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Food Drying Science and Technology-Yiu H. Hui 2008 A guide to the major food drying techniques and equipment. It features technologies for meats, fruits, vegetables, and seafood. It covers microbial issues and safety. It includes designs for drying systems and manufacturing lines, and information on microbial safety, preservation, and packaging.

Drying Technologies in Food Processing-Xiao Dong Chen 2009-03-16 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 microstructural 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.

Advanced Drying Technologies for Foods-Arun S Mujumdar 2019-06-19 The goal of all drying research and development is to develop cost-effective innovative processes that yield high-quality dried products with less energy consumption and reduced environmental impact. With the literature on drying widely scattered, Advanced Drying Technologies for Foods compiles under one cover concise, authoritative, up-to-date assessments of modern drying technologies applied to foods. This book assembles a number of internationally recognized experts to provide critical reviews of advanced drying technologies, their merits and limitations, application areas and research opportunities for further development. Features: Provides critical reviews of advanced drying technologies Discusses the merits and limitations of a variety of food drying technologies Explains drying kinetics, energy consumption and quality of food products Reviews the principles and recent applications of superheated steam drying The first four chapters deal with recent developments in field-assisted drying technologies. These include drying techniques with the utilization of electromagnetic fields to deliver energy required for drying, for example, microwave drying, radio frequency drying, electrohydrodynamic drying, and infrared radiation drying. The remainder of this book covers a wide assortment of recently developed technologies, which include pulse drying, swell drying, impinging stream drying, and selected advances in spray drying. The final chapter
includes some innovative technologies which are gaining ground and are covered in depth in a number of review articles and handbooks, and hence covered briefly in the interest completeness. This book is a valuable reference work for researchers in academia as well as industry and will encourage further research and development and innovations in food drying technologies.

**Sustainable Drying Technologies** - Jorge Del Real Olvera 2016-08-31

**Drying Technologies For Foods** - Prabhat K Nema 2020-10-10 The degradation mechanism and kinetics of vitamin C degradation in fruits and vegetables, kinetics modeling of drying process for the recovery of bioactive compounds and energy.

**Handbook of Drying of Vegetables and Vegetable Products** - Min Zhang 2017-07-12 This handbook provides a comprehensive overview of the processes and technologies in drying of vegetables and vegetable products. The Handbook of Drying of Vegetables and Vegetable Products discusses various technologies such as hot airflow drying, freeze drying, solar drying, microwave drying, radio frequency drying, infrared radiation drying, ultrasound assisted drying, and smart drying. The book’s chapters are clustered around major themes including drying processes and technologies, drying of specific vegetable products, properties during vegetable drying, and modeling, measurements, packaging & safety. Specifically, the book covers drying of different parts and types of vegetables such as mushrooms and herbs; changes to the properties of pigments, nutrients, and texture during drying process; dried products storage; nondestructive measurement and monitoring of moisture and morphological changes during vegetable drying; novel packaging; and computational fluid dynamics.

**Freeze-Drying of Pharmaceutical and Food Products** - Tse-Chao Hua 2010-07-30 Freeze-drying is an important preservation technique for heat-sensitive pharmaceuticals and foods. Products are first frozen, then dried in a vacuum at low temperature by sublimation and desorption, rather than by the application of heat. The resulting items can be stored at room temperature for long periods. This informative text addresses both principles and practice in this area. The first chapter introduces freeze-drying. The authors then review the fundamentals of the technique, heat-mass transfer analyses, modelling of the drying process and the equipment employed. Further chapters focus on freeze-drying of food, freeze-drying of pharmaceuticals and the protective agents and additives applied. The final chapter covers the important subjects of disinfection, sterilization and process validation. Freeze-drying of pharmaceutical and food products is an essential reference for food, pharmaceutical and refrigeration engineers and scientists with an interest in preservation techniques. It will also be of use to students in these fields. Addresses the principles and practices used in this important preservation technique Explains the fundamentals of heat-mass transfer analysis, modelling and the equipment used Discusses the importance of disinfection, sterilization and process validation.

