

Book reviews

Enzymes in Food Processing. Edited by G.A. Tucker and L.F.J. Woods, Blackie and Son Ltd, Glasgow and London, 1991. x+288 pp. Price £69.00. ISBN 0-216-92977-6.

Enzymes, as functional ingredients either in partially purified form or as components of whole systems, have been used for several years in a variety of food processes. However, unsuitable reaction conditions, instability of the enzyme during processing, or the high cost involved in obtaining large amounts of sufficiently pure enzyme have limited the use of enzymes in the food industry.

'Enzymes in Food Processing' covers the basics of enzyme activity that are required to understand the use of enzymes. The general applications and limitations of enzymes in food processing as well as new technologies and how these may be applied to expand the use of enzymes in food processing are discussed in great detail. 'Enzymes in Food Processing' also provides information on specific industrial applications of enzymes in the food industry. The dairy, meat, baking, beverage, sugar and oil industries are extensively treated in several chapters of the book. The book also speculates on the increased use of enzymes in the future. The last chapter of the book considers the kinetics of enzymes in relation to their use as analytical reagents, followed by a description and discussion of the microbiological and non-microbiological applications in relation to food analysis. Future trends in enzyme-based clinical diagnosis with potential for applications in the food sector are also considered.

'Enzymes in Food Processing', backed by extensive literature reference, offers primary value for food technologists, chemists, biochemists and microbiologists working with enzymes as well as students of food science and those working in academic and research institutions.

**Mercedes Garaita
John F. Kennedy**

Glycoconjugates—Composition, Structure, and Function. Edited by H.J. Allen and E.C. Kisailus, Marcel Dekker, Inc., New York, 1992. viii+684 pp. Price US\$195.00. ISBN 0-8247-8431-6.

Various types of compounds consisting of carbohydrates covalently linked with other types of chemical constituents are classified under the general name of glycoconjugates. The major groups of glycoconjugates are the glycoproteins, glycopeptides, peptidoglycans, glycolipids, and lipopolysaccharides. They are ubiquitous in nature and are present in almost all forms of life: animals, plants, and microorganisms. The diverse

biological functions that these macromolecules perform, include among others, enzymatic catalysis, hormonal control, immunological protection, ion transport, blood clotting, lubrication, surface protection, structural support, cell adhesion, intercellular interaction and most importantly recognition in general.

Compared with proteins, lipids, and nucleic acids, carbohydrates constitute the most complicated set of biological polymers for structural characterization. Molecular parameters of ring size, anomeric configuration, position of linkage between monomers, sequence of sugar epimers or sugar types and branching all contribute toward structural diversity. All of these stereochemical and isomeric parameters confer biological activity.

The interest in glycoconjugates has arisen tremendously in the past decade. Systematic research on them has been conducted in various fields such as molecular biology, medicine, organic synthesis, organic analysis and genetic engineering, to gain a better understanding of the structural, biosynthetic data and functional role of glycoconjugates.

This book presents a practical overview of the significant contemporary information in the field of glycobiology, and integrates the structural and biosynthetic data with the functional role of glycoconjugates successfully. Without doubt this is good for the understanding of glycobiology. 'Glycoconjugates' contains 19 chapters, that discuss current approaches to elucidating oligosaccharide structures, the mechanisms of biosynthesis and turnover of these structures, the characteristics of macromolecules that interact with glycoconjugates; it presents the emerging role of molecular biology in the study of glycoconjugates, and presents plausible concepts concerning glycoconjugate function. This book also contains a chapter that presents a summary of the rules of nomenclature for various saccharides and glycoconjugates that will assist beginners in this field in understanding the scientific presentations.

Some minor points detract a little from this otherwise good book: The references on pages 190–202, 354–360, and 655–671 are of a different style from the others. Also the references on pages 98–102 and 515–519 are different from the rest of the book. Most parts of this book summarize significant up-to-date information in the field of glycobiology, but Chapter 6 contains information only up to 1987, and Chapter 16 up to 1988. Also, Chapter 19 and one or two others are too specialized for beginners in this field.

This book is a good source of information on new concepts, experimental approaches, and the biological significance of glycoconjugates, lectins, and other

glycoconjugate receptors for readers who are interested in glycobiology and have a background in biochemistry and cell biology. It is also useful for those who carry out research and development in glycobiology and has value for researchers in related areas because they will find some stimulating ideas.

