

Contemporary Food
Engineering Series
Da-Wen Sun, Series Editor



Computational Fluid Dynamics in Food Processing



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Da-Wen Sun



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Computational Fluid Dynamics In Food Processing Contemporary Food Engineering

Mehmet Mutlu



Computational Fluid Dynamics In Food Processing Contemporary Food Engineering:

Computational Fluid Dynamics in Food Processing Da-Wen Sun, 2007-05-24 The implementation of early stage simulation tools specifically computational fluid dynamics CFD is an international and interdisciplinary trend that allows engineers to computer test concepts all the way through the development of a process or system With the enhancement of computing power and efficiency and the availability of affordable CF *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 *Mathematical Modeling of Food Processing* Mohammed M. Farid, 2010-05-21 Written by international experts from industry research centers and academia Mathematical Modeling of Food Processing discusses the physical and mathematical analysis of transport phenomena associated with food processing The models presented describe many of the important physical and biological transformations that occur in food during proces **Mathematical Modeling of Food Processing** Mohammed M. Farid, 2010-05-21 Written by international experts from industry research centers and academia Mathematical Modeling of Food Processing discusses the physical and mathematical analysis of transport phenomena associated with food processing The models presented describe many of the important physical and biological transformations that occur in food during proces *Food Process Engineering Operations* George D. Saravacos, Zacharias B. Maroulis, 2011-02-22 A unique and interdisciplinary field food processing must meet basic process engineering considerations such as material and energy balances as well as the more specialized requirements of food acceptance human nutrition and food safety Food engineering therefore is a field of major concern to university departments of food science and chem **Innovation in Food Engineering** Maria Laura Passos, Claudio P. Ribeiro, 2016-04-19 Consumer driven products have kept the food industry at the forefront of technological innovations For example the redefinition of the once accepted

compromise between convenience and quality is just one of the current issues driving the development of new products An overview of a range of solutions for these challenges Innovation in Food Engi **Advances in Vinegar Production** Argyro Bekatorou,2019-09-11 In industrial vinegar production there are three main types of methods involved the slow handcrafted traditional method Orleans or French method and the rapid submerged and generator methods The current trend is to fuse traditional techniques with state of the art technologies and a variety of approaches have been developed to increase fermentation efficiency and reduce cost and fermentation time This book reports on all the recent innovations in vinegar production and compares them to the traditional submerged fermentation systems The new trends on raw materials substrate pretreatment strategies alcoholic fermentation and acetification systems are also reviewed **Operations in Food Refrigeration** Rodolfo H. Mascheroni,2012-06-06 The final quality of a food product is impacted heavily by preservation technologies such as chilling freezing and freeze drying as well as the numerous pretreatments that are routinely applied to foods Adequate design and implementation of each of these treatments are critical to ensuring the integrity of the final food product the productivity of the equipment and reduced operation costs Operations in Food Refrigeration explores the fundamental issues involved in heat and mass transfer in food refrigeration and examines aspects of other operations applied to chilled or frozen foods Following an overview of basic concepts and general calculation procedures involved in cooling freezing thawing and freeze drying the book discusses Sizing peeling cutting sorting and blanching fruits and vegetables Pretreatments for meats including tenderization electrical stimulation portioning curing and smoking Pretreatments for fish and other seafood Processing of poultry Air and osmotic partial dehydration infusion of special nutrients and the concentration of juices Traditional chilling and freezing methods Special precooling and freezing techniques The effects of thawing on food factors that influence the choice and design of thawing processes and various thawing methods Freeze drying equipment Each chapter is written by a recognized specialist and can serve as a stand alone resource for the particular topic Several chapters present case studies that can be used for developing processes or in teaching applications Processors researchers and educators in the food industry will find this volume to be an invaluable reference for a host of food operations *Innovative Food Processing Technologies* Kai Knoerzer, PhD,Pablo Juliano, PhD,Peter Roupas, PhD,Cornelis Versteeg, PhD,2011-04-19 Part of the IFT Institute of Food Technologists series this book discusses multiphysics modeling and its application in the development optimization and scale up of emerging food processing technologies The book covers recent research outcomes to demonstrate process efficiency and the impact on scalability safety and quality and technologies including High Pressure Processing High Pressure Thermal Sterilization Radiofrequency Ultrasound Ultraviolet and Pulsed Electric Fields Processing Ideal for food and process engineers food technologists equipment designers microbiologists and research and development personnel this book covers the importance and the methods for applying multiphysics modeling for the design development and application of these technologies

Advances in Fruit Processing Technologies Sueli Rodrigues, Fabiano Andre Narciso Fernandes, 2012-05-18 One of the main concerns of the food industry is the need for high quality fresh fruits and fruit products with good sensory quality long shelf life and high nutritional value To meet these demands new processing technologies are under investigation and development Advances in Fruit Processing Technologies incorporates fundamentals in food processing as well as the advances made in recent years to improve final product quality With contributions from a panel of international researchers who present a blend of classical and emerging technologies the book explores Ozone ultrasound irradiation pulsed electric field vacuum frying and high pressure processing Ultraviolet and membrane processing Enzymatic maceration freeze concentration and refrigeration The effect of processing on sensory characteristics and nutritional value New trends in modified atmosphere packaging The use of fruit juices as a vehicle for probiotic microorganisms Prebiotic oligosaccharides as an alternative for dairy products Incorporating a series of case studies on the application of various technologies the book reviews their advantages limitations successes and failures The contributors also examine the implications of food processing technologies on waste production energy use and resource requirements This comprehensive survey of methods for optimizing fruit quality is an ideal resource for those in the fruit and vegetable industry looking for innovations that can improve efficiency reduce waste and cut costs

