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Book reviews

H. Ramaswamy, M. Marcotte (Eds.), Food Processing: Principles and Applications, CRC Press, Taylor and Francis Group, Boca Raton, FL, USA, 2006 (xvi + 420 pp., £39.99, ISBN 1-58716-008-0)

Food, whether from an agricultural or animal source is highly perishable item and preservation of food has been carried out by man using various means for many years in order to ensure a supply between growing seasons. Thus, the major emphasis of food processing is preservation or shelf life extension of food products by preventing undesirable changes in the wholesomeness, nutritive value and sensory qualities—a topic which definitely involves the physical and physicochemical properties of carbohydrates. The problems in food preservation are caused by wide range of reactions such as physical, chemical, enzymatic and microbiological. They may be prevented or minimized by a range of formulation, processing, packaging and storage techniques including the use of additives. However, the current trend is the minimal use of chemically preservatives, which has implications for the safety of food products. Therefore, new methods of preservation may benefit particularly in new combinations with the new and existing techniques.

Food Processing: Principles and Applications, discusses the basic principles and applications for major processing techniques of commercial importance. The main emphasis is given on three methods of food preservation, i.e. thermal processing, freezing, and dehydration. Both science and engineering principles are covered, highlighting the chemical and microbiological basis of food preservation and covering the mathematical basis for modelling and processing applications. The book opens with an introductory chapter on an overview of the food processing needs and principles. The basic information on units, dimensions, conversions, common terms, mass balance, energy balance, heat transfer, fluid flow, rheological and thermophysical properties is covered in the Chapter 2.

Thermal processing is the primary method for ensuring microbial safety of food products. The major shifts in consumer demand and regulatory burden have increased the importance of thermal processing in food processing. Chapter 3 details the principles of thermal processing, emphasizing the use of process calculation methods and equipment for thermal processing. Low temperature preservation is discussed in the subsequent chapter, in which refrigerated storage is discussed first, followed by freezing techniques.

Food dehydration offers a cost effective and very practical means of food preservation. Drying technology extends the availability of seasonal commodities, retaining their nutritive values and adding variety to the routine diet. Different aspects of food dehydration have been described in the Chapter 5. Different separation and concentration processes such as evaporation, membrane processing, freeze concentration, extraction and osmotic dehydration are discussed in the last chapter.

In conclusion, this volume explores both the basic and applied aspects of food processing with particular emphasis on three main techniques of food preservation. This book can be a useful resource not only to the students but also to the researchers working in the area of food processing and preservation.

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C.M. Smales, D.C. James (Eds.), Therapeutic Proteins: Methods and Protocols, Humana Press Inc., Totowa, New Jersey, USA, 2005 (xiv + 482 pp., £79.50, ISBN 1-58829-390-4)

Modern molecular biology with recombinant DNA techniques has made possible to produce a wide range of natural and modified proteins. In addition, hybridoma technology introduced a new class of protein/glycoprotein reagents—the monoclonal antibodies that provide an alternate approach to treat many diseases. It is now possible to produce not only the recombinant version of natural proteins, but also proteins that have been engineered with improved characteristics. Various approaches have been used to modify the therapeutic activity of proteins, improve their stability, or reduce the rate of clearance, including amino acid substitutions, fusion of peptide sequences, and glycosylation engineering etc.

Therapeutic Proteins; Methods and Protocols, the volume 308 of *Methods in Molecular Biology*™ series, discusses the different techniques for the production of therapeutic proteins. The book opens with an introductory chapter on

biopharmaceutical proteins, in which opportunities and challenges of this emerging field are discussed. A list of approved biopharmaceutical proteins is also given in the chapter. The other chapters of the book describe the complete methods and materials for producing therapeutic proteins from different potential sources.

This volume explains the protocols for production of therapeutic proteins from a variety of sources, including bacterial and yeast expression systems, insect and mammalian cells. It covers the purification of the resulting protein using both state-of-the-art and traditional methods, such as those sourced from plasma. Protocols for the characterization of the therapeutic proteins throughout the production process are described, along with viral inactivation and protein formulation methods and strategies.

