and possible sources of errors in radiochemical control of technetium-99m radiopharmaceuticals.) *Radiol. Jugosl.*, 17 (1983) 493-497; *C.A.*, 100 (1984) 56949s.
- 465 Gattavecchia, R. and Tonelli, D.: Simple and rapid purification of radiolabeled [<sup>14</sup>C]-cyclophosphamide by Sep Pak C18 cartridges. *Int. J. Appl. Radiat. Isot.*, 34 (1983) 1553-1554; *C.A.*, 100 (1984) 39571v.
- 466 Kudelin, B.K. and Kaminskii, Yu.L.: ((Depth)distribution of labeled substances across the thickness of paper chromatograms.) *Radiokhimiya*, 26, No. 1 (1984) 44-48; *C.A.*, 100 (1984) 202803h.
- 467 Majewski, W., Zimmer, A.M. and Spies, S.M.: Radiopharmaceutical evaluation of technetium-99m hydroxymethylene diphosphonate. *J. Nucl. Med. Technol.*, 11 (1983) 23-25; *C.A.*, 100 (1984) 39516f.
- 468 Solin, O.: Counting of positron-emitting radionuclides on thin-layer chromatograms. *Int. J. Appl. Radiat. Isot.*, 34 (1983) 1653-1654; *C.A.*, 100 (1984) 74076j.
- 469 Speis, H., Pietzsch, H.J. and Abram, U.: Lipophilic technetium complexes. Technetium chelates of some oxygen, nitrogen and sulfur donor Schiff bases. *J. Radioanal. Nucl. Chem.*, 85 (1984) 339-344; *C.A.*, 100 (1984) 167046q.
- 470 Visser, G.W.M. and Diemer, E.L.: Inorganic astatine chemistry: formation of complexes of astatine. *Radiochim. Acta*, 33 (1983) 145-151; *C.A.*, 100 (1984) 149995u.

See also 460.

## 35. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

## 35a. Surfactants

- 471 Jonescu, M., Baloiu, L.M. and Angelescu, A.: (Thin-layer chromatographic determination of ethoxylated phosphoric acid esters in industrial products.) *Rev. Chim. (Bucharest)*, 35 (1984) 49-51; *C.A.*, 100 (1984) 194032p.
- 472 Shiseido Co., Ltd.: (Polyethylene glycol alkyl carboxymethyl ether salts as cosmetic surfactants.) *Jpn. Kokai Tokkyo Koho Pat.* JP 58,185,622 [83 185,622] (Cl. C08G65/32), 29 Oct. 1983, Appl. 82/68,166, 23 Apr. 1982, 4 pp.; *C.A.*, 100 (1984) 126716q.

## 35b. Antioxidants and preservatives

- 473 Guven, K.C. and Ertan, G.: The influence of preservatives on metachromatic assay of heparin. *Zentralbl. Pharm., Pharmakother. Laboratoriumsdiagn.*, 123 (1984) 131-132; *C.A.*, 101 (1984) 60190a.
- 474 Masse, M.O., Wyhowski de Bukanski, B. and Gilquin, C.: Analysis of preservatives in and microbiological cleanliness of baby products and products applied close to the eyes. *Cosmet. Toiletries*, 99, No. 2 (1984) 46-56 and 59-59; *C.A.*, 101 (1984) 11985e.
- 475 Zhang, Ch.: (Determination of preservatives in soy sauce and vinegar.) *Tiaowei Fushipin Keji*, No. 11 (1983) 24-25; *C.A.*, 101 (1984) 71130g.

See also 67,71.

## 35c. Food analysis

- 476 Jaench, D.E.: Quantitative thin-layer chromatography of foods and beverages. *Anal. Foods Beverages: Mod. Tech.*, (1984) 69-91; *C.A.*, 101 (1984) 88913n - a review with 20 refs.

See also 323.

## 35d. Various technical products

See 31, 158, 471.

**36. CELLS AND CELLULAR PARTICLES**

- 477 Hansson, G.C., Karlsson, K.A., Larson, G., Stroemberg, N., Thulin, J., Orvell, C. and Norrby, E.: A novel approach to the study of glycolipid receptors for viruses. Binding of Sendai virus to thin-layer chromatograms. *FEBS Lett.*, 170 (1984) 15-18; *C.A.*, 101 (1984) 68842k.

**37. ENVIRONMENTAL ANALYSIS**

- 478 Poon, C.S., Peters, C.J., Perry, R. and Knight, C.P.V.: Assessing the leaching characteristics of stabilized toxic waste by use of thin-layer chromatography. *Environ. Technol. Lett.*, 5 (1984) 1-6; *C.A.*, 100 (1984) 126397m.

See also 302.

*37b. Air pollution*

See 50, 51, 52, 185, 195, 300.

*37c. Water pollution*

See 119, 257, 263, 277, 303, 309, 449.

## Electrophoresis

### 1. REVIEWS AND BOOKS

See 36, 46, 58, 91.

### 2. FUNDAMENTALS, THEORY AND GENERAL

#### 2a. General

- 1 Berger, I. and Ohlenschlaeger, G.: (Basis of electrophoresis and special electrokinetic separation methods. Part II.). *MTA-J.*, 6 (1984) 198-204; *C.A.*, 101 (1984) 86519q.
- 2 Berger, I. and Ohlenschlaeger, G.: (Basis of electrophoresis and special electrokinetic separation methods). *MTA-J.*, 6 (1984) 259-261; *C.A.*, 101 (1984) 106665q.
- 3 Ivory, D.F.: Transient electrophoresis of a dielectric sphere. *J. Colloid Interface Sci.*, 100 (1984) 239-249; *C.A.*, 101 (1984) 28941k.

#### 2b. Thermodynamic and theoretical relationships

- 4 Naumann, R.J. and Rhodes, P.H.: Thermal considerations in continuous flow electrophoresis. *Separ. Sci.*, 19 (1984) 51-75.
- 5 Rilbe, H.: Basic theory of electrophoresis: definitions, terminology and comparison of the basic techniques. *Electrophor. Tech.*, (1983) 1-25; *C.A.*, 101 (1984) 60545v.
- 6 Vacik, J.: Principles and theory of electromigration processes. *New Compr. Biochem.*, 8 (Sep. Methods) (1984) 29-40; *C.A.*, 101 (1984) 137528b - a review with 16 refs.

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

- 7 Busch, D., Haase, G. and Zoergiebel, F.: (Optical method for the determination of the velocity of individual suspended colloidal particles). *Ber. Bunsen-Ges. Phys. Chem.*, 88 (1984) 679-682; *C.A.*, 101 (1984) 98312e.
- 8 Houchin, M.R. and Warren, L.J.: Surface titrations and electrokinetic measurements on stannic oxide suspensions. *J. Colloid Interface Sci.*, 100 (1984) 287-286; *C.A.*, 101 (1984) 28942m.
- 9 Rhee, K.W., Shibata, J., Barish, A., Gabriel, D.A. and Johnson, C.S., Jr.: Electrophoresis combined with holographic relation spectroscopy: a new method for determining mobilities in mixtures. *J. Phys. Chem.*, 88 (1984) 3944-3946; *C.A.*, 101 (1984) 92266t.

### 3. GENERAL TECHNIQUES

#### 3a. Apparatus and accessories

- 10 Korol, L.E., Konshin, N.I., Azhitskii, G.Yu. and Andrienko, V.I.: (Universal apparatus for liquid column electrophoresis of biopolymers). *Mol. Biol.*, 36 (1984) 70-71; *C.A.*, 101 (1984) 147166w.

- 11 Lazarev, A.I. and Volkonskii, L.N.: (Apparatus for isoelectric focusing in borate-polyol buffer solutions). *Mol. Biol.*, 36 (1984) 57-59; *C.A.*, 101 (1984) 146978a.
- 12 Li, S., Wang, J. and Hu, R.: (A simple apparatus for thin layer analytical isoelectric focusing). *Shengwu Huaxue Yu Shengwu Wuli Jinzaan*, 56 (1984) 72-74; *C.A.*, 101 (1984) 68597j.
- 13 Nishizawa, H.: (Apparatus for separation and purification of amphoteric electrolytes). *Jpn. Kokai Tokkyo Koho Pat.* JP 59 26,105 [84 26,105] (Cl. B01D13/02), 10 Feb. 1984, Appl. 82/133,809, 02 Aug. 1982, 4 pp.; *C.A.*, 101 (1984) 3542t.
- 14 Shao, J., Tian, X., Wang, H. and Chen, B.: (A new gel dryer-shaper NJ-1). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 56 (1984) 75-77; *C.A.*, 101 (1984) 106673r.
- 15 Shustov, V.A., Ksenzhel, O.S., Kalinovskii, E.A., Shembel, E.M. and Rossinskii, Yu.K.: (Organization of electrode processes in systems for separation by electrophoresis). *Mol. Biol. (Kiev)*, 36 (1984) 60-66; *C.A.*, 101 (1984) 98287a.

See also 20, 105.

### 3b. Detection procedures and detectors

- 16 Fujita, T., Toda, T. and Ohashi, M.: Silver stain for proteins on a cellulose acetate membrane. *Anal. Biochem.*, 139 (1984) 463-467.
- 17 Heeb, M.J. and Gabriel, O.: Enzyme localization in gels. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 416-439; *C.A.*, 101 (1984) 106121j.
- 18 Iwamoto, M. and Senshu, T.: (A rapid sensitive method of gel fluorography. How to use ENLIGHTNING economically). *Seikagaku*, 56 (1984) 120-122; *C.A.*, 101 (1984) 3402x.
- 19 Kurosaki, T., Tsutsui, K., Tsutsui, K., Aoyama, K. and Oda, T.: Mechanism of silver staining of histones: evidence for involvement of clustered lysine residues. *Biochem. Biophys. Res. Commun.*, 123 (1984) 729-734.
- 20 Lonskii, Yu.A., Margolin, A.Kh., Veretenov, L.N. and Shelkovnikov, M.A.: (Densitometer for quantitative analysis of electrophoretic patterns). *Mol. Biol.*, 36 (1984) 72-76; *C.A.*, 101 (1984) 126079e.
- 21 McConkey, E.H. and Anderson, C.: Double-label autoradiography revisited: I. The  $^3\text{H}$  and  $^{35}\text{S}$ -system. *Electrophoresis (Weinheim)*, 5 (1984) 230-232.
- 22 McConkey, E.H. and Anderson, C.: Double-label autoradiography revisited: II. The  $^{35}\text{S}$  and  $^{75}\text{Se}$ -system. *Electrophoresis (Weinheim)*, 5 (1984) 233-235.
- 23 Mehta, P.D., Mehta, S.P. and Patrick, B.A.: Silver staining of unconcentrated cerebrospinal fluid in agarose gel (Panaigel) electrophoresis. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 735-736.
- 24 Merril, C.R., Harrington, M. and Alley, V.: A photodevelopment silver stain for the rapid visualization of proteins separated on polyacrylamide gels. *Electrophoresis (Weinheim)*, 5 (1984) 289-297.
- 25 Neely, W.E.: Design of a microcomputer-based densitometer system: Application to serum protein electrophoresis. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 794-797.
- 26 Sutherland, J.C., Monteleone, D.C., Trunk, J. and Ciarrochi, G.: Two-dimensional, computer-controlled film scanner: quantitation of fluorescence from ethidium bromide-stained DNA gels. *Anal. Biochem.*, 139 (1984) 390-399.
- 27 Vissing, H. and Madsen, O.D.: Comparison of detection limits for various nitrocellulose binding immunoassays using  $\beta_2$ -microglobulin as a model antigen. *Electrophoresis (Weinheim)*, 5 (1984) 313-314.
- 28 Xie, Z.: (Automated laser light scattering heterodyne electrophoresis). *Shengwu Huaxue Yu Shengwu Wuli Jinzhan*, 56 (1984) 52-57; *C.A.*, 101 (1984) 86516m.

See also 76, 115, 116, 119-121, 124, 126-130, 132, 134, 258, 359, 369, 396.

### 3c. Electrophoresis in stabilized media

- 29 Blackshear, P.J.: Systems for polyacrylamide gel electrophoresis. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 237-255; *C.A.*, 101 (1984) 125403u.
- 30 Juang, R.-H., Chang, Y.-D., Sung, H.-Y. and Su, J.-C.: Oven-drying method for polyacrylamide gel slab packed in cellophane sandwich. *Anal. Biochem.*, 141 (1984) 348-350.

- 31 Miyashita, T.: (Cellulose acetate electrophoresis). *Med. Technol.*, 12 (1984) 895-899; *C.A.*, 101 (1984) 146988d.
- 32 Neuhoff, V.: Improved procedure for silanization of glass plates as supports for polyacrylamide gels. *Electrophoresis (Weinheim)*, 5 (1984) 251.
- 33 Ogawa, M., Shiraishi, H. and Ikeda, T.: Medium for electrophoresis. *Eur. Pat. Appl. EP 115,436 (Cl. B01D13/04)*, 08 Aug. 1984, JP Appl. 83/9,982, 26 Jan. 1983, 15 pp.; *C.A.*, 101 (1984) 147318x.
- 34 Shimabukuro, H.: (Selection and use of filter paper). *Konse to Gijutsu*, 12 (1984) 41-44; *C.A.*, 101 (1984) 47736p.
- 35 Westermeier, R.: (Horizontal one- and two-dimensional electrophoresis in thin or ultrathin gel layers). *Ger. Offen. Pat. DE 3 232,685 (Cl. B01D57/02)*, 15 Mar. 1984, Appl. 02 Sep. 1982, 10 pp.; *C.A.*, 101 (1984) 3557b.

See also 59.

#### 4. SPECIAL TECHNIQUES

##### 4a. Combination of electrophoretic techniques with chromatography

- 36 Giddings, J.C.: Two-dimensional separations: Concept and promise. *Anal. Chem.*, 56 (1984) 1258A-1270A.

See also 85.

##### 4b. Preparative and continuous procedures

- 37 Trop, M., Kushelevsky, A. and Frenkel, C.: A novel method for continuous preparative electrophoresis. *J. Chromatogr. Sci.*, 22 (1984) 300-303.

##### 4c. Isoelectric focusing

- 38 Gelfi, C. and Righetti, P.G.: Swelling kinetics of Immobiline gels for isoelectric focusing. *Electrophoresis (Weinheim)*, 5 (1984) 257-262.
- 39 Gorman, W.W., Jr., Gorman, E.M. and Duthie, C.E.: Automated end point detection of isoelectric focusing (IEF). *Am. Biotechnol. Lab.*, 2 (1984) 42-45; *C.A.*, 101 (1984) 86770q.
- 40 Radola, B.J.: High-resolution preparative isoelectric focusing. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 256-275; *C.A.*, 101 (1984) 51138n.
- 41 Righetti, P.G. and Gelfi, C.: Immobilized pH gradients for isoelectric focusing. III. Preparative separations in highly diluted gels. *J. Biochem. Biophys. Methods*, 9 (1984) 103-119; *C.A.*, 101 (1984) 51142j.
- 42 Westermeier, R.: (Electrophoresis in immobilized pH gradients. 1.). *LaborPraxis*, 8 (1984) 602-608; *C.A.*, 101 (1984) 106656n.
- 43 Westermeier, R.: (Electrofocusing in immobilized pH gradients. 2.). *LaborPraxis*, 8 (1984) 780-785; *C.A.*, 101 (1984) 126069b.

See also 11, 59, 83, 89, 131, 134, 177, 178, 186, 205, 206, 247, 250, 257, 299, 348, 366, 367, 438.

