

these areas should find this book a useful reference source.

**John F. Kennedy
Tracey A. Norris**

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.

**John F. Kennedy
Tracey A. Norris**

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

reference guide and training tool for the student, e.g. post-graduate, experienced researcher and new-comer to the field.

Marion Paterson
John F. Kennedy

Separation Processes in the Food and Biotechnology Industries: Principles and Applications. A.S. Grandison and M.J. Lewis (eds.), Woodhead Publishing Limited, Cambridge, 1996, xii + 290 pp., price £85.00, ISBN 1 85573 287 4

Separation of one or more components from a complex mixture is a requirement for many operations in the food and biotechnology industries. The separations in question range from particulate materials down to small molecules. The separations usually aim to achieve removal of specific components, in order to increase the added value of the products, which may be the residue, the extracted components or both. All separations rely on exploiting differences in physical or chemical properties of the mixture of components. Some of the more common properties involved in separation processes are particle or molecular size and shape density, solubility, and electrostatic charge.

This book concentrates on the more recent methods and techniques for separating food components and products of the biotechnology industry. Each chapter covers a specific type or area of application and includes on the basic principles, industrial equipment available, commercial applications and an overview of current research and development. There are nine chapters: the first is an overview of separation processes and the others focus on supercritical fluid extraction, pressure-activated membrane processes, ultrafiltration, micro-filtration, ion-exchange and electrodialysis, innovative separation methods in bioprocessing, fractionation of fat, and solids separation processes.

This book provides an interesting and up-to-date coverage of the subject and is a useful reference for researchers working in this field.

Marion Paterson
John F. Kennedy

Hydrogels and Biodegradable Polymers for Bioapplications—ACS Symposium Series No. 627. R.M. Ottenbrite, S.J. Huang and K. Park (eds.), American Chemical Society, Washington, D.C., 1996, x + 268 pp., price \$99.95, ISBN 0-8412-3400-0

Many new areas of polymer science have been successfully developed over recent years. One such growth area is undoubtedly the development of potentially biode-

gradable polymeric materials, which can play an important role in many applications, ranging from the synthesis of 'environmentally friendly' packaging materials to slow release drug delivery carriers that undergo a predetermined rate of hydrolysis *in vivo* to provide a time- (and often hence location-) controlled dose of a biologically active agent.

As the title suggests, the main focus of the symposium upon which this volume is based was the biodegradation of hydrogels and hydrogel bioapplications. Hydrogels are formed by adding a small amount of cross-linked macromolecular material to a relatively large amount of water, producing a somewhat gelatinous solid. The development of such technologies into commercially viable biomedical products is of major interest to many individuals and companies. Research into hydrogels has generally been geared toward biomedical applications due to their relatively high biocompatibility, and their hydrophilic nature and large swelling capabilities were originally explored.

'*Hydrogels and Biodegradable Polymers for Bioapplications*' is broadly split into three sections, namely hydrogels in biosystems; biodegradation; and bioapplications, and addresses reversible hydrogels, stimuli-sensitive hydrogels, and some *in vivo* applications of hydrogels. The use of hydrogels in biosystems includes such topics as the synthesis of a novel hydrogel which undergoes sol-gel phase transformation by changes in the glucose concentration of the surrounding medium, the preparation of a bioartificial hydrogel by cross-linking activated poly(ethylene glycol) with bovine serum albumin, and its subsequent use as a matrix for the immobilisation of acid phosphatase and asparaginase, and the *in vivo* bioactivities of sulfonyleurea-grafted polymers for Langerhans islet stimulation in rats.

Chapters are also presented on the biodegradation of poly-(L-lactic acid-co-amino acid) graft copolymers, peroxide stabilised poly(L-lactide), polycarboxylates, protein-starch plastics, and include the activities of depolymerases on polyhydroxyalkanoates which have received considerable attention as biodegradable, biocompatible thermoplastics. Discussion of bioactive polymeric dental materials based on amorphous calcium phosphate is also presented.

The purpose of the ACS Symposium Series is to publish comprehensive volumes based on recent symposia that provide up-to-date information on a specific topic in the form of original current research papers and relevant original review material. This volume certainly lives up to such intended aims and provides its audience with a well presented and extremely informative treatise into the rapidly growing field of biocompatible and biodegradable polymeric materials, and is thus highly recommended to anyone with interests in biopolymers, biomaterials science and biomedical applications.

John F. Kennedy
Charles J. Knill