

## **Emerging Food Packaging Technologies Principles And Practice Woodhead Publishing Series In Food Science Technology And Nutrition Ips By Yam Kit L Author May 03 2012 Hardcover**

Eight papers from a symposium in San Diego, November 1989, and an introductory overview discuss aspects of the food packaging industry, including extending the shelf life of products through computer modeling, the effect of the food on the package, flavor management, and techniques to evaluate packa

Trends in Beverage Packaging, volume 16 in the Science of Beverages series, presents an interdisciplinary approach that provides a complete understanding of packaging theories, technologies and materials. This reference offers a broad perspective regarding current trends in packaging research, quality control techniques, packaging strategies and current concerns in the industry. Consumer demand for bottled and packaged beverages has increased, and the need for scientists and researchers to understand how to analyze quality, safety and control are essential. This is an all-encompassing resource for research and development in this flourishing field that covers everything from sensory and chemical composition, to materials and manufacturing. Includes information on the monitoring of microbial activity using antimicrobial packaging detection of food borne pathogens Presents the most up-to-date information on innovations in smart packaging and sensors for the beverages industry Discusses the uses of natural and unnatural compounds for food safety and good manufacturing practices

Nanotechnology has developed remarkably in recent years and, applied in the food industry, has allowed new industrial advances, the improvement of conventional technologies, and the commercialization of products with new features and functionalities. This progress offers the potential to increase productivity for producers, food security for consumers and economic growth for industries. Food Applications of Nanotechnology presents the main advances of nanotechnology for food industry development. The fundamental concepts of the technique are presented, followed by examples of application in several sectors, such as the enhancement of flavor, color and sensory characteristics; the description of the general concepts of nano-supplements, antimicrobial nanoparticles and other active compounds into food; and developments in the field of packaging, among others. In addition, this work updates readers on the industrial development and the main regulatory aspects for the safety and commercialization of nanofoods. Features: Provides a general overview of nanotechnology in the food industry Discusses the current status of the production and use of nanomaterials as food additives Covers the technological developments in the areas of flavor, color and sensory characteristics of food and food additives Reviews nanosupplements and how they provide improvements in nutritional functionality Explains the antibacterial properties of nanoparticles for food applications This book will serve food scientists and technologists, food engineers, chemists and innovators working in food or ingredient research and new product development. Gustavo Molina is associate professor at the UFVJM (Diamantina—Brazil) in Food Engineering and head of

the Laboratory of Food Biotechnology and conducts scientific and technical research. His research interests are focused on industrial biotechnology. Dr. Inamuddin is currently working as assistant professor in the chemistry department of Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia. He is also a permanent faculty member (assistant professor) at the Department of Applied Chemistry, Aligarh Muslim University, Aligarh, India. He has extensive research experience in multidisciplinary fields of analytical chemistry, materials chemistry, and electrochemistry and, more specifically, renewable energy and environment. Prof. Abdullah M. Asiri is professor of organic photochemistry and has been the head of the chemistry department at King Abdulaziz University since October 2009, as well as the director of the Center of Excellence for Advanced Materials Research (CEAMR) since 2010. His research interest covers color chemistry, synthesis of novel photochromic and thermochromic systems, synthesis of novel coloring matters and dyeing of textiles, materials chemistry, nanochemistry and nanotechnology, polymers, and plastics. Franciele Maria Pelissari graduated in Food Engineering; earned her master's degree (2009) at the University of Londrina (UEL), Londrina, Brazil; and her PhD (2013) at the University of Campinas (Unicamp), Campinas, Brazil. Since 2013, she has been associate professor at the Institute of Science and Technology program at the Federal University of Jequitinhonha and Mucuri (UFVJM), Diamantina, Brazil, in Food Engineering, and also full professor in the graduate program in Food Science and Technology.

In this volume, several new food processing and preservation technologies have been investigated by researchers that have the potential to increase shelf life and preserve the quality of foods. This handbook introduces some emerging techniques in the food processing sector, focusing on nonthermal techniques such as high-pressure processing, ultrasonication of foods, microwave vacuum dehydration, thermoelectric refrigeration technology, advanced methods of encapsulation, ozonation, electrospinning, and mechanical expellers for dairy, food, and agricultural processing. These all have a wide range of application. The volume includes studies that show the successful application of these new technologies on a large number of juices, cheeses, yogurts, soups, egg whites and eggs, vegetable slices, purees, and milk, and the extraction, drying enhancement, and modification of enzymes are reported. This volume, part of the multi-volume Handbook of Research on Food Processing and Preservation Technologies will have tremendous application in different areas of the food industry, including food processing, preservation, safety, and quality evaluation. Other volumes of this handbook cover a wide of other emerging technologies. Handbook of Research on Food Processing and Preservation Technologies: Volume 2: Nonthermal Food Preservation and Novel Processing Strategies is an excellent reference resource for researchers, scientists, faculty and students, growers, traders, processors, industries, and others for looking for new nonthermal approaches for food processing and preservation.

