

Acta Alimentaria, Vol. 46 (2), pp. 259–265 (2017)

DOI: 10.1556/066.2017.46.2.16

BOOK REVIEWS

Confectionery and chocolate engineering – Principles and applications, 2nd edition

F.Á. MOHOS

Wiley Blackwell, Chichester, UK; Hoboken, US

ISBN: 978-1-118-93977-2 (print), 792 pages

Confectionery and chocolate manufacture has been dominated by large-scale industrial processing for several decades. It is often the case though, that a trial and error approach is applied to the development of new products and processes, rather than verified scientific principles.

The purpose of this book is to describe the major features of unit/physical operations, the chemical operations such as inversion, caramelization, and the Maillard reaction, as well as the complex operations as conching, drying, frying, baking, and roasting, that are used in confectionery manufacture. A study of confectionery and chocolate engineering must therefore examine the physical and chemical, as well as the biochemical and microbiological properties of the processed materials. In this way, verified scientific principles may be more consistently applied to new process and product development.

Because both raw materials and end products in the confectionery industry are diverse, and because the operations – which affect these mostly cellular materials – have particular properties, a new approach to the subject is needed, in contrast to the usual technology-focused discussion.

This volume offers a scientific, theoretical description and analysis of confectionery manufacture, building on a background of chemical engineering and a system's approach theory called "structure theory," as described by Blickle and Seitz (1975). Structure theory deals with the interrelationships of properties of the materials produced, the manufacturing operations, and the machinery itself. In the author's comprehension these may be imagined as a technological triangle graph where the vertices are the sets of material properties and the edges are the relations between them. These combined operations are linked as well in detailed technological lay-outs of the most important product groups.

This second edition adds to information presented in the first edition on essential topics such as food safety, quality assurance; sweets for special nutritional purposes, artisan chocolate, and confectioneries. In addition, information is provided on the fading memory of viscoelastic fluids, which are briefly discussed in terms of fractional calculus, and gelation as a second order phase transition.

The author, who has over 40 years' experience in confectionery manufacture, aims to open up new possibilities for process and product improvement, relating to increased efficiency of operations, the use of new materials, and new applications for traditional raw materials.

This book is aimed at food engineers, scientists, and technologists in research and industry, as well as graduate students in relevant food and chemical engineering-related courses.

The author, Professor Ferenc Mohos chaired the Codex Alimentarius Hungaricus Confectionery Products Working Committee for two decades, whilst being the managing director of his consulting company, Food Quality 1992 Ltd., Budapest. Presently, he is affiliated with the Szeged University and also the Szent István University of Gödöllő/Budapest, Hungary.

BADAKNÉ KERTI K.,
Chair of the Codex Alimentarius Hungaricus,
Confectionery Products Working Committee

Food packaging

Nanotechnology in the agri-food industry, Vol. 7

A.M. GRUMEZESCU (Ed.)

Elsevier Science Publishing Co Inc., 2017, 125 London Wall, London EC2Y 5AS, United Kingdom
ISBN: 978-0-12-804302-8, 796 pages

The editor, A.M. Grumezescu is an assistant professor at the Department of Science and Engineering of Oxide Materials and Nanomaterials at the University Politehnica of Bucharest in Romania. He is an experienced and oft-published researcher and editor in the field of nano- and biostructures, and he is the Editor-in-Chief of four journals.

Food Packaging book is the 7th volume of “Nanotechnology in the agri-food industry” series, focuses on the development of novel nanomaterials, the enhancement of barrier performance of non-degradable and biodegradable plastics as well as their fabrication and application in industrial packaging.

This book contains several fabrication techniques of most investigated materials for advanced food package such as nanocoating, nanofiber films, nanocompositing, multilayer structures, and layer-by-layer nanoassemblies based on synthetic and bio-based polymers. Furthermore, there is a presentation of the latest information on new biodegradable materials using fabrications of new high barrier plastics to enhance research. This volume provides examples of risk assessment for nanomaterials for food safety and the benefits of antimicrobial food packaging.

This volume contains 20 chapters. These include for example renewable sources for food packaging, smart biodegradable packaging material for food preservation, encapsulation of sensors, fabrication of high barrier plastics, bioactive food packaging with nanodiamond particles, flexible packaging for high hydrostatic pressure, nanoencapsulation of flavour and aromas, etc.

