

contribute many benefits, which bring an added dimension to the quality of products.

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PII: S0144-8617(00)00202-2

### Recent Advances in Carbohydrate Bioengineering

H.J. Gilbert, G.J. Davies, B. Henrissat and B. Svensson (Eds.); The Royal Society of Chemistry, 1999, pp. x + 312, £69.50, ISBN 0-854-04774-3

Recent technological advances in molecular and structural biology, protein chemistry, bioinformatics and analytical biochemistry have fuelled the rapid expansion of the field of glycobiology. The new knowledge gained has been exploited industrially to produce novel carbohydrates for use in pharmaceutical, food and agricultural applications. *Recent Advances in Carbohydrate Bioengineering* contains papers of oral presentations given at conferences held on carbohydrate bioengineering. It contains cutting edge research data and unique reviews from leading workers in the field.

The book is divided into seven sections, starting with a keynote address (shown as an integrated database) presenting classifications of both catalytic and non-catalytic enzyme modules based on their structural similarities. Topics on the use of glycosidases in oligosaccharide synthesis (especially in the production of oligosaccharides of important biological interest), the biochemistry of these enzymes and the use of 3-dimensional structure to understand the mechanisms of enzyme action are covered.

Further papers on the industrial exploitation of carbohydrate modifying enzymes, to generate industrially important polysaccharides and monosaccharides, and non-catalytic polysaccharide binding molecules are also included. The final section of the book describes the use of protein engineering in increasing the industrial use of carbohydrate modifying enzymes, and in increasing the understanding of the mechanisms of action of biocatalysts.

*Recent Advances in Carbohydrate Bioengineering* describes how developments in recent technologies have

changed our understanding of the catalytic, structural and biological role of carbohydrate modifying enzymes. It is a very informative and detailed text, well referenced and includes many clearly presented illustrations. It is aimed at researchers and postgraduate students, providing a unique source of information on the latest advances in this field.

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PII: S0144-8617(00)00204-6

### Stereoselective Biocatalysis

R.N. Patel (Ed.); Marcel Dekker, New York, 2000, xiii + 932pages, ISBN 0-8247-8282-8 (\$250.00)

Much research today is based on the interaction of small molecules with biological macromolecules. In the pharmaceutical, agrochemical and food industries, the search for selective enzyme inhibitors and receptor agonists/antagonists is essential for target-orientated research, as is the production of optically active chiral intermediates, using various approaches to synthesise chiral compounds. This is important as increased understanding, on a molecular level, of the mechanisms of drug interactions have emphasised the importance of chirality as the key efficacy of many drug products and agrochemicals.

Organic chemistry has been one of the most successful scientific disciplines, having enormous practical utilities, such as developing practical processes in the synthesis of natural products, drugs, agricultural chemicals, polymers and many functional molecules. The use of biocatalysts in organic synthesis is a very powerful method for conducting stereo- and regioselective catalysis. Biocatalysis outperforms chemical catalysis because biocatalysed reactions are stereo- and regioselective and utilise ambient temperatures, atmospheric pressures, and can be performed under environmentally friendly conditions. It minimises the problems of isomerization, racemization, epimerization and rearrangement of molecules, which may occur during chemical processes. Biocatalysts embody the key chemical processes in life such as molecular recognition and selective catalysis and employ enzymes and microbial cells, which can be immobilised and reused over many cycles, and the over-expression of enzymes allows many biocatalytical processes to be economically efficient and inexpensive.

*Stereoselective Biocatalysis* examines the use of different classes of enzymes in the catalysis of many types of

chemical reactions to generate chiral molecules useful in the chemo-enzymatic synthesis of pharmaceutical, agricultural and food products. Over 29 chapters, it discusses the uses of hydrolytic enzymes and describes the uses of oxygenases in stereo- and regioselective hydroxylation, epoxidation reactions, and chemoenzymatic synthesis of chiral diols. The action of oxidoreductases in synthesis is covered, as is chemoenzymatic synthesis of pheromones, terpenes and bioregulators. The synthesis of chiral intermediates for new drug development is explored, and biocatalysis in the enantioselective formation of chiral cyanohydrins is illustrated. Furthermore, the book assesses organic synthesis involving enzyme-mediated decarboxylation reactions, the production of chiral  $\beta$ -hydroxy acids, and enzymatic deprotection techniques. It explains biocatalysis by PEG-modified enzymes and evaluates the effectiveness of supercritical carbon dioxide as a solvent, as well as covering much more besides.

The production of novel stereoselective biocatalysts has increased with advances in the production of tailor made enzymes by random and site-directed mutagenesis with

modified activity, and the preparation of thermostable and pH stable enzymes. This book will prove indispensable for organic and medicinal chemists, pharmacologists, chemical engineers, biochemists, microbiologists and upper level undergraduate and graduate students in these fields, giving details on the use of biocatalysts in organic synthesis. It contains over 4100 references, 1104 tables, micrographs and illustrations, as well as over 68 contributions by international experts in the field.

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PII: S0144-8617(00)00207-1