

Book Reviews

Recent Progress in Bioconversion of Lignocellulosics

Advances in Biochemical Engineering Biotechnology, Vol. 65; G.T. Tsao (Ed.); Springer, Berlin, 1999, vi + 292 pages, ISBN 3-540-65577-8, DM309.00

The continued development of biosustainable and renewable resource technology is of great importance with respect to environmental concerns. The successful and economic recycling of biomaterials will also assist in slowing down the continued deterioration of the environment. The bioconversion of lignocellulosics, natural and man-made, is an extremely important part of this process. This volume describes recent advances in the bioconversion of lignocellulosics. The volume begins with two articles on genetics and properties of cellulases and their reaction kinetics, molecular action and mechanisms. The cost of cellulases has been a hindrance to the large-scale use of enzymatic hydrolysis. Two articles on cellulase production by submerged fermentation and by solid state fermentation are included to describe the state of the art in this area.

Dilute acid hydrolysis of cellulose continues to be of interest as well as potentially useful. Treatment of lignocellulosic biomass with dilute sulphuric acid has been primarily used as a means of hemicellulose hydrolysis and pretreatment for enzymatic hydrolysis of cellulose. Significant advancement has also been made in the dilute acid hydrolysis of cellulose. The most recent advances in this area are discussed. Xylose utilisation is essential for the efficient conversion of lignocellulosic materials to fuels and chemicals. An article discusses the progress that has been made in genetic engineering for improved regulation of xylose fermentation by yeasts. A chapter on genetically engineered *Saccharomyces* for simultaneous fermentation of glucose and xylose describes the important advances made in production of fuel ethanol from lignocellulosic biomass.

In recent years there has been increasing interest in recycling and the reuse of scrap paper as well as other environmental considerations. An article discusses avenues for available research using cellulose (in the form of scrap paper) as a substrate for bioconversion that can lead to commercialisation. Vast amounts of renewable biomass are available for conversion into useful fuels and chemicals. In order to convert biomass to ethanol, the efficient utilisation of both cellulose-derived and hemicellulose-derived carbohydrates is essential. The final two articles present recent advances in the use of lignocellulosic biomass for the production of ethanol and organic acids, respectively.

The microbial production of multifunctional organic acids has received considerable interest due to their increased use in the food industry and their potential as raw materials for the manufacture of biodegradable polymers. In summary, this volume contains a wealth of useful information and will be invaluable to all researchers with interests in aspects of lignocellulosic science.

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Protective Groups in Organic Synthesis (3rd Edition)

T.W. Greene, P.G.M. Wuts; John Wiley & Sons, Inc., New York, 1999, xxi + 779 pages, £58-50, ISBN 0-471-16019-9

The development of new methods for functional group protection/deprotection continues to be an important facet of natural and unnatural product synthesis. When a chemical reaction is to be carried out selectively at one reactive site in a multifunctional compound, other reactive sites must be temporarily blocked. The selection of protective groups is therefore important in such a synthetic methodology. A protective group must react selectively in good yield to give a substrate that is stable to the projected reaction conditions. It must also be selectively removed in good yield by reagents that do not attack the regenerated functionality.

'Protective Groups in Organic Synthesis' aims to provide a detailed insight into the protection/deprotection methodologies available for the major classes of chemical functionality. The focus of the text is placed firmly upon chemical details rather than general discussion. The best methods of formation and cleavage and some information on the scope and limitations of each protective group are given. The protective groups that are used most frequently and that should be considered first are listed in detailed reactivity charts, which give an indication of the reactivity

of a protected functionality in various reagents. The introductory chapter focuses upon the role of protective groups in organic synthesis, whilst subsequent chapters are devoted to the protection of alcohol, phenol and catechol, carbonyl, carboxyl, thiol, amino, alkyne-CH, and phosphate groups. The sections on the protection of phosphates and the alkyne-CH are new for this edition, whilst all other sections have been expanded, some more than others. An effort was made to include more enzymatic methods of protection and deprotection. Most of these are associated with the protection of alcohols as esters and the protection of carboxylic acids. This section does not attempt to be exhaustive, but provides a sufficient number of cases to illustrate the true power of this technology and to refer the reader to several monographs and review articles cited in the references.

This '3rd Edition' updates the literature on protective groups, which was covered in the previous edition and successfully incorporates information on new groups that have been developed since the last publication. The first edition of this book contained approximately 1500 references and 500 protective groups, the second edition introduced an additional 1500 references and about 200 new protective groups, whilst this edition adds around 2500 new citations and 350 new protective groups. Emphasis has been placed upon providing recent references, since the original method may have been improved. New methods added to this edition come from both electronic searches and a manual examination of primary journals.

This comprehensive volume contains a wealth of information that is invaluable to the modern synthetic organic chemist. It is therefore highly recommended as an addition to the libraries of academic and industrial organisations concerned with organic synthesis.

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Handbook of Cereal Science and Technology, 2nd Edition, Revised and Expanded

Food Science and Technology Series, Vol. 99; K. Kulp, J.G. Ponte, Jr. (Eds.); Marcel Dekker, Inc., 2000, ix + 790 pages, US\$225.00, ISBN 0-8247-8294-1

It is now nearly 10 years since the publication of the first edition of this multi-authored Handbook on cereal science and technology. Hence, considering significant research

advances in biology, biochemistry, technology, and nutrition during this decade, "Handbook of Cereal Science and Technology, Second Edition, Revised and Expanded" is especially welcome.

This new edition, which has been significantly revised, updated, and expanded, gives a complete view of all the major aspects of cereal grain science, providing new and expanded treatment of food enrichment techniques, nutritional standards, and product quality evaluation. The opening chapters focus on the most important cereal grains (wheat, corn, barley, oats, sorghum, millets, rice, rye, triticale, and wild rice) covering aspects with respect to structure, composition, breeding, economic, production, processing, and utilisation. Because of the use of oilseeds to technologically related applications of various cereals, a new chapter on oilseed grains and oil-bearing materials has been included. Subsequent chapters discuss recent developments in the chemical composition and functionality of cereal components (proteins, carbohydrates, lipids, and minor constituents). These are followed by a discussion on quality evaluation of cereals and cereal products. Besides describing the main utilisation of cereals as food and food ingredients, non-food uses of cereals and microbiological processes are also covered. Nutritional information has been updated. Related to nutrition is the chapter on food enrichment and labelling, demonstrating the continued interest in fortification programs, as illustrated by the recent inclusion of folic acid as an enrichment factor.

The 790-page volume, supported by extensive literature reference, tables, figures, diagrams, high-quality photographs and schematics of instruments, will be invaluable for cereal chemists and biologists, agronomics, technologists, and nutritionists.

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Antioxidants in Muscle Foods

E.A. Decker, C. Faustman, C.J. Lopez-Bote (Eds.); John Wiley & Sons Ltd, 2000, 499 pages, £71.50, ISBN 0-471-31454-4

The main aim of the book is to examine dietary approaches for improving the quality of muscle based food products from livestock and fish. This is achieved in the main part by the addition of antioxidants (polyunsaturated fatty acids) to the feedstock consumed by the animals.