A comprehensive and accessible textbook, Food Packaging: Principles and Practice, Second Edition presents an integrated approach to understanding the principles underlying food packaging and their applications. Integrating concepts from chemistry, microbiology, and engineering, it continues in the fine tradition of its bestselling predecessor - and has been completely updated to include new, updated, and expanded content. The author divides the book's subject matter into five parts for ease-of-use. The first

part addresses the manufacture, properties, and forms of packaging materials, placing emphasis on those properties that influence the quality and shelf life of food. The second part then details the various types of deteriorative reactions that foods undergo, examines the extrinsic factors controlling their reaction rates, and discusses specific factors influencing shelf life and the methodology used to estimate that shelf life. Chapters on the aseptic packaging of foods, active and intelligent packaging, modified atmosphere packaging, and microwavable food packaging are explored in the third part, while the fourth part describes packaging requirements of the major food groups. The final section examines the safety and legislative aspects of food packaging. The book also includes over 300 industry abbreviations, acronyms, and symbols, and an expansive index. What's New in the Second Edition: Includes five new chapters and diagrams that explain recent developments in packaging materials and processes Provides the latest information on new and active packaging technologies Presents new, updated, and expanded references Adhering to the highly organized format that made the first edition so straightforward and informative, this latest edition of Food Packaging: Principles and Practice presents students with the most essential and cutting-edge information available. The author maintains a website with more information.

Food Packaging: Principles and Practice, Third Edition presents a comprehensive and accessible discussion of food packaging principles and their applications. Integrating concepts from chemistry, microbiology, and engineering, it continues in the tradition of its bestselling predecessors and has been completely revised to include new, updated, and expanded content and provide a detailed overview of contemporary food packaging technologies. Features Covers the packaging requirements of all major food groups Includes new chapters on food packaging closures and sealing systems, as well as optical, mechanical, and barrier properties of thermoplastic polymers Provides the latest information on new and active packaging technologies Offers guidance on the design and analysis of shelf life experiments and the shelf life estimation of foods Discusses the latest details on food contact materials including those of public interest such as BPA and phthalates in foods Devotes extensive space to the discussion of edible, biobased and biodegradable food packaging materials An in-depth exploration of the field, Food Packaging: Principles and Practice includes all-new worked examples and reflects the latest research and future hot topics. Comprehensively researched with more than 1000 references and generously illustrated, this book will serve students and industry professionals, regardless of their level or background, as an outstanding learning and reference work for their professional preparation and practice.

As the complexity of the food supply system increases, the focus on processes used to convert raw food materials and ingredients into consumer food products becomes more important. The Handbook of Food Engineering, Third Edition, continues to provide students and food engineering professionals with the latest information needed to improve the efficiency of the food supply system. As with the previous editions, this book contains the latest information on the thermophysical properties of foods and kinetic constants needed to estimate changes in key components of foods during manufacturing and distribution. Illustrations are used to demonstrate the applications of the information to process design. Researchers should be able to use the information to pursue new directions in process development and design, and to identify future directions for research on the physical properties

of foods and kinetics of changes in the food throughout the supply system. Features Covers basic concepts of transport and storage of liquids and solids, heating and cooling of foods, and food ingredients New chapter covers nanoscale science in food systems Includes chapters on mass transfer in foods and membrane processes for liquid concentration and other applications Discusses specific unit operations on freezing, concentration, dehydration, thermal processing, and extrusion The first four chapters of the Third Edition focus primarily on the properties of foods and food ingredients with a new chapter on nanoscale applications in foods. Each of the eleven chapters that follow has a focus on one of the more traditional unit operations used throughout the food supply system. Major revisions and/or updates have been incorporated into chapters on heating and cooling processes, membrane processes, extrusion processes, and cleaning operations.

Now in a fully revised and updated second edition, this volume provides a contemporary overview of food processing/packaging technologies. It acquaints the reader with food preservation processes, shelf life and logistical considerations, as well as packaging materials, machines and processes necessary for a wide range of packaging presentations. The new edition addresses environmental and sustainability concerns, and also examines applications of emerging technologies such as RFID and nanotechnology. It is directed at packaging technologists, those involved in the design and development of packaging, users of packaging in food companies and those who specify or purchase packaging. Key Features: An up-to-date and comprehensive handbook on the most important sector of packaging technology Links methods of food preservation to the packaging requirements of the common types of food and the available food packages Covers all the key packaging materials - glass, plastics and paperboard Fully revised second edition now covers sustainability, nanotechnology and RFID

The successful employment of food packaging can greatly improve product safety and quality, making the area a key concern to the food processing industry. Emerging food packaging technologies reviews advances in packaging materials, the design and implementation of smart packaging techniques, and developments in response to growing concerns about packaging sustainability. Part one of Emerging food packaging technologies focuses on developments in active packaging, reviewing controlled release packaging, active antimicrobials and nanocomposites in packaging, and edible chitosan coatings. Part two goes on to consider intelligent packaging and how advances in the consumer/packaging interface can improve food safety and quality. Developments in packaging material are analysed in part three, with nanocomposites, emerging coating technologies, light-protective and non-thermal process packaging discussed, alongside a consideration of the safety of plastics as food packaging materials. Finally, part four explores the use of eco-design, life cycle assessment, and the utilisation of bio-based polymers in the production of smarter, environmentally-compatible packaging. With its distinguished editors and international team of expert contributors, Emerging food packaging technologies is an indispensable reference work for all those responsible for the design, production and use of food and beverage packaging, as well as a key source for researchers in this area. Reviews

advances in packaging materials, the design and implementation of smart packaging techniques, and developments in response to growing concerns about packaging sustainability Considers intelligent packaging and how advances in the consumer/packaging interface can improve food safety and quality Examines developments in packaging materials, nanocomposites, emerging coating technologies, light-protective and non-thermal process packaging and the safety of plastics as food packaging materials

