



# **Functionalizing Carbohydrates *for Food* Applications**

*Texturizing  
and Bioactive/Flavor  
Delivery Systems*

*Edited by*

**Milda E. Embuscado**

# Functionalizing Carbohydrates For Food Applications Texturizing And Bioactiveflavor Delivery Systems

**Yicheng Fang**



## **Functionalizing Carbohydrates For Food Applications Texturizing And Bioactiveflavor Delivery Systems:**

**Functionalizing Carbohydrates for Food Applications** Milda E. Embuscado,2014 *Functionalizing Carbohydrates for Food Applications* Milda E. Embuscado,2014-01-03 How to modify and produce customized carbohydrates for foods Applications to flavor and nutrient delivery texturizing and food quality improvement Details on designing and manufacturing carbohydrate delivery systems This book written by leading food chemists systematically explains the chemistry and engineering of new starch based polymers and carbohydrates and shows how they are used to improve food texture and also to function as carriers for flavors and bioactive compounds The book contains original investigations of strategies to modify food carbohydrates for refining product formulations and improving processing Also included are detailed treatments of how such delivery systems are manufactured and tested Key words gums encapsulation celluloses starches polysaccharide rheology emulsion technology bioactive flavor delivery systems

**Nanotechnology Applications in Food** Alexandru Grumezescu,Alexandra Elena Oprea,2017-02-22 Nanotechnology Applications in Food Flavor Stability Nutrition and Safety is an up to date practical applications based reference that discusses the advantages and disadvantages of each application to help researchers scientists and bioengineers know what and what not to do to improve and facilitate the production of food ingredients and monitor food safety The book offers a broad spectrum of topics trending in the food industry such as pharmaceutical biomedical and antimicrobial approaches in food highlighting current concerns regarding safety regulations and the restricted use of nanomaterials Includes how nanobiosensors are useful for the detection of foodborne pathogens Discusses applications of nanotechnology from flavor and nutrition to stability and safety in packaging Includes nano and microencapsulation nanoemulsions nanosensors and nano delivery systems Identifies practical applications of nanoscience for use in industry today

**Sustainable Materials for Food Packaging and Preservation** Tabli Ghosh,Ruchir Priyadarshi,Swarup Roy,2024-09-20 Sustainable Materials for Food Packaging and Preservation Food Security and Sustainability discusses the recent trends and development of bio based sustainable materials focusing on their fabrication and application in food packaging and food preservation This book brings together fundamental information and the most recent advances in the characterization processing and modification of sustainable materials and their impact on food packaging and storage of food products for improving their shelf life Special attention is given to smart active and edible packaging and the utilization of nanoemulsion and nanoencapsulation in the food industry is also discussed In addition the book reviews the use of proteins polysaccharides and microbial and chemically derived materials for food preservation Discusses recent trends and advancements in the applications of sustainable materials in food packaging and preservation providing an overview of various sustainable materials such as agro based and microbial and chemically derived materials Covers fabrication techniques characterization and processing of various sustainable materials used for food packagingand preservation Includes a thorough discussion of the current sustainable solutions for extending the shelf life of food products

in the packaging process      **Starch in Food** Lars Nilsson, 2024-05-15 Starch in Food Structure Function and Applications Third Edition is now fully updated with eleven new chapters covering hot areas for starch applications such as starch based pickering emulsifiers starch for structuring gluten free bread products and starch microspheres for encapsulation of probiotic bacteria Sections illustrate how plant starch can be analyzed and modified including chapters on analysis of starch molecular structure molar mass and size the relationship between structure and digestion of starch sources of starch including new chapters on cereal root and tuber and pulse starches and starch applications with a new chapter on utilizing starches in product development in baked products and in gluten free bread Starch selection is one of the most complex areas for a product developer yet starch is key to solving formulation challenges when developing products to meet many of the emerging consumer trends This book aids the end user on acquiring knowledge on fundamental starch aspects such as granular and molecular structure and properties analysis biosynthesis and general functionality of starch in foods Thoroughly revised edition bringing updated and new chapters covering the fundamentals of starch applications Explores starch aspects such as granular and molecular structure and properties analysis biosynthesis and general functionality of starch in foods Offers insight into how starch related formulation challenges can be addressed      *Nanotechnology in Nutraceuticals* Shampa Sen, Yashwant Pathak, 2016-10-14 While nutraceuticals were verified to be expedient they often lack stability bioavailability and permeability and nano nutraceuticals are being developed to afford a solution to the problem Nanotechnology in Nutraceuticals Production to Consumption delves into the promises and prospects of the application of nanotechnology to nutraceuticals addressing concepts techniques and production methods Nutraceuticals retain less stability efficacy and bioavailability when entering the human body To overcome such problems nanotechnology shows promise when applied as a tool to improve the quality and stability of nutraceuticals This book discusses metallic nanoparticles and their applications in the food industry with specific application to nutraceuticals It includes detailed discussion on potential functional properties of nutraceuticals with regard to antimicrobial activity anti inflammatory activity and anti cancer activity Since nanoparticles can be toxic past a certain limit implementing nanotechnology under thoughtful regulations is considered critical The book addresses these issues with chapters covering the principles for the oversight of nanotechnologies and nanomaterials in nutraceuticals the implications of regulatory requirements the ethics and economics of nano nutraceuticals and consumer acceptance of nanotechnology based foods      **Functional Food Carbohydrates** Costas G. Biliaderis, Marta S. Izydorczyk, 2006-10-10 Historically most of the research into carbohydrates as functional ingredients focused on the improvement of appearance taste mouth feel and stability The growing interest in functional foods however is demanding a critical look at the beneficial nonnutritive effects of carbohydrates on human health Furthermore there is a need to establish definitive relations among the structure physical property and physiological function of these bioactive compounds As more of the benefit and functional versatility of carbohydrates is revealed it is clear that any future research and recommendation

