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Encapsulation Technologies for Active Food Ingredients and Food Processing

 Springer

Encapsulation Technologies For Active Food Ingredients And Food Processing

Alexandru Grumezescu



Encapsulation Technologies For Active Food Ingredients And Food Processing:

Encapsulation Technologies for Active Food Ingredients and Food Processing N.J. Zuidam, Viktor Nedovic, 2009-10-30 Consumers prefer food products that are tasty healthy and convenient Encapsulation is an important way to meet these demands by delivering food ingredients at the right time and right place For example encapsulates may allow flavor retention mask bad tasting or bad smelling components stabilize food ingredients and increase their bioavailability Encapsulation may also be used to immobilize cells or enzymes in the production of food materials or products such as fermentation or metabolite production This book provides a detailed overview of the encapsulation technologies available for use in food products food processing and food production The book aims to inform those who work in academia or R D about both the delivery of food compounds via encapsulation and food processing using immobilized cells or enzymes The structure of the book is according to the use of encapsulates for a specific application Emphasis is placed on strategy since encapsulation technologies may change Most chapters include application possibilities of the encapsulation technologies in specific food products or processes The first part of the book reviews general technologies food grade materials and characterization methods for encapsulates The second part discusses encapsulates of active ingredients e g aroma fish oil minerals vitamins peptides proteins probiotics for specific food applications The last part describes immobilization technologies of cells and enzymes for use within food fermentation processes e g beer wine dairy meat and food production e g sugar conversion production of organic acids or amino acids hydrolysis of triglycerides Edited by two leading experts in the field Encapsulation Technologies for Food Active Ingredients and Food Processing will be a valuable reference source for those working in the academia or food industry The editors work in both industry or academia and they have brought together in this book contributions from both fields

Encapsulation technologies for active food ingredients and food processing, 2010

Encapsulation in Food Processing and Fermentation Steva Lević, Viktor Nedović, Branko Bugarski, 2022-08-18 Food technology has adopted new principles and practices that are rapidly changing the food sector New foods are now available under more uniform standards and better quality control Globalised food market offers opportunities for manufacturers to increase production and profit and at the same time consumers benefit from the choice of food products like never before All this is possible only because of the innovations in the food sector One of such innovations is encapsulation technology which aims to preserve food quality enhance the sensorial properties of food and increase the efficiency in food processing This book discusses the uses of encapsulation technology in food practices and conventional processes and also highlights new directions in food processing In the introductory chapters review of encapsulation technologies carrier materials and criteria for their selection analytical methods for characterisation of encapsulated products and some aspects of product design and process optimisation The most important achievements of encapsulation technology in the food sector are reviewed in the later chapters related to encapsulation of food ingredients

food biocatalysts and examples of usage of encapsulated active ingredients in the dairy and meat industry beverage production etc In addition the implementation of nanotechnology in the food sector is reviewed emphasizing the most important materials and technologies for the production of nanoencapsulates The book is a valuable source of information on encapsulation technology for academia and industry especially the food sector with the aim of enhancing knowledge transfer

Encapsulation Technologies and Delivery Systems for Food Ingredients and Nutraceuticals Nissimarti, D.

Julian McClements, 2012-10-19 Improved technologies for the encapsulation protection release and enhanced bioavailability of food ingredients and nutraceutical components are vital to the development of future foods Encapsulation technologies and delivery systems for food ingredients and nutraceuticals provides a comprehensive guide to current and emerging techniques Part one provides an overview of key requirements for food ingredient and nutraceutical delivery systems discussing challenges in system development and analysis of interaction with the human gastrointestinal tract Processing technologies for encapsulation and delivery systems are the focus of part two Spray drying cooling and chilling are reviewed alongside coextrusion fluid bed microencapsulation microencapsulation methods based on biopolymer phase separation and gelation phenomena in aqueous media Part three goes on to investigate physicochemical approaches to the production of encapsulation and delivery systems including the use of micelles and microemulsions polymeric amphiphiles liposomes colloidal emulsions organogels and hydrogels Finally part four reviews characterization and applications of delivery systems providing industry perspectives on flavour fish oil iron micronutrient and probiotic delivery systems With its distinguished editors and international team of expert contributors Encapsulation technologies and delivery systems for food ingredients and nutraceuticals is an authoritative guide for both industry and academic researchers interested in encapsulation and controlled release systems Provides a comprehensive guide to current and emerging techniques in encapsulation technologies and delivery systems Chapters in part one provide an overview of key requirements for food ingredient and nutraceutical delivery systems while part two discusses processing technologies for encapsulation and delivery systems Later sections investigate physicochemical approaches to the production of encapsulation and delivery systems and review characterization and applications of delivery systems

