


Food Engineering Series  
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# Food Nanoscience and Nanotechnology

 Springer

# Food Nanoscience And Nanotechnology Food Engineering Series

**Suvenu Bhattacharya**



## **Food Nanoscience And Nanotechnology Food Engineering Series:**

**Food Nanoscience and Nanotechnology** Humberto Hernández-Sánchez, Gustavo Fidel Gutiérrez-López, 2015-05-14 Nanoscience and nanotechnology have had a great impact on the food industry They have increased the nutritional and functional properties of a number of food products and have aided in food preservation through the addition of antimicrobials or the reduction of water activity These and many other applications have emerged in recent years to transform food science and technology This book proposes to look at some of these applications and their effect on food production and innovation

Nano-food Engineering Umesh Hebbar, Shivendu Ranjan, Nandita Dasgupta, Raghvendra Kumar Mishra, 2020-08-06 This extensive and singular work focuses on current applications of nanotechnology in food systems The functionality and applicability of food related nanotechnology is covered in depth presenting a view on the food processing packaging storage and safety assessment of nanotechnology in the food industry Multiple nanostructures are covered each with their specific ingredient choice production strategy functionality and application in food engineering Individual chapters focus on current processing methods and applications of nanotechnology in foods Nano food Engineering Volume One brings together panels of highly accomplished experts in the field of composites nanotechnology and chemical engineering and food technology The work encompasses basic studies and addresses novel issues covering all engineering aspects opportunities and challenges and solutions of nano foods

**Environmental Nanotechnology** Nandita Dasgupta, Shivendu Ranjan, Eric Lichtfouse, 2018-05-15 This book presents the environmental benefits of nanomaterials in agriculture water purification and nanomedicine Nanotechnology will modify the environment both in a positive and negative way On the one hand new nanomaterials are promising for reducing greenhouse gases cleaning toxic wastes and building alternative energy sources On the other hand some toxic nanoparticles enter and disrupt ecosystems Therefore research should focus on the sustainable use of nanomaterials to avoid environmental contamination This volume is the first of several volumes on Environmental Nanotechnology which will be published in the series Environmental Chemistry for a Sustainable World

Smart Nanocontainers Phuong Nguyen Tri, Trong-On Do, Tuan Anh Nguyen, 2019-11-08 Smart Nanocontainers explores the fundamental concepts and emerging applications of nanocontainers in biomedicine pharmaceuticals and smart materials In pharmaceuticals nanocontainers have advantages over their micro counterparts including more efficient drug detoxification higher intracellular uptake better stability less side effects and higher biocompatibility with tissue and cells In materials science such as coating technology they help by making coatings smarter stronger and more durable This important reference will help anyone who wants to learn more on how nanocontainers are used to provide the controlled release of active agents including their applications in smart coatings corrosion drug delivery diagnosis agri food and gas storage Discusses how the molecular design of nanocarriers can be optimized to increase performance Explores how nanocarriers are being used to produce a new generation of active coatings Explains how nanocarriers are being used to deliver more

effective nanoscale drug delivery      *Handbook of Food Science, Technology, and Engineering* Yiu H. Hui, 2006

**Nanotechnology in the Agri-Food Sector** Lynn J. Frewer, Willem Norde, Arnout Fischer, Frans Kampers, 2011-02-14

Providing an overview of nanotechnology in the context of agriculture and food science this monograph covers topics such as nano applications in the agri food sector as well as the social and ethical implications Following a review of the basics the book goes on to take an in depth look at processing and engineering encapsulation and delivery packaging crop protection and disease It highlights the technical regulatory and safety aspects of nanotechnology in food science and agriculture while also considering the environmental impact A valuable and accessible guide for professionals novices and students alike

