

Book review

CRC Handbook of Chromatography: Volume 1, The Carbohydrates, edited by S. C. CHURMS; G. ZWEIG, AND J. SHERMA, Eds. in Chief, CRC Press, Boca Raton, Florida, 1982, xii + 265 pages + Subject Index, in US \$54, elsewhere \$62.

It is common to refer to the revolution that took place when chromatographic and related methods were introduced to assist in the study of the carbohydrates and their derivatives. This book might accordingly have been entitled "The Carbohydrate Chemists' Revolutionary Handbook". It is a compact, elegantly and clearly presented compilation of data on gas, liquid, paper, gel-permeation, ion-exchange, and thin-layer chromatographic and electrophoretic methods applied to the examination, or to the separation, of carbohydrates. The second half of the book supplies information on analytical techniques, and on the preparation and use of reagents. The final section lists suppliers. Earlier information on chromatographic data on the carbohydrates was given in Volumes I and II of *The Handbook of Chromatography**, published in 1972, where the data interspersed those on other classes of compounds.

The first half of the book consists of well presented Tables, the first 25 of which give details on the retention times on g.l.c. of volatile derivatives of monosaccharides, lower oligosaccharides, and their partially and fully methylated, and some perethylated, derivatives. The derivatives listed include alditols, aldono-nitriles, oximes, and methyl glycosides, converted where appropriate into volatile acetyl, trifluoroacetyl, trimethylsilyl, butaneboronic ester, or isopropylidene derivatives. There are also data on the resolution of enantiomers after their reaction with chiral compounds, on inositols, sugar acids, and lactones, and on aminodeoxy and acetamidodeoxy sugars and their permethylated derivatives. Values are given for glycoside derivatives having a variety of aglycon groups.

Data are presented in similar format on what is, for convenience, termed liquid chromatography, but which includes not only so-called h.p.l.c. but also ion-exchange and gel-permeation chromatography. There is, naturally, more emphasis in this section, than in the earlier one on g.l.c., on the separation of nonderivatized carbohydrates, and data on the cello-, xylo-, manno-, and laminara-oligosaccharides and others, and on monosaccharides and glycosaminoglycans and

**Handbook of Chromatography*, Volumes I and II, G. ZWEIG AND J. SHERMA (Eds.), CRC Press, Cleveland, Ohio, 1972.

dextrans. Gel-permeation chromatography data relate to the use of Sephadexes, Bio-Gels, agarose, and porous glasses.

Sensibly, there is only a brief section on paper-chromatographic separations of sugars, but, regrettably, virtually no data on permethylated sugars, for which reference may be made to the limited data in Volume 1 of the earlier edition of the Handbook. Tables list paper-chromatographic separations of sugar phosphates, of malto-, isomalto-, and fructo-oligosaccharides, and of many fully acetylated or fully methylated glycosides having various aglycon groups. There is an extensive listing of t.l.c. separations of monosaccharides, aldonic acids, and alditols, and their permethylated derivatives, and of oligosaccharides having up to 20 sugar units. Data are given on the electrophoretic separation of alditols, inositols, and methyl glycosides on paper and glass paper, and of glycosaminoglycans on cellulose acetate strips.

The author then turns attention to descriptive information on methods, apparatus, and reagents. There is only a brief mention of g.l.c. detectors and of the use of g.l.c.-m.s., but an extensive list of references is supplied to direct the reader to more-detailed information. Procedures used to convert sugars into products suitable for detection by "h.p.l.c." are dealt with much more extensively. There is also a detailed list of recipes for the preparation of, and descriptions of the conditions for use of, detection reagents on paper and thin-layer chromatograms. Some carcinogenic compounds continue to be listed, but with a caution. The customary information on the colors produced by the use of the detection reagents on paper chromatograms continues to conjure up visions of pure colors when, in the event, brown spots having the faintest blush of pink may be translated optimistically as "pink" to the initial bewilderment of the newcomer's eyes.

An outline is given of how carbohydrates of plant-stuffs and those in biological fluids (urine, blood, plasma, *etc.*) and in faeces can be examined. An inevitably brief section indicates how, with some luck (preferably modified by a combination of art, skill, experience, and persistence), a chemist can isolate and purify plant and animal polysaccharides.

The last section, although only 16 pages long, deals clearly with reliable methods used to effect depolymerization (here, with considerable truth, called degradation) of polysaccharides by hydrolysis, acetolysis, methanolysis, and partial hydrolysis. Methylation-analysis procedures are clearly outlined, as are the methods used to form derivatives suitable for examination by g.l.c.

Contributors who have added to the quality and accuracy of the Handbook are J. E. Brewer, M. Ghebregzabher, K. Granath, L. Hough, M. Lato, E. H. Merrifield, F. M. Rabel, S. Rufini, R. L. Sidebotham, and H. Weigel.

The book is well presented, clearly and attractively printed and, even when the type-face is tiny, clearly legible. The Tables, which are a major feature of the book, present the data elegantly, with all relevant information and references on the same page. The book should serve a wide readership, as it presents information that many carbohydrate chemists and others routinely require, and it also offers an

avenue to what would otherwise prove a maze to the novice, or to the specialist working in a different discipline. It is primarily a book for the bench, rather than, or as well as, one for the library, and, in the excellent tradition of all CRC Press publications, it is substantially bound to survive much bench use. The book will remain on shelves for long-term consultation, even when further data and new methods on the chromatography of the carbohydrates augment those presented here. Few errors were noted, other than an omission of page numbers in the Section index, but those using the book might usefully inform Dr. Churms, or the other editors, of any errors or omissions, so that later supplements or new editions can retain or enhance the undoubted quality and value of this excellent book.

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