**Intermittent and Nonstationary Drying Technologies** - Azharul Karim 2017-09-18 The first comprehensive book on intermittent drying, Intermittent and Nonstationary Drying Technologies: Principles and Applications demonstrates the benefits of this process and covers key issues, including technologies, effect of operating parameters, mathematical modelling, energy-efficiency, and product quality. It discusses such topics as periodic drying, conventional and intermittent food drying processes and food quality, relationship among intermittency of drying, microstructural changes, and food quality, microwave assisted pulsed fluidized and spouted bed drying, and cellular level water distribution. Aimed at food engineers, chemical product engineers, pharmaceutical engineers and technologists, plant design engineers, and researchers and students in these areas, this useful reference helps readers:

**Encyclopaedia of Food Drying Science and Technology** - 2015

**Drying Atlas** - Werner Muhlbauer 2020-02-21 Drying Atlas: Drying Kinetics and Quality of Agricultural Products provides, in a condensed and systematic way, specific insights on the
drying-relevant properties and coefficients of over 40 agricultural products. It also presents information about the production methods that influence the drying process, the quality of the dried product, the official quality standards of the products, and the design principles and operating characteristics of drying systems that are widely used in the postharvest processing and food industry. Available books on drying technology mainly focus on drying theory and simulation of drying processes. This book offers systematic information on the impact of other important parameters, such as relative humidity, air flow rate, mechanical, thermal and chemical pre-treatment, and drying mode for specific products. It is a unique and valuable reference for scientists and engineers who want to focus on industrial drying applications and dryers, as well as graduate and post-graduate students in postharvest technology and drying. Explores the production methods that influence the drying process and quality of the dried product Outlines the official quality standards of the products, the design principles, and the operating characteristics of drying systems that are used in postharvest processing Features 41 chapters that are (each for an agricultural product) presented in a condensed and systematic way

Spray Drying Techniques for Food Ingredient Encapsulation-C.
Anandharamakrishnan 2015-07-23 Spray drying is a well-established method for transforming liquid materials into dry powder form. Widely used in the food and pharmaceutical industries, this technology produces high quality powders with low moisture content, resulting in a wide range of shelf stable food and other biologically significant products. Encapsulation technology for bioactive compounds has gained momentum in the last few decades and a series of valuable food compounds, namely flavours, carotenoids and microbial cells have been successfully encapsulated using spray drying. Spray Drying Technique for Food Ingredient Encapsulation provides an insight into the engineering aspects of the spray drying process in relation to the encapsulation of food ingredients, choice of wall materials, and an overview of the various food ingredients encapsulated using spray drying. The book also throws light upon the recent advancements in the field of encapsulation by spray drying, i.e., nanospray dryers for production of nanocapsules and computational fluid dynamics (CFD) modeling. Addressing the basics of the technology and its applications, the book will be a reference for scientists, engineers and product developers in the industry.

Advanced Drying Technologies, Second Edition-Tadeusz Kudra 2009-02-11 Presents Drying Breakthroughs for an Array of Materials Despite being one of the oldest, most energy-intensive unit operations, industrial drying is perhaps the least scrutinized technique at the microscopic level. Yet in the wake of today’s global energy crisis, drying research and development is on the rise. Following in the footsteps of the widely read first edition, Advanced Drying Technologies, Second Edition is the direct outcome of the recent phenomenal growth in drying literature and new drying hardware. This edition provides an evaluative overview of new and emerging drying technologies, while placing greater emphasis on making the drying process more energy efficient in the green age. Draws on the Authors’ 60+ Years of Combined Experience Fueled by the current energy crisis and growing consumer demand for improved quality products, this thoroughly updated resource addresses cutting-edge drying technologies for numerous materials such as high-valued, heat-sensitive pharmaceuticals, nutraceuticals, and some foods. It also introduces innovative techniques, such as heat-pump drying of foods, which allow both industrial practice and research and development projects to save energy, reduce carbon footprints, and thus improve the bottom line. Four New Chapters: Spray-Freeze-Drying Fry Drying Refractance Window Drying Mechanical Thermal Expression Requiring no prior knowledge of chemical engineering, this single-source reference should assist researchers in turning the laboratory curiosities of today into the revolutionary novel drying technologies of tomorrow.

