

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.

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**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.

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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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