##### 4d. Isotachophoresis

- 44 Gebauer, P. and Bocek, P.: Chemical kinetics in isotachophoresis. Effects of non-instantaneously reversible complexing equilibria on the stability of zones. *J. Chromatogr.*, 299 (1984) 321-330.
- 45 Holloway, C.J. and Battersby, R.V.: Preparative isotachophoresis. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Techn., Pt. C) (1984) 281-301; *C.A.*, 101 (1984) 68764m.
- 46 Stiefel, T.: Isotachophoresis. In: *Analytisches-Taschenbuch*. 3. R. Bock (Editor), Springer, Berlin, 1983, 139-165 p.; *C.A.*, 101 (1984) 103291d - a review with 46 refs.

- 47 Tetsumi, T., Matsumoto, C. and Sumi, M.: (Electrophoretic behavior of sodium dithiocarbamates by capillary tube isotachophoresis). *Nippon Kagaku Kaishi*, (1984) 780-783; *C.A.*, 101 (1984) 90322n.
- 48 Zhokov, M.Yu.: (Method for calculating band movement and the time taken for complete separation of a mixture in isotachophoresis). *Mol. Biol.*, 36 (1984) 28-34; *C.A.*, 101 (1984) 147165v.

See also 59, 100, 101, 106, 417-419, 428.

#### 4e. Two dimensional electrophoresis

- 49 Boehm, T.L.J. and Drahovsky, D.: Two-dimensional restriction mapping by digestion with restriction endonucleases of DNA in agarose and polyacrylamide gels. *J. Biochem. Biophys. Methods*, 9 (1984) 153-161; *C.A.*, 101 (1984) 68607n.
- 50 Goloman, D. and Merrill, C.R.: Genetic polypeptide variation by two-dimensional electrophoresis. *Ann. N.Y. Acad. Sci.*, 428 (Technol. Impact) (1984) 186-200; *C.A.*, 101 (1984) 106652h.
- 51 Hughes, D.W. and Galeu, G.A.: Addition of proteins to the cylindrical gel embedding medium for transverse molecular-weight markers in two-dimensional gel electrophoresis. *Anal. Biochem.*, 140 (1984) 320-325.
- 52 Marshall, T. and Williams, K.M.: Artifacts associated with 2-mercaptoethanol upon high resolution two-dimensional electrophoresis. *Anal. Biochem.*, 139 (1984) 502-505.
- 53 McFerran, N.V. and Quigley, T.P.: Towards an automated two-dimensional gel analysis system. *Biochem. Soc. Trans.*, 12 (1984) 1000-1005; *C.A.*, 101 (1984) 147177a.
- 54 Miller, M.J., Olson, A.D. and Thorgeirsson, S.S.: Computer analysis of two-dimensional gels: Automatic matching. *Electrophoresis (Weinheim)*, 5 (1984) 297-303.
- 55 Nottbohm, K. and De Maeyer, L.C.: Analysis of 2-D distributions of similar patterns. *Appl. Opt.*, 23 (1984) 2835-2842; *C.A.*, 101 (1984) 126291t.
- 56 Tracy, R.P., Young, D.S., Katzmman, J.A. and Jenny, R.J.: Two-dimensional gel electrophoresis in the systematic development of new laboratory tests. *Ann. N.Y. Acad. Sci.*, 428 (Technol. Impact) (1984) 144-152; *C.A.*, 101 (1984) 106891k.

See also 36, 110, 150, 153, 158, 185, 219, 279.

#### 4f. Affinity electrophoresis

- 57 Hattori, Y. and Yamamoto, K.: (Detection by affinity electrophoresis (polyacrylamide gel)). *Seibutsu Butsuri Kagaku*, 27 (1983) 321-323; *C.A.*, 101 (1984) 70499x.
- 58 Takeo, K.: Affinity electrophoresis: Principles and applications. *Electrophoresis (Weinheim)*, 5 (1984) 187-195 - a review with 81 refs.

See also 73.

#### 4g. Other special techniques

- 59 Azhitskii, G.Yu., Troitskii, G.V., Mitichkin, O.V., Sharaeva, T.K., Vavirovskii, L.A. and Lepskii, A.A.: (Liquid electrophoresis, isoelectric focusing and isotachophoresis under conditions of weightlessness). *Dopov. Akad. Nauk Ukr. RSR, Ser. B: Geol., Khim. Biol. Nauki*, (1984) 54-58; *C.A.*, 101 (1984) 51131e.
- 60 Bartelsman, B.W. and Post, D.L.: Transferring separated components in gel electrophoresis via nylon membrane. *U.S. Pat. US 4,455,370 (Cl. 435-6; G01N33/50)*, 19 Jun. 1984, US Appl. 378,899, 17 May 1982, 6 pp.; *C.A.*, 101 (1984) 106961h.
- 61 Cantor, C.R. and Schwartz, D.C.: Electrophoresis using alternation transverse electric fields. *PCT Int. Pat. Appl. WO 84 02,001 (Cl. G01N27/26)*, 24 May 1984, US Appl. 442,580, 18 Nov. 1982, 30 pp.; *C.A.*, 101 (1984) 86893g.
- 62 Hediger, M.: Apparatus for preparative gel electrophoresis, in particular for separating mixtures on a gradient gel polyacrylamide column. *Eur. Pat. Appl. EP 101,859 (Cl. G01N27/26)*, 07 Mar. 1984, CH Appl. 82/4,521, 23 Jul. 1982, 29 pp.; *C.A.*, 101 (1984) 86889k.

- 63 Horejsi, V.: Affinity electrophoresis. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 275-281; *C.A.*, 101 (1984) 86751j.  
 64 Kakuno, T., Aoki, K., Yamashita, J. and Horo, T.: (Isoelectric chromatography). *Kagaku Zokan*, (1984) 231-240; *C.A.*, 101 (1984) 50937k.  
 65 Naganawa, N.: (Immunofixation electrophoresis). *Kensa To Gijutsu*, 12 (1984) 401-407; *C.A.*, 101 (1984) 50943j.

## 8. SUBSTANCES CONTAINING HETEROCYCLIC OXYGEN

### 8c. Other compounds with heterocyclic oxygen

see 403.

## 10. CARBOHYDRATES

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

- 66 Takasaki, S., Murray, G.J., Furbish, F.S., Brady, R.O., Barranger, J.A. and Kobata, A.: Structure of the N-asparagine-linked oligosaccharide units of human placental  $\beta$ -glucocerebrosidase. *J. Biol. Chem.*, 259 (1984) 10112-10117.  
 67 Yamashita, K., Ohkura, T., Tachibana, Y., Takasaki, S. and Kobata, A.: Comparative study of the oligosaccharides released from baby hamster kidney cells and their polyoma transformant by hydrazinolysis. *J. Biol. Chem.*, 259 (1984) 10834-10840.

### 10b. Polysaccharides, mucopolysaccharides, lipopolysaccharides

- 68 Amerongen, A.V.N., Oderkerk, C.H., Bos-Vreugdenhil, A.P. and Roukema, P.A.: Immunochemical study and acinar localization of AM<sub>1</sub>, a murine submandibular glycoproteins with esterolytic activity. *Biochim. Biophys. Acta*, 801 (1984) 277-284.  
 69 Brownell, M.D., Colley, K.J. and Baenziger, J.U.: Synthesis, processing, and secretion of the core-specific lectin by rat hepatocytes and hepatoma cells. *J. Biol. Chem.*, 259 (1984) 3925-3932.  
 70 Drickamer, K., Mamon, J.F., Binna, G. and Leung, J.O.: Primary structure of the rat liver asialoglycoprotein receptor. Structural evidence for multiple polypeptide species. *J. Biol. Chem.*, 259 (1984) 770-778.  
 71 Fong, S.-L., Liou, G.I., Landers, R.A., Alvarez, R.A. and Bridges, C.D.: Purification and characterization of a retinol-binding glycoprotein synthesized and secreted by bovine neutral retina. *J. Biol. Chem.*, 259 (1984) 6534-6542.  
 72 Hanisch, F.-G., Saur, A., Müller, W.E.G., Conrad, J. and Uhlenbrück, G.: Further characterization of a lectin and its *in vivo* receptor from *Geodia cydonium*. *Biochim. Biophys. Acta*, 801 (1984) 388-395.  
 73 Hansen, J.E.S., Lihme, A. and Bog-Hansen, T.C.: The microheterogeneity components of orosomucoid and the dissociation constants and mobilities of concanavalin A/orosomucoid complexes in crossed affinoimmunolectrophoresis with free concanavalin A. *Electrophoresis (Weinheim)*, 5 (1984) 196-201.  
 74 Imam, A., Taylor, C.R. and Tókes, Z.A.: Immunohistochemical study of the expression of human milk fat globule membrane glycoprotein 70. *Cancer Res.*, 44 (1984) 2016-2022.  
 75 Nibu, K.: (Platelet membrane glycoproteins of thrombocytopenic disorders: analysis using isoelectric focusing and sodium dodecyl sulfate polyacrylamide gel electrophoresis in a two-dimensional technique). *Nippon Ketsueki Gakkai Zasshi*, 47 (1984) 781-791; *C.A.*, 101 (1984) 68793v.  
 76 Ochiai, H.: (Staining of glycoproteins on polyacrylamide gels: a note on Con A-peroxidase method). *Seigaku*, 56 (1984) 406-408; *C.A.*, 101 (1984) 126084c.  
 77 Sage, H., Johnson, Ch. and Bornstein, P.: Characterization of a novel serum albumin-binding glycoprotein secreted by endothelial cells in culture. *J. Biol. Chem.*, 259 (1984) 3993-4007.  
 78 Solum, N.O. and Olsen, T.M.: Glycoprotein Ib in the triton-insoluble (cytoskeletal) fraction of blood platelets. *Biochim. Biophys. Acta*, 799 (1984) 209-220.

- 79 Watanabe, K.: (Analyses of glycoproteins in blood platelet membrane). *Rinsho Kensa*, 28 (1984) 634-641; *C.A.*, 101 (1984) 146992a.  
 80 Zeheb, R. and Orr, G.A.: Characterization of maturation-associated glycoprotein on the plasma membrane of rat caudal epididymal sperm. *J. Biol. Chem.*, 259 (1984) 839-848.  
 81 Zorin, N.A. and Zorina, R.M.: (Immunoelectrophoretic analysis of reactions between heparin and pregnancy proteins). *Vopr. Med. Khim.*, 30 (1984) 26-28; *C.A.*, 101 (1984) 147073p.

See also 119.

## 11. ORGANIC ACIDS AND LIPIDS

### 11a. Organic acids and simple esters

- 82 Shimadzu Corp.: Uniform speed electrophoresis for slightly water-soluble material. *Jpn. Kokai Tokkyo Koho Pat.* JP 59 30,053 [84 30,053] (Cl. GO1N27/26), 17 Feb. 1984, Appl. 82/140,440, 11 Aug. 1982, 5 pp.; *C.A.*, 101 (1984) 32579r.

### 11d. Lipoproteins and their constituents

- 83 Assmann, G., Menzel, H.J., Kladetzky, R.G. and Büttner, G.: Frequency of apolipoprotein A-I mutants in the German population. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 585-589.  
 84 Cole, T.G., Kuisk, I., Patsch, W. and Schonfeld, G.: Effects of high cholesterol diets on rat plasma lipoproteins and lipoprotein-cell interactions. *J. Lipid Res.*, 25 (1984) 593-603.  
 85 Dumon, M.-F. and Clerc, M.: Combination of affinity chromatography and analytical polyacrylamide gel electrophoresis for rapid measurement of human serum high-density lipoprotein apolipoproteins. *Anal. Biochem.*, 141 (1984) 25-32.  
 86 Gambert, P. and Louvrier, E.: (Immunological determination of apolipoprotein B low-density lipoproteins in serum). *Fr. Demande Pat.* FR 2,533,704 (Cl. GO1N33/68), 30 Mar. 1984, Appl. 82/16,219, 27 Sep. 1982, 9 pp.; *C.A.*, 101 (1984) 68918q.  
 87 Ghiselli, G., Gregg, R.E. and Brewer, H.B., Jr.: Apolipoprotein E<sub>Bethesda</sub>. Isolation and partial characterization of a variant of human apolipoprotein E isolated from very low density lipoproteins. *Biochim. Biophys. Acta*, 794 (1984) 333-339.  
 88 Karch, H., Leying, H. and Opferkuch, W.: Analysis of electrophoretically heterogeneous lipopolysaccharides of *Escherichia coli* by immuno blotting. *FEMS Microbiol. Lett.*, 22 (1984) 193-196; *C.A.*, 101 (1984) 50964s.  
 89 Katyal, S.L. and Singh, G.: Analysis of pulmonary surfactant apoproteins by isoelectric focusing. *Biochim. Biophys. Acta*, 794 (1984) 411-418.  
 90 Lee, D.M., Koren, E., Singh, S. and Mole, T.: Presence of B-100 in rat mesenteric chyle. *Biochem. Biophys. Res. Commun.*, 123 (1984) 1149-1156.  
 91 Lewis, L.A. (Editor): *Lipoprotein Methodology in Human Studies*. (*CRC Handbook of Electrophoresis*, 3). CRC Press, Boca Raton, 1983, 386 pp.  
 92 Lundberg, B. and Suominen, L.: Preparation of biologically active analogs of serum low density protein. *J. Lipid Res.*, 25 (1984) 550-558.  
 93 Menzel, H.-J., Assmann, G., Rall, S.C., Jr., Weisgraber, K.H. and Mahley, R.W.: Human apolipoprotein A-I polymorphism. Identification of amino acid substitutions in three electrophoretic variants of the Münster-3 type. *J. Biol. Chem.*, 259 (1984) 3070-3076.  
 94 Reue, K.L., Quon, D.H., O'Donnell, K.A., Dizikes, G.J., Fareed, G.C. and Lusis, A.J.: Cloning and regulation of messenger RNA for mouse apolipoprotein E. *J. Biol. Chem.*, 259 (1984) 2100-2107.  
 95 Shapiro, J.P., Keim, P.S. and Law, J.H.: Structural studies on lipophorin, an insect lipoprotein. *J. Biol. Chem.*, 259 (1984) 3680-3685.  
 96 Wang, C.-S., Fukuda, N. and Ontko, J.A.: Studies on the mechanism of hypertriglyceridemia in the genetically obese Zucker rat. *J. Lipid Res.*, 25 (1984) 571-579.  
 97 Young, P.M., Boehm, T.M. and Brown, J.E.: Resolution and quantitation of apolipoproteins A-I and A-II from human high-density lipoprotein by size exclusion high-performance liquid chromatography. *J. Chromatogr.*, 311 (1984) 79-92.

## 17. AMINES, AMIDES AND RELATED NITROGEN COMPOUNDS

## 17a. Amines and polyamines

- 98 Tsutsumi, A., Kodama, H. and Ishizu, H.: (Detection of spermine in semen by isotachophoresis). *Igaku No Ayumi*, 129 (1984) 15-16; C.A., 101 (1984) 49648k.

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

## 18a. Amino acids and their derivatives

- 99 Durupthy, O., Durupthy, A. and Dubusc, M.: (Paper chromatography and electrophoresis of  $\alpha$ -amino acids). *Bull. Union Physiciens*, 78 (1984) 1043-1049; C.A., 101 (1984) 109775m.
- 100 Fukuba, H. and Tsuda, Y.: (Determination of lysinoalanine by isotachoelectrophoresis). *Nippon Eiyo, Shokuryo Gakkaishi*, 36 (1983) 373-377; C.A., 101 (1984) 3414c.
- 101 Kodama, H., Sasaki, K., Mikasa, H., Cavallini, D. and Ricci, G.: Quantitative analysis of cystathionine and perhydro-1,4-thiazepine-3,5-dicarboxylic acid in the urine of a patient with cystathioninuria using isotachophoresis. *J. Chromatogr.*, 311 (1984) 183-188.
- 102 Storring, P.L. and Tiplady, R.J.: A radioassay for nonoxidized methionine in peptides. A method for identifying (after isoelectric focusing) and for estimating biologically active forms of corticotropin and other hormones. *Anal. Biochem.*, 141 (1984) 43-54.

