

Food Processing Technology By Pj Fellows

This book addresses the future development of ultrasound in food processing, covering both High Power (material altering) and Low Power (non-destructive testing) applications. Leading work is presented for a non-expert audience, so that people in industry and academia can make informed decisions about future research and the adoption of ultrasound techniques. It will be of particular interest to food manufacturing personnel responsible for process development, engineering and research. It will be invaluable for scientists and technologists involved in active ultrasound research and instrument manufacture.

Widely regarded as a standard work in its field, this book introduces the range of processing techniques that are used in food manufacturing. It explains the principles of each process, the processing equipment used, operating conditions and the effects of processing on micro-organisms that contaminate foods, the biochemical properties of foods and their sensory and nutritional qualities. The book begins with an overview of important basic concepts. It describes unit operations that take place at ambient temperature or involve minimum heating of foods. Subsequent chapters examine operations that heat foods to preserve them or alter their eating quality, and explore operations that remove heat from foods to extend their shelf life with minimal changes in nutritional quality or sensory characteristics. Finally, the book reviews post-processing operations, including packaging and distribution logistics. The third edition has been substantially rewritten, updated and extended to include the many developments in food technology that have taken place since the second edition was published in 2000. Nearly all unit operations have undergone significant developments, and these are reflected in the large amount of additional material in each chapter. In particular, advances in microprocessor control of equipment, 'minimal' processing technologies, genetic modification of foods, functional foods, developments in 'active' or 'intelligent' packaging, and storage and distribution logistics are described. Developments in technologies that relate to cost savings, environmental improvement or enhanced product quality are highlighted. Additionally, sections in each chapter on the impact of processing on food-borne micro-organisms are included for the first time.

Sustained developments in various branches of science and technology have resulted in considerable improvements in food processing methods. These new processing technologies have in turn contributed to enhancement of the quality and acceptability of foods. The aim of this book is to assemble, for handy reference, new developments pertaining to selected food processing technologies. Food processing methods covered include: NMR imaging, on-line NMR, on-line sensors, ultrasonics, synchrotron radiation to study fast events, membrane processing, bioseparation, high pressure processing, aseptic processing, irradiation, freezing, extrusion and extraction technologies. The book, adequately referenced and illustrated with numerous figures and tables, is a valuable reference for scientists, engineers, and technologists in industries and government laboratories involved in food processing, food research and/or development, and also for faculty, advanced undergraduate, graduate and postgraduate students from the Food Science, Food Engineering, and Agricultural Engineering departments.

Reflecting current trends in alternative food processing and preservation, this reference explores the most recent applications in

pulsed electric field (PEF) and high-pressure technologies, food microbiology, and modern thermal and nonthermal operations to prevent the occurrence of food-borne pathogens, extend the shelf-life of foods, and improve

Large volume food processing and preparation operations have increased the need for improved sanitary practices from processing to consumption. This trend presents a challenge to every employee in the food processing and food preparation industry. Sanitation is an applied science for the attainment of hygienic conditions. Because of increased emphasis on food safety, sanitation is receiving increased attention from those in the food industry. Traditionally, inexperienced employees with few skills who have received little or no training have been delegated sanitation duties. Yet sanitation employees require intensive training. In the past, these employees, including sanitation program managers, have had only limited access to material on this subject. Technical information has been confined primarily to a limited number of training manuals provided by regulatory agencies, industry and association manuals, and recommendations from equipment and cleaning compound firms. Most of this material lacks specific information related to the selection of appropriate cleaning methods, equipment, compounds, and sanitizers for maintaining hygienic conditions in food processing and preparation facilities. The purpose of this text is to provide sanitation information needed to ensure hygienic practices. Sanitation is a broad subject; thus, principles related to contamination, cleaning compounds, sanitizers, and cleaning equipment, and specific directions for applying these principles to attain hygienic conditions in food processing and food preparation are discussed. The discussion starts with the importance of sanitation and also includes regulatory requirements and voluntary sanitation programs including additional and updated information on Hazard Analysis Critical Control Points (HACCP).