Functional Food Products and Sustainable Health Saghir

Ahmad, Nasser Abdulatif Al-Shabib, 2020-08-29 There is a growing global awareness of the link between good diet and health This fascinating book reviews various functional foods or nutraceuticals and the bio active compounds they contain in order to identify the role of bioactive compounds such as nisin micronutrients and hydrocolloids in the diet in overall human health It also provides up to date information on functional elements like antioxidants dietary fibres pre probiotics vitamins and mineral enriched foods in the human diet Consisting of fifteen chapters the book offers a systematic review of the key factors in the preparation of functional foods from selected sources and also describes the processing preservation and packaging of a range of functional food products This book is a valuable resource for students and researchers working in the field of food

science food technology and nutrition as well as for industry experts Microencapsulation in the Food Industry Robert Sobel, 2014-06-30 Microencapsulation is being used to deliver everything from improved nutrition to unique consumer sensory experiences It s rapidly becoming one of the most important opportunities for expanding brand potential Microencapsulation in the Food Industry A Practical Implementation Guide is written for those who see the potential benefit of using microencapsulation but need practical insight into using the technology With coverage of the process technologies materials testing regulatory and even economic insights this book presents the key considerations for putting microencapsulation to work Application examples as well as online access to published and issued patents provide information on freedom to operate building an intellectual property portfolio and leveraging ability into potential in licensing patents to create produce pipeline This book bridges the gap between fundamental research and application by combining the knowledge of new and novel processing techniques materials and selection regulatory concerns testing and evaluation of materials and application specific uses of microencapsulation Practical applications based on the authors more than 50 years combined industry experience Focuses on application rather than theory Includes the latest in processes and methodologies Provides multiple starting point options to jump start encapsulation use Thermal and Nonthermal Encapsulation Methods Magdalini Krokida, 2017-09-27 Encapsulation is a topic of interest across a wide range of scientific and industrial areas from pharmaceuticals to food and agriculture for the protection and controlled release of various substances during transportation storage and consumption Since encapsulated materials can be protected from external conditions encapsulation enhances their stability and maintains their viability This book offers a comprehensive review of conventional and modern methods for encapsulation It covers various thermal and nonthermal encapsulation methods applied across a number of industries including freeze drying spray drying spray chilling and spray cooling electrospinning electrospraying osmotic dehydration extrusion air suspension coating pan coating and vacuum drying The book presents basic fundamentals principles and applications of each method enabling the reader to gain extended knowledge The choice of the most suitable encapsulation technique is based on the raw materials the required size and the desirable characteristics of the final products *Novel Approaches of Nanotechnology in Food* Alexandru Grumezescu, 2016-05-13 Novel Approaches of Nanotechnology in Food a volume in the Nanotechnology in the Agri Food Industry series represents a summary of the most recent advances made in the field of nanostructured materials that have significant impact on the agri food industry Because the current food market needs innovation nanotechnology coupled with novel interdisciplinary approaches and processing methods has enabled important advances that have the potential to revolutionize agri food sector Nanotechnology can serve to resolve challenges faced by the food and bioprocessing industries for developing and implementing systems that can produce qualitative and quantitative foods that are safe sustainable and ecofriendly This book is a valuable resource for scientists researchers and engineers in food science and biotechnology fields as well as students who want information on cutting edge technologies

Provides worldwide research applications of nanomaterials and nanotechnology useful in food research Presents analytical methods for enzyme immobilization onto magnetic nanoparticles Includes strategies of behavior and structure function to increase application enhancement and control Discusses nanomaterial regulations and for consumer protection awareness

Handbook of Nanoencapsulation Jasmeet Kour, Raees Ul Haq, Sajad Ahmad Wani, Bhaskar Jyoti, 2023-04-05

