

chemical structure and physical behaviour of food polysaccharides which would be difficult to find elsewhere. Although this book does achieve its aims of providing information on the effect of the molecular structure of polysaccharides on their properties, functionalities and, hence, applications it also contains over 2800 references should additional information be required. It is for these reasons that the book is considered to be a valuable addition to the library of food technologists and carbohydrate chemists.

Linda L. Lloyd
John F. Kennedy

Sucrose: Properties and Applications. Edited by M. Mathlouthi & P. Reiser. Chapman Hall, UK, 1995. 293 pp. Price £79.00. ISBN 0-7514-0223-0.

In world trade sugar is a major commodity and there is strong competition from alternative sweeteners and starch derived isoglucoses. Sugar production worldwide has been over 100 million tons per annum in recent years; it can be produced in temperate, tropical and subtropical zones, unlike many other foods.

Future markets for sugar depend on nutritional trends: sugar in many foods may replace fats, as overconsumption of fats is now considered a more serious health hazard than overconsumption of carbohydrates. The physical and chemical properties of sugar are still considered vital in adding bulk and taste to certain foods which would otherwise prove bland and unappetising. Thus, the market for sugar, both for food and non-food uses, is likely to remain buoyant in the long term.

This book has tried to gather data to consider the most important properties of sucrose in detail, and to provide a new insight into recent aspects of sugar studies and applications. The book considers in brief the economic aspects of sucrose and recent studies of sucrose structure in its crystalline form, and in aqueous solution, using modern tools like ^{13}C NMR are presented, along with calculations of molecular mechanisms. An overview of sucrose crystallisation and the structure and practical aspects of amorphous sugar are considered. A discussion of solution and rheological properties is also treated in detail. A discussion on the applications of sucrose is also dealt with in considerable detail, including information such as the compatibility of sucrose with other food ingredients and the enhancements of food flavour and the uses of sucrose as a raw material for chemical and enzymatic reactions.

This book is a good source of information to biologists, food scientists and sugar scientists and technologists, as it covers many, if not all, of the properties and applications of sucrose.

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Glycoproteins: New Comprehensive Biochemistry, Volume 29a. By J. Montreuil, J.F.G. Vligenthart & H. Schachter. Elsevier Science, Amsterdam, 1995. xxvii + 644 pp. Price US\$175.00. ISBN 0-444-82075-2.

Glycoproteins is the term used to describe the vast array of molecules that contain a protein and a covalently bound oligosaccharide. Glycoproteins are widely distributed in nature (present in animals, plants, microorganisms and viruses), and are involved in many important biological processes which include stabilization of protein conformation, protection against proteolysis and classification of blood types. *Glycoproteins* represents Volume 29a in the *New Comprehensive Biochemistry* series. It contains authoritative reviews on our present state of knowledge of glycoproteins.

The book is divided into two parts. The first introductory section begins with a history of glycoproteins which spans more than a century from 1865. It then moves on to discuss their structure, both primary and three dimensional, where the main tool used for analysis in both cases is NMR spectroscopy. This first section also includes a review of glycopeptide syntheses which are used as 'model' compounds in structural investigations of glycoproteins, and the biosynthesis of glycoproteins, which is by far the largest and most detailed chapter of the book.

The second part of the book is concerned with the more complex aspects of glycoproteins. It begins with a review of bacterial glycoproteins, which includes archaeobacteria as well as eubacteria, and then moves on to review glycolysation in yeast, plants and insects. The book concludes with a review of the glycoprotein family, where structure-function studies have been hampered by the lack of crystallographic data, and the carbohydrate moiety of vertebrate collagens.

This is an extremely informative and detailed volume. It is a useful reference source for anyone connected with this field and would be invaluable as part of a scientific or university library.

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Tracey A. Norris

Chemistry and the Living Organism. Edited by M.M. Bloomfield & L.J. Stephens. John Wiley, New York, USA, 1996. xxi + 672 pp. Price US\$23.95. ISBN 0-471-10777-8.

Chemistry is the study of the composition and interaction of substances. It informs you what substances are made of and assists you to understand how they behave. In fact, chemistry, both synthetic and natural, involves every aspect of your life. For instance, clothes which you put on are made mainly of synthetic materials. Your good health depends on chemicals which are in

the form of food that you eat. They supply your body with nutrients and protect you from diseases.