Drying in the Dairy Industry-Cécile Le Floch-Fouéré 2020-12-01 With more than 12M tons of dairy powders produced each year at a global scale, the drying sector accounts to a large extent for the processing of milk and whey. It is generally considered that 40% of the dry matter collected overall ends up in a powder form. Moreover, nutritional dairy products presented in a dry form (eg, infant milk formulae) have grown quickly over the last decade, now accounting for a large share of the profit of the sector. Drying in
the Dairy Industry: From Established Technologies to Advanced Innovations deals with the market of dairy powders issues, considering both final product and process as well as their interrelationships. It explains the different processing steps for the production of dairy powders including membrane, homogenisation, concentration and agglomeration processes. The book includes a presentation of the current technologies, the more recent development for each of them and their impact on the quality of the final powders. Lastly, one section is dedicated to recent innovations and methods directed to more sustainable processes, as well as latter developments at lab scale to go deeper in the understanding of the phenomena occurring during spray drying. Key Features: Presents state-of-the-art information on the production of a variety of different dairy powders Discusses the impact of processing parameters and drier design on the product quality such as protein denaturation and viability of probiotics Explains the impact of drying processes on the powder properties such as solubility, dispersibility, wettability, flowability, floodability, and hygroscopicity Covers the technology, modelling and control of the processing steps This book is a synthetic and complete reference work for researchers in academia and industry in order to encourage research and development and innovations in drying in the dairy industry.

Advances in Heat Pump-Assisted Drying Technology-Vasile Minea 2016-09-15 Drying of solids is one of the most common, complex, and energy-intensive industrial processes. Conventional dryers offer limited opportunities to increase energy efficiency. Heat pump dryers are more energy and cost effective, as they can recycle drying thermal energy and reduce CO2, particulate, and VOC emissions due to drying. This book provides an introduction to the technology and current best practices and aims to increase the successful industrial implementation of heat pump-assisted dryers. It enables the reader to engage confidently with the technology and provides a wealth of information on theories, current practices, and future directions of the technology. It emphasizes several new design concepts and operating and control strategies, which can be applied to improve the economic and environmental efficiency of the drying process. It answers questions about risks, advantages vs. disadvantages, and impediments and offers solutions to current problems. Discusses heat pump technology in general and its present and future challenges. Describes interesting and promising innovations in drying food, agricultural, and wood products with various heat pump technologies. Treats several technical aspects, from modeling and simulation of drying processes to industrial applications. Emphasizes new design concepts and operating and control strategies to improve the efficiency of the drying process.

Drying Technology in Agriculture and Food Sciences-Arun S. Mujumdar 2000 Drying is one of the most cost-effective means of preservation of grains, crops and foods of all varieties. From both energy and environmental viewpoints, as well as the global requirement to feed the growing population, it is important that the drying technique and technology be improved to reduce spoilage and enhance the quality of the product. Much has been accomplished since the 1980s in understanding and development in drying technologies for foods and agro-products. This volume is a compilation of selected invited and refereed articles covering topics of contemporary interest on agricultural and food drying technologies.

Food Drying Science and Technology- 2008

Advanced Drying Technologies for Foods- Arun S Mujumdar 2019-06-19 The goal of all drying research and development is to develop cost-effective innovative processes that yield high-quality dried products with less energy consumption and reduced environmental impact. With the literature on drying widely scattered, Advanced Drying Technologies for Foods compiles under one cover concise, authoritative, up-to-date assessments of modern drying technologies applied to foods. This book assembles a number of internationally recognized experts to provide critical reviews of advanced drying technologies, their merits and limitations, application areas and research opportunities for further development. Features: Provides critical reviews of advanced drying technologies Discusses the merits and limitations of a variety of food drying technologies Explains drying kinetics, energy consumption and quality of food products Reviews the principles and recent applications of superheated steam drying.
The first four chapters deal with recent developments in field-assisted drying technologies. These include drying techniques with the utilization of electromagnetic fields to deliver energy required for drying, for example, microwave drying, radio frequency drying, electrohydrodynamic drying, and infrared radiation drying. The remainder of this book covers a wide assortment of recently developed technologies, which include pulse drying, swell drying, impinging stream drying, and selected advances in spray drying. The final chapter includes some innovative technologies which are gaining ground and are covered in depth in a number of review articles and handbooks, and hence covered briefly in the interest of completeness. This book is a valuable reference work for researchers in academia as well as industry and will encourage further research and development and innovations in food drying technologies.