The Process Analytical Technology (PAT) initiative aims to move from a paradigm of 'testing quality in' to 'building quality in by design'. It can be defined as the optimal application of process analytical technologies, feedback process control strategies, information management tools, and/or product-process optimization strategies. Recently, there have been significant advances in process sensors and in model-based monitoring and control methodologies, leading to enormous opportunities for improved performance of food manufacturing processes and for the quality of food products with the adoption of PAT. Improvements in process efficiency, reduced product variability, enhanced traceability, process understanding, and decreased risk of contamination are some of the benefits arising from the introduction of a PAT strategy in the food industry. Process Analytical Technology for the Food Industry reviews established and emerging PAT tools with potential application within the food processing industry. The book will also serve as a reference for industry, researchers, educators, and students by providing a comprehensive insight into the objectives, challenges, and benefits of adopting a Process Analytical Technology strategy in the food industry.

Food Processing Technology Principles and Practice, Second Edition CRC Press

Green Food Processing Techniques: Preservation, Transformation and Extraction advances the ethics and practical objectives of "Green Food Processing" by offering a critical mass of research on a series of methodological and technological tools in innovative food processing techniques, along with their role in promoting the sustainable food industry. These techniques (such as

microwave, ultrasound, pulse electric field, instant controlled pressure drop, supercritical fluid processing, extrusion...) lie on the frontier of food processing, food chemistry, and food microbiology, and are thus presented with tools to make preservation, transformation and extraction greener. The Food Industry constantly needs to reshape and innovate itself in order to achieve the social, financial and environmental demands of the 21st century. Green Food Processing can respond to these challenges by enhancing shelf life and the nutritional quality of food products, while at the same time reducing energy use and unit operations for processing, eliminating wastes and byproducts, reducing water use in harvesting, washing and processing, and using naturally derived ingredients. Introduces the strategic concept of Green Food Processing to meet the challenges of the future of the food industry Presents innovative techniques for green food processing that can be used in academia, and in industry in R&D and processing Brings a multidisciplinary approach, with significant contributions from eminent scientists who are actively working on Green Food Processing techniques

Rapid expansion of research on the development of novel food processes in the past decade has resulted in novel processes drawn from fields outside the traditional parameters of food processing. Providing a wealth of new knowledge, Novel Food Processing: Effects on Rheological and Functional Properties covers structural and functional changes at the micro level, and their implications at the macro level, in food exposed to new and emerging technologies. Contributions from an international panel with academic and professional credentials form the backbone of this work. They focus on the functional, rheological, and micro-structural changes that occur in foods when using emerging technologies such as high pressure processing, Ohmic heating, pulse electric fields, and ultraviolet radiation. The book examines new and innovative applications and presents the impact of these research findings on the nutritional aspects of protein and carbohydrate containing foods. It also considers the synergic effects of protein-starch components. Each chapter provides an in-depth analysis of a novel technology and its effect on food structure and function. New directions in food processing will continue to be influenced by diverse fields and used to respond to consumer concerns about food safety, quality, sensory attributes, and nutrition. Combining coverage of technological applications with the chemistry of food and biomaterials, this book illustrates in a very clear and concise fashion the structure-functionality relationship and how it is affected by newly developed and increasingly popular processing technologies.

Thermal technologies have long been at the heart of food processing. The application of heat is both an important method of preserving foods and a means of developing texture, flavour and colour. An essential issue for food manufacturers is the effective application of thermal technologies to achieve these objectives without damaging other desirable sensory and nutritional qualities in a food product. Edited by a leading authority in the field, and with a distinguished international team of contributors, Thermal technologies in food processing addresses this major issue. Part one of the collection begins with reviews of conventional retort and continuous heat technologies. Part two then looks at the key issues of effective measurement and control in ensuring that a thermal process is effective whilst minimising any undesirable changes in a food. There are chapters on temperature and pressure measurement, validation of heat processes, modelling and simulation of thermal processes, and the measurement and control of

changes in a food during thermal processing. The final part of the book looks at emerging thermal technologies which becoming more widely used in the food industry. There are chapters on radio frequency heating, microwave processing, infrared heating, instant and high-heat infusion, and ohmic heating A final chapter considers how thermal processing may be combined with high pressure processing in producing safe, minimally-processed food products. Thermal technologies in food processing provides food manufacturers and researchers with an authoritative review of thermal processing and food quality.