A Handbook for Sensory and Consumer Driven New Product Development explores traditional and well established sensory methods (difference, descriptive and affective) as well as taking a novel approach to product development and the use of new methods and recent innovations. This book investigates the use of these established and new sensory methods, particularly hedonic methods coupled with descriptive methods (traditional and rapid), through multivariate data analytical interfaces in the process of optimizing food and beverage products effectively in a strategically defined manner. The first part of the book covers the sensory methods which are used by sensory scientists and product developers, including established and new and innovative methods. The second section investigates the product development process and how the application of sensory analysis, instrumental methods and multivariate data analysis can improve new product development, including packaging optimization and shelf life. The final section defines the important sensory criteria and modalities of different food and beverage products including Dairy, Meat, Confectionary, Bakery, and Beverage (alcoholic and non-alcoholic), and presents case studies indicating how the methods described in the first two sections have been successfully and innovatively applied to these different foods and beverages. The book is written to be of value to new product development researchers working in large corporations, SMEs (micro, small or medium-sized enterprises) as well as being accessible to the novice starting up their own business. The innovative technologies and methods described are less expensive than some more traditional practices and aim to be quick and effective in assisting products to market. Sensory testing is critical for new product development/optimization, ingredient substitution and devising appropriate packaging and shelf life as well as comparing foods or beverages to competitor's products.

Presents novel and effective sensory-based methods for new product development—two related fields that are often covered separately Provides accessible, useful guidance to the new product developer working in a large multi-national food company as well as novices starting up a new business Offers case studies that provide examples of how these methods have been applied to real product development by practitioners in a wide range of organizations Investigates how the application of sensory analysis can improve new product development including packaging optimization

Food Processing: Principles and Applications second edition is the fully revised new edition of this best-selling food technology title. Advances in food processing continue to take place as food scientists and food engineers adapt to the



challenges imposed by emerging pathogens, environmental concerns, shelf life, quality and safety, as well as the dietary needs and demands of humans. In addition to covering food processing principles that have long been essential to food quality and safety, this edition of Food Processing: Principles and Applications, unlike the former edition, covers microbial/enzyme inactivation kinetics, alternative food processing technologies as well as environmental and sustainability issues currently facing the food processing industry. The book is divided into two sections, the first focusing on principles of food processing and handling, and the second on processing technologies and applications. As a hands-on guide to the essential processing principles and their applications, covering the theoretical and applied aspects of food processing in one accessible volume, this book is a valuable tool for food industry professionals across all manufacturing sectors, and serves as a relevant primary or supplemental text for students of food science.

Smart Packaging Technologies for Fast Moving Consumer Goods approaches the subject of smart packaging from an innovative, thematic perspective: Part 1 looks at smart packaging technologies for food quality and safety Part 2 addresses smart packaging issues for the supply chain Part 3 focuses on smart packaging for brand protection and enhancement Part 4 centres on smart packaging for user convenience. Each chapter starts with a definition of the technology, and proceeds with an analysis of its workings and components before concluding with snapshots of potential applications of the technology. The Editors, brought together from academia and industry, provide readers with a cohesive account of the smart packaging phenomenon. Chapter authors are a mixture of industry professionals and academic researchers from the UK, USA, EU and Australasia.

"This book explores the latest technological developments in food preservation, processing, and storage"--

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This new edition of Innovations in Food Packaging ensures that readers have the most current information on food packaging options, including active packaging, intelligent packaging, edible/biodegradable packaging, nanocomposites and other options for package design. Today's packaging not only contains and protects food, but where possible and appropriate, it can assist in inventory control, consumer education, increased market availability and shelf life, and even in ensuring the safety of the food product. As nanotechnology and other technologies have developed, new and important options for maximizing the role of packaging have emerged. This book specifically examines the whole range of modern packaging options. It covers edible packaging based on carbohydrates, proteins, and lipids, antioxidative and antimicrobial packaging, and chemistry issues of food and food packaging, such as plasticization and polymer morphology. Professionals involved in food safety and shelf life, as well as researchers and students of food science, will find great value in this complete and updated overview. New to this edition: Over 60% updated content — including nine

completely new chapters — with the latest developments in technology, processes and materials Now includes bioplastics, biopolymers, nanoparticles, and eco-design of packaging

Towards more sustainable packaging with biodegradable materials! The combination of the continuously increasing food packaging waste with the non-biodegradable nature of the plastic materials that have a big slice of the packaging market makes it necessary to move towards sustainable packaging for the benefit of the environment and human health.

