

volume consists of 45 chapters that have been arranged into five sections. Dealing with (I) determination of mono- and oligosaccharides and certain derivatives; (II) determination of some polysaccharides; (III) structural analysis of more complex polysaccharides; (IV) preparative methods utilising enzymes; and (V) selected methods found in other volumes.

Whilst the enzymic methodology for the first two sections is straightforward, that dealing with the structural analysis of polysaccharides is variable in complexity. Some articles describe the use of one or more enzymes which give valuable information on a particular polysaccharide, e.g. the fine structure of amylopectin. Other articles illustrate the use of enzymic methods for the examination of fine structure of polysaccharides which serve as models for work on unknown polysaccharides. Examples include work on xanthans and yeast cell wall  $\beta$ -glucans.

Section four describes the preparation of some mono- and oligosaccharides mainly using the enzymic depolymerisation of certain polysaccharides of known primary structure.

Volume X contains an easy-to-follow index of methods found in the previous volumes of *Methods in Carbohydrate Chemistry*.

Volumes IX and X of *Methods in Carbohydrate Chemistry* continue the excellent series providing reliable methods for carbohydrate chemistry. They attain the high standard set by previous volumes and are an excellent source of reference for anyone interested in the subject.

Tracey A. Norris  
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**Biopolymer Mixtures.** J. Mitchell and S. Hill (eds.), Nottingham University Press, Nottingham, 1995, xi + 499 pp., price £70.00, ISBN 189767247

When two molecules are mixed together in an aqueous environment one of three things can happen: nothing; phase separation; or the molecules can interact. "Biopolymer Mixtures", which is based on the 56th Easter school held at the University of Nottingham examines the affects caused by mixing macromolecules together in an aqueous environment.

The book consists of 21 chapters that are divided into two sections, phase separation phenomena and interacting systems. Section one is introduced with a review of the principles of phase separation. This theme is continued (Chapter two) by examination of the factors that cause phase separation of mixed polymer systems, which can be explained by consideration of short range and polyelectrolyte effects.

Biopolymer solution demixing is currently of widespread interest especially when dealing with separation

and purification. Chapter three focuses particularly of the gel aspect of biopolymer demixing, but does not include a review of sheer-induced effects that one would expect of real processing situations. These are covered in Chapters four and five which review the rheological behaviour of biopolymer mixtures.

Then follow a series of chapters describing the application of a range of techniques used to investigate the phase separation phenomena of mixed systems, including NMR, microscopy, and FTIR.

Section one concludes with an investigation of one particular macromolecular system, namely starch and the separation phenomena involving its components amylose and amylopectin.

Section two concentrates more on molecules which exhibit "sticking together". The term "synergism" is re-evaluated in terms of these sticking-together phenomena, looking specifically at the area of polysaccharide-polysaccharide interactions (Chapter 13). A theme which is continued in Chapter 14 with a review of interactions involving two particular polysaccharides, glactomannans and glucotomannans.

Before corresponding protein systems are considered, the bridge is provided by a chapter on protein-polysaccharide interactions, where phase separation is the norm. Certain mixed proteins systems can also give rise to phase separation phenomena. Many lead to synergistic interactions and sometimes aggregation or precipitation. All such considerations are discussed in detail in Chapter 16. Mixed biopolymers and their organisation at interfaces are considered in Chapter 17, with specific attention directed towards the role of protein-protein and protein-polysaccharide interactions in relation to the stability of emulsions and foams in food systems. The application of protein-polysaccharide interactions is also important in other areas of commerce. Chapter 18 reviews such interactions with reference to the pharmaceutical industry. Mucoadhesion (adhesion involving a mucosal surface) is a medical phenomena where favourable interactions are sought. There are however medical phenomena where interactions are undesirable. Chapter 19 describes the procedure of "PEGylation" of proteins and liposomes to render them non-antigenic and non-immunogenic.

The volume concludes with two chapters considering favourable interactions occurring between biopolymers and small sugars.

Throughout this book there are approximately 150 different combinations of biopolymer mixtures considered (a separate index is provided), and over 30 techniques described for their investigation. Gels, foams, emulsions, glassy states and plasticizers self-association, complex formation phenomena aggregation, precipitation and phase separation are all considered. A whole range of applications with particular relevance to the food and drug industries is covered, and workers in

these areas should find this book a useful reference source.