Frozen Food Science and Technology - Judith A. Evans 2009-01-21 This book provides a comprehensive source of information on freezing and frozen storage of food. Initial chapters describe the freezing process and provide a fundamental understanding of the thermal and physical processes that occur during freezing. Experts in each stage of the frozen cold chain provide, within dedicated chapters, guidelines and advice on how to freeze food and maintain its quality during storage, transport, retail display and in the home. Individual chapters deal with specific aspects of freezing relevant to the main food commodities: meat, fish, fruit and vegetables. Legislation and new freezing processes are also covered. Frozen Food Science and Technology offers in-depth knowledge of current and emerging refrigeration technologies along the entire frozen food chain, enabling readers to optimise the quality of frozen food products. It is aimed at food scientists, technologists and engineers within the frozen food industry; frozen food retailers; and researchers and students of food science and technology.

Spray Drying Techniques for Food Ingredient Encapsulation - C. Anandharamakrishnan 2015-10-12 Spray drying is a well-established method for transforming liquid materials into dry powder form. Widely used in the food and pharmaceutical industries, this technology produces high quality powders with low moisture content, resulting in a wide range of shelf stable food and other biologically significant products. Encapsulation technology for bioactive compounds has gained momentum in the last few decades and a series of valuable food compounds, namely flavours, carotenoids and microbial cells have been successfully encapsulated using spray drying. Spray Drying Technique for Food Ingredient Encapsulation provides an insight into the engineering aspects of the spray drying process in relation to the encapsulation of food ingredients, choice of wall materials, and an overview of the various food ingredients encapsulated using spray drying. The book also throws light upon the recent advancements in the field of encapsulation by spray drying, i.e., nanospray dryers for production of nanocapsules and computational fluid dynamics (CFD) modeling. Addressing the basics of the technology and its applications, the book will be a reference for scientists, engineers and product developers in the industry.

Advances in Drying - Arun S. Mujumdar

Food Process Engineering and Technology - Zeki Berk 2018-02-13 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, 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.
Dehydration of Foods-Humberto Vega-Mercado 2013-03-14 Completely up-to-date and organized for easy use, this one-of-a-kind reference integrates basic concepts with hands-on techniques for food dehydration. It discusses a wide range of scientific and technical information, from the physical, chemical, and microbiological changes in food dehydration to its packaging aspects.

Food Science-A. K. Haghi 2011-12-15 Food Science: Research and Technology presents a broad selection of new research in food science and reflects the diversity of recent advances in the field. Chapters include a study on the use of microbial enzymes for flavor and production in food production; studies of various natural foods, including litchi (lychee), pinto beans, and chickpeas; the content and antioxidant activity of dried plants; new applications of galactosidases in food products; a study of the medicinal properties of edible mushrooms; and more.

Handbook of Food Powders-Bhesh Bhandari 2013-08-31 Many food ingredients are supplied in powdered form, as reducing water content increases shelf life and aids ease of storage, handling and transport. Powder technology is therefore of great importance to the food industry. The Handbook of food powders explores a variety of processes that are involved in the production of food powders, the further processing of these powders and their functional properties. Part one introduces processing and handling technologies for food powders and includes chapters on spray, freeze and drum drying, powder mixing in the production of food powders and safety issues around food powder production processes. Part two focusses on powder properties including surface composition, shelf life, and techniques used to examine particle size. Focuses on speciality powders such as dairy, infant formulas, powdered egg, fruit and vegetable, and culinary and specialty products.

