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Fermentation Processes Engineering in the Food Industry

Edited by
Carlos Ricardo Soccol
Ashok Pandey
Christian Larroche



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Fermentation Processes Engineering In The Food Industry Contemporary Food Engineering

M. Hofman,P. Thonart



Fermentation Processes Engineering In The Food Industry Contemporary Food Engineering:

Fermentation Processes Engineering in the Food Industry Carlos Ricardo Soccol, Ashok Pandey, Christian Larroche, 2013-03-27 With the advent of modern tools of molecular biology and genetic engineering and new skills in metabolic engineering and synthetic biology fermentation technology for industrial applications has developed enormously in recent years Reflecting these advances *Fermentation Processes Engineering in the Food Industry* explores the state of the art of the engineering technology aspects of fermentation processes in diverse food sectors The book describes the benefits of fermented foods in human health in both dairy and non dairy products and beverages It examines applications of microalgae in the food industry and explains the application of metabolic engineering in the production of fermented food ingredients Exploring a host of important topics in engineering fermentation processes the book covers topics such as Methods and techniques for the isolation improvement and preservation of the microbial cultures used in the food fermentation industry The fundamentals of fermentation processes modes of fermentation and the principles of upstream operation Physical and chemical factors that affect fermentation processes Different types of fermenters employed in submerged and solid state fermentation Unitary operations for solid liquid separation concentration and drying of fermented foods Instrumentation and control of industrial fermentation processes The final chapter discusses the potential application of a biorefinery concept to add value to food industry wastes and presents a case study describing an integrated project in which the concept was applied An essential reference for all food sector professionals this volume surveys critical trends in the food beverage and additive industry and explores the sustainability of these processes

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Engineering Aspects of Food Biotechnology Jose A. Teixeira, Antonio A. Vicente, 2013-08-29 Food biotechnology's typical developments and applications have occurred in the fields of genetics and in enzyme and cell based biological processes with the goal of producing and improving food ingredients and foods themselves While these developments and applications are usually well reported in terms of the underlying science there is a clear

Food Engineering Handbook Theodoros Varzakas, Constantina Tzia, 2014-11-24 *Food Engineering Handbook* Food Process Engineering addresses the basic and applied principles of food engineering methods used in food processing operations around the world Combining theory with a practical hands on approach this book examines the thermophysical properties and modeling of selected processes such as chilling freezing and dehydration

Engineering Aspects of Food Emulsification and Homogenization Marilyn Rayner, Petr Dejmeek, 2015-04-24 Emulsions are found in a wide variety of food products pharmaceuticals paints and cosmetics thus emulsification is a truly

multidisciplinary phenomenon Therefore understanding of the process must evolve from the combination of at least three different scientific specializations Engineering Aspects of Food Emulsification and Homogenization d **Food Engineering Handbook, Two Volume Set** Theodoros Varzakas,Constantina Tzia,2014-12-12 Food Engineering Handbook Two Volume Set provides a stimulating and up to date review of food engineering phenomena It also addresses the basic and applied principles of food engineering methods used in food processing operations around the world Combining theory with a practical hands on approach this set examines the thermophysical propertie **Microbial Enzyme Technology in Food Applications** Ramesh C. Ray,Cristina M. Rosell,2017-03-27 The aim of food processing is to produce food that is palatable and tastes good extend its shelf life increase the variety and maintain the nutritional and healthcare quality of food To achieve favorable processing conditions and for the safety of the food to be consumed use of food grade microbial enzymes or microbes being the natural biocatalysts is imperative This book discusses the uses of enzymes in conventional and non conventional food and beverage processing as well as in dairy processing brewing bakery and wine making Apart from conventional uses the development of bioprocessing tools and techniques have significantly expanded the potential for extensive application of enzymes such as in production of bioactive peptides oligosaccharides and lipids flavor and colorants Some of these developments include extended use of the biocatalysts as immobilized encapsulated enzymes microbes both natural and genetically modified as sources for bulk enzymes solid state fermentation technology for enzyme production Extremophiles and marine microorganisms are another source of food grade enzymes The book throws light on potential applications of microbial enzymes to expand the base of food processing industries **Computational Fluid Dynamics in Food Processing** Da-Wen Sun,2018-10-26 Since many processes in the food industry involve fluid flow and heat and mass transfer Computational Fluid Dynamics CFD provides a powerful early stage simulation tool for gaining a qualitative and quantitative assessment of the performance of food processing allowing engineers to test concepts all the way through the development of a process or system Published in 2007 the first edition was the first book to address the use of CFD in food processing applications and its aims were to present a comprehensive review of CFD applications for the food industry and pinpoint the research and development trends in the development of the technology to provide the engineer and technologist working in research development and operations in the food industry with critical comprehensive and readily accessible information on the art and science of CFD and to serve as an essential reference source to undergraduate and postgraduate students and researchers in universities and research institutions This will continue to be the purpose of this second edition In the second edition in order to reflect the most recent research and development trends in the technology only a few original chapters are updated with the latest developments Therefore this new edition mostly contains new chapters covering the analysis and optimization of cold chain facilities simulation of thermal processing and modeling of heat exchangers and CFD applications in other food processes Handbook of Food Processing Theodoros Varzakas,Constantina Tzia,2015-10-22