Sustainable packaging is the type of packaging that can provide to food the necessary protection conditions, but at the same time is biodegradable and can be disposed as organic waste to the landfills in order to biodegrade through a natural procedure. In this way, sustainable packaging becomes part of the circular economy. ?Sustainable Food Packaging Technology? deals with packaging solutions that use engineered biopolymers or biocomposites that have suitable physicochemical properties for food contact and protection and originate both from renewable or non-renewable resources, but in both cases are compostable or edible. Modified paper and cardboard with increased protective properties towards food while keeping their compostability are presented as well. The book also covers natural components that can make the packaging functional, e.g., by providing active protection to the food indicating food spoilage. \* Addresses urgent problems: food packaging creates a lot of hard-to-recycle waste - this book puts forward more sustainable solutions using biodegradable materials \* State-of-the-art: ?Sustainable Food Packaging Technology? provides knowledge on new developments in functional packaging \* From lab to large-scale applications: expert authors report on the technology aspects of sustainable packaging

This book explores vegetable fiber composite as an eco-friendly, biodegradable, and sustainable material that has many potential industrial applications. The use of vegetable fiber composite supports the sustainable development goals (SDGs) to utilize more sustainable and greener composite materials, which are also easy to handle and locally easily available with economical production costs. This book presents various types of vegetable fiber composite and its processing methods and treatments to obtain desirable properties for certain applications. The book caters to researchers and students who are working in the field of biocomposites and green materials.

Packaging plays an essential role in protecting and extending the shelf life of a wide range of foods, beverages and other fast-moving consumer goods. There have been many key developments in packaging materials and technologies in recent years, and Trends in packaging of food, beverages and other fast-moving consumer goods (FMCG) provides a concise review of these developments and international market trends. Beginning with a concise introduction to the present status and trends in innovations in packaging for food, beverages and other fast-moving consumer goods, the book goes on to consider modified atmosphere packaging and other active packaging systems, including smart and intelligent packaging, and the role these play in augmenting and securing the consumer brand experience. Developments in plastic and bioplastic materials and recycling systems

are then discussed, followed by innovations and trends in metal, paper and paperboard packaging. Further chapters review international environmental and sustainability regulatory and legislative frameworks, before the use of nanotechnology, smart and interactive packaging developments for enhanced communication at the packaging/user interface are explored. Finally, the book concludes by considering potential future trends in materials and technologies across the international packaging market. With its distinguished editor and international team of expert contributors, Trends in packaging of food, beverages and other fast-moving consumer goods (FMCG) is an important reference tool, providing a practical overview of emerging packaging technologies and market trends for research and design professionals in the food and packaging industry, and academics working in this area. Introduces the present status, current trends and new innovations in the field whilst considering future trends in materials and technologies Considers modified atmosphere packaging and other active packaging systems including smart and intelligent packaging Discusses developments in plastic and bioplastic materials and recycling systems

Nanotechnology for Food Packaging: Materials, Processing Technologies, and Safety Issues showcases the latest research in the use of nanotechnology in food packaging, providing an in-depth and interdisciplinary overview of the field. Nanoscale advances in materials science, processing technology and analytical techniques have led to the introduction of new, cheaper and safer packaging techniques. Simultaneously, the increasing use of renewable nanomaterials has made food packaging more sustainable. Chapters provide a comprehensive review on materials used, their structure–function relationship, and new processing technologies for the application and production of nanotechnology-based packaging materials. In addition, the book discusses the use of functional materials for the development of active, smart and intelligent packaging, possible migration and toxicity of nanomaterials for foods and regulatory aspects, and commercial applications. Provides detailed information on the use of nanomaterials and methodologies in food packaging, possible applications and regulatory barriers to commercialization Presents an interdisciplinary approach that brings together materials science, bioscience, and the industrial and regulatory aspects of the creation and uses of food packaging Helps those undertaking research and development in food packaging gain a cogent understanding on how nanotechnology is leading to the emergence of new packaging technologies

A complete guide to the principles and practical application of modified atmosphere packaging Modified atmosphere packaging (MAP) is one of the most cost-effective, versatile, and commonly used methods of preserving food products available today. Employed in both ambient and chilled conditions, it can prolong shelf-life and preserve the quality of a wide array of items via careful processes of atmospheric engineering. The essential scientific principles underlying this technology can, however, be difficult to grasp and effectively apply. With Modified Atmosphere Packaging of Foods, esteemed food science professor Dong Sun Lee provides a thorough and practical explanation of all aspects of MAP. Chapters covering the development, impact, and day-to-day application of the technique give a well-rounded understanding of its pivotal role in the food industry, while accounts of other active packaging methods help to provide broader context. This important new book includes: Detailed guidance on all aspects of MAP – from its scientific background to its practical application Information on how specific MAP products may be developed



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according to their particular engineering principles Coverage of the related active and intelligent packaging techniques Discussion of relevant food safety issues and regulations Containing vital information for industry professionals and food science researchers alike, Modified Atmosphere Packaging of Foods is an essential text for all those working to improve the quality and shelf-life of the food we eat.