T Food, Nutrition and Health, Carbohydrates Proteins and Amino Acids Lipids Vitamins Minerals and Water Food Processing Food Additives Food Adulteration and Testing Food Products Energy Metabolism

Food processing is the step of the food chain that principally affects a food's physical or biochemical properties, along with determining the safety and shelf life of the product. This book provides a comprehensive overview of innovations in non-thermal technologies specifically for fluid foods, recognized for their high bioavailability of macronutrients and micronutrients. Considerable resources and expertise has been devoted to the processing of safe and wholesome foods. Non-thermal technologies have been developed as an alternative to thermal processing, while still meeting required safety or shelf-life demands and minimising the effects on its nutritional and quality attributes. Examines non-thermal processing techniques specifically applied to fluid foods Includes methods for mathematically evaluating each technique Addresses global regulatory requirements for fluid foods Provides recommendations and opportunities for various safety-related issues

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

Foods are ingested and become part of our body. This book describes the science and procedure behind the materials in foods that impart their desirable properties. The book can serve as a text in a course in food materials science at the senior or graduate

level or as a supplemental text in an advanced food technology course. It can also serve as a reference book for professionals in the food industry.

This long awaited second edition of a popular textbook has a simple and direct approach to the diversity and complexity of food processing. It explains the principles of operations and illustrates them by individual processes. The new edition has been enlarged to include sections on freezing, drying, psychrometry, and a completely new section on mechanical refrigeration. All the units have been converted to SI measure. Each chapter contains unworked examples to help the student gain a grasp of the subject, and although primarily intended for the student food technologist or process engineer, this book will also be useful to technical workers in the food industry

The only up-to-date book on this important technology, *Extrusion Processing Technology: Food and Non-Food Biomaterials* bridges the gap between the principles of extrusion science and the practical "know how" of operational engineers and technicians. Written by internationally renowned experts with over forty years of experience between them, this valuable reference for food scientists, food engineers, chemical engineers, and students includes coverage of new, greener technologies as well as case studies to illustrate the practical, real-world application of the principles in various settings.

This book is the first to bring together essential information on the application of ozone in food processing, providing an insight into the current state-of-the-art and reviewing established and emerging applications in food processing, preservation and waste management. The chemical and physical properties of ozone are described, along with its microbial inactivation mechanisms. The various methods of ozone production are compared, including their economic and technical aspects. Several chapters are dedicated to the major food processing applications: fruit and vegetables, grains, meat, seafood and food hydrocolloids, and the effects on nutritional and quality parameters will be reviewed throughout. Further chapters examine the role of ozone in water treatment, in food waste treatment and in deactivating pesticide residues. The international regulatory and legislative picture is addressed, as are the health and safety implications of ozone processing and possible future trends.

The approach to teaching the concepts of food processing to the undergraduate food science major has evolved over the past 40 years. In most undergraduate food science curricula, food processing has been taught on a commodity basis. In many programs, several courses dealt with processing with emphasis on a different commodity, such as fruits and vegetables, dairy products, meat products, and eggs. In most situations, the emphasis was on the unique characteristics of the commodity and very little emphasis on the common elements associated with processing of the different commodities. Quite often the undergraduate student was allowed to select one or two courses from those offered in order to satisfy the minimum standards suggested by the Institute of Food Technologists. The current 1FT minimum standards suggest that the undergraduate food science major be required to complete at least one food

processing course. The description of this course is as follows: One course with lecture and laboratory which covers general characteristics of raw food materials, principles of food preservation, processing factors that influence quality, packaging, water and waste management, and sanitation. Prerequisites: general chemistry, physics, and general microbiology.

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.