Packed with case studies and problem calculations Handbook of Food Processing Food Preservation presents the information necessary to design food processing operations and goes on to describe the equipment needed to carry them out in detail The book covers every step in the sequence of converting raw material to the final product It also discusses *Innovative Processing Technologies for Foods with Bioactive Compounds* Jorge J. Moreno, 2016-08-05 Natural foods like fruits and vegetables represent the simplest form of functional foods and provide excellent sources of functional compounds Maximizing opportunities to make use of and incorporate these compounds requires special processing Fortunately technologies available to produce food with enhanced active compounds have advanced significantly over the last few years This book covers the fundamentals as well as the innovations made during the last few years on the emerging technologies used in the development of food with bioactive compounds **Advances in Food Biotechnology** Ravishankar Rai V, 2015-10-12 The application of biotechnology in the food sciences has led to an increase in food production and enhanced the quality and safety of food Food biotechnology is a dynamic field and the continual progress and advances have not only dealt effectively with issues related to food security but also augmented the nutritional and health aspects of food Advances in Food Biotechnology provides an overview of the latest development in food biotechnology as it relates to safety quality and security The seven sections of the book are multidisciplinary and cover the following topics GMOs and food security issues Applications of enzymes in food processing Fermentation technology Functional food and nutraceuticals Valorization of food waste Detection and control of foodborne pathogens Emerging techniques in food processing Bringing together experts drawn from around the world the book is a comprehensive reference in the most progressive field of food science and will be of interest to professionals scientists and academics in the food and biotech industries The book will be highly resourceful to governmental research and regulatory agencies and those who are studying and teaching food biotechnology

Engineering Aspects of Cereal and Cereal-Based Products Raquel de Pinho Ferreira Guine, Paula Maria dos Reis Correia, 2016-04-19 Cereal food engineering has become increasingly important in the food industry over the years as it plays a key role in developing new food products and improved manufacturing processes Engineering Aspects of Cereal and Cereal Based Products focuses on the recent growth in cereal technology and baked foods science reviewing the latest updates in

Food Biofortification Technologies Agnieszka Saeid, 2017-11-22 Biofortification which can be defined as the process of increasing the content density of essential nutrients and or its bioavailability of food with valuable compounds is a promising means of increasing nutrient intakes Traditional fortification practices in which exogenous nutrients are added to food can increase the content of nutrients but the use of biofortified foods with nutrients also may deliver the compounds in a more available form as well as boost the overall relative effectiveness of these foods in raising nutrients status Food Biofortification Technologies presents the state of the art in the field of novel methods of fortification and agricultural treatments as a way to improve the quality of obtained food products or compounds enriched with valuable nutrients The book deals with

fortification methods and agricultural treatments which can improve the quality of food products or other agricultural compounds providing them with a higher density of valuable nutrients The utilization of novel products such as feed additives and fertilizers can avert nutrients depletion in food products The book describes new and conventional methods of introducing valuable compounds into food components and presents the application of biosorption bioaccumulation and utilization of fertilizers in obtaining designer food Attention is paid to the use of biomass as the carrier of nutrients such as microelements into the food components The chapters are dedicated to specific food products and their nutrient components The first chapter discusses the agronomic biofortification with micronutrients where the fertilization strategies are pointed out as a key to plant cereals fortification Other chapters present the fortification of animal foodstuffs such as meat fish milk and eggs as well as the fortification of plant foodstuffs such as vegetables fruits and cereals The book also explores advances in food fortification with vitamins and co vitamins essential minerals essential fatty and amino acids phytonutrients and enzymes

Advances in Processing Technologies for Bio-based Nanosystems in Food Óscar L. Ramos,Ricardo N. Pereira,Miguel A. Cerqueria,José A. Teixeira,António A. Vicente,2019-07-25 Nanotechnology can be used to address challenges faced by the food and bioprocessing industries for developing and implementing improved or novel systems that can produce safer nutritious healthier sustainable and environmental friendly food products This book overviews the most recent advances made on the field of nanoscience and nanotechnology that significantly influenced the food industry Advances in Processing Technologies for Bio Based Nanosystems in Food provides a multidisciplinary review of the complex mechanisms involved in the research development production and legislation of food containing nanostructures systems Features Presents the most recent advances made in the field of nanoscience and nanotechnology as applied to the food industry Discusses innovative approaches and processing technologies Shows how nanotechnology can be used to produce safer nutritious healthier sustainable and environmental friendly food products Covers the complex mechanisms involved in the research development production and legislation of food containing nanostructures Selected examples of nanotechnology applications in food industry are shown focusing on advanced aspects of food packaging processing and preservation followed by one contribution that presents the potential commercialization and the main challenges for scale up Comprised of 15 chapters this book provides much needed and up to date information on the use of emergent technologies in bio based nanosystems for foods and serves as an ideal reference for scientists regulators industrialists and consumers that conduct research and development in the food processing industry