must be based on a solid synthesis of multidisciplinary findings including epidemiological metabolic and clinical nutritional data Through clinical and epidemiological studies Functional Food Carbohydrates addresses the specific classes of carbohydrates that seem to exert health enhancing effects The text begins with in depth treatments of the chemistry physical properties processing technology safety and health benefits of a variety of carbohydrates including cereal beta glucans microbial polysaccharides chitosan arabinoxylans resistant starch and other polysaccharides of plant origin The authors then discuss the physiological and metabolic effects that a variety of carbohydrates have on specific chronic diseases such as cancer diabetes cardiovascular disease obesity and various gastrointestinal disorders The final chapters discuss the regulatory and technological aspects of using carbohydrates as functional foods Specifically the authors consider the safety and efficacy of pre pro and synbiotics and the potential use of carbohydrates as delivery vehicles for other bioactive compounds With contributions from experts specializing in food chemistry and technology as well as human nutrition and physiology this text illuminates the link between the behavior of carbohydrate compounds and their beneficial end result on human health

**Nanotechnology and Functional Foods** Cristina Sabliov, Hongda Chen, Rickey Yada, 2015-04-21 The continued advancement in the sciences of functional foods and nutraceuticals has clearly established a strong correlation between consumption of bioactives and improved human health and performance However the efficacy and bioavailability of these bioactive ingredients e g omega 3 oils carotenoid antioxidants vitamins and probiotic bacteria in foods often remains a challenge due to their instability in food products and gastrointestinal tract as well as their limited bioavailability In some cases these bioactive ingredients may impart an undesirable organoleptic characteristic to the final product which hinders acceptance by consumers In addressing these challenges development of effective delivery systems is critical to meet the consumer needs for effective bioactives The scientific knowledge behind developing effective delivery of bioactive components into modern and wide ranging food products will be essential to reap their health promoting benefits and to support the sustained growth of the functional foods market Nanotechnology and Functional Foods Effective Delivery of Bioactive Ingredients explores the current data on all aspects of nanoscale packing carrying and delivery mechanisms of bioactives ingredients to functional foods The book presents various delivery systems including nano emulsions solid lipid nanoparticles and polymeric nano particles their properties and interactions with other food components and fate in the human body Later chapters emphasize the importance of consumers attitude towards nano delivery for the success of the technology and investigate the challenges faced by regulatory agencies to control risks and harmonize approaches worldwide The wide applicability of bioactive delivery systems with the purpose of improving food quality food safety and human health will make this book a worthy reference for a diverse range of readers in industry research and academia

