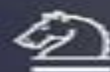


**SPRINGER BRIEFS IN MOLECULAR SCIENCE**  
CHEMISTRY OF FOODS

Luciano Piergiovanni  
Sara Limbo

# Food Packaging Materials



Springer

# Packaging Materials Springerbriefs Molecular Science

**Michele Barone, Rita Tulumello**



## **Packaging Materials Springerbriefs Molecular Science:**

Biomaterials in Food Packaging Mohd Yusuf, Shafat Ahmad Khan, 2022-09-22 Biomaterials in Food Packaging presents up to date research on the applications and development of the packaging materials that originate from biological resources. It discusses the advances made in bioactive biodegradable edible films and nano based smart materials for food packaging applications that can be a substitute for their synthetic counterparts to enhance the food's shelf life significantly. It not only encompasses a comprehensive overview of environment compatible and biodegradable biomaterials but also highlights the recent trends in their applications in food packaging. The book is a valuable reference for researchers, undergraduate and postgraduate students, academicians, educators, industry scientists and general readers seeking bio based materials for food packaging applications.

*Food Packaging* Sanjay Mavinkere Rangappa, Jyotishkumar Parameswaranpillai, Senthil Muthu Kumar Thiagamani, Senthilkumar Krishnasamy, Suchart Siengchin, 2020-10-20 Food Packaging Advanced Materials Technologies and Innovations is a one stop reference for packaging materials researchers working across various industries. With chapters written by leading international researchers from industry, academia, government and private research institutions, this book offers a broad view of important developments in food packaging. Presents an extensive survey of food packaging materials and modern technologies. Demonstrates the potential of various materials for use in demanding applications. Discusses the use of polymers, composites, nanotechnology, hybrid materials, coatings, wood based and other materials in packaging. Describes biodegradable packaging, antimicrobial studies and environmental issues related to packaging materials. Offers current status, trends, opportunities and future directions. Aimed at advanced students, research scholars and professionals in food packaging development, this application oriented book will help expand the reader's knowledge of advanced materials and their use of innovation in food packaging.

**The Importance of Packaging Design for the Chemistry of Food Products** Giovanni Brunazzi, Salvatore Parisi, Amina Pereno, 2014-07-08 This Brief defines reliable correlations between the food packaging design and its chemical features in terms of an integrated food product, the synergistic union composed of the edible content and its container. A good design as described in this Brief implies the best choices from a series of possibilities taking into account economical and commercial influences or limitations in the production and processing chain and the chemical interactions that can arise between the food containers and the contained edible material. This Brief highlights how the different requirements can be combined while avoiding dangerous food risks originating from the chemical interaction between the container and the product. Different designs are critically analysed with relation to the effect on contained foods. The influences and resulting consequences of different possible food packaging designs are highlighted and discussed in selected case studies for some everyday products like potato chips.

**Lignocellulosic Materials and Their Use in Bio-based Packaging** Lina Fernanda Ballesteros, Michele Michelin, António Augusto Vicente, José António Teixeira, Miguel Ângelo Cerqueira, 2018-06-18 This brief provides a