The book contains both general methods and specific case studies that may be equally applicable to other systems or recombinant proteins. Every chapter contains a useful introduction describing theory and background to the method, which is then followed by materials required for the experimentation. The method section describes every step of the protocol and is cross-referenced to notes section, which would be highly useful for a researcher for successful experimentation.

This unique volume provides a comprehensive coverage for protein drug production from expression to formulation. The protocols are well illustrated with suitable figures, tables and recent references. In conclusion, this book is big contribution to the emerging and fascinating area of therapeutic proteins and will serve as an excellent source of practical information for protein scientists, chemists, biochemical/biomedical engineers, molecular biologists and biotechnologists.

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Jörg-Rüdiger Hill, Lalitha Subramanian and Amitesh Maiti, Molecular Modeling Techniques in Material Sciences, CRC Press, Taylor & Francis Group, Boca Raton, FL, USA, 2005 (xiii + 313 pp., £68.99, ISBN 0-8247-2419-4)

Three-dimensional structures, chemical processes and physiochemical properties of molecules and solids can be simulated and predicted by molecular modeling. Molecular modeling is a combination of chemistry techniques and graphics visualisation. Molecular modelling is becoming quite popular in pharmaceutical companies.

Molecular Modeling Techniques in Material Sciences opens with chapter one discussing scope of materials and describes the uses and applications of materials and their technological uses and details the general structure of molecular modeling programs, computer hardware and software related to molecular modelling. Chapter two discusses modeling of metal oxides and details electronic structure methods; cluster models, periodic calculations, and adsorption on metal oxides surfaces. Also detailing force field methods; surfaces and crystal morphology, defects and transport. The following chapter is concerned with microporous materials, zeolites which are mostly made up of silicon and oxygen are examples of microporous materials and have pores of molecular dimensions. The next chapter is about glass and discusses simulation of silica glass, alkali silicate glasses, aluminosilicate, borosilicate and other glasses, simulation of glass surface and diffusion and calculation of glass properties. Chapter five goes on to describe semiconductors and superconductors. Examples of semiconductors include elemental Si, Ge and compounds GaAs, GaP and ZnSe material. Semiconductors are crystals with narrow energy gaps between filled valence bands and empty conduction bands. Chapter six titled 'Nanomaterials', discusses different types of nanomaterials, synthesis methods and potential uses. Nanomaterials are used in light and electron emitting devices, structural materials, energy conversion and storage, catalysts, medical implants, drugs, medical imaging and drug delivery. Also discussed are nanowires and nanoribbons. The final chapter is titled 'Theoretical background', and explains quantum chemistry, covering the wave function and the Schrödinger equation, many particle systems, orbitals, the Hartree–Fock equations, the Roothaan–Hall method, basis sets, the direct self-consistent field (SCF) method, potential energy hypersuperfaces, forces, density functional theory, applications to solids-Bloch's theorem, tight binding theory, nearly-free-electron theory-plane waves and pseudopotentials, semi-empirical methods, the basis set superposition error and nuclear magnetic resonance spectra. Another topic explained is vibrational spectra, followed by statistical mechanics, which covers partition functions, calculation of thermodynamic functions. Molecular mechanics is explained and covers force fields, ion pair and shell model potentials, molecular mechanics force fields, comparison of ion pair and molecular mechanics force fields, force field parameterization and rule based force fields. Next detailed is combining quantum mechanics and force fields embedding, explaining mechanical embedding, electronic embedding, modeling reactions with embedding. This chapter also deals with Monte Carlo calculation, which can be used to study behaviour of molecules at a non-equilibrium configuration and prediction of macroscopic properties. This is followed by molecular dynamics calculations and grand canonical molecular dynamics.

This book provides an excellent introduction to molecular modeling techniques in materials sciences, and uses numerous equations, tables and illustrations to support the text.