See also 105.

## 18b. Peptides and peptidic and proteinous hormones

- 103 Brown, E.M. and Greenberg, R.: Reductive isopropylation of amino groups in lysine containing peptides. *Anal. Lett.*, 17 (1984) 1429-1445.
- 104 Cornell, H.J. and Boughdadu, N.M.: Isolation of insulin-like growth factors I and II from human plasma. *Prepar. Biochem.*, 14 (1984) 123-138.
- 105 Green, J.S. and Jorgenson, J.W.: High speed zone electrophoresis in open-tubular fused silica capillaries. *J. High Resolut. Chromatogr. Chromatogr. Commun.*, 7 (1984) 529-531.
- 106 Mikasa, H., Arata, J. and Kodama, H.: Measurement of prolidase activity in erythrocytes using isotachophoresis. *J. Chromatogr.*, 310 (1984) 401-406.
- 107 Neidle, A. and Kelly, J.A.: The isolation of a peptidyl dipeptidase from mouse brain cytosol that cleaves adrenocorticotropic hormone-(7-10) and des-tyrosine enkephalins. *Arch. Biochem. Biophys.*, 233 (1984) 115-126.

## 18c. General techniques of elucidation of structure of proteins

- 108 Collawn, J.F., Jr., Law, P.Y., Morgan, S.L., Fox, A. and Fish, W.W.: A chemical and physical comparison of ferritin subunit species fractionated by high-performance liquid chromatography.
- 109 Haeberle, J.R., Hott, J.W. and Hathaway, D.R.: Pseudophosphorylation of the smooth muscle 20 000 dalton myosin light chain. An artifact due to protein modification. *Biochim. Biophys. Acta*, 790 (1984) 78-86.
- 110 Kodaira, K.-I. and Takeo, A.: Function and structure of microvirid phage  $\alpha 3$  genome. I. Electrophoretic characterization of proteins encoded by wild-type phage. *Biochim. Biophys. Acta*, 788 (1984) 333-338.
- 111 Kurzok, H.-G. and Feierabend, J.: Comparison of a cytosolic and a chloroplast triosephosphate isomerase isoenzyme from rye leaves II. Molecular properties and phylogenetic relationships. *Biochim. Biophys. Acta*, 788 (1984) 222-233.
- 112 Penin, F., Godinot, C. and Gautheron, D.C.: Two-dimensional gel electrophoresis of membrane proteins using anionic and cationic detergents. Application to the study of mitochondrial  $F_0-F_1$ -ATPase. *Biochim. Biophys. Acta*, 775 (1984) 239-245.

- 113 Steinberg, R.A.: Mapping endpoints of partial proteolysis fragments from regulatory subunit of type I cyclic AMP-dependent protein kinase. *Anal. Biochem.*, 141 (1984) 220-231.

See also 213.

## 19. PROTEINS

### 19a. General techniques

- 114 Abramovitz, A.S., Randolph, V., Mehra, A. and Christakos, S.: Recovery of native proteins from preparative electrophoresis gel slices by reverse polarity elution. *Prepar. Biochem.*, 14 (1984) 205-221.
- 115 Borejdo, J. and Flynn, C.: Electrophoresis in the presence of Coomassie brilliant blue R-250 stained polyacrylamide gels during protein fractionation. *Anal. Biochem.*, 140 (1984) 84-86 - SDS-polyacrylamide gel.
- 116 Cutting, J.A.: Gel protein stains: phosphoproteins. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 451-455; *C.A.*, 101 (1984) 68689r.
- 117 Everitt, E. and Maksimova, A.: Quantitation of protein by alkaline extraction of Naphthol Blue Black-stained polypeptides in sodium dodecyl sulfate-polyacrylamide slab-gels. *Anal. Biochem.*, 141 (1984) 17-24.
- 118 Francis, R.T., Jr., Davie, J.R., Sayre, M., Rocha, E., Ziemer, F. and Riedel, G.: Efficient method for visualization and isolation of proteins resolved in polyacrylamide gels. *J. Chromatogr.*, 298 (1984) 115-121.
- 119 Gander, J.E.: Gel protein stains: glycoproteins. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 447-451; *C.A.*, 101 (1984) 68688q.
- 120 Gersten, D.M., Zapolski, E.J. and Ledley, R.S.: Radioactive staining of gels to identify proteins. *U.S. Pat. US 4,459,356* (Cl. 436-86; C09K11/04), 10 Jul. 1984, Appl. 348,075, 11 Feb. 1982, 7 pp.; *C.A.*, 101 (1984) 105963k.
- 121 Heegaard, N.H.H. Gebsgaard, K.P. and Bjerrum, O.J.: Sodium salicylate for fluorographical detection of immunoprecipitated proteins in agarose gels. *Electrophoresis (Weinheim)*, 5 (1984) 263-269.
- 122 Itoh, T. and Otaka, R.E.: Complete amino-acid sequence of an L7/L12-type ribosomal protein from *Desulfovibrio vulgaris*, Miyazaki. *Biochim. Biophys. Acta*, 789 (1984) 229-233.
- 123 Knüppel, W., Neumeier, D., Fateh-Moghadam, A. and Knedel, M.: Rechnerunterstützte Befundung von Eiweißelektrophoresen auf Celluloseacetatfolie. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 407-417.
- 124 Malloy, J.M., Rieker, J.P. and Rizzo, C.F.: Quantitation of proteins on Coomassie Blue-stained polyacrylamide gels based on spectrophotometric determination of electroeluted dye. *Anal. Biochem.*, 141 (1984) 503-509.
- 125 Mei, B.: (Two-dimensional gel electrophoresis of proteins). *Zhiwu Shenglixue Tongxun*, (1983) 52-54; *C.A.*, 101 (1984) 3423e.
- 126 Merril, C.A., Goldman, D. and Van Keuren, M.L.: Gel protein stains: silver stain. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 441-447; *C.A.*, 101 (1984) 68687p.
- 127 Nielsen, B.L. and Brown, L.R.: The basis for colored silver-protein complex formation in stained polyacrylamide gels. *Anal. Biochem.*, 141 (1984) 311-315.
- 128 Ohsawa, K.: All round color-protein stain in sodium dodecyl sulfate polyacrylamide gel electrophoresis. *Maku*, 9 (1984) 105-108; *C.A.*, 101 (1984) 86753m.
- 129 Parkinson, D. and Rishshaw, J.D.: Visible labeling of proteins for polyacrylamide gel electrophoresis with dabsyl chloride. *Anal. Biochem.*, 141 (1984) 121-126.
- 130 Pfisterer, J.: (Improved evaluation of electrophoretic separations of proteins by specific detection techniques). *GIT Fachs. Lab.*, 28 (1984) 676-680; *C.A.*, 101 (1984) 126218z.
- 131 Phelps, D.S.: Electrophoretic transfer of proteins from fixed and stained gels. *Anal. Biochem.*, 141 (1984) 409-412.
- 132 Reisner, A.H.: Gel protein stains: a rapid procedure. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 439-441; *C.A.*, 101 (1984) 68686n.
- 133 Ribeiro, P.L., Mitra, R.S. and Bernstein, I.A.: Improved performance of mixed esters membranes in protein transfer. *BioTechniques*, 2 (1984) 69-71; *C.A.*, 101 (1984) 51128j.

- 134 Vesterberg, O. and Gramstrup-Christensen, B.: Sensitive silver staining of proteins after isoelectric focusing in agarose gels. *Electrophoresis (Weinheim)*, 5 (1984) 282-285.
- See also 19, 24, 51, 57.
- 19b. *Proteins of cells, viruses and subcellular particles (excluding blood cells and platelets)*
- 135 Agano, A.: (Analysis of rat retinal erythrocyte membrane proteins by sodium dodecylsulfate-polyacrylamide gel electrophoresis method). *Kitasato Igaku*, 14 (1984) 73-75; *C.A.*, 101 (1984) 51151m.
- 136 Alper, M., Salomon, R. and Loebenstein, G.: Gel electrophoresis of virus-associated polypeptides for detecting viruses in bulbous irises. *Phytopathology*, 74 (1984) 960-962; *C.A.*, 101 (1984) 147175y.
- 137 Carlin, C.R. and Knowles, B.B.: Biosynthesis of the epidermal growth factor receptor in human epidermoid carcinoma-derived A431 cells. *J. Biol. Chem.*, 259 (1984) 7902-7908.
- 138 Chinkers, M. and Brugge, J.S.: Characterization of structural domains of the human epidermal growth factor receptor obtained by partial proteolysis. *J. Biol. Chem.*, 259 (1984) 11534-11542.
- 139 Crettaz, M., Jialal, I., Kasuga, M. and Kahn, C.R.: Insulin receptor regulation and desensitization in rat hepatoma cells. The loss of the oligomeric forms of the receptor correlates with the change in receptor affinity. *J. Biol. Chem.*, 259 (1984) 11543-11549.
- 140 Cuming, A.C.: Control of ribosomal protein synthesis during wheat embryo imbibition. *Biochim. Biophys. Acta*, 783 (1984) 42-52.
- 141 Denslow, N.D. and O'Brien, T.W.: Organization of proteins in mammalian mitochondrial ribosomes. Accessibility to lactoperoxidase-catalyzed radioiodination. *J. Biol. Chem.*, 259 (1984) 9867-9873.
- 142 Evans, R.M.: Peptide mapping of phosphorylated vimentin. Evidence for a site-specific alteration in mitotic cells. *J. Biol. Chem.*, 259 (1984) 5372-5375.
- 143 Günther, A., Kinjo, M., Winter, H., Sonka, J. and Volm, M.: Differential expression of intermediate-filament proteins in murine Sarcoma 180 ascites or solid tumor. *Cancer Res.*, 44 (1984) 2590-2594.
- 144 Gupta, R.S. and Gupta, R.: Mutants of Chinese hamster ovary cells affected in two different microtubule-associated proteins. Genetic and biochemical studies. *J. Biol. Chem.*, 259 (1984) 1882-1890.
- 145 Hanspal, M., Luna, E. and Branton, D.: The association of clathrin fragments with coated vesicle membranes. *J. Biol. Chem.*, 259 (1984) 11075-11082.
- 146 Hare, J.F. and Huston, M.: Degradation of surface-labeled hepatoma membrane polypeptides. Effect of inhibitors. *Arch. Biochem. Biophys.*, 233 (1984) 547-555.
- 147 Hunt, R.C., Ruffin, R. and Yang, Y.-S.: Alterations in the transferrin receptor of human erythroleukemic cells after induction of hemoglobin synthesis. *J. Biol. Chem.*, 259 (1984) 9944-9952.
- 148 Lin, A., McNally, J. and Wool, I.G.: The primary structure of rat liver ribosomal protein L39. *J. Biol. Chem.*, 259 (1984) 487-490.
- 149 Ohmasa, M. and Murata, N.: Comparison of cell proteins of bacteria of the genus *Erwinia* by O'Farrell's two-dimensional gel electrophoresis. *Nippon Shokubutsu Byori Gakkaiho*, 49 (1983) 529-538; *C.A.*, 101 (1984) 147176z.
- 150 Rosenblum, B.B., Neel, J.V., Hanash, S.M., Joseph, J.L. and Yew, N.: Identification of genetic variants in erythrocyte lysate by two-dimensional gel electrophoresis. *Am. J. Hum. Genet.*, 36 (1984) 601-612; *C.A.*, 101 (1984) 68792u.
- 151 Satta, D., Schapira, G., Chafey, P., Righetti, P.G. and Wahrmann, J.P.: Solubilization of plasma membranes in anionic, non-ionic and zwitterionic surfactants for iso-dalt analysis: a critical evaluation. *J. Chromatogr.*, 299 (1984) 57-72.
- 152 Schimmor, B.P., Robinson, R., Tsao, J. and Watt, V.M.: A 68000 dalton protein genetically associated with corticotropin-sensitive adenylate cyclase activity. Purification and preliminary characterization using a specific antiserum. *Can. J. Biochem.*, 62 (1984) 601-609.
- 153 Segura, M. and Lindberg, U.: Separation of non-muscle isoactins in the free form or as profilactin complexes. *J. Biol. Chem.*, 259 (1984) 3949-3954.

- 154 Wegenr, A.D. and Jones, L.R.: Phosphorylation-induced mobility shift in phospholamban in sodium dodecyl sulfate-polyacrylamide gels. Evidence for a protein structure consisting of multiple identical phosphorylatable subunits. *J. Biol. Chem.*, 259 (1984) 1834-1841.
- 155 Welch, W.J. and Feramisco, J.R.: Nuclear and nucleolar localization of the 72,000-dalton heat shock protein in heat-shocked mammalian cells. *J. Biol. Chem.*, 259 (1984) 4501-4513.
- 156 Welling, H.W., Nijmeijer, J.R.J., van der Zee, R., Groen, G., Wilterdink, J.B. and Wiling-Wester, S.: Isolation of detergent-extracted Sendai virus proteins by gel-filtration, ion-exchange and reversed-phase high-performance liquid chromatography and the effect on immunological activity. *J. Chromatogr.*, 297 (1984) 101-109.
- 157 Yin, H.L., Kwiatkowski, D.J., Mole, J.E. and Cole, F.S.: Structure and biosynthesis of cytoplasmic and secreted variants of gelsolin. *J. Biol. Chem.*, 259 (1984) 5271-5276.
- 158 Zeindl, E. and Klose, J.: Effect of radioactive amino acids on chromosomes, viability and two-dimensional protein patterns of cultured mammalian cells. *Electrophoresis (Weinheim)*, 5 (1984) 303-309.
- 159 Zukerman, S.H., Linder, S. and Eisenstadt, J.M.: Transformation-associated changes in nuclear-coded mitochondrial proteins in 3T3 cells and SV 40-transformed 3T3 cells. *Biochim. Biophys. Acta*, 804 (1984) 285-290.

See also 75, 122, 196, 260, 263, 266.

#### 19c. Microbial and plant proteins

- 160 Andersson, B., Larsson, C., Jansson, C., Ljungberg, U. and Akerlund, H.-E.: Immunological studies on the organization of proteins in photosynthetic oxygen evolution. *Biochim. Biophys. Acta*, 766 (1984) 21-28.
- 161 Brooks, J.R. and Morr, C.V.: Phosphorus and phytate content of soybean protein components. *J. Agric. Food Chem.*, 32 (1984) 672-674.
- 162 Dawidowicz, A.L. and Lobarzewski, J.: Influence of the thermal modification of controlled porosity glass on the affinity chromatography of fungal proteins. *Chromatographia*, 18 (1984) 389-392.
- 163 Enami, M. and Ishihama, A.: Protein phosphorylation in *Escherichia coli* and purification of a protein kinase. *J. Biol. Chem.*, 259 (1984) 526-533.
- 164 Gyongyossy-Issa, M.I.C., Christie, E.J. and Khachatourians, G.G.: Charge-shift electrophoretic behavior of T-2 toxin in agarose gels. *Appl. Environ. Microbiol.*, 47 (1984) 1182-1184; *C.A.*, 101 (1984) 67459d.
- 165 Hirschberg, Y., Bleecker, A., Kyle, D.J., McIntosh, L. and Arntzen, Ch.I.: The molecular basis of triazine-herbicide resistance in higher-plant chloroplasts. *Z. Naturforsch.*, 39C (1984) 412-420.
- 166 Kishore Kumar Murthy, N.V. and Narasinga Rao, M.S.: Interaction of phytate with mustard 12S protein. *J. Agric. Food Chem.*, 32 (1984) 493-498.
- 167 Metakovskii, E.V., Novoselskaya, A.Yu., Kopus, M.M., Sobko, T.A. and Sozinov, A.A.: Blocks of gliadin components in winter wheat detected by one-dimensional polyacrylamide gel electrophoresis. *Theor. Appl. Genet.*, 67 (1984) 559-568; *C.A.*, 101 (1984) 51856v.
- 168 Mohri, M. and Matsushita, S.: Improvement of water absorption of soybean protein by treatment with bromelain. *J. Agric. Food Chem.*, 32 (1984) 486-490.
- 169 Murphy, P.A. and Resurreccion, A.P.: Varietal and environmental differences in soybean glycinin and  $\beta$ -conglycinin content. *J. Agric. Food Chem.*, 32 (1984) 911-915.
- 170 Peruanskii, Yu.V. and Dukhnov, S.N.: (Use of the electrophoretic spectra of gliadin in wheat breeding). *Vestn. S-Kh. Nauki Kaz.*, (1984) 35-38; *C.A.*, 101 (1984) 87566q.
- 171 Stahl, E., Quirin, K.W. and Blagrove, R.J.: Extraction of seed oils with supercritical carbon dioxide: Effect on residual proteins. *J. Agric. Food Chem.*, 32 (1984) 938-940.
- 172 Sussman, D.J., Sellers, J.R., Flicker, P., Lai, E.Y., Cannon, E., Szent-Gyorgyi, A.G. and Fulton, C.: Actin of *Naegleria gruberi*. Absence of N-methylhistidine. *J. Biol. Chem.*, 259 (1984) 7349-7354.

