

Book Reviews

Sweeteners: Nutritive

by R.J. Alexander; St. Paul: Eagan Press, 1998, vi + 116 pages, ISBN 0-913250-95-3, \$59.00

Sweeteners play an important role in the production of many food industry products. Nutritive sweeteners are in general carbohydrate-based, unlike the widely utilised synthetic sweeteners such as aspartame, acesulfame, saccharin and cyclamate. The opening chapter in this volume details the chemistry of carbohydrate-based sweeteners and discusses carbohydrate nomenclature before moving on to cover reactions of carbohydrate-based sweeteners, e.g. hydrolysis and inversion, isomerisation, reduction, oxidation, and thermal degradation.

The next chapter covers sweetness as a sensory property and discusses the definition of sweetness with respect to taste profile, taste spectra, perceived sweetness and relative sweetness. The link between chemical structure and sweetness is also covered in this chapter. There are many different types of commercially available sweeteners, and it is important to understand what these types are in order to select the most appropriate sweetener for a particular food system. The third chapter is therefore devoted to production processes and descriptions of major carbohydrate-based sweeteners, including those based upon sucrose, starch, glucose and fructose. This chapter also includes information on honey, lactose, maple syrup, maple sugar and fruit-derived sweeteners. Analytical tests for sweeteners are covered in the fourth chapter, which is split into three subsections, namely physical tests, chemical tests and microbiological tests. Measurement of such parameters is important with respect to ensuring a safe, consistent, high quality product and for the assessment of changes during storage and transportation. This leads nicely into the next chapter, which focuses upon the chemical and functional properties of carbohydrate-based sweeteners that help determine how it is used to produce the desired effects in food systems.

The next three chapters are concerned with application areas, namely bakery and other grain-based products, confections, and other applications. Carbohydrate-based sweeteners are present in hard and soft wheat products, breakfast cereals and granola products. Frostings, glazes, icings, and fillings are also covered in this chapter since they are often integral components of many grain-based products. Sucrose is the most abundantly utilised sweetener in confections, however, other sweeteners can be used to aid in the manipulation of such characteristics as texture,

graininess, and sweetness. Processing considerations, chocolate and compound coatings, hard candies, caramels and other chewy candies, fudge, fondants and cremes, and aerated candies are discussed. Other applications detailed in this volume include fruit and vegetable preservation (jams, jellies, preserves, canned fruits and vegetables), beverages (carbonated and non-carbonated, powdered drink mixes, and alcoholic beverages), and dairy-based foods (ice cream, frozen desserts, and yoghurt), and soups and gravies. The final chapter details special topics such as sweetener selection in product development, dental caries, diabetes, and regulatory status and nutritional labelling.

'Sweeteners: Nutritive' is part of the Eagan Press Handbook series, which was developed as a series of practical guides serving the interests of the food industry. The series aims to offer a practical approach to understanding the basics of food ingredients, applications, and processes. Presented contents aim to bridge the gap between highly specialised information presented in the scientific literature and the product-specific information available from suppliers. This volume is presented in a user-friendly format with definitions of terms, examples, illustrations, and troubleshooting tips included throughout. There is a comprehensive set of appendices detailing the characteristics of selected sugars and carbohydrate-based products, and providing detailed information on sugar solutions. This volume is therefore recommended to individuals involved in product development, production, testing, ingredient purchasing, engineering, and marketing aspects within the food industry.

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Conformation of Carbohydrates

V.S.R. Rao, P.K. Qasba, P.V. Balaji, R. Chandrasekaran; Harwood Academic Publishers, 1998, xiv + 359 pages, ISBN 90 5702 315 6, Code VUV, £41.00

Technical developments in nuclear magnetic resonance, X-ray diffraction and computer modelling methods have made the greatest contribution to the structure determination and understanding of the conformations of carbohydrates.

