

Book Reviews

Essentials of Carbohydrate Chemistry and Biochemistry

Thisbe K. Lindhorst. Wiley & Sons Ltd, 2000, 217pp, £34.95p, ISBN 3-527-29543-7

Millions of tonnes of carbohydrates are biosynthesised by plants and algae each year, their agricultural, social and industrial importance cannot be overstated. They are primarily an energy store and a structural building block for the organism producing them, they also have other functions such as encoding of biological information and cell to cell communication.

The book starts by examining the basic structure of mono-, oligo- and polysaccharides. The protecting groups for carbohydrates are discussed in detail in conjunction with strategies for protecting the anomeric centre, many chemical reaction methodologies and pathways are given to illustrate the concepts. A variety of methods are given for the chemical synthesis of *o*-glycoside in its many forms including mannopyranosides, glycopeptides and pentanyl glycosides, there is also an enzymatic alternative to the chemical synthesis of *o*-glycoside. The activation of the hydroxyl groups on the carbohydrate ring is discussed with a selection of widely used leaving groups, followed by functionalisation reactions. The diverse structure of glycoconjugates are examined, these being glycoproteins and glycolipids.

The biosynthesis and occurrence of oligosaccharides *N*-glycoproteins, *O*-glycoproteins and glycosphingolipids are considered in detail with the enzymes used to catalyse the conversion. Some of the wider implications and occurrence of glycobiology are discussed using examples such as: blood group specificities; lectins; carbohydrate–selectin interactions in leucocyte trafficking and microbial adhesion. Methods for purification and analysis are briefly described, these include chromatography, polarimetry, mass spectrometry and nuclear magnetic resonance.

This book would be good primer in carbohydrates for any student with a basic knowledge of organic chemistry. The carbohydrate chemist will find this an invaluable reference source for reaction mechanisms, protecting groups, functionalisation, enzymes and a host of other useful information.

John F. Kennedy*

Lorraine Quinton

*Birmingham Carbohydrate & Protein Technology Group,
Chembiotech Laboratories,*

*The University of Birmingham Research Park,
Birmingham B15 2SQ, UK*

E-mail address: jfkennedy@chemistry.bham.ac.uk

* Corresponding author. Tel.: +44-121-414-7029; fax: +44-121-414-7030.

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ROMPP Encyclopedia Natural Products

W. Steglich, B. Fugmann, S. Lang-Fugmann (Eds.). Georg Thieme Verlag, Stuttgart, 2000, 748pp, DM498, ISBN 3-13-117711-X (GTV) or ISBN 0-86577-988-0 (TNY)

Natural products, with their complex structural, biological and physical properties, are a source of continued inspiration for scientists from numerous different disciplines. *ROMPP Encyclopedia Natural Products* provides insights into the immense structural diversity of natural substances. It presents thorough and meticulous information on the chemical structures, stereochemistry, biological properties, physical properties, biological sources and medical applications of natural products isolated from a myriad of organisms. One of the aims of this volume is to provide insight into the vast structural diversity of secondary metabolites, which have become increasingly important in the discovery of lead structures in pharmaceutical and crop protection research.

This text mainly focuses on secondary metabolites (although important primary metabolites are also covered), with the main emphasis being placed on types of microbial, plant or animal secondary metabolites, which show interesting biological activities or are responsible for conspicuous properties of the organism, like colour or smell. The compounds selected include antibiotics, alkaloids, pheromones, flavonoids, and ionophores. This volume is also a rich source of compounds like isocyanides, nitro compounds and halogenated aromatic ring systems, which were previously thought to be of synthetic origin only. This encyclopaedia presents the profiles of different natural products, from their discovery to their applications, and useful synthetic derivatives and biosynthesis of natural products have also been included. This book also contains

historical coverage of the natural compounds covered, as well as overview texts.

ROMPP Encyclopedia Natural Products is a clearly written and user-friendly compendium brought together by leading German natural products chemists, and containing over 6000 natural substances, which are of the greatest interest to researchers in biology, chemistry, biochemistry, pharmacology and medicine. This volume contains numerous cross references designed to make information readily accessible, and an appendix with an extensive index of Latin species names and a molecular formula index. This encyclopaedia serves as a reference to some important general terms related to natural products, like alkaloids, carotinoids, glycoproteins, and snake venoms. It is an invaluable key reference book for anyone interested in natural products chemistry, regardless of whether they are experts or newcomers in the field.

John F. Kennedy*

Nahid Turan

Chembiotech Laboratories,

University of Birmingham Research Park,

Vincent Drive,

Birmingham B15 2SQ, UK

* Corresponding author. Tel.: +44-121-414-7029; fax: +44-121-414-7030.

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Methods in Non-Aqueous Enzymology

Munishwar Nath Gupta (Ed.), Birkhäuser Verlag, Basel, 2000, x + 218pp, sFr. 228, ISBN 3-7643-6109-3

Low water systems have attracted considerable attention in recent years. Extending the range of enzymatic catalysis by using non-aqueous media increases the range of enzyme applications. This technique has developed into a powerful approach in biochemistry and biotechnology. *Methods in Non-Aqueous Enzymology* gives a comprehensive survey of the potential applications of non-aqueous enzymology.

The book is comprised of 12 chapters, each containing some background information and covering protocols for several specific applications in different types of non-aqueous media, such as nearly anhydrous media, aqueous-organic cosolvent mixtures and reverse micelles. The initial introductory chapter covers some general issues and perspectives on non-aqueous enzymology. Early chapters are concerned with the importance of water activity for enzyme catalysis in non-aqueous organic media, the engineering and stabilisation of enzymes via immobilisa-

tion, especially the immobilisation of lipases for use in non-aqueous reaction systems. In the book, much focus has been placed on lipases, as this class of enzyme is used more often than others in non-aqueous enzymology.

Subsequent chapters deal with applications of enzymes and membrane technology in fat and oil processing, and strategies for improving the lipase catalysed preparation of chiral compounds are described. The text also covers peptide synthesis and sugar transformations using enzymes in non-aqueous media, and enzyme selectivity in organic media is also discussed. Emerging processes, such as the use of reversed micelles as microreactors and the use of biosensors in harsher non-aqueous environments, are covered in two separate chapters. The book concludes with a chapter outlining the importance of the medium for in vitro and in vivo protein folding mechanisms, and its biomedical implications.

Methods in Non-Aqueous Enzymology is a comprehensive clearly written and presented compendium containing illustrations of specific applications and detailed methodology guides (with strategies for optimisation). The protocols described are easy to follow and critical evaluations of results obtained are given, as well as extensive troubleshooting guidelines. This book is highly recommended for scientists and researchers and developers in biotechnology, the pharmaceutical industry and in academia.

Nahid Turan

John F. Kennedy*

Chembiotech Laboratories,

University of Birmingham Research Park,

Vincent Drive,

Birmingham B15 2SQ, UK

E-mail address: jfkennedy@chemistry.bham.ac.uk

* Corresponding author. Tel.: +44-121-414-7029; fax: +44-121-414-7030.

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The Science of Sugar Confectionery

W.P. Edwards, The Royal Society of Chemistry, 2000, x? pp., £17.95, ISBN 0-85404-593-7

The confectionery industry is enormous. It ranges from small shops to branches of the largest companies in the food industry. The industry is divided into three classes: chocolate, flour and sugar confectionery. The manufacture of most confectionery has not been a science-based profession. Few people know the underlying science of sugar confectionery. Traditionally, skilled craftsmen confectioners working