- 173 Widger, W.R., Farchaws, J.W., Cramer, W.A. and Dilley, R.A.: Studies on the relation of the Mr9000 phosphoprotein to cytochrome b-559 in spinach thylakoid membranes. *Arch. Biochem. Biophys.*, 233 (1984) 72-79.

See also 247.

19d. Proteins of blood, serum and blood cells

- 174 Candiano, G., Ghiggeri, G.M., Delfino, G., Queirolo, C., Gianazza, E. and Righetti, P.G.: Glycosylation of human albumin in diabetes mellitus: Extensive microheterogeneity of serum and urinary species as revealed by isoelectric focusing. *Electrophoresis (Weinheim)*, 5 (1984) 217-222.
- 175 Cardin, A.D., Witt, K.R., Chao, J., Margolius, H.S., Donaldson, V.H. and Jackson, R.L.: Degradation of apolipoprotein B-100 of human plasma low density lipoproteins by tissue and plasma kallikreins. *J. Biol. Chem.*, 259 (1984) 8522-8528.
- 176 Colombi, M., Barlati, S., Magdelenat, H. and Fiszer-Szafarz, B.: Relationship between multiple forms of plasminogen activator in human breast tumors and the presence of metastases in lymph nodes. *Cancer Res.*, 44 (1984) 2971-2979.
- 177 Daly, M. and Hallinan, F.: Analysis of plasma protein variants by I.E.F./P.A. (isoelectric focusing in polyacrylamide gels) and immunoblotting techniques. *Biochem. Soc. Trans.*, 12 (1984) 672-673; *C.A.*, 101 (1984) 147250u.
- 178 D'Andrea, A.L. and Castagnino, J.M.: (Analytical isoelectric focusing of human serum proteins in pH ranges of 4-6 and 6.5-9). *Acta Bioquim. Latinoam.*, 17 (1983) 471-478; *C.A.*, 101 (1984) 68763k.
- 179 Dixit, V.M., Grant, G.A., Santoro, S.A. and Frazier, W.A.: Isolation and characterization of a heparin-binding domain from the amino terminus of platelet thrombospondin. *J. Biol. Chem.*, 259 (1984) 10100-10105.
- 180 Elkow, K.B., Jankowski, P.W. and Chu, J.-L.: Blotting intact immunoglobulins and other high-molecular-weight proteins after composite agarose-polyacrylamide gel electrophoresis. *Anal. Biochem.*, 140 (1984) 208-213.
- 181 Elliot, C. and Ralston, G.B.: Solubilisation of human erythrocyte band 4.1 protein in the non-ionic detergent Tween 20. *Biochim. Biophys. Acta*, 775 (1984) 313-319.
- 182 Feldman, S.R., Gonias, S.L., Ney, K.A., Pratt, Ch.W. and Pizzo, S.V.: Identification of "embryonin" as bovine G<sub>2</sub>-macroglobulin. *J. Biol. Chem.*, 259 (1984) 4458-4462.
- 183 Fontaine, M. and Sim, R.B.: Localisation of a group of antigenic sites in complement component C3, and identification of a new fragmentation pattern. *Biochim. Biophys. Acta*, 789 (1984) 119-127.
- 184 Fowler, V.M. and Bennett, V.: Erythrocyte membrane tropomyosin. Purification and properties. *J. Biol. Chem.*, 259 (1984) 5978-5989.
- 185 Gianazza, E., Frigerio, A., Tagliabue, A. and Righetti, P.G.: Serum fractionation on immobilized pH gradients with one- and two-dimensional techniques. *Electrophoresis (Weinheim)*, 5 (1984) 209-216.
- 186 Gianazza, E., Frigerio, A., Astrua-Testori, S. and Righetti, P.G.: The behavior of serum albumin upon isoelectric focusing on immobilized pH gradients. *Electrophoresis (Weinheim)*, 5 (1984) 310-312.
- 187 Godal, H.C., Gravem, K., Brosstad, F. and Nyvold, N.: Quantitation of factor XIII by SDS polyacrylamide gel electrophoresis. *Thromb. Res.*, 35 (1984) 577-582; *C.A.*, 101 (1984) 147178b.
- 188 Grinevich, A.S., Martynov, A.I., Pinegin, B.V. and Mayatnikov, A.Yu.: (Distribution of idiotype-positive antibodies in the isoelectrofocusing spectra of antiovalbumin antibodies). *Immunologiya*, (1984) 20-25; *C.A.*, 101 (1984) 149462p.
- 189 Habeeb, A.F.S.A. and Francis, R.D.: Preparation of human immunoglobulin by caprylic acid precipitation. *Prepar. Biochem.*, 14 (1984) 1-17.
- 190 Holland, L.J. and Wangh, L.J.: *Xenopus* fibrinogen synthesis and secretion. Analysis of precursor polypeptides and their post-translational modification. *J. Biol. Chem.*, 259 (1984) 3757-3762.
- 191 Huang, D.-P., Schwartz, Ch.E., Chiu, J.-F. and Cook, J.R.: Dexamethasone inhibition of rat hepatoma growth and G-fetoprotein synthesis. *Cancer Res.*, 44 (1984) 2976-2980.
- 192 Irita, K., Takeshige, K. and Minakami, S.: Protein phosphorylation in intact pig leukocytes. *Biochim. Biophys. Acta*, 805 (1984) 44-52.

- 193 Kadofuku, T. and Sato, T.: Detection of changes in rabbit serum proteins after partial hepatectomy by means of two-dimensional electrophoresis under non-denaturing conditions. *J. Chromatogr.*, 311 (1984) 93-99.
- 194 Kelker, H.Ch., Le, J., Rubin, B.Y., Yip, Y.K., Nagler, C. and Vilcek, J.: Three molecular weight forms of natural human interferon- $\gamma$  revealed by immunoprecipitation with monoclonal antibody. *J. Biol. Chem.*, 259 (1984) 4301-4304.
- 195 Kinkel, J.N., Anspach, B., Unger, K.K., Wieser, R. and Brunner, G.: Separation of plasma membrane proteins of cultured human fibroblasts by affinity chromatography on bonded microparticulate silicas. *J. Chromatogr.*, 297 (1984) 167-177.
- 196 Kline, K., Allison, J.P., McIntyre, B.W. and Sanders, B.G.: Immunochemical characterization of differentiation and age-related cell surface antigens expressed by chicken erythrocytes. *Cancer Res.*, 44 (1984) 3576-3583.
- 197 Leto, Th.L. and Marchesi, V.T.: A structural model of human erythrocyte protein 4.1. *J. Biol. Chem.*, 259 (1984) 4603-4608.
- 198 Lorier, M.A. and Hawes, C.R.: Haemoglobin treatment of  $\alpha_1$ -antitrypsin phenotype samples. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1588.
- 199 Lundahl, P., Greijer, E., Lindblom, H. and Fägerstam, L.G.: Fractionation of human red cell membrane proteins by ion-exchange chromatography in detergent on Mono Q, with special reference to the glucose transporter. *J. Chromatogr.*, 297 (1984) 129-137.
- 200 Maruyama, M., Sumi, H., Akazawa, K. and Mihara, H.: Marked increase of plasma acid stable/soluble trypsin inhibitor in hemodialysis patients. *Clin. Chim. Acta*, 138 (1984) 205-213.
- 201 Massi, G., Marano, G., Patalano, F. and Auconi, P.: Silver-stained phenotyping of  $\alpha_1$ -antitrypsin in dried blood and serum specimens. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1674-1676.
- 202 Matsumoto, A. and Fujita, T.: Abnormalities in erythrocyte membrane protein in pseudohypoparathyroidism type 1. *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 281-283.
- 203 Meier, H., Garlt, C. and Krueger, I.: (Micro-agar gel electrophoresis for quantitative determination of protein fractions in blood serum of clinically healthy dogs). *Arch. Exp. Veterinaermed.*, 38 (1984) 211-218; *C.A.*, 101 (1984) 68769s.
- 204 Nagamine, M.: (Methods for detection of the enzyme-binding immunoglobulin complexes). *Seibutsu Butsuri Kagaku*, 27 (1983) 311-314; *C.A.*, 101 (1984) 70497v.
- 205 Nakashima, S. and Kamikawa, H.: Sequential expansion of antibody heterogeneity during the response to bacterial  $\alpha$ -amylase. *J. Biochem. (Tokyo)*, 96 (1984) 223-228.
- 206 Olsson, T., Kostulas, V. and Link, H.: Improved detection of oligoclonal IgG in cerebrospinal fluid by isoelectric focusing in agarose, double-antibody peroxidase labeling, and avidin-biotin amplification. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1246-1249.
- 207 Otto, S.: Immunofixation electrophoresis: an immunochemical method for testing protein anomalies. *Haematologia*, 17 (1984) 289-295; *C.A.*, 101 (1984) 106701y.
- 208 Rodriguez de Cordoba, S., Rubinstein, P. and Ferreira, A.: High resolution isoelectric focusing of immunoprecipitated proteins under denaturing conditions. A simple analytical method applied to the study of complement component polymorphisms. *J. Immunol. Methods*, 69 (1984) 165-172; *C.A.*, 101 (1984) 5177b.
- 209 Saoji, A.M., Jad, C.Y., Yemul, V.L., Khare, P.M. and Kelkar, S.S.: Raising monospecific antibodies by use of protein components prestained with Remazol Brilliant Blue and separated by disc electrophoresis on polyacrylamide gel. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1252-1254.
- 210 Schmitter, H. and Kissling, E.: (GC-subtyping on blood stains by isoelectric focusing in immobilized pH gradients). *Arch. Kriminol.*, 173 (1984) 50-54; *C.A.*, 101 (1984) 1902m.
- 211 Shimizu, T., Hasegawa, I., Fukuda, T. and Kato, K.: Sensitive enzyme immunoassay for the measurement of platelet factor 4 in blood plasma. *Clin. Chim. Acta*, 138 (1984) 151-161.
- 212 Skok, M.V. and Komissarenko, S.V.: (Isolation of monospecific antibodies by preparative isoelectric focusing). *Mol. Biol.*, 36 (1984) 76-79; *C.A.*, 101 (1984) 128499r.

- 213 Sottrup-Jensen, L., Stepanik, T.M., Jones, C.M., Lonblad, P.B., Kristensen, T. and Wierzbicki, D.M.: Primary structure of human  $\alpha_2$ -macroglobulin. I. Isolation of the 26 CNBr fragments, amino acid sequence of 13 small CNBr fragments, amino acid sequences of methionine-containing peptides, and alignment of all CNBr fragments. *J. Biol. Chem.*, 259 (1984) 8293-8303.
- 214 Sudo, K.: (Methods for detection of the enzyme-immunoglobulin complexes). *Butsuri Kagaku*, 27 (1983) 305-310; *C.A.*, 101 (1984) 70496u.
- 215 Villa, V., Raganon, E., Llopis, P. and Aznar, J.: Isolation of human fibrinogen using nitroblue tetrazolium (NTB). *Clin. Chim. Acta*, 138 (1984) 215-219.
- 216 Weaver, D.C. and Marchesi, V.T.: The structural basis of ankyrin function. I. Identification of two structural domains. *J. Biol. Chem.*, 259 (1984) 6165-6169.
- 217 Weaver, D.C., Pasternack, G.R. and Marchesi, V.T.: The structural basis of ankyrin function. II. Identification of two functional domains. *J. Biol. Chem.*, 259 (1984) 6170-6175.
- 218 Weinstein, S., Jain, A., Bhagavan, N.V. and Scottolini, A.G.: Biclonal IgA and IgM gammopathy in lymphocytic lymphoma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1710-1712.
- 219 Willard-Gallo, K.E.: Analysis of normal subset-specific and disease-specific human leukocyte proteins by cell sorting and two-dimensional electrophoresis. *Ann. N.Y. Acad. Sci.*, 428 (Technol. Impact.) (1984) 201-222; *C.A.*, 101 (1984) 88503d.
- 220 Zimmerman, T.S., Roberts, J.R. and Ruggeri, Z.M.: Factor VIII - related antigen: characterization by electrophoretic techniques. *Methods Hematol.*, 5 (Hemophilias) (1982) 81-91; *C.A.*, 101 (1984) 5121d.

See also 25, 27, 81, 93, 331, 424.

#### *19e. Structural and muscle proteins*

- 221 Abrams, R., Verbeke, R. and Van Hoof, J.: (Fish species identification by isoelectric focusing applied to trade products). *Fleischwirtschaft*, 64 (1984) 622-624; *C.A.*, 101 (1984) 71149v.
- 222 Berchtold, M.W., Celio, M.R. and Heizmann, C.W.: Parvalbumin in non-muscle tissues of the rat. Quantitation and immunohistochemical localization. *J. Biol. Chem.*, 259 (1984) 5189-5196.
- 223 Briggs, M.M., Klevit, R.E. and Schachat, F.H.: Heterogeneity of contractile proteins. Purification and characterization of two species of troponin T from rabbit fast skeletal muscle. *J. Biol. Chem.*, 259 (1984) 10369-10375.
- 224 Butaisky, L.B., Butler-Browne, G.S., Sell, S.M. and Whalen, R.G.: Structural differences in the subfragment 1 and rod portions of myosin isozymes from adult and developing rat skeletal muscles. *J. Biol. Chem.*, 259 (1984) 7212-7218.
- 225 Casas, C., Tormo, J., Hernandez, P.E. and Sanz, B.: Detection and partial characterization of soluble pig muscle proteins by immuno-electrophoresis in agarose gels. *J. Food Technol.*, 19 (1984) 283-287; *C.A.*, 101 (1984) 149935v.
- 226 Chan, D. and Cole, W.G.: Quantitation of type I and III collagens using electrophoresis of alpha chains and cyanogen bromide peptides. *Anal. Biochem.*, 139 (1984) 322-328.
- 227 Dillmann, W.H., Barrieux, A. and Reese, G.S.: Effect of diabetes and hypothyroidism of cardiac myosin heavy chains synthesized *in vivo* or in a cell-free system. *J. Biol. Chem.*, 259 (1984) 2035-2038.
- 228 Evans, R.R., Robson, R.M. and Stromer, M.H.: Properties of smooth muscle vinculin. *J. Biol. Chem.*, 259 (1984) 3016-3924.
- 229 Gerstenfeld, L., Beldekas, J.C., Sonenshein, G.E. and Franzblau, C.: Processing of procollagen types III and I in cultured bovine smooth muscle cells. *J. Biol. Chem.*, 259 (1984) 9158-9162.
- 230 Hill, R.J. and Harper, E.: Quantitation of types I and III collagens in human tissue samples and cell culture by cyanogen bromide peptide analysis. *Anal. Biochem.*, 141 (1984) 83-93.
- 231 Hiratsuka, T.: Direct cross-linking of three domains in the myosin head. *J. Biochem. (Tokyo)*, 96 (1984) 269-272.
- 232 Kubo, K. and Takagi, T.: The  $\alpha_1(I)$  and  $\alpha_2(I)$  chains of collagen separate in sodium dodecyl sulfate-polyacrylamide gel electrophoresis due to differences in sodium dodecyl sulfate binding capacities. *Collagen Relat. Res.*, 4 (1984) 201-208; *C.A.*, 101 (1984) 86782v.