comprehensive review of lignocellulosic materials and their primary role in the future development of bio based packaging Topics such as sources and extraction methods of lignocellulosic materials main constituents of lignocellulosic materials functionality of lignocellulosic materials the development of bio based and biodegradable packaging incorporation of lignocellulosic materials in bio based packaging materials properties and functionality of bio based packaging are discussed by authors who are experts in the field *Food Packaging Materials* Luciano Piergiovanni, Sara Limbo, 2015-11-26 This Brief is concerned with the material chemistry of food packaging materials It introduces the properties and peculiarities of typical packaging materials such as plastics cellulose components ceramics and metals Their overall performance as food packaging material is determined by the chemical and physical properties The Brief describes how the final properties of a food packaging material can be influenced through chemical modifications in the structure and composition of the used components The authors also cover potential chemical reactions of food packaging materials that may affect their performance Potential hazards that may arise such as influences on the product quality or effects on their recycling or disposal are discussed Different influences like metal corrosion chemical resistance and degradability of the main packaging materials or properties like hydrophobicity surface energy and migration have to be taken into account This Brief gives an introduction to all these different aspects of food packaging *Food Packaging and Preservation* Alexandru Mihai Grumezescu, Alina Maria Holban, 2017-10-20 Food Packaging and Preservation Volume 9 in the Handbook of Food Bioengineering series explores recent approaches to preserving and prolonging safe use of food products while also maintaining the properties of fresh foods This volume contains valuable information and novel ideas regarding recently investigated packaging techniques and their implications on food bioengineering In addition classical and modern packaging materials and the impact of materials science on the development of smart packaging approaches are discussed This book is a one stop shop for anyone in the food industry seeking to understand how bioengineering can foster research and innovation Presents cutting technologies and approaches utilized in current and future food preservation for both food and beverages Offers research methods for the creation of novel preservatives and packaging materials to improve the quality and lifespan of preserved foods Features techniques to ensure the safe use of foods for longer periods of time Provides solutions of antimicrobial films and coatings for food packaging applications to enhance food safety and quality Bio-Based Packaging Salit Mohd Sapuan, Rushdan Ahmad Ilyas, 2021-03-31 Bio Based Packaging Bio Based Packaging An authoritative and up to date review of sustainable packaging development and applications Bio Based Packaging explores using renewable and biodegradable materials as sustainable alternatives to non renewable petroleum based packaging This comprehensive volume surveys the properties of biopolymers the environmental and economic impact of bio based packaging and new and emerging technologies that are increasing the number of potential applications of green materials in the packaging industry Contributions address the advantages and challenges of bio based packaging discuss new materials to be used for food

packaging and highlight cutting edge research on polymers such as starch protein polylactic acid PLA pectin nanocellulose and their nanocomposites In depth yet accessible chapters provide balanced coverage of a broad range of practical topics including life cycle assessment LCA of bio based packaging products consumer perceptions and preferences supply chains business strategies and markets in biodegradable food packaging manufacturing of bio based packaging materials and regulations for food packaging materials Detailed discussions provide valuable insight into the opportunities for biopolymers in end use sectors the barriers to biopolymer based concepts in the packaging market recent advances made in the field of biopolymeric composite materials the future of bio plastics in commercial food packaging and more This book Provides deep coverage of the bio based packaging development characterization regulations and environmental and socio economic impact Contains real world case studies of bio based packaging applications Includes an overview of recent advances and emerging aspects of nanotechnology for development of sustainable composites for packaging Discusses renewable sources for packaging material and the reuse and recycling of bio based packaging products Bio Based Packaging is essential reading for academics researchers and industry professionals working in packaging materials renewable resources sustainability polymerization technology food technology material engineering and related fields For more information on the Wiley Series in Renewable Resources visit [www.wiley.com/go/rrs](http://www.wiley.com/go/rrs)

**Nonthermal Food Engineering Operations** Nitin Kumar, Anil Panghal, M. K. Garg, 2024-06-18 NONTHERMAL FOOD ENGINEERING OPERATIONS Presenting cutting edge information on new and emerging food engineering processes Nonthermal Food Engineering Operations the latest volume in the series Bioprocessing in Food Science is an essential reference on the modeling quality safety and technologies associated with food processing operations today Bioprocessing in Food Science is a series of volumes covering the entirety of unit operations in food processing This latest volume covers nonthermal food engineering operations focusing on packaging techniques artificial intelligence and other emerging technologies and their use and relevance within food engineering fluid extraction nanotechnology and many other topics As the demand for healthy food is increasing in the current global scenario manufacturers are searching for new possibilities for occupying a greater share in the rapidly changing food market Compiled reports and updated knowledge on thermal processing of food products are imperative for commercial enterprises and manufacturing units In the current scenario academia researchers and food industries are working in a scattered manner and different technologies developed at each level are not compiled to implement for the benefits of different stakeholders However advancements in bioprocesses are required at all levels for the betterment of food industries and consumers This series of groundbreaking edited volumes will be a comprehensive compilation of all the research that has been carried out so far their practical applications and the future scope of research and development in the food bioprocessing industry During the last decade there have been major developments in novel technologies for food processing This series will cover all the novel technologies employed for processing different types of foods encompassing the

background principles classification applications equipment effect on foods legislative issue technology implementation constraints and food and human safety concerns