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**Fundamentals of Enzyme Kinetics (revised edition).** A. Cornish-Brown (ed.), Portland Press, London, 1995, xiii + 343 pp., price £18.00, ISBN 188557780720

The first edition of "*Fundamentals of Enzyme Kinetics*" was published in 1979. Since that time, the development of techniques for studding and manipulating genes has transformed biochemistry. Nonetheless, enzymes remain at the heart of all living systems and an understanding of how they operate is vital for understanding the chemistry of life.

"*Fundamentals of Enzyme Kinetics*" aims to provide a basis for understanding the study of enzyme kinetics, whether at the undergraduate, research student or researcher level. Rather than to cover every aspect of the subject in an encyclopaedic style, the aim has been to provide principles that will allow the reader to progress as far as they wish in any direction.

"*Fundamentals of Enzyme Kinetics*" begins with an introductory chapter explaining the basic principles of chemical kinetics, which then leads into an introduction of enzyme kinetics. Before detailing how to derive steady state equations, some of the practical aspects of studding enzyme kinetics are reviewed. Reactions for which no spectrophotometric assay is suitable may still be followed by taking advantage of the fact that many enzyme-catalysed reactions are accompanied by a release or consumption of protons.

Substances that decrease the rate of an enzyme-catalysed reaction when present in the reaction mixture are called inhibitors. The effects of reversible inhibitors on enzyme kinetics are detailed in Chapter five.

The principle of enzyme kinetics in the initial chapters of the book have been considered with reactions of a single substrate and product. Such reactions in practice, however, are rather rare. Chapter six explains the principle steady-state kinetic methods for elucidating the order of addition of substrates and release of products.

Besides spectroscopy, the availability of isotopes has been an important factor in the development of classical biochemistry. Chapter seven considers the major uses of isotopes in enzyme kinetics. Environmental effects of enzyme kinetics are then reviewed in Chapter eight.

Cycling between active and inactive forms of an enzyme can be an extremely sensitive mechanism for regulating catalytic activity. Chapter nine illustrates the problem of trying to control enzyme activity.

For most of the history of enzymology there has been little attempt to connect kinetic measurements with the

physiology of an enzyme. Enzymes in living organisms are not separate entities, but rather they are components of systems. Chapter ten discusses the system "metabolic control analysis" used to analyse the behaviour of interaction enzyme systems.

When dealing with kinetic, there are a number of reactions for which the application of the steady-state model is not applicable. One such type of reaction in enzyme kinetics are fast reactions. The limitations of steady-state as applied to enzyme fast reactions are detailed in Chapter 11. The book concludes with an estimation of kinetic constants.

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

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**Bacteria in Biology, Biotechnology and Medicine.** P. Singleton (ed.), John Wiley, Chichester, 1995, vii + 319 pp., price £15.99, ISBN 0-471-95811-5

Bacteria cause some major diseases as well as a number of minor ones. However, pathogenic bacteria are only a small proportion of the bacteria as a whole. Most bacteria do little or no harm, and many are positively useful to man. Some, for example, produce antibiotics which have revolutionized the treatment of diseases, while others provide enzymes for "biological" washing powders. Some are used as "microbial insecticides" and others are used to make biodegradable plastics. Bacteria are also used to leach out metals from low-grade ores (biomining). They also contribute a lot to the food industry. Not least, bacteria have essential roles in the natural cycles of matter—on which, ultimately, all life depends. In the soil, bacteria affect fertility and structure, so that a better understanding of bacterial activity will permit better management of land and crops.

The third edition of "*Bacteria*" has been fully revised and expanded. New to this edition are sections on food hygiene and food poisoning; bioplastics; the greenhouse effect; and the methodology of recombinant DNA technology. The 16 chapters of this book cover the bacterial cell; growth and reproduction; differentiation; metabolism; molecular biology; bacteriophages; applied bacteriology (in medicine, food and miscellaneous aspects); some practical bacteriology; and identification and classification of bacteria. It also includes in the appendix, minidescriptions of some genera, families, orders and other categories of bacteria.

This book provides useful information to anyone involved in research, development and industrial processes which deal with bacteria. It is an important