- 233 LaRocca, P.J. and Rheinwald, J.G.: Coexpression of simple epithelial keratins and vimentin by human mesothelium and mesothelioma *in vivo* and in culture. *Cancer Res.*, 44 (1984) 2991-2999.
- 234 Montgomery, K. and Mak, A.S.: *In vitro* phosphorylation of tropomyosin by a kinase from chicken embryo. *J. Biol. Chem.*, 259 (1984) 5555-5560.
- 235 Otsuka, K., Yao, K.-L., Wasi, S., Tung, P.S., Aubin, J.E., Sodek, J. and Termine, J.D.: Biosynthesis of osteonectin by fetal porcine calvarial cells *in vitro*. *J. Biol. Chem.*, 259 (1984) 9805-9812.
- 236 Saidpet, C., Khandekar, P., Mendola, C. and Siddiqui, M.A.Q.: Tissue specificity of 3'-untranslated sequence of myosin light chain gene: unexpected interspecies homology with repetitive DNA. *Arch. Biochem. Biophys.*, 233 (1984) 565-572.
- 237 Seiler, S., Wegener, A.D., Whang, D.D., Hathaway, D.R. and Jones, L.R.: High molecular weight proteins in cardiac and skeletal muscle junctional sarcoplasmic reticulum vesicles bind calmodulin, are phosphorylated, and are degraded by  $\text{Ca}^{2+}$ -activated protease. *J. Biol. Chem.*, 259 (1984) 8550-8557.
- 238 Trüb, B. and Bornstein, P.: Characterization of the precursor form of type VI collagen. *J. Biol. Chem.*, 259 (1984) 8597-8604.

See also 172, 184.

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

- 239 Gurley, L.R., D'Anna, J.A., Blumenfeld, M., Valdez, J.G., Sebring, R.J., Donahue, P.R., Prentice, D.A. and Spall, W.D.: Preparation of histone variants and high-mobility group proteins by reversed-phase high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 147-165.
- 240 Javaherian, K. and Fasman, G.D.: Nick translation of HeLa cell nuclei as a probe for locating DNase I-sensitive nucleosomes. *J. Biol. Chem.*, 259 (1984) 3343-3349.
- 241 Jones, Ch.A., Hesse, L., Muzik, H. and Jerry, L.M.: Phenol-soluble nonhistone chromatin proteins in chronic lymphocytic leukemia. *Cancer Res.*, 44 (1984) 2068-2077.
- 242 Karpenchuk, K.G. and Vashakidze, R.P.: (Analysis of the chemical acetylation of histones in nucleosomes using high resolution gel electrophoresis). *Mol. Biol.*, 36 (1984) 24-27; *C.A.*, 101 (1984) 146328p.
- 243 Lennox, R.W.: Differences in evolutionary stability among mammalian H1 subtypes. Implications for the roles of H1 subtypes in chromatin. *J. Biol. Chem.*, 259 (1984) 669-672.
- 244 Schmidt, W.N., McGehee, R.H., Shimada, T., Williams, G.M. and Knilica, L.S.: Antigenic similarity of nonhistone chromosomal proteins in cultured rat liver epithelial cells, fetal liver, and transplantable tumors. *Cancer Res.*, 44 (1984) 2163-2169.
- 245 Trostle-Weige, P.K., Meistrich, M.L., Brock, W.A. and Nishioka, K.: Isolation and characterization of TH3, a germ cell-specific variant of histone 3 in rat testis. *J. Biol. Chem.*, 259 (1984) 8769-8776.
- 246 Zwierzina, H., Loidl, A., Fuith, L.C., Helliger, W., Puschendorf, B. and Grunicke, H.: Depression of histone acetylation by alkylating antitumor agents in murine cells. *Cancer Res.*, 44 (1984) 3335-3339.

See also 19.

#### 19g. Chromoproteins and metalloproteins

- 247 Abramowicz, D.A. and Dismukes, G.-C.: Manganese proteins isolated from spinach thylakoid membranes and their role in  $\text{O}_2$  evolution. I. A 56 kilodalton manganese-containing protein, a probable component of the coupling factor enzyme. *Biochim. Biophys. Acta*, 765 (1984) 309-317.
- 248 Abrosio, P., Levi, S., Gabri, E., Stefanini, S., Finazzi-Agro, A. and Chiancone, E.: Properties of ferritin from the earthworm *Octolasmium complanatum*. *Biochim. Biophys. Acta*, 787 (1984) 264-269.
- 249 Bansal, S.K., Love, J.H. and Gurtoo, H.L.: Resolution of multiple forms of cytochrome P-450 by high-performance liquid chromatography. *J. Chromatogr.*, 297 (1984) 119-127.

- 250 Black, J.: Isoelectric focusing in agarose gel for detection and identification of hemoglobin variants. *Hemoglobin*, 8 (1984) 117-127; *C.A.*, 101 (1984) 147164u.
- 251 Cazenave, J., Brunet, J. and Michon, D.: (Determination of glycosylated hemoglobin by agar gel electrophoresis). *Feuill. Biol.*, 25 (1984) 45-50; *C.A.*, 101 (1984) 51143k.
- 252 Duong, L.T., Fleming, P.J. and Russell, J.T.: An identical cytochrome b<sub>561</sub> is present in bovine adrenal chromaffin vesicles and posterior pituitary neurosecretory vesicles. *J. Biol. Chem.*, 259 (1984) 4885-4889.
- 253 Garver, F.A., Singh, H., Moscoco, H., McGuire, B.S. and Kestler, D.P.: Immunochemical identification of normal and variant hemoglobins after electrophoretic separation and transfer to nitrocellulose membranes. *Hemoglobin*, 8 (1984) 105-115; *C.A.*, 101 (1984) 106880f.
- 254 Hsia, J.C., Hayes, T.M. and Er, S.S.: Separation of glyoxylated hemoglobin with varying oxygen affinity by polyanion fast protein liquid chromatography. *J. Chromatogr.*, 303 (1984) 425-428.
- 255 Lian, S. and Chen, W.: (Isolation of leghemoglobin by polyacrylamide gel electrophoresis). *Zhiwu Shenglixue Tongxun*, (1983) 56-58; *C.A.*, 101 (1984) 3422d.
- 256 Luo, Z. and Liang, J.: (Determination of glycosylated hemoglobin A<sub>1</sub> by agar gel electrophoresis). *Sichuan Yixueyuan Xuebao*, 15 (1984) 176-183; *C.A.*, 101 (1984) 86783w.
- 257 Magliozzo, R.S., Park, C.M. and Peisach, J.: Direct spectrophotometric analysis of hemoglobin in isoelectric focusing tube gels. *Anal. Biochem.*, 140 (1984) 276-283.
- 258 Miller, D.J. and Nicholas, D.J.D.: 3,3',5,5'-Tetramethylbenzidine/H<sub>2</sub>O staining is not specific for heme proteins separated by gel electrophoresis. *Anal. Biochem.*, 140 (1984) 577-580.
- 259 Ohniwa, Y., Miyaji, R. and Fujisawa, Y.: (Abnormal hemoglobin. 3. Electrophoresis). *Kensa To Gijutsu*, 12 (1984) 326-330; *C.A.*, 101 (1984) 50928n.
- 260 Pan, B.T. and Jonstone, R.: Selective externalization of the transferrin receptor by sheep reticulocytes *in vitro*. Response to ligands and inhibitors of endocytosis. *J. Biol. Chem.*, 259 (1984) 9776-9782.
- 261 Polidori, G., Mainwaring, M., Kosinski, T., Schwarz, C., Fingal, R. and Vinogradov, S.N.: The dissociation of the extracellular haemoglobin of *Tubifex tubifex* at extremes of pH and its reassociation upon return to neutrality. *Arch. Biochem. Biophys.*, 233 (1984) 800-814.
- 262 Randhawa, Z.I., Jones, R.T. and Lie-Injo, L.E.: Human hemoglobin Portland II ( $\zeta_2\beta_2$ ). Isolation and characterization of Portland hemoglobin components and their constituent globin chains. *J. Biol. Chem.*, 259 (1984) 7325-7330.
- 263 Ryan, D.E., Iida, S., Wood, A.W., Thomas, P.E., Lieber, Ch.S. and Levin, W.: Characterization of three highly purified cytochromes P-450 from hepatic microsomes of adult male rats. *J. Biol. Chem.*, 259 (1984) 1239-1250.
- 264 Widger, W.R., Cramer, W.A., Hermodson, M., Meyer, D. and Gullifor, M.: Purification and partial amino acid sequence of the chloroplast cytochrome b-559. *J. Biol. Chem.*, 259 (1984) 3870-3876.

*19h. Proteins of glands, gland products and various zymogens (including milk proteins)*

- 265 Aggarwal, B.B., Moffat, B. and Harkins, R.N.: Human lymphotoxin. Production by a lymphoblastoid cell line, purification, and initial characterization. *J. Biol. Chem.*, 259 (1984) 686-691.
- 266 Anderson, K.P., Martin, A.D. and Heath, E.C.: Rat major acute phase protein: biosynthesis and characterization of a cDNA clone. *Arch. Biochem. Biophys.*, 233 (1984) 624-635.
- 267 Bucci, L.R., Brock, W.A., Goldknopf, I.L. and Meistrich, M.L.: Characterization of high mobility group protein levels during spermatogenesis in the rat. *J. Biol. Chem.*, 259 (1984) 8840-8846.
- 268 Dalay, N., Özkanak, E., Kirdar, B., Carin, M. and Bermek, E.: Isolation of protein μH<sub>2</sub>A using a one step preparative gel electrophoresis. *Prepar. Biochem.*, 14 (1984) 181-192.
- 269 De Palo, E., Ceriotti, F., De Palo, C., Federspil, G. and Scandellari, C.: Pituitary protein lipolytic factor(s); Partial purification by isoelectric focusing (IEF). *J. Protein Chem.*, 2 (1983) 455-468; *C.A.*, 101 (1984) 104267n.
- 270 Dubé, J.Y., Chappelaine, P., Tremblay, R.R., Thabet, M. and Roy, R.: Synthesis acid phosphatase and other proteins by human prostatic tissue *in vitro*. *Can. J. Biochem.*, 62 (1984) 555-558.

- 271 Egen, N.B. and Russell, F.E.: Effects of preparatory procedures on the venom from a rattlesnake (*Crotalus molossus molossus*), as determined by isoelectric focusing. *Toxicon*, 22 (1984) 653-657; *C.A.*, 101 (1984) 124540z.
- 272 Marshall, T.: Analysis of human sweat proteins by two-dimensional electrophoresis and ultrasensitive silver staining. *Anal. Biochem.*, 139 (1984) 506-509.
- 273 Marshall, T.: Silver staining of human salivary proteins following two-dimensional electrophoresis using either protein denaturing or non-denaturing conditions. *Electrophoresis (Weinheim)*, 5 (1984) 245-250.
- 274 Palumbo, G. and Tecce, M.F.: Molecular organization of 19S calf thyroglobulin. *Arch. Biochem. Biophys.*, 233 (1984) 169-173.
- 275 Shimazaki, K. and Sukegawa, K.: (Analysis of bovine caseins and whey proteins in skim milk by two-dimensional electrophoresis). *Rakuno Kagaku, Shokuhin No Kenkyu*, 33 (1984) A19-A25; *C.A.*, 101 (1984) 5707z.
- 276 Wolfschoon, P. and Alan, F.: (Cellogel electrophoresis of milk proteins). *Alimentacao*, 69 (1983) 10-12; *C.A.*, 101 (1984) 69045t.

*19i. Proteins of neoplastic tissue*

- 277 Brabon, A.C., Williams, J.F. and Cardiff, R.D.: A monoclonal antibody to a human breast tumor protein released in response to estrogen. *Cancer Res.*, 44 (1984) 2704-2710.
- 278 Hiasa, Y., Lin, J.-Ch., Konishi, N., Kitahori, Y., Enoki, N. and Shimoyama, T.: Histopathological and biochemical analyses of transplantable renal adenocarcinoma in rats induced by N-ethyl-N-hydroxyethylnitrosamine. *Cancer Res.*, 44 (1984) 1664-1670.
- 279 Jellum, E., Thorsrud, A.K., Vatn, M.H., Grimstad, I.A., Brennhovd, I., Tveit, K.M. and Pihl, A.: Detection of cancer-related proteins by two-dimensional electrophoresis. *Ann. N.Y. Acad. Sci.*, 428 (Technol. Impact) (1984) 173-186; *C.A.*, 101 (1984) 106837x.
- 280 Nakaya, K. and Nakamura, Y.: Changes in histone H1 phosphorylation during differentiation of mouse myeloid leukemia cells. *Chem. Pharm. Bull.*, 32 (1984) 2364-2370.
- 281 Vignon, F., Lippman, M.E., Nawata, H., Derocq, D., and Rochefort, H.: Induction of two estrogen-responsive proteins by antiestrogens in R<sub>27</sub>, a tamoxifen-resistant clone of MCF<sub>7</sub> cells. *Cancer Res.*, 44 (1984) 2084-2088.

See also 143, 146, 176, 297, 350.

*19j. Specific binding proteins*

- 282 Andy, R.J. and Kornfeld, R.: Biosynthesis of the adenosine deaminase-binding protein in human fibroblasts and hepatoma cells. *J. Biol. Chem.*, 259 (1984) 9832-9839.
- 283 Bernard, B.A., Akiyama, S.K., Newton, S.A., Yamada, K.M. and Olden, K.: Structural and functional comparisons of chicken and human cellular fibronectins. *J. Biol. Chem.*, 259 (1984) 9899-9905.
- 284 Bishop, Ch.W., Kendrick, N.C. and DeLuca, H.F.: The early time course of calcium-binding protein induction by 1,25-dihydroxyvitamin D<sub>3</sub> as determined by computer analysis of two-dimensional electrophoresis gels. *J. Biol. Chem.*, 259 (1984) 3355-3360.
- 285 Bonifacino, J.S. and Dufau, M.L.: Structure of the ovarian lactogen receptors. Analysis with bifunctional cross-linking reagents. *J. Biol. Chem.*, 259 (1984) 4542-4549.
- 286 Butley, M.S., Beer, D.G. and Malkinson, A.M.: Functional changes in the regulatory subunit of the type II cyclic adenosine 3':5'-monophosphate-dependent protein kinase isozyme during normal and neoplastic lung development. *Cancer Res.*, 44 (1984) 2689-2697.
- 287 Elliott, C. and Goren, H.J.: Adipocyte insulin-binding species: the 40 Å Stoke's radius protein. *Can. J. Biochem.*, 62 (1984) 566-570.
- 288 Flanagan, S.D. and Yost, B.: Calmodulin-binding proteins: visualization by <sup>125</sup>I-calmodulin overlay on blots quenched with Tween 20 or bovine serum albumin and poly(ethylene oxide). *Anal. Biochem.*, 140 (1984) 510-519.
- 289 Fujita-Yamaguchi, Y.: Characterization of purified insulin receptor subunits. *J. Biol. Chem.*, 259 (1984) 1206-1211.