Innovative Food Processing Technologies: Extraction, Separation, Component Modification and Process Intensification focuses on advances in new and novel non-thermal processing technologies which allow food producers to modify and process food with minimal damage to the foodstuffs. The book is highly focused on the application of new and novel technologies, beginning with an introductory chapter, and then detailing technologies which can be used to extract food components. Further sections on the use of technologies to modify the structure of food and the separation of food components are also included, with a final section focusing on process intensification and enhancement. Provides information on a variety of food processing technologies Focuses on advances in new and novel non-thermal processing technologies which allow food producers to modify and process food with minimal damage to the foodstuffs Presents a strong focus on the application of technologies in a variety of situations Created by editors who have a background in both the industry and academia

A comprehensive survey of thermal processing and modelling techniques in food process engineering. It combines

theory and practice to solve actual problems in the food processing industry - emphasizing heat and mass transfer, fluid flow, electromagnetics, stochastic processes, and neural network analysis in food systems. There are specific case studies. High pressure processing technology has been adopted worldwide at the industrial level to preserve a wide variety of food products without using heat or chemical preservatives. High Pressure Processing: Technology Principles and Applications will review the basic technology principles and process parameters that govern microbial safety and product quality, an essential requirement for industrial application. This book will be of interest to scientists in the food industry, in particular to those involved in the processing of products such as meat, fish, fruits, and vegetables. The book will be equally important to food microbiologists and processing specialists in both the government and food industry. Moreover, it will be a valuable reference for authorities involved in the import and export of high pressure treated food products. Finally, this update on the science and technology of high pressure processing will be helpful to all academic, industrial, local, and state educators in their educational efforts, as well as a great resource for graduate students interested in learning about state-of-the-art technology in food engineering.

Computational modeling is an important tool for understanding and improving food processing and manufacturing. It is used for many different purposes, including process design and process optimization. However, modeling goes beyond the process and can include applications to understand and optimize food storage and the food supply chain, and to perform a life cycle analysis. Modeling Food Processing Operations provides a comprehensive overview of the various applications of modeling in conventional food processing. The needs of industry, current practices, and state-of-the-art technologies are examined, and case studies are provided. Part One provides an introduction to the topic, with a particular focus on modeling and simulation strategies in food processing operations. Part Two reviews the modeling of various food processes involving heating and cooling. These processes include: thermal inactivation; sterilization and pasteurization; drying; baking; frying; and chilled and frozen food processing, storage and display. Part Three examines the modeling of multiphase unit operations such as membrane separation, extrusion processes and food digestion, and reviews models used to optimize food distribution. Comprehensively reviews the various applications of modeling in conventional food processing Examines the modeling of multiphase unit operations and various food processes involving heating and cooling Analyzes the models used to optimize food distribution

Cold Plasma in Food and Agriculture: Fundamentals and Applications is an essential reference offering a broad perspective on a new, exciting, and growing field for the food industry. Written for researchers, industry personnel, and students interested in nonthermal food technology, this reference will lay the groundwork of plasma physics, chemistry, and technology, and their biological applications. Food scientists and food engineers interested in understanding the

theory and application of nonthermal plasma for food will find this book valuable because it provides a roadmap for future developments in this emerging field. This reference is also useful for biologists, chemists, and physicists who wish to understand the fundamentals of plasma physics, chemistry, and technology and their biological interactions through applying novel plasma sources to food and other sensitive biomaterials. Examines the topic of cold plasma technology for food applications Demonstrates state-of-the-art developments in plasma technology and potential solutions to improve food safety and quality Presents a solid introduction for readers on the topics of plasma physics and chemistry that are required to understand biological applications for foods Serves as a roadmap for future developments for food scientists, food engineers, and biologists, chemists, and physicists working in this emerging field

The book provides comprehensive coverage of the processing and preservation aspects of food science that include chemical, microbiological and technological processes on the one hand, and assessment of food quality and safety, new and modified foods by fermentation, food-borne diseases and food spoilage on the other. The preservation operations involving the use of high and low temperatures and radiation have also been discussed in detail. Intended as a textbook for undergraduate students of science and engineering, this study would also be of great help to postgraduate students offering courses in food science, and to professionals as well as academicians.