Modified Atmosphere and Active Packaging Technologies Ioannis Arvanitoyannis, 2012-06-12 Many factors are relevant in making the proper choice of food packaging material including those related to shelf life and biodegradability To meet these demands new processing and preservation techniques have arisen most notably modified atmosphere packaging MAP and active packaging AP Modified Atmosphere and Active Packaging Technologies

Biosensors in Food Processing, Safety, and Quality Control Mehmet Mutlu, 2016-04-19 This book details the latest developments in sensing technology and its applications in the food industry profiling the improvements achieved in recent years for better food quality safety processing and control Topics discussed include the use of biosensors for the assessment of natural toxins in food and for pesticides and foodborne pathogen

Physicochemical Aspects of Food Engineering and Processing Sakamon Devahastin, 2010-08-03 Physical and chemical interactions between various constituents resulting from processing operations often lead to physical sensory and nutritional changes in foods Combining important information on processing and food quality Physicochemical Aspects of Food Engineering and Processing describes the effects of various processing technologies on

Food Nanotechnology C. Anandharamakrishnan, S. Parthasarathi, 2019-01-22 Nanotechnology offers great potential to revolutionize conventional food science and the food industry The use of nanotechnology in the food industry promises improved taste flavor color texture and consistency of foodstuffs and increased absorption and bioavailability of nutraceuticals Food Nanotechnology Principles and Applications examines the current state of nanoscale phenomena and processes benefits and risks of nanotechnology This work contains 18 chapters particularly focused on the design production and utilization of nanoparticles with specific applications for the

food industry Through several studies it has been proven that nanotechnology can offer distinct advantages over conventional methods in terms of functionality targeted delivery of food bioactive compounds improved food quality characteristics like texture taste sensory attributes and improved stability in the gastrointestinal tract and controlled release profiles Features Offers clear and concise coverage on application of nanotechnology in nutrient delivery food packaging and pathogen pesticide detection Addresses both the technological aspects of delivering nano based food products and the societal implications that affect take up Covers broad range of topics including nanoemulsification electrospraying nanocomposites plasma processing and nanosensors Discusses different formulation and preparation methods for loading food bioactive compounds Exploratory in nature this book presents the latest of such data on all aspects of applications of nanotechnology in food systems With its practical focus on the fabrication and application of nanotechnology in food this book is a valuable resource for students researchers food process engineers

Advances in Food Extrusion Technology
Medeni Maskan,Aylin Altan,2016-04-19 A fresh view of the state of the art Advances in Food Extrusion Technology focuses on extruder selection extrudate development quality parameters and troubleshooting in the 21st century extrusion process In particular the book Introduces the history nomenclature and working principles of extrusion technologyPresents an overview of various t

Physical Properties of Foods Ignacio Arana,2012-02-27 With higher food quality in increasing demand by consumers there is continuous pressure on food engineers to meet market needs One of the critical challenges is to use modern technology and knowledge to develop new processes for improving food quality Given the global food marketplace there is also a greater need for a means of objectively classifying and differentiating foods Physical properties determined by measurable physical parameters profoundly affect food quality and can be used for these determinations Physical Properties of Foods Novel Measurement Techniques and Applications presents a wide range of these practical low cost techniques to characterize physical properties without destroying the food The book presents principles and measurement techniques highlighting the latest methods and their ability to replace the traditional costly time consuming ones It also covers the application of the measurements to classify and differentiate various foods including fruits vegetables cereals and dairy and meat products The text gathers up to date procedures for determining the most important physical parameters that characterize food quality many of which have not previously been sufficiently described in the literature and delivers them in one useful volume It includes methods based on a variety of technologies such as electronics spectroscopy mechanics and acoustic response which can be applied to a wide range of foods With a focus on practical application of novel techniques chapters specify method details the type of food to which it has been applied the accuracy its ability to replace traditional techniques as well as whether it can be installed on line Written by internationally renowned engineers and scientists this reference offers crucial information in an easily accessible format for engineers researchers and those in the food industry all who will benefit from the cutting edge practices described for measuring parameters that affect food quality and food

characterization The text is also an excellent resource for students and university researchers *Emerging Technologies for Food Quality and Food Safety Evaluation* Yong-Jin Cho, Sukwon Kang, 2011-03-09 Even though the perception of food quality may depend on its hedonic and often subjective attributes it is essential to quantitatively evaluate its quality and safety Fortunately the advent of sophisticated systems including nondestructive testing techniques has made it possible to definitively evaluate food quality Reflecting these advances **A Glance at Food Processing Applications** Isıl Var, Sinan Uzunlu, 2022-07-13 Food processing is a part of the manufacturing industry To serve a marketable food product there are several intrinsic and extrinsic parameters to consider that determine the specific processing design of each product Food production should ensure a safe environmentally sustainable and adequate supply of food This book presents a comprehensive review of food processing applications Chapters address such topics as the effects of rice bran corn fiber and sugarcane bagasse on the quality of baked foods honey production processes the potential usage of pectin in food packaging and agro industrial wastes for packaging processes and much more *Enhancing Extraction Processes in the Food Industry* Nikolai Lebovka, Eugene Vorobiev, Farid Chemat, 2016-04-19 Extraction is an important operation in food engineering enabling the recovery of valuable soluble components from raw materials With increasing energy costs and environmental concerns industry specialists are looking for improved techniques requiring less solvents and energy consumption Enhancing Extraction Processes in the Food Industry is a **Engineering Aspects of Thermal Food Processing** Ricardo Simpson, 2009-06-22 Access the Latest Advances in Food Quality Optimization and Safety Assurance Thermal processing has undergone a remarkable amount of research throughout the past decade indicating that the process not only remains viable but that it is also expanding around the world An organized exploration of new developments in academic and current food industr

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