**Sustainable Innovations in Food Packaging** Teresa De Pilli, Antonietta Baiano, Giuseppe Lopriore, Carlo Russo, Giulio Mario Cappelletti, 2021-08-19 This book explores the latest advances in the sustainable production of packaged foods Packaging plays an important role in sustainable food production and consumption in industrialized countries where there is an increasing pressure to reduce the environmental impact of packaged foods For example the European Union recommends packaging from renewable sources with a focus on bio based materials Sustainable packaging processes guarantee the reuse of the entire waste material and at the same time avoid the loss of food safety and quality during storage by preventing food borne diseases and chemical contamination Furthermore the dramatic problem of plastic waste accumulation and the conservation of oil and food resources need to be taken into consideration This book presents eco friendly packaging strategies to reduce food and plastic waste and address the end of life issues of persistent materials It particularly focuses on the production of biodegradable microbial polymers and the use of by products and waste from the agricultural and food industries These strategies promote an innovative and productive waste based food packaging economy separating the food packaging industry from fossil reserves and allowing bio polymers to return to the soil Lastly the book covers life cycle assessment life cycle costing and externality assessment to help readers understand the economical reliability of the innovations presented

*Raw Material Scarcity and Overproduction in the Food Industry* Suresh D. Sharma, Arpan R. Bhagat, Salvatore Parisi, 2019-04-09 This book describes the consequences of an increased demand for food for human consumption for the global food industry In four concise chapters the authors explore the trend for the overproduction of food the concomitant diminution of raw materials and the increase in environmental concerns Chapter one describes the variations in biochemical properties of fishmeal depending on the season and geographical location Chapter two discusses how the expansion of cropland and pastures to meet the rising demand for food is damaging the environment while chapter three examines the impact of bee viruses on food crops and production Lastly the fourth chapter addresses the issue of food adulteration and provides specific examples of fraud in the American dairy industry This book is of interest to researchers working in the area of food production in academia and industry as well as certification and scientific bodies involved in food inspection

Food Traceability in Jordan Moawiya A. Haddad, Mohammed I. Yamani, Da'san M.M. Jaradat, Maher Obeidat, Saeid M. Abu-Romman, Salvatore Parisi, 2021-02-02 This book outlines the evolution of food traceability matters in the current traditional foods market and particularly with regard to selected historical foods based in Jordan At present traceability is just one of the many requirements the food industry is forced to meet The topic can be approached from various angles regulation technological perspectives food business operators packaging manufacturers software producers and consumer views In addition traceable food products provide an interesting legacy for many geographical and ethnic cultures Consequently the examination of certain recipes or food products linked

with history and traditions can make a unique and valuable contribution to future developments in this area In this regard Jordanian foods offer a prime example This book examines three traditional products from different viewpoints paying special attention to their chemical composition the identification of raw materials preparation procedures and traceability The book begins with a more general discussion on food traceability without detailed regional implications while the second chapter discusses the product hummus in its many versions In turn the third and fourth chapters focus on two fermented dairy products labaneh and jameed and their connections with the Mediterranean diet The book offers a valuable reference guide to many traditional historical products in the Middle East with a particular focus on traceability matters and solutions

*The Chemistry of Thermal Food Processing Procedures* Maria Micali, Marco Fiorino, Salvatore Parisi, 2016-07-08 This Brief reviews thermal processes in the food industry pasteurization sterilization UHT processes and others It evaluates the effects on a chemical level and possible failures from a safety viewpoint and discusses in how far the effects can be predicted In addition historical preservation techniques smoking addition of natural additives irradiation etc are compared with current industrial systems like fermentation irradiation addition of food grade chemicals The Brief critically discusses storage protocols cooling freezing etc and packing systems modified atmosphere technology active and intelligent packaging Can undesired chemical effects on the food products be predicted This Brief elucidates on this important question On that basis new challenges that currently arise in the food sector can be approached

**Analytical Methods for the Assessment of Maillard Reactions in Foods** Rajeev K. Singla, Ashok K. Dubey, Sara M. Ameen, Shana Montalto, Salvatore Parisi, 2018-03-08 This Brief provides an overview of different analytical methods and techniques for the qualitative and quantitative evaluation of Maillard Reactions and their reaction products in foods during processing and storage Reliable methodology for the investigation of Maillard Reactions and their products are of utmost importance in food analysis since Maillard Reactions can on the one hand be desirable and advantageous influencing the colors flavors and odors of food products they can on the other hand also produce detrimental compounds afflicting the consumers health e g furfurals furosine or acrylamide This Brief introduces different analytical methods which can be used to investigate and characterize Maillard Reactions and their products in foods including for example capillary electrophoresis high performance liquid chromatography gas chromatography with mass spectrometric detection UV VIS spectrophotometry fluorescence electronic nose gravimetric systems and many more The chapters exemplify how the analytical techniques can be applied for assessing and evaluating different Maillard Reaction products in foods Readers will find basic information as well as practical hints and guidelines for application in their own laboratory

