

**Carbohydrates as Organic Raw Materials III.** Herman van Bekkum, Harald Roper and Fons Voragen (eds.), VCH, Weinheim, Germany, 1996, x + 315 pp., DM 178.00, ISBN 3-527-30079-1

Carbohydrates are versatile natural materials and can be used as they are, in a processed form or in a chemically modified form. Although they are available in nature in abundance, the present industrial utilization of the total available natural carbohydrates is rather small. This, however, is expected to increase with the development of non-food utilization of agricultural products and as the search for new environmentally friendly product continues.

"*Carbohydrates as Organic Raw Materials III*" details the presentations held at the Third Workshop on Carbohydrates as Organic Raw Materials, Wageningen, The Netherlands, which was organized by the Carbohydrate Research Foundation. This volume contained several new topics which were not discussed in the preceding two workshops, for example, insulin, lactose and lactic acid and a topic which was not presented at the workshop, but relevant to the subject—metal-catalyzed oxidation and hydrogenation.

The papers in this volume were mainly contributed by people from the industries; thus the subject discussed is broad and is written with an overview style (except for the chapter on starch and dextrin in emulsion copolymerization which was written in a more specific research report format). As is the case in other multi-author books, the scope and depth of discussion is not consistent. The paper on lactic acid focuses more on the practical processing and application aspects, whilst others on cell wall polysaccharides, insulin, lactose, fermentation and starch were more comprehensive, containing discussions on theoretical details like properties and other chemical aspects. However, they all give an excellent review of the current status and future development of the carbohydrates as chemical raw materials of the respective industries.

All in all, the chapters have been well written, and are easily comprehensible with good diagrams and illustrations. "*Carbohydrates as Organic Raw Materials III*" would be a valuable reference not only for researchers but also for those people involved in the relevant industries.

F.A. Putri  
John F. Kennedy

**Comprehensive Polymer Science—Second Supplement.** S.L. Aggarwal and S. Russo (eds.), Elsevier Science, Oxford, 1996, x + 763 pp., price \$385.00, ISBN 0-08-042708-1

Polymer chemistry is a very important and extremely broad topic involving the study of the synthetic char-

acteristics and physico-chemical properties of large molecules formed by the repetition of small chemical units called monomers.

This book is the second supplement to a seven-volume treatise on polymer science. It is a reference work consisting of 19 chapters, each written by a different author(s). The first 12 chapters cover recent developments in six areas of interest (catalysis, mechanisms and kinetics; synthesis and novel structures; advanced characterisation methods; crystallisation and other phase transitions; structure–property relationships; and theories of rubber elasticity), and the remaining seven chapters are committed to special topics of current interest.

The content of these chapters varies from the theoretical work such as 'Statistical Thermodynamics of Copolymers and their Blends' to practical subjects like 'Overview of Polymer Recycling Technologies'. All chapters are written as self-contained review articles and are aimed at a research audience. Each chapter is provided with a comprehensive list of references (typically around 200 in number).

In general, the style is to outline the chronological development of the subject matter described and the reader is often directed to the original work for details. As a consequence, a critical reader would probably want to use this book in a library where they can easily obtain the references cited. The book is well presented, with clear diagrams and photographs. It provides an excellent introduction to the literature for the topics covered and access to it would be an asset to any research scientist starting out in one of these areas.

Emma J. Place  
John F. Kennedy

**Magnetic Resonance in Food Science.** P.S. Belton, I. Delgadillo, A.M. Gil and G.A. Webb (eds.), The Royal Society of Chemistry, Cambridge, 1995, ix + 292 pp., price £55.00, ISBN 0-85404-725-5

Nuclear magnetic resonance (NMR) spectroscopic techniques are undoubtedly some of the most widely used, informative and powerful analytical tools currently at the disposal of the research scientist. However, the application of these techniques to complex multicomponent systems such as food materials has only really developed over recent years and significant progress continues to be made. This volume is based upon the proceedings of the '*Second International Conference on Applications of Magnetic Resonance in Food Science*' which was held in Portugal, and is essentially divided into four main subject areas. The first area contains eight chapters which deal with the developing scene of magnetic resonance applications. An introductory chapter on the basic principles and applications of magnetic resonance paves the way for

more detailed discussions, including heterogeneous systems, water mobility, molecular motions, and enzyme activity, which are covered in later chapters. An informative chapter focuses on the glass transition in sugar–water systems. Water acts as a universal plasticizer for the carbohydrate structure and therefore strongly influences the temperature at which the glass transition occurs, which can be of paramount importance in food applications.