John F. Kennedy
Yu Fang

Food Irradiation: A Guidebook. Edited by M. Satin, Technomic Publishing AG, Basel, 1993. xxi+185 pp. Price SFr. 67.00. ISBN 1-56676-037-2.

Food irradiation has recently become a subject of discussion in public. However, it seems that there is confusion and misunderstanding about this kind of food treatment leading to many fears and insecurities at the consumer level. Although food irradiation has been scientifically proven to be safe, this method is only starting to be applied commercially.

Radiation can be used to prevent the spread of food-borne diseases—illnesses from eating food that contain toxins or pathogens—and prevent food loss by eliminating pathogen microorganisms. The idea of using ionising radiation to destroy microorganisms in food materials is centuries old but it took nearly a century for the methodology to get accepted. This book tries to clear up the reasons for the delay in the introduction of food irradiation. It starts by giving a technical insight into the methodology followed by a comparison of the developmental history of food irradiation and pasteurisation. The author then lists a variety of food-borne diseases including the microorganisms causing them. The next chapters concentrate on the applications of food irradiation citing a range of examples. Finally objections and questions raised by the consumer and its advocacy groups are analysed and discussed.

This book gives a general overview of the state of the topic. It studies the technology, the issues and the conflicts of interest that have come into play to prevent access to food irradiation. Since the book explains very fundamental features, e.g. what is a microorganism? or what are ions?, and avoids any mathematical or chemical derivation, virtually no previous knowledge is necessary for the understanding. The carbohydrate scientist who is interested in the changes of food carbohydrates as caused by irradiation, however, will not find any detailed information. 'Food Irradiation' can therefore only be recommended to readers who just want to get a general idea on this topic but do not expect a thorough analysis.

Karin Pawlowsky
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Food Biotechnology—Techniques and Applications. Edited by Gauri S. Mittal, Technomic Publishing Co.,

Inc., Basel, 1992. x+380 pp. SFr. 209. ISBN 0-87762-888-2.

Biotechnology may be defined as the integrated use of biochemistry, microbiology and biochemical, genetic, and process engineering to manufacture products by utilising bacteria, fungi, yeasts, algae, plant cells, or cultured mammalian cells as constituents of industrial processes. Such techniques have been used in food processing since ancient times, however, intensive research and development in this area has only been initiated in recent years. New techniques are being used in many food processes to improve food quality, safety, nutritional value and palatability, and to develop new food products.

Biotechnology is an area of expansion and opportunity involving many sectors of industry. Many common foods and beverage products are based on natural fermentation (bread, wine, pickles, yoghurt, cheese, etc.) or are based on the use of enzymes (beer, tenderised meat, and cheese). In food processing it is used in two ways: (1) to design microorganisms that transform inedible biomass into food for human consumption, or into feed for animals; and (2) to use biological systems as an aid during food processing, either by acting directly on the food itself or by providing materials that can be added to food.

The book is divided into eleven chapters, with a glossary of important terms. Chapter 1 introduces the field of food biotechnology, its importance and present trends. Genetic engineering principles, including recombinant DNA techniques, are discussed in Chapter 2. Chapter 3 surveys plant tissue and cell culture techniques including embryogenesis and protoplast fusion, whilst Chapter 4 deals with microbial synthesis and production. Mutagenesis (random, *in vitro*, site directed) and protein engineering are covered in Chapter 5. Chapter 6 provides an in-depth view of the immobilisation techniques for enzymes and cells. Techniques of biosensor development are described in Chapter 7. These include potentiometric, amperometric, calorimetric, optical, conductimetric and piezoelectric biosensors. DNA, microbe, and enzyme probes are also explained. Down-stream processing is discussed in Chapter 8, whilst Chapter 9 deals with fermentation. Scale-up techniques are discussed in Chapter 10, and applications are explained in Chapter 11.

This book is a most valuable manual and reference work, giving the food scientist a thorough and comprehensive account of innovative and already established food biotechniques. It is encyclopedic in scope, systematically covering the important techniques used in every area of food biotechnology today, and should therefore prove to be a vital addition to the library of any food scientist.

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