**Novel Processing Methods for Plant-Based Health Foods** Megh R. Goyal, N. Veena, Ritesh B. Watharkar, 2023-03-10 This new volume presents an array of new and emerging techniques in the food processing sector focusing on the extraction

encapsulation and health benefits of bioactive Compounds It illustrates various applications of novel food processing extraction and encapsulation techniques along with the health and safety aspects of plant derived bioactive compounds and functional foods Some of the sustainable and green extraction techniques discussed include novel extraction techniques such as microwave assisted extraction MAE ultrasonic assisted extraction UAE supercritical fluid extraction SFE accelerated solvent extraction ASE and rapid solid liquid extraction RSLE The volume also covers the principles and methods of encapsulation its role and application in protection and stabilization and as a targeted delivery system for enhanced nutritional health benefits Various encapsulation methods such as spray drying spray cooling chilling fluidized bed coating coacervation liposome entrapment extrusion inclusion complexation etc are discussed in detail for application in the food industry Novel Processing Methods for Plant Based Health Foods Extraction Encapsulation and Health Benefits of Bioactive Compounds also highlights the potential of nutraceuticals and biological active compounds in human health various sources consumers acceptance safety aspects and their application in development of functional foods This volume offers many tremendous applications in different areas of the food industry including in food processing preservation health promoting properties and safety and quality evaluation of plant based foods The book provides a wealth of information and will be an excellent reference material for researchers scientists students growers traders processors industry professionals and others on the emerging food processing approaches for extraction and encapsulation of plant based bioactive compounds and health promoting properties of plant derived nutraceuticals and safety aspects in production of functional foods     *Preparation, Characterization and Application of the Delivery System for Food Products* Qing Guo,2024-10-29 In the dynamic realm of food science and technology the development of innovative delivery systems for bioactive compounds stands as a cornerstone of contemporary research Driven by the escalating demand for functional foods that offer enhanced nutritional value and controlled release of bioactive components the following Special Issue in the journal Foods entitled Preparation Characterization and Application of the Delivery System for Food Products marks a pivotal advancement The focus of this Special Issue is on the preparation characterization and application of delivery systems designed to revolutionize the consumption and bioavailability of bioactive compounds Bioactive compounds including antioxidants phytochemicals and more hold immense potential for promoting human health However harnessing their full therapeutic benefits necessitates overcoming challenges related to stability controlled release and interaction with the gastrointestinal milieu This Special Issue delves into the latest advancements in controlled release technologies encapsulation techniques and nanostructured delivery systems The articles explore how these approaches safeguard bioactive compounds from degradation enhance their solubility and enable sustained release ultimately maximizing their efficacy Stability and bioavailability critical factors governing the efficacy of bioactive compounds are also thoroughly examined Strategies to improve stability during processing and storage as well as targeted release along the digestive tract are discussed     **Food Bioactives** Sankar

Chandra Deka, Dibyakanta Seth, Nishant Rachayya Swami Hulle, 2019-10-28 This valuable volume addresses the growing consumer demand for novel functional food products and for high value nutritionally rich products by focusing on the sources and applications of bioactives from food. The chapters in the book describe functional properties and discuss applications of the selected food ingredients obtained from various sources including culinary banana phalsa pseudocereals roselle calyces asparagus and more. Several chapters address the resurgence of interest in pseudocereals due to their excellent nutritional and biological values, gluten free composition and the presence of some health promoting compounds. The book also looks at utilizing industrial byproducts for making functional and nutraceutical ingredients. The chapters on prebiotics and probiotics highlight different functional properties and a chapter on food allergens discusses advancements in detection and management in the food manufacturing industries. Functional Carbohydrates Jian Chen, Yang Zhu, Song Liu, 2017-10-02

Functional carbohydrates is the term used to describe those carbohydrates that play an important role in strengthening immunity, decreasing the level of blood lipid and regulating the intestinal flora of humans, beyond those simply used as the energy supplying materials. To date, functional carbohydrates mainly cover dietary fiber, functional polysaccharides, functional oligosaccharides, sugar alcohols and other functional monosaccharides. Functional Carbohydrates: Development, Characterization and Biomanufacture facilitates tracking the important progresses in functional carbohydrates. This book addresses the history and recent developments of a selected number of important functional carbohydrates and it introduces the source, properties and applications of a number of functional carbohydrates. It describes in detail the biomanufacture of these carbohydrates based on fermentation or enzyme catalysis, including the strain screening and improvement, optimization of fermentation process and product downstream processing. Functional Food Ingredients and Nutraceuticals John Shi, 2015-10-28 The second edition of a bestseller Functional Food Ingredients and Nutraceuticals: Processing Technologies covers new and innovative technologies for the processing of functional foods and nutraceuticals that show potential for academic use and broad industrial applications. The book includes a number of green separation and stabilization techno-