- 290 Glasgow, J.E. and Colman, R.W.: Fibronectin synthesized by a human hepatoma cell line. *Cancer Res.*, 44 (1984) 3022-3028.
- 291 Hergenhahn, H.-G., Kegel, G. and Sedlmeier, D.:  $\text{Ca}^{2+}$ -binding proteins in crayfish abdominal muscle. Evidence for a calmodulin lacking trimethyllysine. *Biochim. Biophys. Acta*, 787 (1984) 196-203.
- 292 Herrmann, G., Thiel, A. and Böger, P.: Herbicide-binding protein, binding sites and electron-transport activity: quantitative relations. *Z. Naturforsch.*, 39C (1984) 430-433.
- 293 Horuk, R., Beckner, S., Lin, M., Wright, D.E. and Chrambach, A.: Purification of the photoaffinity-labeled glucagon receptor by gel electrophoretic methods. *Prepar. Biochem.*, 14 (1984) 99-121.
- 294 Hutchins, B.L.M. and Frazier, W.A.: Purification and characterization of a membrane-associated cAMP binding protein from developing *Dictyostelium discoideum*. *J. Biol. Chem.*, 259 (1984) 4379-4388.
- 295 Hwang, J. and Menon, K.M.J.: Characterization of the subunit structure of gonadotropin receptor in luteinized rat ovary. *J. Biol. Chem.*, 259 (1984) 1978-1985.
- 296 Iyengar, R. and Herberg, J.T.: Structural analysis of the hepatic glucagon receptor. Identification of a guanine nucleotide-sensitive hormone-binding region. *J. Biol. Chem.*, 259 (1984) 5222-5229.
- 297 Kapoor, Ch.L., Grantham, F. and Cho-Chung, Y.S.: Nucleolar accumulation of cyclic adenosine 3':5'-monophosphate receptor proteins during regression of MCF-7 human breast tumor. *Cancer Res.*, 44 (1984) 3554-3560.
- 298 Lee, J.C. and Traut, R.R.: Proximity of 5.8 S RNA-binding proteins and A-site proteins in yeast ribosomes inferred from cross-linking. *J. Biol. Chem.*, 259 (1984) 9971-9974.
- 299 Lizan, J. and Olsson, I.: High resolution isoelectric focusing in a narrow pH interval for the vitamin D-binding protein (Gc-globulin). *J. Clin. Chem. Clin. Biochem.*, 22 (1984) 545-549.
- 300 Rickers, J., Tober, I. and Spener, F.: Purification and binding characteristics of a basic fatty acid binding protein from *Avena sativa* seedlings. *Biochim. Biophys. Acta*, 794 (1984) 313-319.
- 301 Rochette-Egly, C. and Stussi-Garaud, Ch.: Selective detection of calmodulin in polyacrylamide gels by double staining with Coomassie Blue and silver. *Electrophoresis (Weinheim)*, 5 (1984) 285-288.
- 302 Ronnett, G.V., Knutson, V.P., Kohanski, R.A., Simpson, T.L. and Lane, M.D.: Role of glycosylation in the processing of newly translated insulin proreceptor in 3T3-L1 adipocytes. *J. Biol. Chem.*, 259 (1984) 4566-4575.
- 303 Stiles, G.L., Benovic, J.L., Caron, M.G. and Lefkowitz, R.J.: Mammalian  $\beta$ -adrenergic receptors. Distinct glycoprotein populations containing high mannose or complex type carbohydrate chains. *J. Biol. Chem.*, 259 (1984) 8655-8663.
- 304 Thibault, C., Chan, J.K., Perdue, J.F. and Daughaday, W.H.: Insulin-like growth factor II receptors. Molecular radius and molecular weight determination using quantitative polyacrylamide gel electrophoresis. *J. Biol. Chem.*, 259 (1984) 3361-3367.
- 305 Wrangle, O., Humla, S., Ramberg, I., Nordenskjöld, B. and Gustafsson, J.A.: Estrogen and progestin receptor analysis in human breast cancer by isoelectric focusing in slabs of polyacrylamide gel. *Recent Results Cancer Res.*, 91 (Clin. Interest Steroid Horm. Recept. Breast Cancer) (1984) 32-40; *C.A.*, 101 (1984) 68790s.
- 306 Wrangle, Ö., Okret, S., Radojcic, M., Carlstedt-Duke, J. and Gustafsson, J.-Å.: Characterization of the purified activated glucocorticoid receptor from rat liver cytosol. *J. Biol. Chem.*, 259 (1984) 4534-4541.

See also 77, 138, 139, 147, 235.

#### 19k. Urinary proteins

See 174.

## 191. Other proteins

- 307 Gunzer, G. and Hennrich, N.: Purification of  $\alpha_1$ -proteinase inhibitor by triazine dye affinity chromatography, ion-exchange chromatography and gel filtration on Fractogel TSK. *J. Chromatogr.*, 296 (1984) 221-229.
- 308 Harrington, M.G., Merril, C.R., Goldman, D., Xu, X.H. and McFarlin, D.E.: Two-dimensional electrophoresis of cerebrospinal fluid proteins in multiple sclerosis and various neurological diseases. *Electrophoresis (Weinheim)*, 5 (1984) 236-245.
- 309 Herrmann, H., Pytela, R., Dalton, J.M. and Wiche, G.: Structural homology of microtubular-associated proteins 1 and 2 demonstrated by peptide mapping and immunoreactivity. *J. Biol. Chem.*, 259 (1984) 612-617.
- 310 Heydorn, W.E., Creed, G.J. and Jacobowitz, D.M.: Effect of desmethylimipramine and reserpine on the concentration of specific proteins in the parietal cortex and the hippocampus of rats as analyzed by two-dimensional gel electrophoresis. *J. Pharmacol. Exp. Ther.*, 229 (1984) 622-628.
- 311 Husseini, H.S. and Balzer, H.O.: Use of TSK-SW columns for the high-performance liquid chromatographic analysis of proteins, isolated from sympathetic nerves and fractionated by fractogel TSK-HW chromatography. Purification of L-DOPA decarboxylase. *J. Chromatogr.*, 297 (1984) 375-383.
- 312 Kawaoya, J.K., Keim, P.S., Ryan, R.O., Shapiro, J.P., Samaraweera, P. and Law, J.H.: Insect apolipoporphin III. Purification and properties. *J. Biol. Chem.*, 259 (1984) 10733-10737.
- 313 Lubahn, D.B. and Silverman, L.M.: A rapid silver-stain procedure for use with routine electrophoresis of cerebrospinal fluid on agarose gels. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1689-1691.
- 314 Ramaekers, F.C.S., Hukkelhoven, M.W.A.C., Groeneveld, A. and Bloemendaal, H.: Changing protein patterns during lens cell aging *in vitro*. *Biochim. Biophys. Acta*, 799 (1984) 221-229.
- 315 Weidinger, S. and Cleve, H.: High resolution of alpha-1-antitrypsin PIM subtypes by isoelectric focusing with a modified immobilized pH gradient. *Electrophoresis (Weinheim)*, 5 (1984) 223-226.
- 316 Wong, J., Hutchison, S.B. and Liem, R.K.H.: An isoelectric variant of the 150,000-dalton neurofilament polypeptide. Evidence that phosphorylation state affects its association with the filament. *J. Biol. Chem.*, 259 (1984) 10867-10874.

See also 23, 331.

## 20. ENZYMES

## 20a. Oxidoreductases

- 317 Dommes, V. and Kunau, W.-H.: Purification and properties of acyl coenzyme A dehydrogenases from bovine liver. Formation of 2-trans,4-cis-decadienoyl coenzyme A. *J. Biol. Chem.*, 259 (1984) 1789-1797.
- 318 Ehmke, A., Scheid, H.W. and Hartmann, T.: Glutamate dehydrogenase of *Pisum sativum*: Heat-dependent interconversion of the multiple forms. *Z. Naturforsch.*, 39C (1984) 257-260.
- 319 Goodman, J.M., Scott, C.W., Donahue, P.N. and Atherton, J.P.: Alcohol oxidase assembles post-translationally into the peroxisome of *Candida boidinii*. *J. Biol. Chem.*, 259 (1984) 8485-8493.
- 320 Kato, S., Ishii, H., Kano, S., Horii, K. and Tsuchiya, M.: Evidence that "lactate dehydrogenase isoenzyme 6" is in fact alcohol dehydrogenase. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1585-1586.
- 321 Onorato, V.A., Manly, K.F. and Vladitiu, A.O.: Association of an oxygen-sensitive lactate dehydrogenase isoenzyme, LD<sub>K</sub>, with LD-6 in serum of critically ill patients. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1603-1606.
- 322 Sawada, H., Hara, A., Hayashibara, M., Nakayama, T. and Usui, S.: Immunological identification of soluble carbonyl reductase with testosterone 17 $\beta$ -dehydrogenase (NADP<sup>+</sup>) in guinea pig liver and kidney. *Biochim. Biophys. Acta*, 799 (1984) 322-325.
- 323 Smalley, D.L., Womack, B., Handorf, C. and Acchiardo, S.: Aberrant creatine kinase and lactate dehydrogenase response in a myocardial infarct patient. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1708-1709.

- 324 Smith, S.C., Kemp, B.E., McAdam, W.J., Mercer, J.P.B. and Cotton, R.G.H.: Two apparent molecular weight forms of human and monkey phenylalanine hydroxylase are due to phosphorylation. *J. Biol. Chem.*, 259 (1984) 11284-11289.  
 325 Yamamoto, H. and Brumbaugh, J.A.: Purification and isoelectric heterogeneity of chicken tyrosinase. *Biochim. Biophys. Acta*, 800 (1984) 282-290.

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

- 326 Artur, Y., Wellman-Bednawska, M., Jacquier, A. and Siest, G.: Complexes of serum gamma-glutamyltransferase with apolipoproteins and immunoglobulin A. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 631-633.  
 327 Barouki, R., Finidori, J., Chobert, M.-N., Aggerbeck, M., Laperche, Y. and Hanoune, J.: Biosynthesis and processing of  $\gamma$ -glutamyl transpeptidase in hepatoma tissue culture cells. *J. Biol. Chem.*, 259 (1984) 7970-7974.  
 328 Hersh, L.B., Wainer, B.H. and Andrews, L.P.: Multiple isoelectric and molecular weight variants of choline acetyltransferase. Artifact or real? *J. Biol. Chem.*, 259 (1984) 1253-1258.  
 329 Kitahara, A., Satoh, K., Nishimura, K., Ishikawa, T., Ruike, K., Sato, K., Tsuda, H. and Ito, N.: Changes in molecular forms of rat hepatic glutathione S-transferase during chemical hepatocarcinogenesis. *Cancer Res.*, 44 (1984) 2698-2703.  
 330 Ram, B.P. and Munjal, D.D.: Isolation and characterization of cancer-associated galactosyltransferase isoenzyme. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1656-1663.  
 331 Spearman, M.E. and Leibman, K.C.: Aging selectively alters glutathione S-transferase isozyme concentrations in liver and lung cytosol. *Drug Metab. Disp.*, 12 (1984) 661-671.

See also 385, 397.

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

- 332 Biswas, S.B. and Kornberg, A.: Nucleoside triphosphate binding to DNA polymerase III holoenzyme of *Escherichia coli*. A direct photoaffinity labeling study. *J. Biol. Chem.*, 259 (1984) 7990-7993.  
 333 Dahmus, G.K., Glover, C.V.C., Brutlag, D.L. and Dahmus, M.E.: Similarities in structure and function of calf thymus and *Drosophila* casein kinase II. *J. Biol. Chem.*, 259 (1984) 9001-9006.  
 334 Fenton, J.J., Brunstetter, S., Gordon, W.C., Rippe, D.F. and Bell, M.L.: Diagnostic efficacy of a new enzyme immunoassay for creatine kinase MB isoenzyme. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1399-1401.  
 335 George, S., Ishikawa, Y., Perryman, M.B. and Roberts, R.: Purification and characterization of naturally occurring and *in vitro* induced multiple forms of MM creatine kinase. *J. Biol. Chem.*, 259 (1984) 2667-2674.  
 336 Guilfoyle, T.J., Hagen, G. and Malcolm, S.: Size heterogeneity of the largest subunit of nuclear RNA polymerase II. An immunological analysis. *J. Biol. Chem.*, 259 (1984) 649-653.  
 337 Mitsui, K., Ohnishi, R., Hirose, S. and Igarashi, K.: Necessity of polyamines for maximum *in vivo* synthesis of  $\beta, \beta'$  subunits of RNA polymerase. *Biochem. Biophys. Res. Commun.*, 123 (1984) 528-534.  
 338 Nishikawa, M., de Lanerolle, P., Lincoln, T.M. and Adelstein, R.S.: Phosphorylation of mammalian myosin light chain kinases by the catalytic subunit of cyclic AMP-dependent protein kinase and by cyclic GMP-dependent protein kinase. *J. Biol. Chem.*, 259 (1984) 8429-8436.  
 339 Perryman, M.B., Knell, J.D. and Roberts, R.: Carboxypeptidase-catalyzed hydrolysis of C-terminal lysine: Mechanism for *in vivo* production of multiple forms of creatine kinase in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 662-664.  
 340 Robinson-Steiner, A.M., Beebe, S.J., Rannels, S.R. and Corbin, J.D.: Microheterogeneity of type II cAMP-dependent protein kinase in various mammalian species and tissues. *J. Biol. Chem.*, 259 (1984) 10596-10605.  
 341 Scovassi, A.I., Stefanini, M. and Bertazzoni, U.: Catalytic activities of human poly(ADP-ribose) polymerase from normal and mutagenized cells detected after sodium dodecyl sulfate-polyacrylamide gel electrophoresis. *J. Biol. Chem.*, 259 (1984) 10973-10977.

- 342 Stambolian, D., Scarpino-Myers, V. and Harris, H.: Isoelectric-focusing of galactokinase in lens and other tissues. *Exp. Eye Res.*, 38 (1984) 231-237; *C.A.*, 101 (1984) 52281r.
- 343 Sutton, J.G. and Westwood, S.A.: Separation of the primary isoenzyme bands ( $\alpha_1$ ,  $\beta_1$ ) determined by the phosphoglucomutase (PGM<sub>1</sub>) locus on an immobilized pH gradient. *Electrophoresis (Weinheim)*, 5 (1984) 252-253.

See also 323.