**Sustainable Agriculture Reviews 55** Vaibhav Kumar Maurya, K. M. Gothandam, Shivendu Ranjan, Nandita

Dasgupta, Eric Lichtfouse, 2021-10-12 This book provides up to date information on the emerging trends and technology in food nanotechnology It gives high quality literature focused on the recent developments research trends methods and issues related to the safe use of nanoscale materials to add value to food Most importantly this book encloses critical reviews on micro and nanoengineering concepts principles and applications in food It also provides a scientific basis of micro and nanoengineered structures and compounds their industrial food applications encapsulation techniques and methods This book encompasses detection analysis and characterization techniques for nanostructures the fate of encapsulated materials in target food It also educates on regulatory issues and safety of clinical translation of nanomaterials in fortified foods

Nanoscience and Nanotechnology in Foods and Beverages Vellaichamy Chelladurai, Digvir S. Jayas, 2018-11-15 Potential applications of nanotechnology in food industry include encapsulation and delivery of substances in targeted sites increasing flavor introducing antibacterial nanoparticles into food enhancing shelf life sensing contamination improved food storage tracking tracing and brand protection This book provides a basic understanding of the nanoscience and nanotechnology and their applications to different food industry sectors covering both benefits and drawbacks using nanotechnology in food processing and discussing the development of an international regulatory framework      **Nanoscience in Food and**

**Agriculture 2** Shivendu Ranjan, Nandita Dasgupta, Eric Lichtfouse, 2016-08-18 This book is the second volume on this topic within the series With unique properties nanomaterials are rapidly finding novel applications in many fields such as food

medicine agriculture and pollution Such applications include to treat cancer nanosensors to detect food contamination nanomaterials for food packaging nanoencapsulation to preserve nutraceuticals and nanofertilisers for advanced agriculture After an introductory chapter on property rights of nanomaterials readers will discover the applications of nanotechnology in food health environment ecotoxicology and agriculture      **Advancements in Nanotechnology for Food and Packaging**

Tabli Ghosh, Swarup Roy, Łukasz Łopusiewicz, 2024-11-30 Advancements in Nanotechnology for Food and Packaging explores current trends advances and associated challenges of the applications of nanotechnology in the food sectors such as the fabrication and characterization of functional food developments and shelf life extension This book is organized into 16

chapters that cover the main concepts related to the use of nanotechnology in food processing packaging and monitoring Coverage includes food functionalization quality management and control food sensory membrane filtration technology nanotechnology based sensors sustainable packaging regulatory aspects and much more This book an essential resource for materials and food scientists technologists researchers academics and professionals working in nanotechnology and food science Discusses several applications of nanotechnology in the food industry including flavoring enhancement of shelf life improved food storage and more Includes nano and microencapsulation nanoemulsions nanosensors and nano additives Features case studies demonstrating how nanotechnology is being used in today s food industry

**Nanoscience in Food and Agriculture 1** Shivendu Ranjan,Nandita Dasgupta,Eric Lichtfouse,2016-08-18 Nanotechnology is a fast evolving discipline that already produces outstanding basic knowledge and industrial applications for the benefit of society Whereas the first applications of nanotechnology have been developed mainly in material sciences applications in the agriculture and food sectors are still emerging Due to a rapid population growth there is a need to produce food and beverages in a more efficient safe and sustainable way Here nanotechnology is a promising way to improve crop production water quality nutrition packaging and food security There are actually few comprehensive reviews and clear textbooks on nanotechnology in agriculture water and food In this book there are 10 chapters describing the synthesis and application of nanomaterials for health food and agriculture are presented Nanomaterials with unique properties will dramatically improve agriculture and food production Applications will include nanofertilisers to enhance plant growth and nanosensors to detect food contamination An overall view of nanotechnology applications in agriculture food water and environment are described in the first two chapters by Dasgupta et al and Singh Health and environmental applications of nanotechnology are presented in chapters 3 5 Shukla and Iravani review green methods to synthesize metal nanoparticles and give applications to water purification in chapter 3 The removal of up to 95% of contaminants by nanoparticles nanotubes and nanostructured membranes is described by Naghdi et al in chapter 4 Yoti et al then review nanosensors for the detection of pathogenic bacteria in chapter 5 Those nanosensors can be used as biodiagnostics to control food and water quality Food applications of nanoscience are presented in chapters 6 and 7 by Kuswandi and Sarkhar et al Kuswandi explain in chapter 6 that nanomaterials can improve packaging quality and that nanosensors can detect freshness and containimants The use of nanoparticles to protect ingredients such as vitamins flavours and antimicrobials is reviewed by Sarkhar et al in chapter 7