Carbohydrates comprise the most abundant group of natural compounds. They are essential components of all living organisms, which also perform a variety of functions. In many cases, they are utilized as food by man, other animals or micro-organisms. They are a source of energy and important devices for the storage of solar energy. Others — starch and glycogen — serve as the major source of metabolic energy for the human body while cellulose is the most important component of the supporting tissue of plants. The vital constituents of shells of insects, crabs and lobsters are chitin.

Chemistry and the Living Organism is the sixth edition which updates the content and format of the previous ones. It is divided into three sections: the living organism, the elements necessary for life and the compounds for life. Studies on carbohydrates are in the fifteenth chapter. Beginning with an interesting story, it discusses diabetes — one of the most common diseases associated with carbohydrates. In addition, it deals with the definition, structure, properties and functions of monosaccharides, disaccharides and polysaccharides. Important examples of monosaccharides are glucose, fructose, galactose and ribose. Sucrose, maltose and lactose are also significant examples of disaccharides. Polysaccharides can be both linear polymers of glucose — amylose and cellulose — and branched polymers of glucose — glycogen and amylopectin.

This book offers the fundamental chemistry for students. It is easily understandable and enjoyable to read since the fundamental concepts of chemistry are clearly presented through examples relevant to the student's own lives. Furthermore, it contains a lot of learning aids such as learning objectives, perspectives, chapter summaries, problem sets, appendices, an extensive glossary and index.

Pawadee Methacanon
John F. Kennedy

Biomass, for Energy, Environment, Agriculture and Industry: 8th EC Conference, Vols 1–3. Edited by Ph. Chartier, A.A.C. Beenackers & G. Grassi. Pergamon, Oxford, UK, 1995. LII + 2426 pp. Price £275.00. ISBN 0-08-042135-0.

Interest in the use of biomass for non-food applications has grown rapidly over recent years, mainly due to increased environmental awareness with respect to the need for prime renewable energy resources. The development of such resources will contribute greatly to the prevention of dramatic climatic change and to the security of energy supplies for the benefit of future generations.

These three volumes chart the proceedings of the 8th European Community Conference, held in Vienna in 1994. The conference was larger than any of its predecessors, with over 300 refereed contributions from over 20 countries around the world, providing the opportunity for an international exchange of information on recent progress in the development and implementation of renewable biomass based non-food technologies. This publication therefore contains one of the most complete overviews of the present state-of-the-art in this ever expanding field of research.

A wide variety of subject areas are covered, including biomass resource bases, bio- and thermo-chemical conversion technologies, environmental and economic aspects, and worldwide implementation (particularly in developing countries). The cost of any bioenergy system depends to a large extent on the ability to secure the resource within a manageable catchment area at a cost which allows the whole production, conversion and distribution scheme to be financially viable. For an energy crop to be truly renewable the biomass harvested for use as a fuel must represent substantially more energy than that consumed in its production (planting, harvesting, maintenance).

Volume 1 covers resource bases and the generation of electricity and heat from such resources. The use of a wide variety of specialist natural biopolymer based crops is highlighted, e.g. many types of wood, sorghum, *miscanthus sinensis* (a perennial grass), eucalyptus, hemp and olive husks. The state of biomass programmes all over Europe is also discussed. The second volume is chiefly concerned with the production of transportation fuels from biomass sources, such as biodiesel, rapeseed methyl ester fuels, and fuels from sugarbeet, and the use of biotechnology to produce a variety of chemicals and products, such as bioaerosols, xylitol from hemi-cellulosics, lactic acid production, and the enzymatic saccharification of cellulosics. The final volume deals with the production of chemicals and products by thermochemistry and includes the gasification of many natural products such as almond shells and horse chestnut seeds. The economics and the effect on the environment of such developments are also discussed in some detail in this volume.

The publication also contains authoritative reviews on many of the mentioned subjects by leading experts in each field, and provides a detailed background to the agricultural policy history of the EC (Common Agricultural Policy). Overall, this three volume set is indispensable for those working in any area of biomass technology, whether in research, design or policy development, and is thoroughly recommended.

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