Nutraceutical encapsulation envelopes protection of products from oxidative damage controlled delivery of nanoencapsulated nutraceuticals and improved nutraceutical bioavailability as well as biological action It is a promising technique to ensure the stabilization of such labile compounds and to protect the core ingredients from premature reactions and interactions In a comprehensive manner the Handbook of Nanoencapsulation Preparation Characterization Delivery and Safety of Nutraceutical Nanocomposites presents various nanosystems nanocarriers physical and chemical techniques used in encapsulation of various nutraceuticals and the targeted delivery of various significant nutraceuticals This book bridges the gap between academia and research as it encompasses the ubiquitous applications of nanoencapsulation technique used on significant nutraceuticals derived from plants animals as well as microalgae Key Features Provides a quick and easy access to major plant animal and microalgae derived nutraceutical ingredients Discusses nanoencapsulation techniques for protection and targeted release of various food bioactive ingredients Covers safety bioaccessibility and multiple applications of nanoencapsulated nutraceuticals in the food industry Unveiling pivotal aspects of nanoencapsulation of significant nutraceuticals this book is a valuable resource for researchers food toxicologists food scientists nutritionists and scientists in medicinal research

Encapsulation and Controlled Release Technologies in Food Systems Dr Jamileh M.

Lakkis, 2016-02-11 The emergence of the discipline of encapsulation and controlled release has had a great impact on the food and dietary supplements sectors principally around fortifying food systems with nutrients and health promoting ingredients The successful incorporation of these actives in food formulations depends on preserving their stability and bioavailability as well as masking undesirable flavors throughout processing shelf life and consumption This second edition of Encapsulation and Controlled Release Technologies in Food Systems serves as an improvement and a complement companion to the first However it differentiates itself in two main aspects Firstly it introduces the reader to novel encapsulation and controlled release technologies which have not yet been addressed by any existing book on this matter and secondly it offers an in depth discussion on the impact of encapsulation and controlled release technologies on the bioavailability of health ingredients and other actives In common with the first edition the book includes chapters written by distinguished authors and researchers in their respective areas of specialization This book is designed as a reference for scientists and formulators in the food nutraceuticals and consumer products industries who are looking to formulate new or existing products using microencapsulated ingredients It is also a post graduate text designed to provide students with an introduction to encapsulation and controlled release along with detailed coverage of various encapsulation technologies and

their adaptability to specific applications **Flavors for Nutraceutical and Functional Foods** M.

Selvamuthukumaran, Yashwant Pathak, 2018-08-06 Flavors are an integral part of nutraceutical formulations. Flavors offer significant advantage to Nutraceuticals when it comes to palatability and get an edge over other products in an extremely competitive nutraceutical market. Flavors for Nutraceuticals and Functional Foods addresses different natural ingredients/botanicals used in various functional foods and nutraceutical products. The techniques of incorporating flavors in Nutraceutical products can be classified as conventional and using recently developed modern techniques such as nanotechnology are also covered in different chapters. These techniques are mainly used for masking the taste of nutraceutical and functional food products. The book discusses the basics of flavors and the significance of the flavor industry in relation to Nutraceuticals. This book covers various processes involved in incorporating flavor and improving product acceptability. It provides an overview on the potential applications of the main terpene based flavors as part of nutraceutical formulations. This book will serve as a reference to academicians and industry people who are involved in Nutraceutical formulations and marketing.

Handbook of Encapsulation and Controlled Release Munmaya Mishra, 2015-12-01 The field of encapsulation especially microencapsulation is a rapidly growing area of research and product development. The Handbook of Encapsulation and Controlled Release covers the entire field presenting the fundamental processes involved and exploring how to use those processes for different applications in industry. Written at a level comparable to Process-Spray Udo Fritsching, 2016-08-01 This book describes the latest research on producing functional particles using spray processes. The authors detail micro level elementary processes and phase boundaries, process analysis, scaling and modeling and macro level process functions and particle properties. They include numerical simulations and particulars of experiments for deriving process conditions for particle production.

Principles of Biomaterials Encapsulation: Volume One Farshid Sefat, Gholamali Farzi, Masoud Mozafari, 2022-10-13 Principles of Biomaterials Encapsulation Volume One provides an expansive and in depth resource covering the key principles, biomaterials strategies and techniques for encapsulation. Volume One begins with an introduction to encapsulation with subsequent chapters dedicated to a broad range of encapsulation principles and techniques including spray chilling and cooling, microemulsion, polymerization, extrusion, cell microencapsulation and much more. This book methodically details each technique, assessing the advantages and disadvantages of each, allowing the reader to make an informed decision when using encapsulation in their research. Principles of Biomaterials Encapsulation Volume One enables readers to learn about the various strategies and techniques available for encapsulation of a wide selection of biomedical substrates such as drugs, cells, hormones, growth factors and so on. Written and edited by well versed materials scientists with extensive clinical, biomedical and regenerative medicine experience, this book offers a deeply interdisciplinary look at encapsulation in translational medicine. As such, this book will provide a useful resource to a broad readership including those working in the fields of materials science, biomedical

engineering regenerative and translational medicine pharmacology chemical engineering and nutritional science Details the various biomaterials available for encapsulation as well as advantages and disadvantages of conventional and contemporary biomaterials for encapsulations Describes a broad range of applications in regenerative medicine uniquely bringing encapsulation into the worlds of translational medicine and tissue engineering Written and edited by well versed materials scientists with extensive clinical biomedical and regenerative medicine experience offering an interdisciplinary approach