“Conformation of Carbohydrates” compiles this structural knowledge and offers a firm understanding of all aspects of carbohydrate conformation by describing and explaining the importance of interactions between carbohydrates, as well as interactions of carbohydrates with proteins, nucleic acids or any other macromolecule. A basic knowledge of the chemical structure of carbohydrates is essential for the development of conformational analysis and visualisation of the geometries of complex carbohydrates. Therefore, the first chapter “Configuration of monosaccharides”, backed by schematic diagrams that reinforce the material discussed, is devoted to this topic. In “Methods of conformational analysis” experimental methods are outlined briefly before embarking on a discussion of the computational methods. In addition to describing the conformation of monosaccharides, disaccharides and oligosaccharides extensively, the chain conformations of some selected homopolysaccharides in crystalline state as well as randomly coiled polysaccharides are also provided. Fibre diffraction studies, together with molecular modelling, have led to the determination of the morphologies of a wide variety of right and left-handed, fully extended and wide cylindrical, single and multistranded polysaccharide helices. Therefore, a chapter is devoted to important details on the basic principles of fibre diffraction, generation of molecular and packing models of helices and subsequent refinement of structures by the least-squares methods. The book also features structures of more complex polysaccharides such as “Carrageenan”, “Hyaluronan”, “Sulfated glycosaminoglycans” and “Polysaccharides with large repeating units” as well as “Peptidoglycans”. A richly illustrated chapter on carbohydrate–protein interactions dealing with more complex X-ray structure data of carbohydrates–protein complexes completes the book.

“Conformation of Carbohydrates”, supported by extensive literature references, is a “one-stop” source of current information of carbohydrate conformation and the potential use of conformational properties in industry and also of their crucial role in important biological events such as cell–cell interaction, cell-adhesion, and cellular signalling mechanisms. It is, therefore, a valuable source for students, teachers and research scientists interested in carbohydrate structures.

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Metabolic Pathways of Agrochemicals

Parts 1 & 2; Terry Roberts & David Hutson (Eds.); ISBN 0-85404-489-2

The pursuit of agriculture has been profitable from time immemorial, but currently there is a large drive to make even better and wider use of crops particularly for non-food uses. Indeed much funding has been directed at this by the EU and individual member state government departments. Add to this the current interest and debate over genetically modified crops and the ongoing concern regarding the toxicity of plant treatment products both to man and animals, together with the resistance to pesticides manifestly developed by some pests, new ideas on soil decontamination and regeneration and there you have a field ripe for scientific assessment as to what happens in real life with agrochemicals.

These important new volumes provide a comprehensive summary of data and information on the metabolism and chemical degradation of agrochemicals in soils, plants and animals. Part 1, Herbicides and Plant Growth Regulation, provides information on over 170 chemicals, as well as important research on sulfonyl ureas and imidazolines. Part 2, Insecticides and Fungicides, provides information on over 250 chemicals, as well as previously unpublished information by Agrochemical companies. The second volume also includes information on nematicides, rodenticides, insect growth modulators and plant activators.

The contents of the two books include metabolic pathways, mechanisms and products, as well as information on physico and chemical properties and mode of action. Knowledge of the metabolism of herbicides, their selectivity and mode of action are invaluable to biochemists and synthetic chemists. The metabolism of insecticides and other agrochemicals also gives information on the mechanisms of toxicology.

Both volumes of comprehensive reference source are designed to provide easy access to information on the degradation and metabolism of all the major classes of agrochemicals in use. The books are comprised of the following: separate entries for each pesticide; overviews of the metabolism of specific classes of agrochemicals; similarities and differences between chemicals in each class; an extensive bibliography (as each reference is fully referenced); and finally, comprehensive, high quality indexes. Included in the indexes are the chemical/common names, CAS Registry Number, and reaction type.

These two new publications are organised systematically, and are very readable. A structural approach is taken, and over 40 years of literature is covered in these very detailed volumes, as well as unpublished works. *Metabolic Pathways of Agrochemicals* is compiled by a highly respected team of international editors, and is a comprehensive reference source for chemists, biochemists and biologists working in the discovery, development and registration of