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

- 344 Alpers, D.H., Goodwin, C.L. and Young, G.P.: Quantitation of human intestinal and liver/bone alkaline phosphatase in serum by rocket electroimmunoassay. *Anal. Biochem.*, 140 (1984) 129-137.
- 345 Bär, W., Häni, M. and Biedermann, V.: Esterase D: Simultaneous electrophoretic determination of the three common allozymes (ESD 1, 2, 5). *Electrophoresis (Weinheim)*, 5 (1984) 280-281.
- 346 Barbaric, S., Kozulic, B., Ries, B. and Mildner, P.: Physicochemical and kinetic properties of acid phosphatase from *Saccharomyces cerevisiae*. *J. Biol. Chem.*, 259 (1984) 878-883.
- 347 Budowle, B.: Rapid electrofocusing of erythrocyte acid phosphatase. *Electrophoresis (Weinheim)*, 5 (1984) 254-255.
- 348 Budowle, B.: Typing of esterase D by isoelectric focusing. *Electrophoresis (Weinheim)*, 5 (1984) 314-316.
- 349 Duncan, P.H., Van Etten, R.L., MacNeil, M.L. and Shaw, L.M.: Development of a stable reference material for prostatic acid phosphatase. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1327-1331.
- 350 Ho, F., Sartwell, A.D. and Chow, J.Y.: 5-Bromo-2'-deoxyuridine induces placental alkaline phosphatase biosynthesis in cultured choriocarcinoma cells. *Arch. Biochem. Biophys.*, 233 (1984) 830-837.
- 351 Kincaid, R.L., Manganiello, V.C., Ody, Ch.E., Osborne, J.C., Jr., Stith-Coleman, I.E., Danello, M.A. and Vaughan, M.: Purification and properties of calmodulin-stimulated phosphodiesterase from mammalian brain. *J. Biol. Chem.*, 259 (1984) 5158-5166.
- 352 Masson, P., Marnot, B., Lombard, J.Y. and Morelis, P.: (Electrophoretic study of aged soman-inhibited butyryl cholinesterase). *Biochimie*, 66 (1984) 235-249; *C.A.*, 101 (1984) 124288y.
- 353 Peat, D., Brock, D.J.H.: Quantitative estimation of the density ratios of cholinesterase bands in human amniotic fluid. *Clin. Chim. Acta*, 138 (1984) 319-324.
- 354 Rosalki, S.B. and Foo, A.Y.: Two new methods for separating and quantifying bone and liver alkaline phosphatase isoenzymes in plasma. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 1182-1186.
- 355 Sharma, R.K., Adachi, A.-M., Adachi, K. and Wang, J.H.: Demonstration of bovine brain calmodulin-dependent cyclic nucleotide phosphodiesterase isozymes by monoclonal antibodies. *J. Biol. Chem.*, 259 (1984) 9248-9254.
- 356 Shriner, C.L. and Brautigan, D.L.: Cytosolic protein phosphotyrosine phosphatases from rabbit kidney. Purification of two distinct enzymes that bind to Zn<sup>2+</sup>-imino-diacetate agarose. *J. Biol. Chem.*, 259 (1984) 11383-11390.
- 357 Toyoda, Y. and Sy, J.: Purification and phosphorylation of fructose-1,6-bisphosphatase from *Kluyveromyces fragilis*. *J. Biol. Chem.*, 259 (1984) 8718-8723.

See also 269, 385.

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

- 358 Bartley, T.D., Murphy-Holland, K. and Eveleigh, D.E.: A method for the detection and differentiation of cellulose components in polyacrylamide gels. *Anal. Biochem.*, 140 (1984) 157-161.
- 359 Berheau, Y., Madgidi-Hervan, E., Kotoujansky A., Nguyen-The, C., Andro, T. and Coleno, A.: Detection of depolymerase isoenzymes after electrophoresis or electrofocusing, or in titration curves. *Anal. Biochem.*, 139 (1984) 383-389.
- 360 Bianchi, M.A., Aglietti, A. and Bandinelli, R.: (Electrophoretic separation of amylase isoenzymes and its application). *Clin. Lab.*, 8 (1984) 175-180; *C.A.*, 101 (1984) 86173x.

- 361 d'Azzo, A., Proia, R.L., Kolodny, E.H., Kaback, M.M. and Neufeld, E.F.: Faulty association of  $\alpha$ - and  $\beta$ -subunits in some forms of  $\beta$ -hexosaminidase A deficiency. *J. Biol. Chem.*, 259 (1984) 11070-11074.
- 362 Bravowski, G.A. and Dagan, A.: Human lysosomal  $\beta$ -glucuronidase: purification by affinity chromatography. *Anal. Biochem.*, 141 (1984) 267-279.
- 363 Gupta, D.K., Schmidt, A., von Figura, K. and Hasilik, A.: Processing and transport of lysosomal enzymes in human monocyte line U937. *Hoppe Seyler's Z. Physiol. Chem.*, 365 (1984) 867-876.
- 364 Luciani, J.A. and Dubois de Trecco, M.E.: (Amylase activity during germination of wheat seeds. Electrophoretic study). *Turrialba*, 34 (1984) 108-111; C.A., 101 (1984) 127051b.
- 365 Schuchman, E.H., Guzman, N.A. and Desnick, R.J.: Human  $\alpha$ -L-iduronidase. I. Purification and properties of the high uptake (higher molecular weight) and the low uptake (processed) forms. *J. Biol. Chem.*, 259 (1984) 3132-3140.
- 366 Spaltro, J. and Alhadeff, J.A.: Solubilization, stabilization and isoelectric focusing of human liver neuraminidase activity. *Biochim. Biophys. Acta*, 800 (1984) 159-165.
- 367 Tamm, V.: (Isoelectric focusing of mannanase preparations from *Nocardia erythropolis* strain 19). *Mol. Biol.*, 36 (1984) 79:81; C.A., 101 (1984) 146557n.

20f. Other hydrolases

- 368 Croall, D.E. and DeMartino, G.N.: Comparison of two calcium-dependent proteinases from bovine heart. *Biochim. Biophys. Acta*, 788 (1984) 348-355.
- 369 Gardi, C. and Lungarella, G.: Detection of elastase activity with a zymogram method after isoelectric focusing in polyacrylamide gel. *Anal. Biochem.*, 140 (1984) 472-477.
- 370 Hasegawa, R.: (Comparative studies of various preparations of urokinase on isoelectric focusing). *Eisei Shinkensho Hokoku*, (1983) 156-159; C.A., 101 (1984) 2808x.
- 371 Merichi, S., Sako, E., Hasegawa, E., Suyama, T. and Moriya, H.: Large-scale purification and characterization of human urinary kallikrein. *Chem. Pharm. Bull.*, 32 (1984) 1152-1162.
- 372 Myerowitz, R., Robbins, A.R., Proia, R.L., Sahagian, G.G., Puchalski, C.M. and Neufeld, E.F.: Studies of lysosomal enzyme biosynthesis in cultured cells. *Methods Enzymol.*, 96 (Biomembranes, Pt. J) (1983) 729-736; C.A., 101 (1984) 3005v.
- 373 Peo, M., Bergstrom, A.R., Wu, J.K., Bennett, C.D., Rodkey, J.A. and Hoogsteen, K.: Mouse submaxillary gland renin. Purification and properties of minor forms, which include several differently processed forms of the major gene product and a second gene product. *J. Biol. Chem.*, 259 (1984) 8358-8362.
- 374 Sinha, P. and Gossrau, R.: Investigation of proteases with chromogenic substrates after isoelectric focusing. *Histochemistry*, 81 (1984) 161-165; C.A., 101 (1984) 146526b.
- 375 Suzuki, J. and Kobayashi, S.: (Analysis of streptolysin O by cellulose acetate membrane isoelectric focusing). *Seibutsu Butsuri Kagaku*, 27 (1983) 349-354; C.A., 101 (1984) 49624z.
- 376 Washabaugh, M.W. and Collins, K.D.: Dihydroorotase from *Escherichia coli*. Purification and characterization. *J. Biol. Chem.*, 259 (1984) 3293-3298.
- 377 Zimmerman, U.-J.P. and Schlaepfer, W.W.: Multiple forms of Ca-activated protease from rat brain and muscle. *J. Biol. Chem.*, 259 (1984) 3210-3218.

See also 331, 385.

20g. Lyases

- 378 Barnett, G.R. and Kazarinoff, M.N.: Purification and properties of ornithine decarboxylase from *Physarum polycephalum*. *J. Biol. Chem.*, 259 (1984) 179-183.
- 379 Feldstein, J.B. and Silverman, D.N.: Purification and characterization of carbonic anhydrase from the saliva of the rat. *J. Biol. Chem.*, 259 (1984) 5447-5453.

- 380 Wevers, R.A., Boegheim, J.P.J., Hommes, O.R., van Landeghem, A.A.J., Mul-Steinbusch, M.W.F.J., van der Stappen, J.W.J. and Soons, J.B.J.: A study on post-synthetic modification in alfa-alfa enolase (E.C. 4.2.1.11) brought by a human serum protein. *Clin. Chim. Acta*, 139 (1984) 127-135.

See also 359.

*20h. Isomerases*

- 381 Ramaswamy, S.G.: Hydroxyproline 2-epimerase of *Pseudomonas*. Subunit structure and active site studies. *J. Biol. Chem.*, 259 (1984) 249-254.
- 382 Schellenberg, G.D., Sarthy, A., Larson, A.E., Backer, M.P., Crabb, J.W., Lidstrom, M., Hall, B.D. and Furlong, C.E.: Xylose isomerase from *Escherichia coli*. Characterization of the protein and the structural gene. *J. Biol. Chem.*, 259 (1984) 6826-6832.

*20i. Ligases*

- 383 Gerken, S.C. and Arfin, S.M.: Chinese hamster ovary cells resistant to borrelidin overproduce threonyl-tRNA synthetase. *J. Biol. Chem.*, 259 (1984) 9202-9206.
- 384 Seelig, G.F., Simonsen, R.P. and Meister, A.: Reversible dissociation of  $\gamma$ -glutamylcysteine synthetase into two subunits. *J. Biol. Chem.*, 259 (1984) 9345-9347.

*20j. Complex mixtures and incompletely identified enzymes*

- 385 Jung, K. and Wischke, U.W.: Electrophoretic variants of alanine aminopeptidase, alkaline phosphatase, and  $\gamma$ -glutamyltransferase in urine. *Clin. Chem. (Winston-Salem, N.C.)*, 30 (1984) 856-859.
- 386 Miura, S., Mori, M., Takiguchi, M., Tatibana, M., Furuta, S., Miyazawa, S. and Hashimoto, T.: Biosynthesis and intracellular transport of enzymes of peroxisomal  $\beta$ -oxidation. *J. Biol. Chem.*, 259 (1984) 6397-6402.
- 387 Pupkevich-Diamant, Ya.S. and Sholokhov, V.V.: (Comprehensive study of blood enzymes and isozymes by disc electrophoresis in polyacrylamide gel). *Lab. Delo*, (1984) 232-237; *C.A.*, 101 (1984) 50510u.

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

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

- 388 Cheng, Z., Lo, J., Gai, X., Xu, C. and Shen, T.: (Determination of the length of the 3'-terminal poly(A) of eukaryotic mRNA). *Xibao Shengwu Xue Zaishi*, 5 (1983) 19-21; *C.A.*, 101 (1984) 51223m.

*21b. Nucleic acids, RNA*

- 389 Berger, F.G., Szymanski, P., Read, E. and Watson, G.: Androgen-regulated ornithine decarboxylase mRNAs of mouse kidney. *J. Biol. Chem.*, 259 (1984) 7941-7946.
- 390 Dieckmann, C.L., Koerner, T.J. and Tzagoloff, A.: Assembly of the mitochondrial membrane system. CBP1, a yeast nuclear gene involved in 5' end processing of cytochrome b pre-mRNA. *J. Biol. Chem.*, 259 (1984) 4722-4731.
- 391 Espejo, R.T. and Puerto, F.: Shifts in the electrophoretic pattern on the RNA genome of rotaviruses under different electrophoretic conditions. *J. Virol. Methods*, 8 (1984) 293-299; *C.A.*, 101 (1984) 147169z.
- 392 Göringer, H.U., Bertram, S. and Wagner, R.: The effect of tRNA binding on the structure of 5 S RNA in *Escherichia coli*. A chemical modification study. *J. Biol. Chem.*, 259 (1984) 491-496.
- 393 Gupta, R.: *Halobacterium volcanii* tRNAs. Identification of 41 tRNAs covering all amino acids, and the sequences of 33 class I tRNAs. *J. Biol. Chem.*, 259 (1984) 9461-9471.

- 394 King, Ch.R. and Piatigorsky, J.: Alternative splicing of  $\alpha$ A-crystallin RNA. Structural and quantitative analyses of the mRNAs for the  $\alpha$ A<sub>2</sub>- and  $\alpha$ A<sup>ins</sup>-crystallin polypeptides. *J. Biol. Chem.*, 259 (1984) 1822-1826.
- 395 Lund, E. and Dahlberg, J.E.: True genes for human U1 small nuclear RNA. Copy number, polymorphism, and methylation. *J. Biol. Chem.*, 259 (1984) 2013-2021.
- 396 Medvedev, A.I., Korol, B.A., Shlektarev, V.A. and Umanskii, S.R.: (Densitometric determination of nucleic acids in gels after electrophoresis). *Prikl. Biokhim. Mikrobiol.*, 20 (1984) 420-427; *C.A.*, 101 (1984) 86822h.
- 397 Pickett, C.B., Telakowski, Hopkins, C.A., Ding, G.J.-F., Argenbright, L. and Lu, A.Y.H.: Rat liver glutathione S-transferases. Complete nucleotide sequence of a glutathione S-transferase mRNA and the regulation of the Y<sub>a</sub>, Y<sub>b</sub>, and Y<sub>c</sub> mRNAs by 3-methylcholanthrene and phenobarbital. *J. Biol. Chem.*, 259 (1984) 5182-5188.
- 398 Seilhamer, J.J., Olsen, G.J. and Cummings, D.J.: *Paramecium* mitochondrial genes. I. Small subunit rRNA gene sequence and microevolution. *J. Biol. Chem.*, 259 (1984) 5167-5172.
- 399 Seilhamer, J.J., Gutell, R.R. and Cummings, D.J.: *Paramecium* mitochondrial genes. II. Large subunit rRNA gene sequence and microevolution. *J. Biol. Chem.*, 259 (1984) 5173-5181.
- 400 Shelness, G.S. and Williams, D.L.: Apolipoprotein II messenger RNA. Transcriptional and splicing heterogeneity yields six 5'-untranslated leader sequences. *J. Biol. Chem.*, 259 (1984) 9929-9935.
- 401 Szeberenyi, J. and Apirion, D.: Synthesis and processing of 5 S rRNA from an *rrnB* minigene in a plasmid. *Biochim. Biophys. Acta*, 783 (1984) 15-25.

#### 21c. Nucleic acids, DNA

- 402 Boyd, D.A., Bobman, T.C., Gruenke, S.A. and Klassen, G.R.: Evolutionary stability of mitochondrial DNA organization in *Achlya*. *Can. J. Biochem.*, 62 (1984) 571-576.
- 403 Calvin, N.M. and Hanawalt, P.C.: Electrophoretic separation of furocoumarin: DNA photoadducts. *Photochem. Photobiol.*, 40 (1984) 161-170; *C.A.*, 101 (1984) 125953y.
- 404 Carle, G.F. and Olson, M.V.: Separation of chromosomal DNA molecules from yeast by orthogonal-field-alternation gel electrophoresis. *Nucleic Acids Res.*, 12 (1984) 5647-5664; *C.A.*, 101 (1984) 126211s.
- 405 Emerson, B.M. and Roeder, R.G.: DNA sequences and transcription factor interactions of active and inactive forms of mammalian 5 S RNA genes. *J. Biol. Chem.*, 259 (1984) 7926-7935.
- 406 Fedorov, S.N., Tatosyan, A.G., Smirnova, T.A., Kalinovskii, V.P., Knyazev, P.G. and Seits, I.F.: (Preparative electrophoresis isolation of nonintegrated forms of oncovirus proviral DNA). *Eksp. Onkol.*, 6 (1984) 39-41; *C.A.*, 101 (1984) 1732f.
- 407 Gianns, E.I., Choudary, P.V., Martin, B.M., Winfield, S., Stubblefield, B., Mayor, J., Markle-Lehman, D., Murray, G.J., Bowers, L.A. and Barranger, J.A.: Isolation of cDNA clones for human B-glucocerebrosidase using the  $\lambda$ gt11 expression system. *Biochem. Biophys. Res. Commun.*, 123 (1984) 574-580.
- 408 Naimski, P. and Defendi, V.: Structure of Simian Virus 40 DNA in primary and derived mouse tumors. *Cancer Res.*, 44 (1984) 3983-3986.
- 409 Shlyakhtenko, L.S.: A study of the B-A transition in DNA by gel electrophoresis. *J. Biomol. Struct. Dyn.*, 1 (1984) 1511-1516; *C.A.*, 101 (1984) 68791t.
- 410 Tien Kuo, M., Iyer, B., Wu, J.R., Lapeyre, J.-N. and Becker, F.F.: Methylation of the  $\alpha$ -fetoprotein gene in productive and nonproductive rat hepatocellular carcinomas. *Cancer Res.*, 44 (1984) 1642-1647.
- 411 Xu, Y. and Sun, Y.: (Properties of the diazobenzoyloxymethyl (DBM)-paper used in DNA transfer and hybridization experiment). *Shiyan Shengwu Xuebao*, 17 (1984) 211-218; *C.A.*, 101 (1984) 147248z.

