

Food Engineering Series
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Handbook of Food Processing Equipment

Second Edition

 Springer

Handbook Food Processing Equipment Engineering

**Antonio Lopez-Gomez, Gustavo V.
Barbosa-Canovas**



Handbook Food Processing Equipment Engineering:

Handbook of Food Processing Equipment George D. Saravacos, Athanasios E. Kostaropoulos, 2012-12-06 Recent publications in food engineering concern mainly food process engineering which is related to chemical engineering and deals primarily with unit operations and unit processes as applied to the wide variety of food processing operations. Relatively less attention is paid to the design and operation of food processing equipment which is necessary to carry out all of the food processes in the food plant. Significant technical advances on processing equipment have been made by the manufacturers as evidenced by the efficient modern food processing plants. There is a need to relate advances in process engineering to process equipment and vice versa. This book is an attempt to apply the established principles of transport phenomena and unit operations to the design, selection and operation of food processing equipment. Since food processing equipment is still designed empirically due to the complexity of the processes and the uncertainty of food properties, description of some typical industrial units is necessary to understand the operating characteristics. Approximate values and data are used for illustrative purposes since there is an understandable lack of published industrial data. *Handbook of Food Processing Equipment* George Saravacos, Athanasios E. Kostaropoulos, 2015-12-29 This text covers the design of food processing equipment based on key unit operations such as heating, cooling and drying. In addition, mechanical processing operations such as separations, transport, storage and packaging of food materials as well as an introduction to food processes and food processing plants are discussed. *Handbook of Food Processing Equipment* is an essential reference for food engineers and food technologists working in the food process industries as well as for designers of process plants. The book also serves as a basic reference for food process engineering students. The chapters cover engineering and economic issues for all important steps in food processing. This research is based on the physical properties of food, the analytical expressions of transport phenomena and the description of typical equipment used in food processing. Illustrations that explain the structure and operation of industrial food processing equipment are presented. The materials of construction and fabrication of food processing equipment are covered here as well as the selection of the appropriate equipment for various food processing operations. Mechanical processing equipment such as size reduction, size enlargement, homogenization and mixing are discussed. Mechanical separations equipment such as filters, centrifuges, presses and solids air systems plus equipment for industrial food processing such as heat transfer, evaporation, dehydration, refrigeration, freezing, thermal processing and dehydration are presented. Equipment for novel food processes such as high pressure processing are discussed. The appendices include conversion of units, selected thermophysical properties, plant utilities and an extensive list of manufacturers and suppliers of food equipment. **Handbook of Food Process Design, 2 Volume Set** Jasim Ahmed, Mohammad Shafiur Rahman, 2012-05-21 In the 21st Century, processing food is no longer a simple or straightforward matter. Ongoing advances in manufacturing have placed new demands on the design and methodology of

food processes A highly interdisciplinary science food process design draws upon the principles of chemical and mechanical engineering microbiology chemistry nutrition and economics and is of central importance to the food industry Process design is the core of food engineering and is concerned at its root with taking new concepts in food design and developing them through production and eventual consumption Handbook of Food Process Design is a major new 2 volume work aimed at food engineers and the wider food industry Comprising 46 original chapters written by a host of leading international food scientists engineers academics and systems specialists the book has been developed to be the most comprehensive guide to food process design ever published Starting from first principles the book provides a complete account of food process designs including heating and cooling pasteurization sterilization refrigeration drying crystallization extrusion and separation Mechanical operations including mixing agitation size reduction extraction and leaching processes are fully documented Novel process designs such as irradiation high pressure processing ultrasound ohmic heating and pulsed UV light are also presented Food packaging processes are considered and chapters on food quality safety and commercial imperatives portray the role process design in the broader context of food production and consumption

Handbook of Farm Dairy and Food Machinery Myer Kutz, 2007-02-28 Indispensable for food chemical mechanical and packaging engineers Handbook of Farm Dairy and Food Machinery covers in one comprehensive volume fundamental food engineering principles in the design of food industry machinery The handbook provides broad yet technically detailed coverage of food safety regulations product processing systems packaging facilities waste management and machinery design topics in a farm to the fork organization The 22 chapters are contributed by leading experts worldwide with numerous illustrations tables and references The book includes the new USDA regulations for certified organic processing as well as state of the art technologies for equipment both on the farm and in the plant

Handbook Of Food Processing Equipment George D. Saravacos, 2006-06-01

[Food Engineering Handbook](#) Theodoros Varzakas, Constantina Tzia, 2014-12-02 Food Engineering Handbook Food Engineering Fundamentals provides a stimulating and up to date review of food engineering phenomena Combining theory with a practical hands on approach this book covers the key aspects of food engineering from mass and heat transfer to steam and boilers heat exchangers diffusion and absorption A complement to