This book provides valuable information on a range of food packaging topics. It serves as a source for students, professionals and packaging engineers who need to know more about the characteristics, applications and consequences of different packaging materials in food-packaging interactions. This book is divided into 13 chapters and focuses on the agro-food, cosmetics and pharmaceutical sectors. The first four chapters cover traditional packaging materials: wood, paper and cardboard, glass and metal. The next two deal, respectively, with plastics and laminates. Biobased materials are then covered, followed by a presentation of active and smart packaging. Some chapters are also dedicated to providing information on caps and closures as well as auxiliary materials. Different food packaging methods are presented, followed by an investigation into the design and labelling of packaging. The book ends with a chapter presenting information on how the choice of packaging material is dependent on the characteristics of the food products to be packaged.

Food Processing Technology: Principles and Practice, Fourth Edition, has been updated and extended to include the many developments that have taken place since the third edition was published. The new 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, there are new chapters on industrial cooking, heat removal, storage, and distribution, along with updates on all the remaining chapters. 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. Updated edition completely revised with new developments on all the processing stages and aspects of food industry management not otherwise considered (e.g. financial management, marketing, food laws, and food industry regulation), and more Introduces a range of processing techniques that are used in food manufacturing Explains the key principles of each process, including the equipment used and the effects of processing on micro-organisms that contaminate foods Describes post-processing operations, including packaging and distribution logistics Includes extra textbook elements, such as videos and calculations slides, in addition to summaries of key points in each chapter

The edible food packaging industry has experienced remarkable growth in recent years and will continue to impact the food market for quite some time going into the future. Edible Food Packaging: Materials and Processing Technologies provides a broad and comprehensive review on recent aspects related to edible packaging, from processing to potential applications, and covering the use of nanotechnology in edible packaging. The book's 14 chapters promote a comprehensive review on such subjects as

materials used, their structure-function relationship, and new processing technologies for application and production of edible coatings and films. Specific topics include edible film and packaging using gum polysaccharides, protein-based films and coatings, and edible coatings and films from lipids, waxes, and resins. The book also reviews stability and application concerns, mass transfer measurement and modeling for designing protective edible films, and edible packaging as a vehicle for functional compounds. The authors explore antimicrobial edible packaging, nanotechnology in edible packaging, and nanostructured multilayers for food packaging by electrohydrodynamic processing. Additionally, they show how to evaluate the needs for edible packaging of respiring products and provide an overview of edible packaging for fruits, vegetables, and dairy products. Lastly, they examine edible coatings and films for meat, poultry, and fish.

With a wealth of illustrations, examples, discussion questions, and case studies, the Food Packaging Science and Technology covers basic principles and technologies as well as advanced topics such as active, intelligent, and sustainable packaging with unparalleled depth and breadth of scope. Emphasizing the application of relevant scientific principles to create effective designs and quality products, an international team of contributors draws on their collective experience to equip you with the necessary knowledge and tools to tackle modern food packaging problems. Divided into four parts, this book begins with an extensive discussion of packaging materials science. Contributions review the basic concepts of chemical and physical properties as they relate to food packaging. They cover gas permeation and migration and give detailed information on the four basic types of packaging materials: plastics, glass, metal, and cellulosic. The second part applies the previous information to the field of packaging technologies. Traditional methods and concepts such as end-of-line operations, permeation and migration, canning and aseptic packaging, and vacuum/modified atmosphere packaging are juxtaposed with the more advanced technologies of microwaveable packaging, active packaging, and intelligent packaging. Part 3 discusses shelf life determination and elements of storage stability and packaging requirements of various food categories. The final part presents issues related to packaging sociology, addressing sustainable packaging, as well as sociological and legislative considerations.

The second edition of Emerging Technologies in Food Processing presents essential, authoritative, and complete literature and research data from the past ten years. It is a complete resource offering the latest technological innovations in food processing today, and includes vital information in research and development for the food processing industry. It covers the latest advances in non-thermal processing including high pressure, pulsed electric fields, radiofrequency, high intensity pulsed light, ultrasound, irradiation, and addresses the newest hurdles in technology where extensive research has been carried out. Provides an extensive list of research sources to further research development Presents current and thorough research results and critical reviews Includes the most recent technologies used for shelf life extension, bioprocessing simulation and optimization

While conventional technologies such as chilling and freezing are used to avoid deteriorative processes like autolytic and microbial spoilage of seafood, innovative technologies have also been developed as a response to economic and environmental demands. Innovative Technologies in Seafood Processing gives information on advances in chilling, freezing, thawing, and packaging of seafood and also updates knowledge of novel process technologies (high-pressure processing, irradiation, ultrasound, pulsed electric field, microwave and radio

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frequency, sous vide technology, novel thermal sterilization technologies, ozone and nanotechnological applications, and other innovative technologies such as cold plasma, ohmic heating, infrared heating supercritical carbon dioxide, and high-intensity pulsed light) for the seafood industry. Features ? Reviews novel process technologies applied in the seafood industry ? Highlights processing effects on product quality and safety of treated seafood ? Focuses on the development of safe and effective natural antimicrobials and additives ? Assesses alternative techniques to utilize fish discards and waste as high value products Further it highlights aspects related to quality of seafood treated with these innovative technologies, effect on food constituents, possible risk, security/safety both of seafood and consumers, the environmental impact, and the legislative aspects. The book also addresses the growing international environmental concern for fish discards and fish waste generated in the seafood processing industries by including a chapter, Advances in Discard and By-Products Processing, which assesses alternative techniques to utilize fish discards and waste as high value products. This book will be of value to researchers and technicians in the food technology area, especially those dealing with seafood.

