

Book reviews

Lectins and Glycobiology. Edited by H. Gabius & S. Gabius. Springer, Berlin, 1993. xx + 521 pp. Price £73.00. ISBN 3-540-5611-7.

Lectins are carbohydrate-binding proteins of nonimmune origin which occur throughout the biosphere. They have been found in the plant and animal kingdoms and in microorganisms (including prokaryotes). Their most obvious property, haemagglutination, has been known for more than a century. The role of lectins in immunological defence reactions is of great interest. Lectins are also involved in various biochemical and cellular processes, such as cell recognition, communication and inflammation. The great breakthrough in the art of purifying lectins came with the introduction of affinity chromatography. First with homopolymer polysaccharides which are suitable for only certain lectins and later with tailor-made affinity adsorbents prepared by immobilising monosaccharides, oligosaccharides, glycopeptides or glycoproteins to hydrophilic and water insoluble matrices.

Lectins and Glycobiology is organised in ten sections, each of which focuses on techniques in different research fields that deal with lectins. The introduction presents insights into the state of knowledge of lectins by literature searches. The four following sections deal with chemical synthesis of lectin ligands, purification and characterisation of lectins and of lectin–ligand interactions, and the use of lectins as tools for the characterisation of glycoconjugates. The determination of expression of lectins and their ligands, and the use of lectins in histochemical and cytochemical analysis are discussed in the sixth and seventh sections. The last sections are devoted to biosignalling, cell adhesion and molecular genetics of lectins.

Each chapter comprises procedures, equipment, materials, helpful hints and references. Certainly, this book provides information of invaluable help to all those active in the field, especially biochemists, chemists, molecular biologists, cell biologists and biotechnologists.

Marion Paterson
John F. Kennedy

Food Polysaccharides and Their Applications. Edited by A.M. Stephen. Marcel Dekker, New York, USA, 1995. 654 pp. Price US\$195. ISBN 0-8247-9353-6.

Carbohydrates, mono-, oligo- and polysaccharides, are essential components of our food and constitute the bulk of the human diet. The polysaccharide component is not only important where it forms the major part of the food, for example as in the case of the starch polysaccharide in potato and bread, but also where a particular polysaccharide may be present at a level below 5% but is responsible for the physical characteristics of the food. Polysaccharides are often present as additives for thickening, stabilising and emulsifying foods due to their unique ability to form gels and highly viscous solutions at low concentrations.

This volume *Food Polysaccharides and Their Applications* in the *Food Science and Technology* series of monographs, textbooks and reference books, sets out to provide a comprehensive reference work on the sources, types, modification, properties, characterisation, and regulatory aspects of the polysaccharides used by the food industry. The early part of the book focuses on the neutral homopolysaccharides — starch and cellulose — and reviews their structure, analysis and applications. The properties of modified polysaccharides, modified starches and cellulose derivatives are also discussed and methods of preparation are detailed, including one chapter which is exclusively devoted to the starch hydrolysates (Chapter 4), which are of major importance in the food industry. The next group of chapters deals with more complex polysaccharides including the neutral heteropolysaccharide galactomannan, agar — a polysaccharide of galactose residues with alternating linkages, the sulphated polysaccharide carrageenan, the hexuronic acid-containing polysaccharides alginate and pectin, bacterial polysaccharides, gums and mucilages, and finally the basic chitin and chitosan polysaccharides. Although properties and applications are discussed for each polymer in the relevant sections there are also three excellent chapters detailing polysaccharide interactions, emulsion stabilisation by polysaccharides and polysaccharide rheology and in-mouth perception — perhaps the most important properties for food applications.

Although this book is expensive, it does contain a huge amount of current information relating to the

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.

M.B. Chaudhry
John F. Kennedy

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.

John F. Kennedy
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