Frontiers in Spray Drying-Nan Fu 2020-08-13 This book covers the latest developments and advances in spray drying and describes how they impact the basic aspect of designing and operating spray dryers. This generic approach allows users to understand how different basic aspects of spray drying have advanced. Users will learn how to apply these advances in their own specific spray drying applications. This book also discusses the handling and control of spray dried products. Includes the latest techniques for use in the design and operation of spray drying operations. Covers the basic operations of spray drying that can be applied to different applications of spray drying. Discusses the handling and control of spray dried product qualities from a general approach, allowing readers to tailor these approaches to their own specific products. This book is aimed at professionals, researchers, and academics working in the fields of food, chemical, pharmaceutical, and industrial engineering.

Handbook of Food Science, Technology, and Engineering - 4 Volume Set-Y. H. Hui 2005-12-19 Advances in food science, technology, and engineering are occurring at such a rapid rate that obtaining current, detailed information is challenging at best. While almost everyone engaged in these disciplines has accumulated a vast variety of data over time, an organized, comprehensive resource containing this data would be invaluable to have. The Handbook on Spray Drying Applications for Food Industries-M. Selvamuthukumaran 2019-07-12 Spray drying is a mechanical process by which materials in liquid form can be converted into solid form such as powders. It is a rapid, continuous, cost-effective, reproducible and scalable process for producing dry powders from a fluid material by atomization through an atomizer into a hot drying gas medium, usually air. The Handbook on Spray Drying Applications for Food Industries deals with recent techniques adopted in spray drying systems for drying a vast array of food products, novel and emerging tools.
Food Science and Technology Abstracts-1986

Food Processing Handbook-James G. Brennan 2012-05-07 The second edition of the Food Processing Handbook presents a comprehensive review of technologies, procedures and innovations in food processing, stressing topics vital to the food industry today and pinpointing the trends in future research and development. Focusing on the technology involved, this handbook describes the principles and the equipment used as well as the changes - physical, chemical, microbiological and organoleptic - that occur during food preservation. In so doing, the text covers in detail such techniques as post-harvest handling, thermal processing, evaporation and dehydration, freezing, irradiation, high-pressure processing, emerging technologies and packaging. Separation and conversion operations widely used in the food industry are also covered as are the processes of baking, extrusion and frying. In addition, it addresses current concerns about the safety of processed foods (including HACCP systems, traceability and hygienic design of plant) and control of food processes, as well as the impact of processing on the environment, water and waste treatment, lean manufacturing and the roles of nanotechnology and fermentation in food processing. This two-volume set is a must-have for scientists and engineers involved in food manufacture, research and development in both industry and academia, as well as students of food-related topics at undergraduate and postgraduate levels. From Reviews on the First Edition: "This work should become a standard text for students of food technology, and is worthy of a place on the bookshelf of anybody involved in the production of foods." Journal of Dairy Technology, August 2008 "This work will serve well as an excellent course resource or reference as it has well-written explanations for those new to the field and detailed equations for those needing greater depth." CHOICE, September 2006

Unit Operations in Food Processing-R. L. Earle 2013-10-22 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

Concepts of Small-scale Food Processing-Donald G. Mercer 2021-02-08 Providing detailed information on key areas of post-harvest technologies, this book is written with small-scale processors and entrepreneurs in food processing, who have no formal training in Food Science or Food Engineering, in mind. Uniquely, it will review the hands-on aspects of food
processing from a largely non-academic viewpoint. It is written in non-technical language and covers everything from the basic science of why food is processed to a description of the main methods used. Coverage includes all current technologies that are used at the small-scale such as why food is processed, the historical development of food processing, background skills, heating and cooling in food processing, thermal processing basics and specialised calculations, drying food materials, statistical manufacturing control and sugar solution calculations in beverage making. The target audience for this book is vastly underserved with appropriate information and the abundant use of photographs, showing the various concepts described in the text, makes this book appealing to those required to understand their food process operations.