Nanomaterials for Food Applications highlights recent developments in nanotechnologies, covering the different food areas where these novel products or technologies can be applied. The book covers five major themes, showing how nanotechnology is used in food, the use of ingredients in nanoform to improve bioavailability or nanoencapsulation technologies, nanotechnologies for food processing, nanosensors for food quality and safety, nanotechnologies for food packaging, and methods to evaluate potential risks and regulatory issues. This is an important research reference that will be of great value to academic and industrial readers, as topics of importance, both at a research level and for commercial applications, are covered. Regulatory agencies will also be interested in the latest developments covered in the book as they will help set the foundation for further regulations. Demonstrates how nanotechnology can improve food quality and safety Shows how nanotechnology is used to create more effective food processing techniques Discusses the regulatory issues surrounding the use of nanomaterials in food to ensure they are used safely and responsibly

Many factors are relevant in making the proper choice of food packaging material, including those related to shelf life and biodegradability. To meet these demands, new processing and preservation techniques have arisen, most notably modified atmosphere packaging (MAP) and active packaging (AP). Modified Atmosphere and Active Packaging Technologies presents an overview of the current status of MAP and AP, exploring techniques, methodologies, applications, and relevant legislation. For clarity and easy reference, the book is divided into seven convenient sections: Principles, Materials, Gases, and Machinery for MAP provides a basic overview of the topic and defines modified atmosphere, controlled atmosphere, and active packaging. Safety and Quality Control of MAP Products examines the effect of MAP on various foods and discusses governmental control mechanisms to ensure food safety. Applications of MAP in Foods of Animal Origin explores how MAP can be used in fish, meat, poultry and dairy products. Applications of MAP in Foods of Plant Origin discusses MAP for cereals, minimally processed vegetables, fruits, and bakery products. Other Applications of MAP reviews MAP's use in ready-to-eat (RTE) foods and coffee, tea, beer, and snack foods. Active Packaging and its New Trends examines issues related to nanotechnology and bioactive packaging. Consumer Behavior/Sensory Analysis and Legislation covers legislation in the European Union, the United States, and Canada and presents conclusions and new issues on the horizon. From the very basics (films, gases, techniques, and applications) up to the latest advances (nanotechnology and bioactive compounds), this book covers nearly all issues related to MAP and AP, providing an essential reference for food scientists and engineers, agriculturalists, chemists, and all those on the cutting edge of food packaging.

Food and beverage labels often specify a product's geographical origin, species, variety and method of production. These claims can

significantly influence an item's economic value, but their verification is not always straightforward. New analytical approaches for verifying the origin of food reviews new analytical methods in this area together with applications to key commodities. Part one introduces the concept of food origin and provides supporting information on labelling legislation and standards. Part two moves on to explore new approaches for verifying the geographical origin of food using geospatial models and verifying species and varietal components of the food we eat. Holistic methods of verification methods using vibrational spectroscopy and associated chemometrics are also discussed. Finally, part three highlights the applications of new analytical methods to verify the origin of particular food commodities: fish, honey and wine. New analytical approaches for verifying the origin of food is a standard reference for professionals working in analytical laboratories testing food authenticity and for researchers, in the food industry, analytical laboratories and academia, working on the development of analytical methods for food authenticity. Includes a chapter on origin labelling legislation and standards Chapters address the applications of both established and novel methods in key product sectors Reviews new analytical methods and their applications in the food industry

Active polymer food packaging is packaging which has been designed to deliberately interact with food or with a direct food environment to reduce oxygen and moisture levels, preserve flavourings and the quality of the food. New concepts of active and intelligent packaging play an increasingly important role by offering numerous and innovative solutions for extending the shelf-life or for maintaining, improving or monitoring food quality and safety. This is the driving force for the food packaging industry's development of new and improved packaging concepts using nanoparticles. This book gives an overview of applications for various types of nanoparticles, such as different metal based substances, and explains their role in polymer food packaging. The book also elaborates the mechanism of activity of each type of nanoparticle, for example:- Antimicrobial activity- Oxygen absorption (scavengers)- Ultraviolet blocking properties- Water vapour permeability The characterisation of polymer nanocomposite materials and the regulatory aspects of nanomaterials are also discussed. Information is provided about the polymers and polymer nanocomposites, and in addition, the book provides information about new food packaging materials with improved mechanical, barrier and antimicrobial properties to preserve the food during transport and storage. Saffron: Science, Technology and Health summarizes the scientific, technical and health aspects of this crop. Saffron possesses unique agronomical, ecological, social and physiological characteristics. And, there are various chemical components present in saffron, including carbohydrates, minerals, vitamins, color pigment, aromatic and flavoring agents. Saffron has a long history of use in traditional medicine, and in recent years, the application of saffron in the medical industry as a cancer curing and antidepressant agent has brought more attention. There is also a growing trend of saffron use in the conventional food industry, including saffron desserts, cream, butter, beverages, powders, cake mixes and soups. Intended for nutrition scientists and scientists and technologists working in the areas of food, agriculture, new product development and pharmacology. Summarizes the scientific, technical and health aspects of saffron Explores the use of saffron in the conventional food industry in the development of new products Uncovers the unique agronomical, ecological, social and physiological characteristics of saffron