Food By-Product Based Functional Food Powders Özlem Tokuşoğlu, 2018-01-29 The by-products of food processing operations may still contain many valuable substances. Nowadays the potential utilization of these major components has been the focus of increasing attention. Food by-products or food industry shelf stable coproducts in liquid, pomace or powder forms can be obtained by processing fruits, vegetables, meat, seafood, milk and dairy, cereal, nuts, fats and oils, drying by-products and converting them into powder offers a way to preserve them as useful and valuable products. Food By-product Based Functional Food Powders discusses food powders derived from food by-products and waste as well as their chemical characterization, functional properties, unique bioactive features, enhancing technologies, processing of food by-product powders and utilization. The book discusses how these by-products may be evaluated as a source of dietary phytochemicals including phenolic antioxidants, carotenoids, other bioactive polyphenols and dietary fiber as a source of proteins, peptides and

amino acids as extruded products as a source of collagen and gelatin and as a source of various food additive materials

*Industrial Application of Functional Foods, Ingredients and Nutraceuticals* C. Anandharamakrishnan, Parthasarathi Subramanian, 2023-08-11 *Industrial Application of Functional Foods Ingredients and Nutraceuticals* Extraction Processing and Formulation of Bioactive Compounds explains the fundamental concepts and underlying scientific principles of nutrient delivery nutraceutical processing technologies and potential opportunities in the field of new product development The book also includes sections on the extraction and purification of functional ingredients effective delivery of nutrients health benefits safety and regulatory aspects Divided in four sections this book provides an up to date highly applicative work that highlights the mechanistic aspects related to the challenges and opportunities associated with developing delivering and marketing functional foods and nutraceuticals Explains the fundamental concepts of nutrient delivery and nutraceutical processing technologies Provides an understanding of pharmacokinetics oral bioavailability and different delivery techniques Features case studies to illustrate practical applications and commercialization

*Food-borne Delivery Systems of Functional Substances for Precision Nutrition*, 2024-09-03 *Food Borne Delivery Systems of Functional Substances for Precision Nutrition* Volume 112 highlights new advances in the field with this new volume presenting interesting chapters on a range of topics including Biological activity limitations and steady state delivery of functional substances for precision nutrition Nanoparticles delivery systems of functional substances for precision nutrition Micelles delivery systems of functional substances for precision nutrition Microgel delivery systems of functional substances for precision nutrition Emulsions delivery systems of functional substances for precision nutrition and Microencapsule delivery systems of functional substances for precision nutrition and much more Other chapters focus on Liposomes delivery systems of functional substances for precision nutrition Hydrogel delivery systems of functional substances for precision nutrition Vesicle delivery systems of functional substances for precision nutrition and Future development trend of food borne delivery systems of functional substances for precision nutrition Provides the latest information on food substances and nutrition Covers biological activity limitations and steady state delivery of functional substances for precision nutrition Includes content on topics such as microgel delivery systems and emulsions delivery systems

*Designing Functional Foods* D. Julian McClements, Eric A Decker, 2009-07-30 The breakdown of food structures in the gastrointestinal tract has a major impact on the sensory properties and nutritional quality of foods Advances in understanding the relationship between food structure and the breakdown digestion and transport of food components within the GI tract facilitate the successful design of health promoting foods This important collection reviews key issues in these areas Opening chapters in Part one examine oral physiology and gut microbial ecology Subsequent chapters focus on the digestion absorption and physiological effects of significant food components such as lipids proteins and vitamins Part two then reviews advances in methods to study food sensory perception digestion and absorption including in vitro simulation of the stomach and intestines and the use of stable



isotopes to determine mineral bioavailability The implications for the design of functional foods are considered in Part three Controlling lipid bioavailability using emulsion based delivery systems designing foods to induce satiation and self assembling structures in the GI tract are among the topics covered With contributions from leading figures in industry and academia Designing functional foods provides those developing health promoting products with a broad overview of the wealth of current knowledge in this area and its present and future applications Reviews digestion and absorption of food components including oral physiology and gut microbial ecology Evaluates advances in methods to study food sensory perception assessing criteria such as simulation of flavour released from foods Investigates the implications for the design of functional foods including optimising the flavour of low fat foods and controlling the release of glucose     *Nutraceutical and Functional Food Components* Charis M. Galanakis,2021-10-24 *Nutraceutical and Functional Food Components* Effects of Innovative Processing Techniques Second Edition highlights the impact of recent food industry advances on the nutritional value functional properties applications bioavailability and bioaccessibility of food components This second edition also assesses shelf life sensory characteristics and the profile of food products Covering the most important groups of food components including lipids proteins peptides and amino acids carbohydrates dietary fiber polyphenols carotenoids vitamins aromatic compounds minerals glucosinolates enzymes this book addresses processing methods for each Food scientists technologists researchers nutritionists engineers and chemists agricultural scientists other professionals working in the food industry as well as students studying related fields will benefit from this updated reference Focuses on nutritional value functional properties applications bioavailability and bioaccessibility of food components Covers food components by describing the effects of thermal and non thermal technologies Addresses shelf life sensory characteristics and health claims