Drying and Roasting of Cocoa and Coffee-Ching Lik Hii 2019-06-26 This is the first practical book dedicated to the fundamental and application aspects of two major unit operations in cocoa and coffee processing, namely drying and roasting. The drying and roasting of cocoa and coffee beans play critical roles in governing the formation of flavor precursors in the early stages and also the development of flavor and aroma in the later stages during processing. Hence, qualities of the finished chocolates and coffee powder products are affected greatly by the dried and roasted beans produced. Drying and Roasting of Cocoa and Coffee covers key topics areas ranging from post-harvest processing, equipment selection, physical and chemical changes during processing, flavor development, grading and dried product quality. The book consists of two parts with topics dedicated to the drying/roasting aspects of cocoa and coffee, respectively. Features Provides a comprehensive review on flavor development during cocoa/coffee processing Discusses the impact of processing parameters on cocoa/coffee quality Presents the new trends in drying/roasting techniques and novel technology Examines the concept of coffee quality in light of both paradigms: the traditional coffee and the specialty coffee grading systems No prior knowledge of cocoa and coffee processing is required to benefit from this book, which is written for a variety of readers. It is suitable for undergraduate and postgraduate students, researchers and industrial practitioners/consultants from various domains in the food and beverage industries.

Processing Vegetables-Durward S. Smith 1997-06-03 The variety, distribution range and quality of processed vegetables have grown rapidly in recent years, due in large part to advances in vegetable processing technology. This 448-page book provides a detailed, expert guide to current methods of vegetable processing. The authoritative presentations were prepared by a team of leading international food specialists. The text is organized for easy reference and supplemented with hundreds of photographs and diagrams illustrating procedures and equipment. Hundreds of tables provide useful reference data in convenient form. Each chapter includes a section of extensive references for additional research on each subject.

Sustainable Food Drying Techniques in Developing Countries: Prospects and Challenges-Mahadi Hasan Masud 2020-05-08 This book presents a comprehensive review of renewable energy-based sustainable drying techniques for developing countries. Aspiring towards a world with zero food waste, the book has provided discussion on sustainable drying techniques in terms of energy efficiency. The socio-economic condition of each developing country is unique; therefore, has specific technological requirements. As such, the book presents discussions on food waste scenario around the world, the socio-economic status of developing countries and their correlation with food. The book gives an overview of the quality aspects of drying, along with the required energy and time to retain these features. Additionally, a method of selecting drying techniques for developing countries, taking the cost and safety factor into consideration, has been discussed extensively. Also, the renewable and non-renewable energy resources of low income, lower-middle income, middle income, and high-income developing countries have been analyzed and presented. The book also highlights the available drying techniques that are currently being practiced by the consumers and industries of developing countries. The book recommends ten sustainable drying technologies for the developing countries and describes their working principle. Discussion on potential challenges for sustainable drying technology adoption is also presented. The book presents up-to-date
research on sustainable drying techniques and their impact on developing countries to reduce food waste. Food waste is not only a humanitarian concern but also a threat to environmental sustainability. Currently, one-third of all produced food is being wasted, when nearly 805 million people - including children remain undernourished on a daily basis. In an effort to solve this crisis, a number of food preservation techniques are being practiced in food supply chain. Drying is one such preservation technique that prevents microbial proliferation, slows enzymatic reaction and preserves the physio-chemical properties of food. Albeit, drying is an effective means of food preservation; it is also highly energy-intensive. Developing countries do not have sufficient energy and financial resources to adopt conventional (expensive and high energy) drying techniques. As such, this is the first reference work dedicated to discussing the prospects and challenges of sustainable (renewable energy based and inexpensive) drying techniques for developing countries in order to reduce food waste. Sustainable food drying techniques in developing countries: Prospects and Challenges is a singular work in the field of food preservation and affordable drying technology.

**Intelligent Control in Drying**-Alex Martynenko 2018-09-03 Despite the available general literature in intelligent control, there is a definite lack of knowledge and know-how in practical applications of intelligent control in drying. This book fills that gap. Intelligent Control in Drying serves as an innovative and practical guide for researchers and professionals in the field of drying technologies, providing an overview of control principles and systems used in drying operations, from classical to model-based to adaptive and optimal control. At the same time, it lays out approaches to synthesis of control systems, based on the objectives and control strategies, reflecting complexity of drying process and material under drying. This essential reference covers both fundamental and practical aspects of intelligent control, sensor fusion and dynamic optimization with respect to drying.