Flavor Development for Functional Foods and Nutraceuticals M. Selvamuthukumaran, Yashwant V Pathak, 2019-09-23 In a finished nutraceutical product flavors play an integral role Flavor Development for Functional Foods and Nutraceuticals is about the crucial role added flavors play in any nutraceutical product It describes the various extraction techniques that are being adopted for manufacturing flavors from natural raw materials Yield and retention of aromatic components during several extraction methods and flavor encapsulation techniques for thermal degradable food components are discussed Advanced methods of flavor extraction techniques like supercritical CO₂ extraction are emphasized The safety and quality aspects of flavor incorporation in food processing industries are reviewed with respect to international regulations The importance of flavor in the nutraceuticals industry is also discussed In addition the book stresses the functional value and organoleptic acceptability towards product optimization formulation Features Explains how flavors play an integral role in a finished nutraceutical product Describes the various extraction techniques that are being adopted for manufacturing flavors from natural raw materials Covers flavor encapsulation techniques for thermal degradable food components Provides an introduction to the history of how some natural flavor ingredients botanicals and extracts were used in ancient times in Ayurveda and herbal medicine This is an ideal reference book for the flavor chemists food scientists nutraceutical formulators and students and academicians who are working in the area of nutraceutical supplement and functional food development and provides very useful information to help them select appropriate flavors for their products Also available in the Nutraceuticals Basic Research Clinical Applications Series Flavors for Nutraceuticals and Functional Foods edited by M Selvamuthukumaran and Yashwant Pathak ISBN 978 1 1380 6417 1 Antioxidant Nutraceuticals Preventive and Healthcare Applications edited by Chuanhai Cao Sarvadaman Pathak Kiran Patil ISBN 978 1 4987 3703 6 Food By product Based Functional Food Powders edited by Zlem Toku o lu ISBN 978 1 4822 2437 5 Probiotics, Prebiotics and Synbiotics Parmjit Singh Panesar, Anil Kumar Anal, 2022-01-18 In Probiotics Prebiotics and Synbiotics Technological Advancements Towards Safety and Industrial Applications a team of distinguished researchers delivers an insightful exploration of various aspects of functional foods The book includes information about critical facets of the production of these beneficial compounds recent technological developments in the field and their present and future commercial potential The authors describe their mechanisms of action and their applications in several sectors Probiotics Prebiotics and Synbiotics is divided into five parts A general introduction about these substances begins the book and is followed by discussions of

common probiotics prebiotics and synbiotics Finally a treatment of safety issues and regulatory claims as well as their market potential rounds out the resource Perfect for researchers industry practitioners and students working in or studying food processing and food microbiology Probiotics Prebiotics and Synbiotics is also an invaluable resource for professionals working in the field of food biotechnology **Nanotechnology Horizons in Food Process Engineering** Megh R.