*Functional Food and Human Health* Vibha Rani, Umesh C. S. Yadav, 2018-10-12 Global health and the increasing incidence of various diseases are a cause for concern and doctors and scientists reason that the diet food habits and lifestyle are contributing factors Processed food has reduced the nutritional value of our diet and although supplementing foods with various additives is considered an alternative the long term impact of this is not known

Many laboratories around the world are working to identify various nutritional components in our daily food and their effect on human health. These have been classified as Nutraceuticals or functional food and they may have preventive and therapeutic effects in a number of pathologies associated with modern dietary habits and lifestyles. This book addresses various aspects of this issue, revitalizing the discussion and consolidating the latest research on nutritional and functional food and their effects in in vitro, in vivo and human clinical studies.

### **Food Coatings and Preservation Technologies**

Mousumi Sen, 2024-10-09. This book compiles recent studies about edible coatings and how they have improved food products packaging techniques and product quality to cause fewer health risks. Food Coatings and Preservation Technologies presents the most recent studies about the application of edible coatings to a wide variety of foods. Edible coatings are globally utilized for preventing food product contamination from harmful microorganisms and pathogens. This book highlights the developments made in designing new edible coatings. Herein particular attention is given to the main components, manufacturing methods and their application to specific products. The book also discusses the current state of the art alternative to conventional package usage, providing the main features biodegradable packaging should meet for distinct uses for the conservation and improvement of various food products. This information will be helpful for processors to select the best coating material and its effective concentration for different fresh and minimal processed vegetables. Each chapter delves into edible based coating research and critical developments to enhance food preservation standards. The first section focuses on biopolymer based edible coatings, food packaging and preservation. It provides a comprehensive understanding of the current state and critical developments in biodegradable polymer packaging systems for food applications. As technology advances, the next section highlights ongoing research focusing on optimizing coating effectiveness and the development of eco friendly and sustainable materials. This section's objective is to identify edible materials and combine the most recent information available to provide a comprehensive understanding of formulation methods and approaches to enhancing the properties of the coatings applied to food products. The final section discusses encapsulation techniques and levels of retention to improve shelf life. Readers will find in this book information concerning the efficiency and functional properties of edible coating materials. Feasibility studies performed on new process evaluation, safety and toxicity determination, regulatory assessment and consumer studies regarding the commercial uses of edible coatings. Coating technologies that present a promising avenue to enhance the delivery stability and efficacy of medical foods and nutraceuticals. Shelf life testing that suggests future directions. Novel practical and reliable tools that are applicable in the industrial process.

Audience: The book is aimed at chemists, food technologists, food scientists, nutritionists, dietitians, pharmaceutical technologists, biochemists and engineers as well as postgraduate PhD students and postdocs working in the area of edible food coatings and prevention technologies.

### **Chemistry of Maillard Reactions in Processed Foods**

Salvatore Parisi, Weihui Luo, 2018-06-29. This SpringerBrief explains the importance of Maillard reactions in food processing. It underlines that the



term Maillard reaction actually does not describe one single chemical reaction but an entire class of chemical reactions which lead to browning with a strong impact on visual appearance odor and flavor It emphasizes that the Maillard reactions are still not fully characterized despite extensive historical studies While under the right conditions Maillard reactions have many favorable effects e g formation of antioxidants the Brief discusses that there are also conditions where Maillard reactions can result in toxic or mutagenic reactions Hence it emphasizes that the reaction should be viewed as a complex network of various sub reactions with a plethora of concomitant reaction mechanisms and kinetics This Brief thus makes a step toward a holistic evaluation of the complexity of the Maillard reaction scheme with the aim of making better and more targeted use in food processing