This book is a valuable resource for anyone in the food industry who needs the most current information and scientific advances in the field of nanotechnology as applied to food packaging.

L. SZALÓKI-DORKÓ

Food processing technology

Principles and practice

P.J. FELLOWS (Ed.)

Woodhead Publishing, Cambridge, 2017, Series in Food Science, Technology and Nutrition, Fourth Edition
ISBN: 978-0-08-101907-8, 1152 pages

Food processing is a multidisciplinary subject that includes chemistry/biochemistry, physics, biology, microbiology, sensory analysis, engineering, marketing, finance and economics, managements and psychology.

This edition includes an overview of the component subjects in food science and technology, processing stages, important aspects of food industry management not otherwise considered (e.g. financial management, marketing, food laws and food industry regulation), value chains, the global food industry, and over-arching considerations (e.g. environmental issues and sustainability). In addition, this fourth edition has been substantially updated, rewritten and extended with a new chapter on industrial cooking, heat removal, storage and distribution.

The book contains five parts: Part I. "Basic principles" describes important basic concepts, including food composition, physical and biochemical properties, food quality and safety, process monitoring and control. Part II. "Ambient temperature processing" contains operations that take place at ambient temperature or involve minimum heating foods. Part III. "Processing by application of heat" includes operations to preserve or alter eating quality of heated foods. Part IV. "Processing by removal of heat" describes operations that remove heat from foods to extend their shelf-life with minimal changes to nutritional quality or sensory properties. Part V. "Postprocessing operation" contains packaging, storage and distribution logistics.

In summary, this updated edition consolidates the position of this foundational book as the best single-volume introduction to food manufacturing technologies available, remaining as the most adopted standard text for many food science and technology courses.

L. SZALÓKI-DORKÓ

Lactose-derived prebiotics – A process perspective

A. ILLANES, C. GUERRERO, C. VERA, L. WILSON, R. CONEJEROS and F. SCOTT

Academic Press is an imprint of Elsevier, London, UK, San Diego, USA, Cambridge, USA, Oxford, UK, 2016
ISBN: 978-0-12-802724-0 (print), 312 pages

Prebiotics are promising and ever growing sources of the ingredients for functional foods. Among them, lactose-derived prebiotics are unique in their properties and origin. Since whey, the major by-product in dairy industry, is rich in lactose, converting it into valuable prebiotics is important in the perspective of profit as well as environment. This recently published book, entitled “Lactose-derived prebiotics – A process perspective” is the first overview of the scientific-technological processes to derive oligosaccharides from lactose for use in functional foods.

The book is divided into eight chapters, where Chapter 1 presents whey as raw material for lactose production, technological platforms for lactose upgrading, and enzymatic processes for lactose conversion. In Chapter 2, entitled Functional foods and feeds, the authors summarize new trends in human and animal feeding, the concept, present status, and challenges of pro-, pre-, and synbiotics. Chapter 3 presents production, present status, technological perspectives, and market outlook of lactose-derived non-digestible oligosaccharides. Chapters 4, 5, and 6 present enzymatic production of galacto-oligosaccharides, lactulose, and other prebiotic candidates in detail, where the authors review different enzymatic technologies, their mechanisms and optimization, the downstream processes, and applications of these prebiotics in food and feed. Chapter 7 summarizes the industrial production of lactose-derived prebiotics from technical and economic points of view. In the last chapter, the authors report the future trends of lactose-derived non-digestible oligosaccharides production and application.

This handbook is a comprehensive guide for dairy scientists and engineers working in the industry, and also for product development professionals and researchers with an interest in this area, to get acquainted with the challenges and opportunities of deriving oligosaccharides from lactose.