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 A complement to Food Engineering Handbook Food Engineering Fundamentals this text Discusses size reduction mixing emulsion and encapsulation Provides case studies of solid liquid and supercritical fluid extraction Explores fermentation enzymes fluidized bed drying and more Presenting cutting edge information on new and emerging food engineering processes Food Engineering Handbook Food Process Engineering is an essential reference on the

modeling quality safety and technologies associated with food processing operations today *Food Process Design* Zacharias B. Maroulis, George D. Saravacos, 2003-05-09 Utilizes simplified computer strategies to analyze develop and optimize industrial food processes Discusses the integration and economic evaluation of the entire processing plant including effective use of water energy and raw materials process profitability and wastewater reduction Offers detailed numerical examples for major food processes including heating cooling evaporation dehydration and thermal processing **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 **Food Plant Design** Antonio Lopez-Gomez, Gustavo V. Barbosa-Canovas, 2005-05-06 Although chemical engineering and food technology are subject areas closely related to food processing systems and food plant design coverage of the design of food plants is often sporadic and inadequately addressed in food technology and engineering books Some books have attempted to treat food engineering from this dual point of view but most have not achieved balanced coverage of the two Focusing on food processing rather than chemical plants Food Plant Design presents precise design details with photos and drawings of different types of food processing plants including food processing systems refrigeration and steam systems conveying systems and buildings The authors discuss the subject in an ordered format that gives you the tools to produce food products with minimum cost Including modeling procedures for food processing systems and auxiliary systems they elucidate synthesis techniques and procedures Using a clear structure for different levels of information and data on different food processing alternatives the book outlines solutions to plant design problems in the context of overall optimization of an agro industrial system and corresponding food chain It provides the work procedures and techniques for solving the design

problems of a food processing plant and in making a defined food product **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 **Handbook of Food Processing Equipment** George D Saravacos,Athanasios E Kostaropoulos,2003-01-31 Handbook of Food Engineering Practice Kenneth J. Valentas,Enrique Rotstein,R. Paul Singh,1997-07-23 Food engineering has become increasingly important in the food industry over the years as food engineers play a key role in developing new food products and improved manufacturing processes While other textbooks have covered some aspects of this emerging field this is the first applications oriented handbook to cover food engineering processes and manufacturing techniques A major portion of Handbook of Food Engineering Practice is devoted to defining and explaining essential food operations such as pumping systems food preservation and sterilization as well as freezing and drying Membranes and evaporator systems and packaging materials and their properties are examined as well The handbook provides information on how to design accelerated storage studies and determine the temperature tolerance of foods both of which are important in predicting shelf life The book also examines the importance of physical and rheological properties of foods with a special look at the rheology of dough and the design of processing systems for the manufacture of dough The final third of the book provides useful supporting material that applies to all of the previously discussed unit operations including cost profit analysis methods simulation procedures sanitary guidelines and process controller design The book also includes a survey of food chemistry a critical area of science for food engineers *Food Engineering Handbook* Theodoros Varzakas,Constantina Tzia,2014-12-02 Food Engineering Handbook Food Engineering Fundamentals provides a stimulating and up to date review of food engineering phenomena Combining theory with a practical hands on approach this book covers the key aspects of food engineering from mass and heat transfer to steam and boilers heat exchangers diffusion and absorption A complement to Food Engineering Handbook Food Process Engineering this text Explains the interactions between different food constituents that might lead to changes in food properties Describes the characterization of the heating behavior of foods their heat transfer heat exchangers and the equipment used in each food engineering method Discusses rheology fluid flow evaporation and distillation and includes illustrative case studies of food behaviors Presenting cutting edge information Food Engineering Handbook Food Engineering Fundamentals is an essential reference on the fundamental concepts associated with food engineering today **Food Process Engineering Operations** George D. Saravacos,Zacharias B. Maroulis,2011-04-11 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 chemical and biological engineering as well as engineers and scientists working in various food processing industries Part of the notable CRC Press Contemporary Food Engineering series Food Process Engineering Operations focuses on the application of chemical engineering unit operations to the handling processing packaging and distribution of food products Chapters 1 through 5 open the text with a review of the fundamentals of process engineering and food processing technology with typical examples of food process applications The body of the book then covers food process engineering operations in detail including theory process equipment engineering operations and application examples and problems Based on the authors long teaching and research experience both in the US and Greece this highly accessible textbook employs simple diagrams to illustrate the mechanism of each operation and the main components of the process equipment It uses simplified calculations requiring only elementary calculus and offers realistic values of food engineering properties taken from the published literature and the authors experience The appendix contains useful engineering data for process calculations such as steam tables engineering properties engineering diagrams and suppliers of process equipment Designed as a one or two semester textbook for food science students Food Process Engineering Operations examines the applications of process engineering fundamentals to food processing technology making it an important reference for students of chemical and biological engineering interested in food engineering and for scientists engineers and technologists working in food processing industries