Containing a selection of papers presented at an international conference, this volume reviews the need for increased training in the food industry in order to bridge the gap between standards in Eastern and Western Europe and the USA. Higher education is discussed, including the training of food technicians. European initiatives such as ERASMUS and Network are also described. The text includes coverage of the importance of international trade and consumer protection acts, including a description of the needs of various groups and future developments.

This latest edition of the most internationally respected reference in food chemistry for more than 30 years, Fennema's Food Chemistry, 5th Edition once again meets and surpasses the standards of quality and comprehensive information set by its predecessors. All chapters reflect recent scientific advances and, where appropriate, have expanded and evolved their focus to provide readers with the current state-of-the-science of chemistry for the food industry. This edition introduces new editors and contributors who are recognized experts in their fields. The fifth edition presents a completely rewritten chapter on Water and Ice, written in an easy-to-understand manner suitable for professionals as well as undergraduates. In addition, ten former chapters have been completely revised and updated, two of which receive extensive attention in the new edition including Carbohydrates (Chapter 3), which has been expanded to include a section on Maillard reaction; and Dispersed Systems: Basic considerations (Chapter 7), which includes thermodynamic incompatibility/phase separation concepts. Retaining the straightforward organization and accessibility of the original, this edition begins with an examination of major food components such as water, carbohydrates, lipids, proteins, and enzymes. The second section looks at minor food components including vitamins and minerals, colorants, flavors, and additives. The final section considers food systems by reviewing basic considerations as well as specific information on the characteristics of milk, the postmortem physiology of edible muscle, and postharvest physiology of plant tissues.

Food engineering is a required class in food science programs, as outlined by the Institute for Food Technologists (IFT). The concepts and

applications are also required for professionals in food processing and manufacturing to attain the highest standards of food safety and quality. The third edition of this successful textbook succinctly presents the engineering concepts and unit operations used in food processing, in a unique blend of principles with applications. The authors use their many years of teaching to present food engineering concepts in a logical progression that covers the standard course curriculum. Each chapter describes the application of a particular principle followed by the quantitative relationships that define the related processes, solved examples, and problems to test understanding. The subjects the authors have selected to illustrate engineering principles demonstrate the relationship of engineering to the chemistry, microbiology, nutrition and processing of foods. Topics incorporate both traditional and contemporary food processing operations. The mixing of liquids, solids and gases is one of the most common unit operations in the food industry. Mixing increases the homogeneity of a system by reducing non-uniformity or gradients in composition, properties or temperature. Secondary objectives of mixing include control of rates of heat and mass transfer, reactions and structural changes. In food processing applications, additional mixing challenges include sanitary design, complex rheology, desire for continuous processing and the effects of mixing on final product texture and sensory profiles. Mixing ensures delivery of a product with constant properties. For example, consumers expect all containers of soups, breakfast cereals, fruit mixes, etc to contain the same amount of each ingredient. If mixing fails to achieve the required product yield, quality, organoleptic or functional attributes, production costs may increase significantly. This volume brings together essential information on the principles and applications of mixing within food processing. While there are a number of credible references covering general mixing, such publications tend to be aimed at the chemical industry and so topics specific to food applications are often neglected. Chapters address the underlying principles of mixing, equipment design, novel monitoring techniques and the numerical techniques available to advance the scientific understanding of food mixing. Food mixing applications are described in detail. The book will be useful for engineers and scientists who need to specify and select mixing equipment for specific processing applications and will assist with the identification and solving of the wide range of mixing problems that occur in the food, pharmaceutical and bioprocessing industries. It will also be of interest to those who teach, study and research food science and food engineering.

This is a new book on food process engineering which treats the principles of processing in a scientifically rigorous yet concise manner, and which can be used as a lead in to more specialized texts for higher study. It is equally relevant to those in the food industry who desire a greater understanding of the principles of the food processes with which they work. This text is written from a quantitative and mathematical perspective and is not simply a descriptive treatment of food processing. The aim is to give readers the confidence to use mathematical and quantitative analyses of food processes and most importantly there are a large number of worked examples and problems with solutions. The mathematics necessary to read this book is limited to elementary differential and integral calculus and the simplest kind of differential equation.