Zs. ZALÁN

Nanobiosensors

A. GRUMEZESCU (Ed.)

Nanotechnology in the Agri-Food Industry Vol. 8. Academic Press is an imprint of Elsevier, 125 London Wall, London EC2Y 5AS, United Kingdom
ISBN: 978-0-12-804301-1, 926 pages

This multivolume series was developed by the increasing need to summarize the recent progress, and applications by investigating nanotechnology on the field of agri-food science. Accordingly, the series entitled Nanotechnology in the agri-food industry brings comprehensive and recent knowledge regarding the impact of the research of different nanomaterials on the mentioned field. Volume VIII deals with the “Nanobiosensors” in 20 chapters, prepared by outstanding international researchers. As nanobiosensors are robust, rapid, inexpensive, and safe alternative technologies for monitoring, testing and detection of harmful or dangerous contaminants in foods. Due to their high sensitivity and selectivity, they have attracted attention for monitoring various biological, chemical or even physical hazards in food. A special attention is given to the detection of microbial contaminants and harmful metabolites, such as toxins and hormones, which have a great impact both on humans and animal health and feed.

Besides giving a general overview about the possible application of biosensors in the food analysis, more chapters summarize the results of the cutting edge research and investigations regarding biosensors for detection of mycotoxins and pathogenic bacteria in food. Different technological points of view are delineated, focused on the antibodies and DNA/RNA aptamers based biosensors; the application of gold and silver plasmonic nanoparticles for detecting hazardous factors; review of the new trends in nanomaterial-based electrochemical biosensors; the use of hybrid nanomaterials for food analysis. Various nanomaterial-based sensor platforms for facile detection of food contaminants, evanescent field effect based nanobiosensors applicable in agro-environmental and food safety, even as micro- and nanotechnology-based approaches including the nanocomposite biosensors for point of care are summarized. Separate chapters discuss the potential, advantages and drawbacks of fluorescent-based quantum dots in food contaminant detection.

The application of nanomaterials-based optoelectronic noses for food monitoring and identification of spoilage or freshness and of other type of nanotechnology-based contaminant sensors (e.g. E-nose, E-tongue, Lab-on-chip nanotechnology-based pathogen sensors, surface enhanced Raman scattering-based sensors) is detailed.

Special attention is given to the determination of melamine in food products, to the possible prevention of food spoilage by monitoring of humidity and excess gasses in production, packaging, and storage processes by conductive and photoconductive humidity nanosensors, and to the new trends of design, application, and constituents of the main types of nanosensors – radio frequency identification, for sensing gas and nanobiosensors.

In conclusion, “Nanobiosensors” is recommended for professionals, researchers, academic staff and students across all of food science.

N. ADÁNYI

Sustainable protein sources

S.R. NADATHUR, J.P.D. WANASUNDARA and L. SCANLIN (Eds)

Academic Press is an imprint of Elsevier, London, UK, San Diego, USA, Cambridge, USA, Oxford, UK, 2016
ISBN: 978-0-12-802778-3 (print), 456 pages

Proteins are essential food ingredients for growth and development of children and for the maintenance of the health status of grownups. Therefore, protein plays a critical role in human nutrition. Although animal-derived proteins constitute the majority of protein consumed (including meat, fish, milk, and eggs), plant-derived proteins (from soy, wheat, vegetables) can also fulfil the nutritional, health, and consumers' requirements, moreover with less environmental and cost impact. Furthermore, novel protein sources (like insects) are expected to enter the European feed, food production and food market as alternative replacers of animal-derived proteins.

Consumers expect from food products with alternative sources of protein an excellent product performance regarding taste, nutritional value, texture, and consumer satisfaction. The book allows readers to understand that unique technologies in protein research, including innovation, also is crucial in providing enough, safe, and healthy foods for the future. The book also explores opportunities for "protein innovations" to improve their utilization, to make current production and consumption of proteins more sustainable by modifying the production of animal proteins, and to develop new protein products.

However, food safety aspects of these novel protein sources are not well known; the book delves into food security, the EU requirements on food safety hazards of alternative protein sources.

First the book introduces and defines proteins themselves, referring particularly to their structure levels, existing classification systems, and their role in food and diet, beside the challenges in feeding global population. It presents chapter-by-chapter the proteins from various sources, including cereals and legumes, oilseeds, pseudo-cereals, fungi, algae, and insects. It assesses their nutrition value, functionality, and provides an overview of their production, including processing, protein isolation, possible applications, and their benefits.

This handbook is a comprehensive guide for protein scientists, protein engineers, product development professionals, and the usual consumer citizens.

K. TAKÁCS

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