Provides detailed information about the use of nanotechnology in remediating waste and pollution in agriculture Nano-Technological Intervention in Agricultural Productivity explores sustainable, eco-friendly technologies for remediating wastes and contaminated areas in both water and land ecosystems. Focusing on nano-technological innovations that use microbes and microbial agents to improve the quality and pollutant discharge of contaminated sites, this comprehensive volume also discusses molecular approaches for the characterization of nanoparticles, the biosynthetic pathways of microbes, gene and protein expression studies for bio-deterioration techniques, and more.

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Organized into nine chapters, the book opens with a thorough overview of the functions, classification, properties, synthesis, and applications of nanoparticles. Following a discussion of the environmental and agricultural implications of nanotechnology, the authors examine the current role and future prospects of nanotechnology in managing plant diseases, improving agri-food production, and increasing agricultural productivity. Subsequent chapters cover lignin nanoparticles, various applications of nanotechnology in agriculture, and nano-based advances in plant and microbial science. Offering an up-to-date account of the role of nanotechnologies in agricultural bioremediation, this book: Explores biotechnological advances in the development of sophisticated green technologies for waste minimization and waste control Emphasizes the use of microbes for degradation and removal of various xenobiotic substances Discusses bioremediation approaches in relation to the impact of increased urbanization and industrialization on the environment Covers a variety of applications of nanotechnology in agriculture, including nano-fertilizers, nano-biosensors, nano-pesticides, and nanoparticle protection in plants Nano-Technological Intervention in Agricultural Productivity is a valuable resource for students in plant biotechnology and agricultural science and engineering, as well as an important reference for researchers in plant biotechnology and agricultural sciences, particularly those with interest in the use of nanomaterials for pollution remediation and sustainable development.

Packaging plays an essential role in limiting undesired microbial growth and sensory deterioration. Advances in meat, poultry and seafood packaging provides a comprehensive review of both current and emerging technologies for the effective packaging of muscle foods. Part one provides a comprehensive overview of key issues concerning the safety and quality of packaged meat, poultry and seafood. Part two goes on to investigate developments in vacuum and modified atmosphere packaging for both fresh and processed muscle foods, including advances in bulk packaging and soluble carbon dioxide use. Other packaging methods are the focus of part three, with the packaging of processed, frozen, ready-to-serve and retail-ready meat, seafood and poultry products all reviewed, alongside advances in sausage casings and in-package pasteurization. Finally, part four explores emerging labelling and packaging techniques. Environmentally-compatible, antimicrobial and antioxidant active packaging for meat and poultry are investigated, along with edible films, smart packaging systems, and issues regarding traceability and regulation. With its distinguished editor and international team of expert contributors, Advances in meat, poultry and seafood packaging is a key text for those involved with the research, development and production of packaged meat, poultry and seafood products. It also provides an essential overview for post-graduate students and academic researchers with an interest in the packaging of muscle foods. Provides a comprehensive review of current and emerging technologies for the effective and safe packaging of muscle foods Investigates developments in vacuum and modified atmosphere packaging for fresh and processed muscle foods, including advances in bulk packaging and soluble carbon dioxide use Explores environmentally-compatible, antimicrobial and antioxidant active packaging for meat and poultry, along with edible films, smart packaging systems, and issues regarding traceability and regulation



The second edition of *The Stability and Shelf-life of Food* is a fully revised and thoroughly updated edition of this highly-successful book. This new edition covers methods for shelf-life and stability evaluation, reviewing the modelling and testing of the deterioration of products as well as the use of sensory evaluation methods for testing food spoilage. The first part of the book focuses on deteriorative processes and factors influencing shelf-life, covering aspects such as chemical deterioration, physical instability and microbiological spoilage. The effects of process and packaging on the stability and shelf-life of products are also covered in this part. Part Two reviews the methods for shelf life and stability evaluation. These include sensory evaluation methods and instrumental methods to determine food quality deterioration. The final section of the book covers stability of important ingredient categories, from oils and fats, to beverages such as beer, wine, coffee and fruit juices, in addition to bakery products and meats. With updated chapters reflecting advances made in the field and with the addition of new chapters covering the stability and shelf-life a variety of products, this new edition will provide the latest research for both academics working in the field of food quality as well as providing essential information for food scientists working in industry. Thoroughly revised and updated edition of a very popular and well regarded book Includes dedicated chapters covering the shelf-life and stability of specific products making this book ideal for those working in industry Presents a wide coverage of the processes and factors influencing shelf-life, the evaluation of stability and shelf-life and the stability and shelf-life of particular products makes this book valuable for both academics and those working in industry