Biopolymer Nanostructures for Food Encapsulation Purposes Seid Mahdi Jafari,2019-06-14 Biopolymer Nanostructures for Food Encapsulation Purposes a volume in the Nanoencapsulation in the Food Industry series guides readers on how to fabricate and apply nanostructures from different proteins carbohydrates and chemical sources for food encapsulation purposes This book covers recent and applied research in all disciplines of bioactive and nutrient delivery Chapters emphasize original results relating to experimental theoretical formulations and or applications of nano structured

biopolymers Includes updated applications of biopolymer nanostructures from different protein carbohydrate and chemical sources Discloses the current knowledge and potential of biopolymer nanostructures Brings the novel applications of biopolymer nanostructures for the development of bioactive delivery systems together      **Food Hydrocolloids as Encapsulating Agents in Delivery Systems** Adil Gani,F.A. Masoodi,Umar Shah,Shah Asima,2019-06-07 This book addresses the use of food hydrocolloids as agents for encapsulating biological active ingredients It details the challenges of poorly controlled rate of hydration thickness decrease in viscosity upon storage and susceptibility to microbial contamination Food Hydrocolloids as Encapsulating Agents in Delivery Systems briefly describes various emerging biomaterials including food gums starches beta glucans and proteins for their potential role as wall material in the development of nutraceutical delivery systems Further it describes different techniques of fabrication of nanodelivery systems Features Provides an introduction to food hydrocolloids as encapsulating agents Covers starches and their derivatives as delivery systems Includes gum based delivery systems Discusses the classification isolation and purification of protein delivery systems This book would be helpful to food scientists and pharmaceutical scientists working in areas including nanotechnology polymer chemistry and nutraceutical delivery as well as regulators and government researchers in US FDA USDA and UK FSA regulatory agencies      *Nanotechnology Applications in Agricultural and Bioprocess Engineering* Megh R. Goyal,Santosh K. Mishra,Lohith Kumar Dasarahalli-Huligowda,2022-06-15 This new volume looks at new research and advances in the use of nanotechnology applications in agricultural and bioprocess engineering The first section deals with the impact of nanotechnology in agricultural engineering looking at the role of nanomaterials in plant growth and nutrition It goes on to discuss specific methods and processes in the development of food products nutraceuticals and therapeutics This includes nanotechnological methods for iron fortification of dairy food for processing and preservation of meat and meat products for selective targeting of cancer and more The book then discusses the role of nanotechnology in bioprocessing such as for biofuel production for wastewater treatment and as enzymatic nanoparticles for fabrication processes      Conventional and Advanced Food Processing Technologies Suvendu Bhattacharya,2014-09-26 Food processing technologies are an essential link in the food chain These technologies are many and varied changing in popularity with changing consumption patterns and product popularity Newer process technologies are also being evolved to provide the added advantages Conventional and Advanced Food Processing Technologies fuses the practical application machinery theoretical model equation and cutting edge recent trends making it ideal for industrial academic and reference use It consists of two sections one covering conventional or well established existing processes and the other covering emerging or novel process technologies that are expected to be employed in the near future for the processing of foods in the commercial sector All are examined in great detail considering their current and future applications with added examples and the very latest data Conventional and Advanced Food Processing Technologies is a comprehensive treatment of the current state of knowledge on food processing

technology In its extensive coverage and the selection of reputed research scientists who have contributed to each topic this book will be a definitive text in this field for students food professionals and researchers