*Lathyrus sativus and Nutrition* Michele Barone,Rita Tulumello,2020-10-07 This book addresses the traditional use of a specific crop legume grass pea *Lathyrus sativus* as a food product and ingredient for typical food products Grass pea has very interesting nutritional qualities including an abundance of proteins and peculiar organoleptic properties As the crop also shows an enhanced resistance to adverse conditions it is used in many geographical areas as the main ingredient of certain traditional foods On the other hand grass pea is questionable as a source of human and animal nutrition because it contains a neurotoxin N oxalyl L diaminopropionic acid that is known for its neurological effects The related disease is referred to as neurolathyrism and occurs when grass pea based foods are consumed in large quantities The book is divided into five chapters the first of which summarizes the chemical and biochemical properties of grass pea and provides nutritional evaluations The second chapter provides an overview of foods containing *Lathyrus sativus* around the world while the third describes Italian foods in detail The fourth chapter focuses on the problem of neurolathyrism in connection with human nutrition and health In closing the fifth chapter sheds light on the historical and traditional food products sector from a food traceability and authenticity standpoint

Chemicals in the Food Industry Rachid Chaib,Michele Barone,2020-03-05 This book addresses the use and management of chemicals in the food and beverage industry The authors explore the use of chemicals as food additives and sanitizers and provide an overview of their toxicological characterisation with regard to the employees who handle them and to consumers In addition the authors pay special attention to the safe and reliable management of chemicals in the food production and packaging areas and in quality control laboratories Topics such as toxicological risks the importance of labelling technical and material safety data sheets risk categories e g fire explosion unforeseen chemical reactions etc safe use of hazardous chemicals prevention procedures and emergency planning in laboratories and industrial areas are also covered In closing readers will learn more about the future behaviour of food production workers regarding chemical handling and approved uses especially in light of the recent REACH obligations Given its scope the book will appeal not only to researchers interested in food production food safety risk prevention and public health but also to professionals involved in quality control and risk assessment in the food and beverage industry

Feeds for the Aquaculture Sector Laura Gasco,Francesco Gai,Giulia Maricchiolo,Lucrezia

Genovese,Sergio Ragonese,Teresa Bottari,Gabriella Caruso,2018-03-23 This Brief discusses potential alternative sources for feeds in aquaculture fish diet and explains that the future of aquaculture s development is dependent on the costs of fishmeal and fish oil Considering that the increasing costs of traditional feeds constrain this development research is looking into alternatives which can ensure adequate nutrition for animals growth This work reviews the use of alternative plant microbial and insect protein sources evaluating in particular their impact on growth nutrient digestibility fillet quality traits and sensorial perception in the most important farmed marine and freshwater fish species The Brief specifically summarizes the pros and cons of plant oils from oilseeds which can on the one hand be a sustainable substitute for fish oil but which are on the other hand less rich in omega 3 long chain polyunsaturated fatty acids The feeding might therefore result in an undesired reduced nutritional value of the flesh of farmed fish The authors also explore the possible use of fishery discards as potential aquaculture feed source Since the landing of by catch will with the new Common Fisheries Policy CFP become obligatory instead of simply returning it to the sea often dead suitable uses of what must not be used for human consumption can be investigated The authors give an outlook whether this might become a sensible alternative to improve the management of discards and create more sustainable fisheries The Brief also addresses the issues of additives to aquafeeds such as vitamins minerals and antioxidants but also immunostimulants and enzymes The authors discuss which effects these additives may have on fish growth welfare reproduction and health status in aquacultures

#### **Quality Systems in the Food Industry**

Marco Fiorino,Caterina Barone,Michele Barone,Marco Mason,Arpan Bhagat,2019-06-05 This book explains the role of food oriented or food centric quality system standards in the modern food and beverage industry It discusses food safety schemes based on the international norm ISO 9001 and the Hazard Analysis and Critical Control Points approach and also introduces the new Global Standard for Food Safety GSFS and the International Featured Standard IFS 7th ed outlining standardization for international equivalence while maintaining the necessary flexibility and independence which is not always easy an easy task Providing selected specific examples it examines the problems of chemical additives and possible cross contaminations between different production lines as well as adequate reactions to and handling of intentional adulterations In addition it includes a chapter focusing on quality audits and technical data sheets in the food industry and a final chapter describing the certification of food grade lubricants in the food industry especially with regard to allergenic substances

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