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

Drying is by far the most useful large scale operation method of keeping solid foods safe for long periods of time, and is of fundamental importance in most sectors of food processing. Drying operations need to be precisely controlled and optimized in order to produce a good quality product that has the highest level of nutrient retention and flavor whilst maintaining microbial safety. This volume provides an up to

date account of all the major drying technologies employed in the food industry and their underlying scientific principles and effects. Various equipment designs are classified and described. The impact of drying on food properties is covered, and the micro-structural changes caused by the process are examined, highlighting their usefulness in process analysis and food design. Key methods for assessing food properties of dried products are described, and pre-concentration and drying control strategies are reviewed. Thermal hazards and fire/explosion detection and prevention for dryers are discussed in a dedicated chapter. Where appropriate, sample calculations are included for engineers and technologists to follow. The book is directed at food scientists and technologists in industry and research, food engineers and drying equipment manufacturers.

Food Processing: Principles and Applications second edition is the fully revised new edition of this best-selling food technology title. Advances in food processing continue to take place as food scientists and food engineers adapt to the challenges imposed by emerging pathogens, environmental concerns, shelf life, quality and safety, as well as the dietary needs and demands of humans. In addition to covering food processing principles that have long been essential to food quality and safety, this edition of Food Processing: Principles and Applications, unlike the former edition, covers microbial/enzyme inactivation kinetics, alternative food processing technologies as well as environmental and sustainability issues currently facing the food processing industry. The book is divided into two sections, the first focusing on principles of food processing and handling, and the second on processing technologies and applications. As a hands-on guide to the essential processing principles and their applications, covering the theoretical and applied aspects of food processing in one accessible volume, this book is a valuable tool for food industry professionals across all manufacturing sectors, and serves as a relevant primary or supplemental text for students of food science.

The first edition of Food Processing Technology was quickly adopted as the standard text by many food science and technology courses. While keeping with the practice of covering the wide range of food processing techniques, this new edition has been substantially expanded to take account of the advances in technology that have taken place since the publication of the first edition. The Second Edition includes new chapters on computer control of processing, novel 'minimal' technologies, and Ohmic heating, and an extended chapter on modified atmosphere packaging. It is a comprehensive - yet basic - text that offers an overview of most unit operations, while at the same time providing details of the processing equipment, operating conditions and the effects of processing on the biochemistry of foods. The book is divided into five parts, in which unit operations are grouped according to the nature of the heat transfer that takes place. Each chapter describes the formulae required for calculation of processing parameters, sample problems, and the effects on sensory characteristics and nutritional properties of selected foods. By combining food processing theory and calculations with descriptions of commercial practice and results of scientific studies, Food Processing Technology: Principles and Practice, Second Edition helps readers make attractive saleable products and extend the shelf-life of foods.

The processing of food is no longer simple or straightforward, but is now a highly inter-disciplinary science. A number of new techniques have developed to extend shelf-life, minimize risk, protect the environment, and improve functional, sensory, and nutritional properties. The ever-increasing number of food products and preservation techniques cr

Food Process Engineering and Technology, Third Edition combines scientific depth with practical usefulness, creating a tool for graduate students and practicing food engineers, technologists and researchers looking for the latest information on transformation and preservation processes and process control and plant hygiene topics. This fully updated edition provides recent research and developments in the area,

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features sections on elements of food plant design, an introductory section on the elements of classical fluid mechanics, a section on non-thermal processes, and recent technologies, such as freeze concentration, osmotic dehydration, and active packaging that are discussed in detail. Provides a strong emphasis on the relationship between engineering and product quality/safety Considers cost and environmental factors Presents a fully updated, adequate review of recent research and developments in the area Includes a new, full chapter on elements of food plant design Covers recent technologies, such as freeze concentration, osmotic dehydration, and active packaging that are discussed in detail

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