**Impact of Nanoscience in the Food Industry** Alexandru Mihai Grumezescu, Alina Maria Holban, 2018-01-20 The Impact of Nanoscience in the Food Industry Volume 12 in The Handbook of Food Bioengineering series explores how nanoscience applications in food engineering offer an alternative to satisfying current food needs that cannot be fulfilled by natural products Nanotechnology enables the development of tailored food ingredients and structures to replace products that are difficult to obtain The book discusses how specialized nano preservatives sensors and food degradation and contamination detectors were developed and how they can be introduced in food products without degrading quality or properties of the final product A valuable resource for food engineering researchers and students alike Identifies common nanomaterials used in food preservation and food packaging Provides industrial applications to increase food production Describes analytical methods for assessing food safety Identifies how nanoscience advances allow for new developments in functional foods and nutraceuticals Discusses safety concerns regulations and restricted use of nanomaterials in food bioengineering

**Microbial Food Safety and Preservation Techniques** V Ravishankar Rai, Jamuna A. Bai, 2014-09-26 In recent years rapid strides have been made in the fields of microbiological aspects of food safety and quality predictive microbiology and microbial risk assessment microbiological aspects of food preservation and novel preservation techniques Written by the experts and pioneers involved in many of these advances Microbial Food Safety and P

**Nano-Engineering at Functional Interfaces for Multidisciplinary Applications** Sai Sathish Ramamurthy, Seemesh Bhaskar, Narendra Reddy, 2024-10-18 Nano Engineering at Functional Interfaces for Multi disciplinary Applications Electrochemistry Photoplasmonics Antimicrobials and Anticancer Applications provides a comprehensive overview of the fundamentals and latest advances of nano engineering strategies for the design development and fabrication of novel nanostructures for different applications in the fields of photoplasmonics and electrochemistry as well as antibacterial and anticancer research areas The book begins with an introduction to the fundamentals and characteristics of nanostructured interfaces and their associated technologies including an overview of their potential applications in different fields The following chapters present a thorough discussion of the synthesis processing and characterization methods of nanomaterials with unique functionalities suitable for energy harvesting food and textile applications electrocatalysis biomedical applications and more It then concludes outlining research future directions and potential industrial applications Presents the advantages and impact of nano engineering in technological advances with up to date discussions on their applications Covers research directions and potential future applications of nano engineering in industry Includes case studies that illustrate important processes

**Sustainable Nanomaterials for Biosystems Engineering** Junaid Ahmad Malik, Megh R. Goyal, Mohamed Jaffer M. Sadiq, 2023-05-04 This new volume explores the integration of bionanomaterials and sustainable resources for the development of new and emerging sustainable processes It

highlights the concept of essential bionanomaterials derived from sustainable resources with examples of interdisciplinary methodologies and research that highlight the reuse of biomass waste as well as the proper usage of green technologies The volume considers the most recent trends challenges and applications in bionanomaterials derived from sustainable sources in energy production and environmental mitigation The book looks at state of the art trends in the use of bionanomaterials for renewable energy such as in production of solar energy for energy harvesting and for energy conversion and storage Chapters consider the application of bionanomaterials for the development of improved optical and electrical biosensors The volume goes on to address the promising use of bionanomaterials for environmental remediation such as for recovering heavy metals radioactive metals and other pollutants from wastewater from river water from soils etc Other topics include the use of sustainable nanomaterials in the food industry in the biomedical field in ecological research and more **Plant**

**Tuber and Root-Based Biocomposites** S. M. Sapuan,H. Abrial,Tarique Jamal,V.K. Thakur,A. Nazrin,S.F.K.

Sherwani,2024-08-23 Plant Tuber and Root based Biocomposites Development Characterization and Applications discusses the latest advances in this important research field The book details novel tuber and root based materials individually and covers their manufacturing characterization and applications Emphasis is placed on the fundamental properties of these materials to address challenges and opportunities for industrial commercialization in the future Various applications in food medicine textiles biofuel pulp and paper making industries as well as bioenergy packaging and automotive are covered Covers the latest advances in the application of bio based feedstocks tubers root fibers for manufacturing composites Includes materials selection design solutions manufacturing techniques structural analysis and performance of tuber and root based composites in various applications Explores new materials such as Dioscorea hispida arrowroot bagasse and cassava bagasse Covers step by step procedures to develop biodegradable packaging materials such as extraction of raw materials treatment of materials and incorporation of additives to improve the functional properties of developed products Includes nanobiocomposites covers commercialization and is a practical guide to realistic applications



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