The next six chapters cover the analysis and authentication of foodstuffs including the application of high resolution NMR and SNIF-NMR. Such techniques have proved to be invaluable in the detection and monitoring of food adulteration. Specific application examples discussed in this section include the analysis of lactic acid bacteria to aid in the understanding of wine fermentation and the monitoring of trace amino acid profiles as a fingerprint in European wine analysis. The application of magnetic resonance techniques to the study of nutrition is presented in a subsequent section. Such methodologies can be utilised to aid our understanding of human metabolism and disease.

Food systems pose interesting and important problems with respect to rapid, non-invasive analytical techniques, and the final section involves the study of biopolymers in such complex systems. Specific topics include water–macromolecular interactions in chocolate and the analysis of cereal proteins. A chapter in this section discusses conformational and dynamic analysis of polysaccharide gels. The gel-forming ability of a number of polysaccharides, e.g. curdlan, starch, pectin and carrageenan, is a crucial physico-chemical attribute in many food applications, such as in the manufacture of marmalade.

This volume presents a detailed up-to-date account of research in this constantly advancing area of food science through contributions by experts who demonstrate the importance of magnetic resonance in food science and nutrition, and the application of such techniques to industrial processes. It is therefore highly recommended to individuals with interests in the food science sector, as well as those interested in applications of spectroscopic techniques.

Charles J. Knill  
John F. Kennedy

**Liquid Chromatography of Oligomers.** C.V. Uglea (ed.), Marcel Dekker, New York, USA, 1996, 344 pp., price \$150.00, ISBN 0-8247-9720-5

Anyone working in the area of separation science is very familiar with the use of chromatography for identifying the qualitative and quantitative composition of complex mixtures. Those working with small molecules, pharmaceuticals, additives, plasticisers, food components etc. will know the value of high performance liquid chromatography for sample analysis while polymer chemists will

know the value of gel permeation chromatography in characterising polymers for molecular weight and distribution parameters. The application of liquid chromatography to the analysis and characterisation of oligomers is less familiar although the technique would be eminently suitable. The book attempts to address the specific use of the technique for this application.

There are four chapters in this book, the first two are relatively short and deal with the definition, history and nomenclature and also molecular nonhomogeneity of synthetic oligomers. This includes specific characteristics of oligomers which must be considered when attempting to develop a separation or interpret data. The third and fourth chapters deal with liquid chromatography and gel permeation chromatography respectively. In the chapter dealing with liquid chromatography, there is extensive treatment of the theory of the technique and also information on types of column packings, the chemistry of their production and suppliers. The parts of the chromatograph are discussed, methods of detection and detectors as well as lists of equipment suppliers are included. Much of the information relates to all types of liquid chromatography separations and isn't specifically relevant to the analysis of oligomers. Applications of the technique for oligomer characterization are tabulated with a literature reference. The gel permeation chromatography chapter follows the same format, theory, types of packing materials, non-size exclusion effects, and practical considerations. Again applications are tabulated with a literature reference. Indeed, the book lists approximately 1500 references, some of which are essential if information on actual separations are required as none is given in the text.

Although the author has identified an area of liquid chromatography which is under utilised the lack of information on actual separations which can be achieved limits its usefulness. Indeed there is not a single chromatogram of a "real" oligomer separation in the book. For any scientist with experience in liquid chromatography, this book is of limited use being merely a source of references but for people working with oligomers and who have no experience of the technique and wish to understand the theory it may be of some interest.

John F. Kennedy  
Linda L. Lloyd

**Food: The Chemistry of its Components (third edition).** T.P. Coultate (ed.), Royal Society of Chemistry, Cambridge, 1996, xii + 360 pp., price £14.50, ISBN 0 85404 513 9

Public awareness of the chemistry of food and food processing has increased dramatically in recent years as