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Book Reviews

Volatile Compounds in Foods and Beverages. Edited by H. Maarse. M. Dekker, New York, 1991. xii + 764 pp: ISBN 0-8247-8390-5. Price: US$ 172·50.

This is clearly the companion volume to H. Maarse and C. A. Visscher's Volatile Compounds in Food—Qualitative and Quantitative Data (1989), which aims to present complete lists of compounds identified in each food or beverage commodity to date, together with such quantitative data on their concentration as are available (see *Food Chemistry* **39**, 120). These extensive lists are not reproduced, but those compounds are emphasised that play a significant role as regards sensory characteristics and/or relative concentration.

The book consists of nineteen chapters, each written by an internationally recognised authority. In the first (39 pp, 101 refs), Dr Maarse himself briefly reviews the history of flavour research, recent developments in instrumental techniques, odour units and their variants, including charm values and flavour dilution analysis, and future trends. Then come fifteen chapters, each dealing with a type of product or group of products: bread (W. Grosch and P. Schieberle, 37 pp, 78 refs); rice (H. Maarse, 11 pp, 32 refs); milk (H. T. Badings, 16 pp, 23 refs); meat (D. S. Mottram, 71 pp, 215 refs), seafood (D. B. Josephson, 24 pp, 94 refs), vegetables (F. B. Whitfield and J. H. Last, 79 pp, 209 refs); fruits (four chapters: R. G. Berger, 22 pp, 127 refs; P. E. Shaw, 23 pp, 61 refs; A. Latrasse, 59 pp, 198 refs; and P. Winterhalter, 21 pp, 72 refs); spices and condiments (two chapters: H. M. J. Richard, 37 pp, 93 refs; and M. H. Boelens, 34 pp, 89 refs); wine (P. X. Etiévant, 64 pp, 225 refs); distilled beverages (L. and I. Nykänen, 34 pp, 88 refs); beef (S. A. G. F. Angelino, 36 pp, 77 refs); coffee, cocoa, and tea (I. Flament, 53 pp, 314 refs); nuts (J. A. Maga, 18 pp, 57 refs); and off-flavours (B. Nijssen, 47 pp, 236 refs). There is also an extensive subject index (28 pp), but no author index.

The book is not easy to use as a source of information. For example, ethyl 2-methylbutanoate is the character-impact compound of Delicious apples and is an important food volatile. It is not listed in the index as such. However, it does appear under 'Threshold value of', which leads one to apples, oranges, and beer. Again, β-damascenone is another important food volatile. The index does list it, but refers only to wine. Its threshold leads to beer. Other references occur in the text (e.g. under apples and elderberries), but not in the index.

To emphasise the contributions that individual components make to the aroma of particular foods and beverages, use is made of odour units, for which a knowledge of threshold values is required. Threshold values are therefore given throughout the text and the index indicates that the thresholds of more than 300 compounds are quoted. Odour descriptions are often given, but these are not dealt with systematically. Indeed, the development of sets of flavour descriptors for the different foods and beverages is a desirable objective for the future, largely fulfilled already in the case of beer.

Although the chemistry and biochemistry will differ from one type of food or beverage to another, much of both is relevant far more widely. But once it is decided that the format of the book is to be based on commodities, there are bound to be problems of linking the chemistry and biochemistry of different chapters. Although Chapter 1 deals with the methodology of flavour analysis, there is no equivalent attempt to deal with flavour chemistry and biochemistry in a general way.

One of the important discoveries of the past decade has been the presence of precursors of many flavour compounds in the form of glycosides. This is alluded to, for example, under wine, blackcurrants and strawberries, and spices and condiments, but deserves greater emphasis.

Overall, the book is a mine of information, but addresses the practising flavour chemist, rather than the student. It is very well produced and remarkably free from errors. It is reasonably up to date, references quoted falling off rapidly after 1987, though there are one or two to 1990 and even some to unpublished material. The book is expensive, but not in relation to the work that has gone into producing it. It is highly recommended.

H. E. Nursten

Oxidative Enzymes in Food. Edited by D. S. Robinson and N. A. M. Eskin. Elsevier Applied Science Publishers, Barking, 1991. ix + 314 pp. ISBN 1-85166-613-3. Price £66·00.

Oxidative enzymes have an important effect on food quality with, for example, lipoxygenases being involved in the biosynthesis of flavour components, and super-

oxide dismutase contributing to the antioxidant properties of biological systems. In addition, oxidative enzymes contribute to the loss of colour, flavour and nutrients from foods through the generation of reactive species such as hydrogen peroxide or free radicals. It is therefore appropriate that this group of enzymes should be the subject of a book. The seven chapters cover peroxidases and catalases; superoxide dismutase; amine oxidases and amino acid oxidases; lactoperoxidase; lipoxygenases; polyphenol oxidases; and carbohydrate oxidases.

Although each chapter is only able to discuss a small part of the large body of literature on each of these enzymes, the authors have discussed the major aspects of the enzymes and their reactions. Much of the more recent literature concerned with enzyme structure and mechanism is included, and each chapter has an extensive list of references.

The editors have assembled a group of well-known and respected contributors. The chapter on amine oxidases and amino acid oxidases is one of the last publications of the late James Burt, who was a much respected figure in the area of biochemistry relevant to fish.

This book will make a useful addition to the library of research scientists interested in oxidative enzymes that cause changes in the pigments, flavour components and nutrients in biological systems.

M. H. Gordon

Studies in Natural Products: Volume 9, Structure and Chemistry. Edited by B. Atta-ur-Rahman. Elsevier Science Publishers, Amsterdam, 1992. xviii + 714 pp. ISBN 0-444-89165-X. Price US$ 220·50.

This is the ninth volume in the series created in 1988 to provide timely reviews of all aspects of Natural Products' chemistry. Several of the reviews were first presented as papers at the 4th Symposium on Natural Products Chemistry. Most of the previous volumes have concentrated on synthesis, but this one (like volume 2) is devoted mainly to structural studies.

As usual, Atta-ur-Rahman has assembled a distinguished team of contributors, and the articles by Carl Djerassi (on the structure and biosynthesis of cyclopropane-containing marine sterols), and by Ian Scott (on vitamin B_{12} biosynthesis) are particularly welcome. Other highlights include an account of strategies (mainly using nmr) for the identification of trace amounts of indole alkaloids (J. Schripsema and R. Verpoorte); a chapter describing a plethora of structures from *Fusarium* species, many of economic significance (J. W. Apsimon *et al.*); and a fascinating account about self-inhibitors of fungal spore germination, which includes extensive experimental details (T. Ueno *et al.*). Another chapter with excellent experimental information is supplied by J. McLaughlin *et al.* on methodology for the rapid bioassay of bioactive natural products. A timely review of vitamin D_3 chemistry is provided by R. Neidlein, who also discusses the synthesis of several novel analogues; and there is a substantial review of the products of the various lipoxygenases (G. Veldink and J. F. G. Vliegenthart).

Finally, there are numerous chapters detailing spectroscopic studies of enough esoteric compounds to keep the synthetic chemists occupied for some considerable time.

John Mann