Goyal,Santosh K. Mishra,Satish Kumar,2023-03-10 Although nanotechnology has revolutionized fields such as medicine genetics biology bioengineering mechanics and chemistry its increasing application in the food industry is relatively recent in comparison Nanotechnology in the food industry is now being explored for creating new flavors extending food shelf life and improving food protection and nutritional value as well as for intelligent nutrient delivery systems smart foods contaminant detection nanodevices and nanosensors advanced food processing antimicrobial chemicals encapsulation and green nanomaterials This new three volume set addresses a multitude of topical issues and new developments in the field Volume 1 focuses on food preservation food packaging and sustainable agriculture while Volume 2 looks at nanotechnology in food process engineering applications of biomaterials in food products and the use of modern nanotechnology for human health The third volume explores the newest trends in nanotechnology for food applications and their application for improving food delivery systems Together these three volumes provide a comprehensive and in depth look at the emerging status of nanotechnology in the food processing industry explaining the benefits and drawbacks of various methodologies that will aid in the improvement and development of food product sourcing and food hygiene monitoring methods Volume 2 discusses nanotechnology use in non thermal techniques such as high pressure processing HPP pulsed electric fields PEFs pulsed light ultraviolet microwave ohmic heating electrospraying and nano and microencapsulation This volume looks at the role and application of minimal processing techniques such as ozone treatment vacuum drying osmotic dehydration dense phase carbon dioxide treatment and high pressure assisted freezing The successful applications of nanotechnologies on juices meat and fish fruits and vegetable slices food surface purees milk and milk products extraction drying enhancement and encapsulation of micro macro nutrients are also considered The volume also presents several computer aided techniques that are emerging in the food processing sector such as robotics radio frequency identification RFID three dimensional food printing artificial intelligence etc Significant role of food properties in design of specific food and edible packaging films have been elucidated *Advances in Food Process Engineering* Megh R. Goyal,N. Veena,Ritesh B. Watharkar,2023-05-04 This new volume highlights a selection of novel applications for food processing food preservation and food decontamination methods It discusses the principles benefits and techniques used and presents recent developments and applications of ultrasonication It explores supercritical fluid extraction and supercritical fluid chromatography extrusion technology advanced drying and dehydration technologies and encapsulation methods as important tools in the processing of food It addresses the basic membrane processing technologies along with their advantages and disadvantages The volume presents

the application and use of mathematical models for measuring and regulating fermentation procedures It also provides an understanding of how the hydration kinetics of grains can help in optimization and scaling of processes on a large industrial scale Topics on decontamination methods for foods are included such as an overview of concepts basic principles potential applications and prospects and limitations of cold plasma technology and irradiation in the food processing sector

Encapsulations Alexandru Grumezescu, 2016-05-27 Encapsulations a volume in the Nanotechnology in the Agri Food Industry series presents key elements in establishing food quality through the improvement of food flavor and aroma The major benefits of nanoencapsulation for food ingredients include improvement in bioavailability of flavor and aroma ingredients improvement in solubility of poor water soluble ingredients higher ingredient retention during production process higher activity levels of encapsulated ingredients improved shelf life and controlled release of flavor and aroma This volume discusses main nanoencapsulation processes such as spray drying melt injection extrusion coacervation and emulsification The materials used in nanoencapsulation include lipids proteins carbohydrates cellulose gums and food grade polymers Applications and benefits of nanoencapsulation such as controlled release protections and taste masking will be explained in detail Includes the most up to date information on nanoencapsulation and nanocontainer based delivery of antimicrobials Presents nanomaterials for innovation based on scientific advancements in the field Provides control release strategies to enhance bioactivity including methods and techniques for research and innovation Provides useful tools to improve the delivery of bioactive molecules and living cells into foods

Handbook of Food Preservation M. Shafiur Rahman, 2020-06-10 The processing of food is no longer simple or straightforward but is now a highly interdisciplinary science A number of new techniques have developed to extend shelf life minimize risk protect the environment and improve functional sensory and nutritional properties Since 1999 when the first edition of this book was published it has facilitated readers understanding of the methods technology and science involved in the manipulation of conventional and newer sophisticated food preservation methods The Third Edition of the Handbook of Food Preservation provides a basic background in postharvest technology for foods of plant and animal origin presenting preservation technology of minimally processed foods and hurdle technology or combined methods of preservation Each chapter compiles the mode of food preservation basic terminologies and sequential steps of treatments including types of equipment required In addition chapters present how preservation method affects the products reaction kinetics and selected prediction models related to food stability what conditions need be applied for best quality and safety and applications of these preservation methods in different food products This book emphasizes practical cost effective and safe strategies for implementing preservation techniques for wide varieties of food products Features Includes extensive overview on the postharvest handling and treatments for foods of plants and animal origin Describes comprehensive preservation methods using chemicals and microbes such as fermentation antimicrobials antioxidants pH lowering and nitrite Explains comprehensive preservation by

controlling of water structure and atmosphere such as water activity glass transition state diagram drying smoking edible coating encapsulation and controlled release Describes preservation methods using conventional heat and other forms of energy such as microwave ultrasound ohmic heating light irradiation pulsed electric field high pressure and magnetic field Revised updated and expanded with 18 new chapters the Handbook of Food Preservation Third Edition remains the definitive resource on food preservation and is useful for practicing industrial and academic food scientists technologists and engineers

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Encapsulation Technologies For Active Food Ingredients And Food Processing Introduction

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