**Functional Foods and Biotechnology** Kalidas Shetty,Dipayan Sarkar,2020-04-13 The second book of the Food Biotechnology series *Functional Foods and Biotechnology* Biotransformation and Analysis of Functional Foods and Ingredients highlights two important and interrelated themes biotransformation innovations and novel bio based analytical tools for understanding and advancing functional foods and food ingredients for health focused food and nutritional security solutions The first section of this book provides novel examples of innovative biotransformation strategies based on ecological biochemical and metabolic rationale to target the improvement of human health relevant benefits of functional foods and food ingredients The second section of the book focuses on novel host response based analytical tools and screening strategies to investigate and validate the human health and food safety relevant benefits of functional foods and food ingredients Food biotechnology experts from around the world have contributed to this book to advance knowledge on bio based innovations to improve wider health focused applications of functional food and food ingredients especially targeting non communicable chronic disease NCD and food safety relevant solution strategies Key Features Provides system science based food biotechnology innovations to design and advance functional foods and food ingredients for solutions to

emerging global food and nutritional insecurity coupled public health challenges Discusses biotransformation innovations to improve human health relevant nutritional qualities of functional foods and food ingredients Includes novel host response based food analytical models to optimize and improve wider health focused application of functional foods and food ingredients The overarching theme of this second book is to advance the knowledge on metabolically driven food system innovations that can be targeted to enhance human health and food safety relevant nutritional qualities and antimicrobial properties of functional food and food ingredients The examples of biotransformation innovations and food analytical models provide critical insights on current advances in food biotechnology to target design and improve functional food and food ingredients with specific human health benefits Such improved understanding will help to design more ecologically and metabolically relevant functional food and food ingredients across diverse global communities The thematic structure of this second book is built from the related initial book which is also available in the Food Biotechnology Series Functional Foods and Biotechnology Sources of Functional Food and Ingredients edited by Kalidas Shetty and Dipayan Sarkar ISBN 9780367435226 For a complete list of books in this series please visit our website at <https://www.crcpress.com> Food Biotechnology Series book series CRCFOOBIOTECH

**Handbook of Food Bioactive Ingredients** Seid Mahdi Jafari, Ali Rashidinejad, Jesus Simal-Gandara, 2023-09-13 Bioactive ingredients including both bioactive compounds and bioactive live organisms are present in small amounts in natural sources such as fruits and vegetables These ingredients have been continuously investigated during the last few decades and the epidemiological data suggest that their intake is associated with significant decreased risk of various disorders and chronic diseases owing to their anti oxidant anti bacterial and anti inflammatory qualities Some of these natural ingredients such as catechins curcumin resveratrol oleuropein quercetin rutin hesperidin sulforaphane ellagic acid and anthocyanins have been studied as factors with possible direct or indirect effect on specific molecular pathways which are playing vital roles in the association with the pathophysiology of the chronic diseases such as cancer In light of this natural foods and food derived products rich in bioactives have received recent growing attention It has been reported that frequent consumption of fruits vegetables and their associated natural products have many health promoting benefits that protect against degenerative illnesses including heart disease arthritis cancer immune system decline brain dysfunction inflammation and cataracts Functional foods and medicinal supplements containing encapsulated bioactive materials will be the future of new emerging products in the food and pharma industries Such products present therapeutical and medicinal properties that can prevent and or cure specific chronic diseases and disorders Handbook Of Bioactive Ingredients provides a systematic overview of different food bioactive ingredients describing their chemistry structure functionality safety toxicity oral delivery and their applications in functional foods Detailed chapters will describe various bioactive ingredients including polyphenolic compounds such as phenolic acids flavonoids and anthocyanins carotenoids sterols such as non oxygenated carotenoids xanthophylls and phytosterols bioactive peptides such as marine

bioactive peptides animal bioactive peptides plant bioactive peptides microbial bioactive peptides essential fatty acids like fish and marine oils and plant oils live organisms like probiotics and yeasts essential oils and oleoresins like monoterpenes and sesquiterpenes and oleoresins vitamins and minerals including liposoluble vitamins hydrosoluble vitamins and trace minerals and other bioactive compounds including prebiotics oligosaccharides dietary fibers and beta glucan This book is the first comprehensive collection of scientific evidence from published literature on natural bioactive ingredients

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