This book is a printed edition of the Special Issue "Food Packaging Based on Nanomaterials" that was published in *Nanomaterials*

*Integrating the Packaging and Product Experience in Food and Beverages: A Road-Map to Consumer Satisfaction* focuses on the interrelationship between packaging and the product experience. In both industry and academia there has been a growing interest in investigating approaches that capture consumer responses to products that go beyond traditional sensory and liking measures. These approaches include assessing consumers' emotional responses, obtaining temporal measures of liking, as well as numerous published articles considering the effect of situation and context in the evaluation of food and beverage products. For fast-moving consumer goods (FMCG) products in particular, packaging can be considered as a contributor to consumer satisfaction. Recent cross-modal research illustrated consumers' dissatisfaction or delight with a product can be evoked when there is dissonance between the packaging and the product experience. The book includes an extensive overview of an adapted satisfaction scale that has been tailored for the food and beverage sector and which identifies varying satisfaction response modes such as contentment, pleasure, and delight with a product. This is an important development as it provides insights about products that can be

used to market specific categories and brands of foods and beverages. The book demonstrates the value of this approach by bringing together case studies that consider the interrelationships between packaging design, shape, on-pack sensory messages, expectations, and consumer satisfaction with the product. Focuses on the inter-relationship between packaging and the product experience, specifically in the context of the food and beverage sector Presents the expectancy disconfirmation model of satisfaction, which is well developed within the social sciences, to the food and beverage sector Contains case studies demonstrating how these practices can be used in industry to better enhance customer's responses to products Includes an extensive overview of an adapted satisfaction scale that has been tailored for the food and beverage sector and which identifies varying satisfaction response modes such as contentment, pleasure, and delight with a product

Antimicrobial packaging systems are those that beneficially interact with the food or with the surrounding environment, inhibiting microorganism growth or reducing their counts to improve the quality and extend the shelf-life of industrially produced foods. They have undoubtedly become a fully accepted alternative to the direct addition of preservatives to foods, with excellent future prospects. This book will help develop a working knowledge and understanding of antimicrobial packaging, it includes a description of the antimicrobial agents most commonly used and their mechanisms of action, the manufacturing methods available to fabricate the active system, the critical parameters to make an effective product and the tools to optimise them, and the various in vitro and in vivo methods for measuring the goodness of the antimicrobial system for validation purposes. The reader will develop the ability to understand why a specific agent is selected for a particular food product, or why a specific polymeric material and manufacturing technology are chosen. The reader will also become familiar with the different procedures for improving the activity of the packaging solution that is being developed and ways of testing its efficacy. This will accelerate the formulation of the active packaging concept, reducing development-time with respect to the trial and error processes common in many literature reports. Finally, it will help to identify the best and most cost-effective solutions. This volume is intended to be a practical guide to antimicrobial packaging and a quick reference for students and researchers from both academia and industry.

The food packaging industry is experiencing one of the most relevant revolutions associated with the transition from fossil-based polymers to new materials of renewable origin. However, high production costs, low performance, and ethical issues still hinder the market penetration of bioplastics. Recently, coating technology was proposed as an additional strategy for achieving a more rational use of the materials used within the food packaging sector. According to the packaging optimization concept, the use of multifunctional thin layers would enable the replacement of multi-layer and heavy structures, thus reducing the upstream amount of packaging materials while maintaining (or even improving) the

functional properties of the final package to pursue the goal of overall shelf life extension. Concurrently, the increasing requirements among consumers for convenience, smaller package sizes, and for minimally processed, fresh, and healthy foods have necessitated the design of highly sophisticated and engineered coatings. To this end, new chemical pathways, new raw materials (e.g., biopolymers), and non-conventional deposition technologies have been used. Nanotechnology, in particular, paved the way for the development of new architectures and never-before-seen patterns that eventually yielded nanostructured and nanocomposite coatings with outstanding performance. This book covers the most recent advances in the coating technology applied to the food packaging sector, with special emphasis on active coatings and barrier coatings intended for the shelf life extension of perishable foods.

Active antimicrobial food packaging is a new generation of packaging. Antimicrobial food additives are incorporated in the food packaging systems to inhibit, retard, or inactivate microbial growth to extend the shelf life of foods. This book is composed of five chapters, and is aimed at introducing the reader to active antimicrobial food packaging, as well as concerns of the consumers on synthetic-based food additives.

The book is intended as an overview on the recent and more relevant developments in the application of composite materials for food packaging applications, emphasizing the scientific outcome arising from the physico-chemical properties of such engineered materials with the needs of food quality and safety. Consumers are increasingly conscious of the strong relationship between food quality and health, and thus the request of packaging materials allowing the quality and safety of foods to be highly preserved. As a result, scientists from both academia and industry work to increase the quality of the food storage, with this book meant as a link between scientific and industrial research, showing how the development in composite materials can impact the field. In the book, the inorganic materials employed for the preparation of composite material is extensively analyzed in terms of physico-chemical properties, environmental and reusability concerns, as well as food interaction features, highlighting the importance and the potential limitations of each approach.

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