**Encapsulated and Powdered Foods**-Charles Onwulata 2005-05-26 Encapsulated and Powdered Foods is a practical guide to the characterization and applications of the powdered form of foods. It details the uses of food powder as well as the physical, chemical, and functional properties of particular food powders, such as milk, cocoa, salts, and sugars. The author describes the powder manufacturing processes and a range of related topics, including drying technologies; storage, moisture, lumping, and bridging in the bin; and the blending and segregation of powders. The book concludes with discussions on the creation of specialty ingredients and engineered powders.

**Emerging Technologies for Food Processing**-Da-Wen Sun 2014-08-14 The second edition of Emerging Technologies in Food Processing presents essential, authoritative, and complete literature and research data from the past ten years. It is a complete resource offering the latest technological innovations in food processing today, and includes vital information in research and development for the food processing industry. It covers the latest advances in non-thermal processing including high pressure, pulsed electric fields, radiofrequency, high intensity pulsed light, ultrasound, irradiation, and addresses the newest hurdles in technology where extensive research has been carried out. Provides an extensive list of research sources to further research development Presents current and thorough research results and critical reviews Includes the most recent technologies used for shelf life extension, bioprocessing simulation and optimization

**Intermittent and Nonstationary Drying Technologies**-Azharul Karim 2017-09-18 The first comprehensive book on intermittent drying, Intermittent and Nonstationary Drying Technologies: Principles and Applications demonstrates the benefits of this process and covers key issues, including technologies, effect of operating parameters, mathematical modelling, energy-efficiency, and product quality. It discusses such topics as periodic drying, conventional and intermittent food drying processes and food quality, relationship among intermittency of drying, microstructural changes, and food quality, microwave assisted pulsed fluidized and spouted bed drying, and cellular level water distribution. Aimed at food engineers, chemical product engineers, pharmaceutical engineers and technologists, plant design engineers, and researchers and students in these areas, this useful reference helps readers:
Food Microstructure and Its Relationship with Quality and Stability - Sakamon Devahastin

2017-12-20 Food Microstructure and Its Relationship with Quality and Stability is a comprehensive overview of the effects that the properties of the underlying structures of food have on its perceived quality to the consumer. The book's first section consists of chapters outlining the fundamentals of food microstructure, food composition, molecular mobility of various food constituents, and their relationships with food quality and stability. The role of various processing technologies in the production of specific microstructures for enhanced quality and stability is outlined. The second part of the book consists of various chapters devoted to microstructures, constituents and their relationship with quality, functionality, and stability of selected foods, for example, food hydrocolloids, frozen seafood, dried foods, extruded products, and dietary fibers. This information is of paramount importance for both academic researchers in the areas of food quality, preservation, and stability, as well as for food developers and processors. Brings together leading experts from around the world to provide the latest information on a topic essential to the quality of food products. Includes dedicated chapters covering the microstructure of specific products and its relationship to quality and stability, making this book ideal for those working in industry. Provides a single reference source for a topic of great importance to a number of fields within both academic and industrial food sciences - food quality, stability, processing, and engineering.

Freeze Drying of Pharmaceutical Products - Davide Fissore

2019-10-24 Freeze Drying of Pharmaceutical Products provides an overview of the most recent and cutting-edge developments and technologies in the field, focusing on formulation developments and process monitoring and considering new technologies for process development. This book contains case studies from freeze dryer manufacturers and pharmaceutical companies for readers in industry and academia. It was contributed to by lyophilization experts to create a detailed analysis of the subject matter, organically presenting recent advancements in freeze-drying research and technology. It discusses formulation design, process optimization and control, new PAT-monitoring tools, multivariate image analysis, process scale-down and development using small-scale freeze-dryers, use of CFD for equipment design, and development of continuous processes. This book is for industry professionals, including chemical engineers and pharmaceutical scientists.