See also 240, 389.

#### 21d. Nucleoproteins

- 412 Madore, S.J., Wieben, E.D. and Pederson, T.: Eukaryotic small ribonucleoproteins. Anti-La human autoantibodies react with U1 RNA-protein complexes. *J. Biol. Chem.*, 259 (1984) 1929-1933.

- 413 Pettersson, I., Hinterberger, M., Mimori, T., Gottlieb, E. and Steitz, J.A.: The structure of mammalian small nuclear ribonucleoproteins. Identification of multiple protein components reactive with anti-(U1)ribonucleoprotein and anti-S<sub>m</sub> autoantibodies. *J. Biol. Chem.*, 259 (1984) 5907-5914.

*21f. Structural studies of nucleic acids*

- 414 James, R. and Bradshaw, R.A.: Strand separation of DNA fragments and their isolation from nondenaturing polyacrylamide gels. *Anal. Biochem.*, 140 (1984) 456-458.
- 415 Sanso Seisakusho K.K.: (DNA base sequence determination). *Jpn. Kokai Tokkyo Koho Pat.* JP 5 944,648 [84 44,648] (Cl. G01N27/26), 13 Mar. 1984, Appl. 82/155, 550, 07 Sep. 1982, 6 pp.; *C.A.*, 101 (1984) 51310n.
- 416 Vary, C.P.H. and Vournakis, J.N.: RNase H-catalysed site-specific deadenylylation of rabbit  $\alpha$ - and  $\beta$ -globin mRNAs. Secondary structure of 3'-noncoding regions. *J. Biol. Chem.*, 259 (1984) 3299-3307.

See also 49, 394, 398-400, 405.

24. ORGANIC SULPHUR COMPOUNDS

- 417 Krivankova, L., Bocek, P. and Samcova, E.: (Isotachophoretic determination of thiadiglycolic acid in persons exposed to vinyl chloride). *Prac. Lek.*, 36 (1984) 163-165; *C.A.*, 101 (1984) 145234t.
- 418 Krivankova, L., Samcova, E. and Bocek, P.: Determination of thiodiacetic acid in urine of people exposed to vinyl chloride by analytical capillary isotachophoresis. *Electrophoresis (Weinheim)*, 5 (1984) 226-230.

26. ORGANOMETALLIC AND RELATED COMPOUNDS

*26c. Coordination compounds*

- 419 Yoshida, H. and Hirama, Y.: Separation of cationic metal chelates of 1,10-phenanthroline by capillary tube isotachophoresis in non-aqueous systems. *J. Chromatogr.*, 298 (1984) 243-251.

28. ANTIBIOTICS

- 420 Miyashiro, S., Kida, T., Shibai, H., Shioi, T. and Ueda, S.: The fermentation, isolation and characterization of macromolecular peptide antibiotics: AN-7A, 7B and AN-7D. *J. Antibiot.*, 37 (1984) 20-26.
- 421 Miyashiro, S., Kida, T., Shibai, H., Shioi, T. and Ueda, S.: The fermentation, isolation and characterization of a macromolecular peptide antibiotic: AN-1. *J. Antibiot.*, 37 (1984) 27-32.

29. INSECTICIDES, PESTICIDES AND OTHER AGROCHEMICALS

*29c. Carbamates*

See 47.

## 30. SYNTHETIC AND NATURAL DYES

30b. *Chloroplasts and other natural pigments*

- 422 Glazkova, L.P., Ulashchik, V.S. and Puntus, F.A.: (Experimental studies of humic acids electrophoresis). *Vopr. Kurortol., Fizioter. Lech. Fiz. Kul't.*, (1984) 21-24; *C.A.*, 101 (1984) 97722b.

## 31. PLASTICS AND THEIR INTERMEDIATES

- 423 Sabet, V.M., Zourab, S.M., El-Sayed, M.M. and Kotb, S.M.: Interaction of poly(vinyl alcohol) with protein at air/water and oil/water interfaces and its effect on emulsion stability. *Indian J. Chem. Sect. A*, 23A (1984) 372-374; *C.A.*, 101 (1984) 98167m.

## 32. PHARMACEUTICAL AND BIOMEDICAL APPLICATIONS

32d. *Toxicological applications*

- 424 Westwood, S.A.: A method for dissociating group-specific component from protein complexes in human bloodstains and its significance in forensic biology. *Electrophoresis (Weinheim)*, 5 (1985) 316-318.

32e. *Plant extracts*

- 425 Tomoda, M., Shimizu, N. and Katoh, K.: New methods for identification of *Alismatis rhizoma* by means of electrophoresis, paper partition chromatography, and thin-layer chromatography. *Chem. Pharm. Bull.*, 32 (1984) 2845-2847.

32f. *Clinico-chemical applications and profiling body fluids*

See 218, 308, 313, 321, 323, 330, 334, 387.

## 33. INORGANIC COMPOUNDS

33a. *Cations*

- 426 Ekinci, S.: Separation of radionuclides by the paper electrophoresis method. *Turk. J. Nucl. Sci.*, 10 (1983) 94-98; *C.A.*, 101 (1984) 13665z.  
427 Ishii, M., Kaji, K., Ao, Y. and Ogino, T.: Determination of zinc and zinc-containing compound in rabbit aqueous humour by high performance aqueous gel permeation chromatography-atomic absorption spectrophotometry. *Bunseki Kagaku*, 33 (1984) E335-E341.  
428 Stover, F.S.: Isotachophoresis of metal-neutral ligand complexes: 18-crown-6 ether complexes with alkali metals. *J. Chromatogr.*, 298 (1984) 203-210.

See also 419.

33b. *Anions*

- 429 Motooka, I., Narai, H., Nakazaki, K. and Tsuhako, M.: Isotachophoresis of cyclic condensed phosphates. *J. Chromatogr.*, 295 (1984) 533-536.

## 34. RADIOACTIVE AND OTHER ISOTOPE COMPOUNDS

- 430 Bonner, W.M.: Fluorography for the detection of radioactivity in gels. *Methods Enzymol.*, 104 (Enzyme Purif. Relat. Tech., Pt. C) (1984) 460-465; *C.A.*, 101 (1984) 68852p.
- 431 Emile, B.F.M.: Process for isotope separation. *Report 1983, UCRL-Trans-11923*, 30 pp. Avail. INIS; NTIS as De84001983. From *INIS Atomindex* 15 (1984), Abstr. No. 15:01 8032; *C.A.*, 101 (1984) 62202e.

See also 21, 22, 426.

## 35. SOME TECHNICAL PRODUCTS AND COMPLEX MIXTURES

## 35b. Antioxidants and preservatives

- 432 Donhauser, S., Glas, K. and Gruber, B.: (Detection of preservatives in beer using HPLC and isotachophoresis). *Monatschr. Brauwiss.*, 37 (1984) 252-258; *C.A.*, 101 (1984) 108866e.

## 35c. Food analysis

- 433 Dal Belin Peruffo, A., Pallavicini, C., Tealdo, E. and Zamorani, A.: Identification of milk coagulants by electrophoresis in sodium dodecyl sulfate polyacrylamide gels. *Milchwissenschaft*, 39 (1984) 153-155; *C.A.*, 101 (1984) 5603n.

See also 432.

## 35e. Compounds with distinct biological activity and diverse chemical nature

See 200.

## 35f. Complex mixtures and non-identified compounds

- 434 Ajinomoto Co., Inc.: (Electrophoresis of culture media). *Jpn. Kokai Tokkyo Koho Pat.* JP 59 22,608 [84 22,608] (Cl. B01D13/02), 04 Feb. 1984, Appl. 82/134, 452, 30 Jul. 1982, 3 pp.; *C.A.*, 101 (1984) 3556a.

## 36. CELLS AND CELLULAR PARTICLES

- 435 Bartlett, R.L., Jeynes, M.H., England, J.R. and Pease, P.E.: A computer analysis of polyacrylamide gel electrophoresis of strains of *Yersinia enterocolitica*. *Inst. Natl. Sante Rech. Med. (Colloq.)*, 114 (Bacilles Gram Negat. Interet. Med. Sante Publique) (1983) 99-108; *C.A.*, 101 (1984) 126406j.
- 436 Bauer, J. and Hannig, K.: Changes of the electrophoretic mobility of human monocytes are regulated by lymphocytes. *Electrophoresis (Weinheim)*, 5 (1984) 269-274.
- 437 Begbie, R. and Stewart, C.S.: Polyacrylamide gel electrophoresis of *Bacteroides succinogenes*. *Can. J. Microbiol.*, 30 (1984) 863-866; *C.A.*, 101 (1984) 87126w.
- 438 Griffing, L.R. and Quatrano, R.S.: Isoelectric focusing of plant cell membranes. *Proc. Natl. Acad. Sci. U.S.A.*, 81 (1984) 4804-4808; *C.A.*, 101 (1984) 127429f.
- 439 Lopes, U.G., Momen, H., Grimaldi, G., Jr., Marzochi, M.C.A., Pacheco, R.S. and Morel, C.M.: Schizodeme and zymodeme characterization of *Leishmania* in the investigation of foci of visceral and cutaneous leishmaniasis. *J. Parasitol.*, 70 (1984) 89-98; *C.A.*, 101 (1984) 126453x.
- 440 Parent, J.G. and Asselin, A.: Note on the characterization and electrophoretic detection of a Canadian isolate of alfalfa mosaic virus. *Phytoprotection*, 65 (1984) 35-39; *C.A.*, 101 (1984) 126421k.

- 441 Serwer, P., Moreno, E.T., Hayes, S.J., Berger, P., Langham, M. and Toler, R.W.: Rapid detection and characterization of plant viruses by agarose gel electrophoresis: Size, surface charge and heterogeneity of panicum mosaic and related viruses. *Electrophoresis (Weinheim)*, 5 (1984) 202-208.
- 442 Tomoda, A., Kodaira, K., Taketo, A., Tanimoto, K. and Yoneyama, Y.: Isolation of human erythrocyte membranes in glucose solution. *Anal. Biochem.*, 140 (1984) 386-390.



## PUBLICATION SCHEDULE FOR 1985

*Journal of Chromatography* (incorporating *Chromatographic Reviews*) and *Journal of Chromatography, Biomedical Applications*

MONTH	N 1984	D 1984	J 1985	F	M	A	M	
Journal of Chromatography	312 314	315 316 317	318/1 318/2 319/1	319/2 319/3 320/1	320/2 321/1 321/2 322/1	322/2 322/3 323/1 323/2		
Chromatographic Reviews		313				334/1		
Bibliography Section				335/1		335/2		
Biomedical Applications		336/1 336/2	337/1	337/2 338/1	338/2	339/1	339/2 340	

The publication schedule for further issues will be published later

### INFORMATION FOR AUTHORS

(Detailed *Instructions to Authors* were published in Vol. 295, No. 2, pp. 555-558. A free reprint can be obtained by application to the publisher.)

**Types of Contributions.** The following types of papers are published in the *Journal of Chromatography* and the section on *Biomedical Applications*: Regular research papers (Full-length papers), Short communications and Notes. Short communications are preliminary announcements of important new developments and will, whenever possible, be published with maximum speed. Notes are usually descriptions of short investigations and reflect the same quality of research as Full-length papers, but should preferably not exceed four printed pages. For review articles, see page 2 of cover under **Submission of Papers**.

**Submission.** Every paper must be accompanied by a letter from the senior author, stating that he is submitting the paper for publication in the *Journal of Chromatography*. Please do not send a letter signed by the director of the institute or the professor unless he is one of the authors.

**Manuscripts.** Manuscripts should be typed in double spacing on consecutively numbered pages of uniform size. The manuscript should be preceded by a sheet of manuscript paper carrying the title of the paper and the name and full postal address of the person to whom the proofs are to be sent. Authors of papers in French or German are requested to supply an English translation of the title of the paper. As a rule, papers should be divided into sections, headed by a caption (e.g., Summary, Introduction, Experimental, Results, Discussion, etc.). All illustrations, photographs, tables, etc., should be on separate sheets.

**Introduction.** Every paper must have a concise introduction mentioning what has been done before on the topic described, and stating clearly what is new in the paper now submitted.

**Summary.** Full-length papers and Review articles should have a summary of 50-100 words which clearly and briefly indicates what is new, different and significant. In the case of French or German articles an additional summary in English, headed by an English translation of the title, should also be provided. (Short communications and Notes are published without a summary.)

**Illustrations.** The figures should be submitted in a form suitable for reproduction, drawn in Indian ink on drawing or tracing paper. Each illustration should have a legend, all the legends being typed (with double spacing) together on a *separate sheet*. If structures are given in the text, the original drawings should be supplied. Coloured illustrations are reproduced at the author's expense, the cost being determined by the number of pages and by the number of colours needed. The written permission of the author and publisher must be obtained for the use of any figure already published. Its source must be indicated in the legend.

**References.** References should be numbered in the order in which they are cited in the text, and listed in numerical sequence on a separate sheet at the end of the article. Please check a recent issue for the layout of the reference list. Abbreviations for the titles of journals should follow the system used by *Chemical Abstracts*. Articles not yet published should be given as "in press", "submitted for publication", "in preparation" or "personal communication".

**Dispatch.** Before sending the manuscript to the editor please check that the envelope contains three copies of the paper complete with references, legends and figures. One of the sets of figures must be the originals suitable for direct reproduction. Please also ensure that permission to publish has been obtained from your institute.

**Proofs.** One set of proofs will be sent to the author to be carefully checked for printer's errors. Corrections must be restricted to instances in which the proof is at variance with the manuscript. "Extra corrections" will be inserted at the author's expense.

**Reprints.** Fifty reprints of Full-length papers, Short communications and Notes will be supplied free of charge. Additional reprints can be ordered by the authors. An order form containing price quotations will be sent to the authors together with the proofs of their article.

**Advertisements.** Advertisement rates are available from the publisher on request. The Editors of the journal accept no responsibility for the contents of the advertisements.

# BALANCE

## A Program to Compare the Means of Two Series of Measurements

- requires no profound knowledge of statistics by the user
- guides user with playful ease to the correct statistical test
- incorporates:
  - paired t-test (parametric)
  - Wilcoxon test (non-parametric)
  - Student's t- and Cochran's tests (parametric)
  - Mann-Whitney's U-test (non-parametric)
  - tests for small and large numbers of measurements
  - one/two tailed (sided) tests
- clear, fully descriptive manual with worked examples
- US \$ 150.00

### AVAILABLE FROM

Elsevier Scientific Software (JIC)  
52 Vanderbilt Avenue  
New York, NY 10017 USA  
Phone: (212) 370 5520  
Telex: 420643

or  
Elsevier Scientific Software  
P.O. Box 330  
1000 AH Amsterdam  
THE NETHERLANDS  
Phone: (020) 5803 911  
Telex: 18582

*Write to us for further information on our other programs.*

No shipping charge if paid in advance



for: IBM-PC  
and  
Apple II  
series



Apple is a registered trademark of Apple Computer, Inc.  
IBM-PC is a registered trademark of IBM.