Food Science A. S. Bawa, 2013-06-15 The book aims at imparting basics of the subject besides the latest trends in the evolution of technologies and important industrial practices Besides the technological aspects adequate emphasis has also been laid on the quality aspects and adequate knowledge input required for a student or professional in Food Science and Technology The book contains 16 s addressing various important aspects such as unit operations thermal processing hurdle technology preservation cold preservation dehydration freezing and advanced thermal techniques such as infrared and microwaves besides non thermal aspects such as high pressure and pulsed electric field processing as well as irradiation State of art subject areas such as functional foods could be an added flavour as the global food market has ample potential in the area of functional foods Food packaging and food laws are important in commercializing processed foods as well as fresh produce and the areas require due emphasis to make the book more comprehensive

Food Plant Economics Zacharias B. Maroulis, George D. Saravacos, 2007-08-02 Applying the proven success of modern process engineering economics to the food industry Food Plant Economics considers the design and economic analysis of food preservation food manufacturing and food ingredients plants with regard to a number of representative food processes Economic analysis of food plants requires the evaluation of quantitative data from the design and operation of food processes and processing plants Accompanying downloadable resources include prepared Excel spreadsheets for calculating various food plants scenarios by applying appropriate data regarding the cost of equipment and equipment sizing material and energy balances and plant operating costs Beginning with a thorough background in the

economics of a food plant the first three chapters summarize recent advances in food process and research technology the structure of the food system in the US and EU and the principles of modern design in food processes processing equipment and processing plants The second three chapters discuss process economics in relation to the food industry by applying the concepts of capital cost operating cost and cash flow to estimations of plant profitability Detailed chapters cover estimations of capital investment and operating costs including statistical data empirical models and useful rules of thumb The remaining three chapters apply the techniques of the previous discussions to food preservation plants such as concentration canning and dehydration manufacturing plants including wine bread and yogurt as well as ingredients plants that produce sugars and oils A useful appendix contains a glossary tables conversions nomenclature food properties and heat transfer coefficients A practical and comprehensive treatment of process economics **Food Plant Economics** provides a complete introduction to the application of this efficient technique to the food industry

Dietary Supplement Good Manufacturing Practices

William J. Mead, 2016-04-19 Dietary Supplement GMP is a one stop how to road map to the final dietary supplement GMP regulations recently issued by the FDA covering the manufacture packaging and holding of dietary supplement products The recent regulations outlining broad goals intentionally avoid specifics to allow for future technological advances leaving implementati

Shelf Life and Food Safety Basharat Nabi Dar, Manzoor Ahmad Shah, Shabir Ahmad Mir, 2022-06-01 The quality and safety of the food we eat deserves the utmost attention and is a priority for producers and consumers alike Shelf life studies provide important information to manufacturers and consumers to ensure a high quality food product Various evaluation methods are used for shelf life determination and they are usually performed at the manufacturer level Moreover various techniques are utilized throughout the food chain that enhance the shelf life of food products This sensitive issue is reviewed in Shelf Life and Food Safety which brings together a group of subject experts to present up to date and objective discussions on a broad range of topics including food spoilage and safe preservation packaging and sensory aspects The book presents both traditional and innovative technologies for enhancing food safety and increasing shelf life along with methods for the assessment and prediction of food safety and shelf life Key Features Overviews the issues associated with shelf life enhancement and shelf life evaluation of various food products Addresses issues important to maintaining food safety Explains how shelf life depends on factors including ingredients for formulation processing techniques packaging and storage conditions Covers shelf life evaluation methods determinants for shelf life food quality assessment and basic and innovative technologies that will improve the shelf life of food products This book is the first of its kind focusing on issues related to evaluation techniques for shelf life determinants and techniques for shelf life enhancement It is appropriate for students researchers scientists and professionals in food science and technology It is also a helpful source of information for people involved in the food industry food processing sector product development marketing and other associated fields

Food Processing J. Scott Smith, Y. H. Hui, 2008-02-28 Renowned international academicians and food industry

professionals have collaborated to create Food Processing Principles and Applications This practical fully illustrated resource examines the principles of food processing and demonstrates their application by describing the stages and operations for manufacturing different categories of basic food products Ideal as an undergraduate text Food Processing stands apart in three ways The expertise of the contributing authors is unparalleled among food processing texts today The text is written mostly by non engineers for other non engineers and is therefore user friendly and easy to read It is one of the rare texts to use commodity manufacturing to illustrate the principles of food processing As a hands on guide to the essential processing principles and their application this book serves as a relevant primary or supplemental text for students of food science and as a valuable tool for food industry professionals

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