Advances in Heat Transfer Unit Operations Georgina Calderon-Dominguez,Gustavo F. Gutierrez-Lopez,Keshavan Niranjana,2016-10-03 Advances in Heat Transfer Unit Operations Baking and Freezing in Bread Making explains the latest understanding of heat transfer phenomena involved in the baking and freezing of bread and describes the most recent advanced techniques used to produce higher quality bread with a longer shelf life Heat transfer phenomena occur during key bread making stages cold storage resting and fermentation in which

temperature and amount of heat transfer must be carefully controlled This book combines the engineering and technological aspects of heat transfer operations and discusses how these operations interact with the bread making process the book also discusses how baking and freezing influence the product quality Divided into fourteen chapters the book covers the basics of heat and mass transfer fluid dynamics and surface phenomena in bread making industrial operations mathematical modelling in porous systems the estimation of thermo physical properties related to bread making design of equipment and industrial applications

Food Processing Technology P.J. Fellows, 2016-10-04 Food Processing Technology Principles and Practice Fourth Edition has been updated and extended to include the many developments that have taken place since the third edition was published The new edition includes an overview of the component subjects in food science and technology processing stages important aspects of food industry management not otherwise considered e g financial management marketing food laws and food industry regulation value chains the global food industry and over arching considerations e g environmental issues and sustainability In addition there are new chapters on industrial cooking heat removal storage and distribution along with updates on all the remaining chapters This updated edition consolidates the position of this foundational book as the best single volume introduction to food manufacturing technologies available remaining as the most adopted standard text for many food science and technology courses Updated edition completely revised with new developments on all the processing stages and aspects of food industry management not otherwise considered e g financial management marketing food laws and food industry regulation and more Introduces a range of processing techniques that are used in food manufacturing Explains the key principles of each process including the equipment used and the effects of processing on micro organisms that contaminate foods Describes post processing operations including packaging and distribution logistics Includes extra textbook elements such as videos and calculations slides in addition to summaries of key points in each chapter

Engineering and Manufacturing for Biotechnology M. Hofman, P. Thonart, 2006-04-11 Early integration is the key to success in industrial biotechnology This is as true when a selected wild type organism is put to work as when an organism is engineered for a purpose The present volume Engineering and Manufacturing for Biotechnology took advantage of the 9th European Congress on Biotechnology Brussels Belgium July 11 15 1999 in the topics handled and in the expertise of the contributors the engineering science symposia of this congress offered just what was needed to cover the important topic of integration of process engineering and biological research The editors have solicited a number of outstanding contributions to illustrate the intimate interaction between productive organisms and the numerous processing steps running from the initial inoculation to the packaged product Upstream processing of the feed streams selection of medium components product harvesting downstream processing and product conditioning are just a few major steps Each step imposes a number of important choices Every choice is to be balanced against time to market profitability safety and ecology

Bioreactor Technology in Food Processing Rosane F. Schwan, V. K. Joshi, Disney R. Dias, 2024-11-29

Bioreactor Technology in Food Processing brings peculiarities specificities and updates on bioreactors and bioprocesses related to food and beverage production The 26 chapters of this book are the result of the participation of more than 70 professionals including professors researchers and experts from the industrial sector from different countries around the world The chapters cover such topics as history classification scale up analytical tools and mathematical and kinetic models for the operation of bioreactors in the food industry In addition chapters detail the characteristics of bioreactors for the production of food bread cheese and coffee fermentation and fermented beverages beer wine distilled beverages and organic compounds such as enzymes acids aromas and pigments biocolorants among others Key Features Describes the basic and applied aspects of bioreactor in food processing Gathers information on bioreactors that is scattered in different journals and monographs as reviews and research articles Covers various types of bioreactors including stirred tank airlift photo bioreactor and disposable bioreactors Gives a broad overview of what exactly is involved in designing a bioreactor and optimizing its performance and finally their applications in the food processing industry The broad interdisciplinary approach of this book will certainly make your reading very interesting and we hope that it can contribute to knowledge and instigate creative thinking to overcome the challenges that food bioprocessing brings us **Food Science and Technology**

Oluwatosin Ademola Ijabadeniyi,2020-12-07 Food Science and Technology Trends and Future Prospects presents different aspects of food science i e food microbiology food chemistry nutrition process engineering that should be applied for selection preservation processing packaging and distribution of quality food The authors focus on the fundamental aspects of food and also highlight emerging technology and innovations that are changing the food industry The chapters are written by leading researchers lecturers and experts in food chemistry food microbiology biotechnology nutrition and management This book is valuable for researchers and students in food science and technology and it is also useful for food industry professionals food entrepreneurs and farmers **Handbook of Food Processing, Two Volume Set** Theodoros Varzakas,Constantina Tzia,2015-11-04 Authored by world experts the Handbook of Food Processing Two Volume Set discusses the basic principles and applications of major commercial food processing technologies The handbook discusses food preservation processes including blanching pasteurization chilling freezing aseptic packaging and non thermal food processing It describes com

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