Superheated Steam Drying And Processing


A comprehensive summary of the state of the art in the reaction engineering approach to drying processes, including modelling, experimentation and applications. There have been many developments in the science and technology of thermochemical biomass conversion since the previous conference on Advances in Thermochemical Biomass Conversion in Interlaken, Switzerland, in 1992. This conference again covers all aspects of thermal biomass conversion systems from fundamental research through applied research and development to demonstration and commercialization. A specific highlight is the demonstration of progress made in the past four years. Major issues of bioenergy systems are covered from pretreatment through to end-user applications with increased consideration paid to the environmental benefits and problems of implementing bio-energy systems. This book is divided into five main areas covering pyrolysis, pretreatment, gasification, combustion and system studies and this division is reflected in the structure of these conference proceedings. Each main section was preceded by a state-of-the-art review to provide a focus for the ensuing presentations and an authoritative reference. All the papers included have been subject to a full peer review process. As with any international conference, an important aim was to exchange ideas and discuss problems with fellow researchers, as well as to hear about the latest research and development and applications. A workshop programme was included to encourage this interaction in areas of interest selected by participants. The resultant workshop reports provide a summary of topical problems and opportunities. Jasmine rice (Oryza sativa L.) was subjected to two drying operations: combined microwave-hot air drying (MHA) at initial power intensity of 3, 4 and 6 W g⁻¹ and superheated steam drying (SHS) at 300 °C and 400 °C. During drying, kinetic rate constants of SHS were significantly higher than those of MHA. Both drying operations could decrease enthalpy of starch gelatinisation from 9.28 J g⁻¹ to 1.64-6.17 J g⁻¹, increase gelatinisation extent to 33.51-82.33%, decrease crystallinity from 28.87% to 18.15-21.33%, improve scavenge ability of 1, 1-diphenyl-2-picrylhydrazyl, increase ferric reducing antioxidant power and increase hardness of cooked rice from 5.66 N to 5.83-6.55 N, depending on microwave power and drying medium temperature. However, taste profiles and liking scores were comparable to the regular brown rice. Therefore, MHA and SHS operations could be potentially used for reducing drying process and promoting antioxidant activity. Abstract: Combined Microwave-hot Air Drying (MHA) and superheated steam drying (SHS) could decrease enthalpy of starch gelatinisation, increase gelatinisation extent and decrease crystallinity of brown rice, depending on microwave power and drying medium temperature. However, taste profiles and liking scores were comparable to the regular brown rice. This book provides recent advances in research on drying of particulate and porous materials. It is based on a selection of papers presented at the 1st Polish Drying Symposium 2005. The contributions cover theoretical, as well as experimental and modeling research on heat and mass transfer processes during drying of porous material and fluidized beds. The book is a pioneering contribution to the science and technology of drying of particulate solids. It’s been nearly 40 years since the last book on infrared heating for food processing was published, and in the meantime, the field has seen significant progress in recent years. Infrared heating for Food and Agricultural Processing presents the latest applications of IR heating technology, focusing on thermal processing of food and agricultural products. Blanching - one of the world’s most fundamental processes in the food and beverage industry - is also addressed. The book provides up-to-date and practical information on radio frequency and microwave drying, Blaching Baking Thawing Pest management Food safety improvement Where applicable, this readily accessible guide reviews case studies to address specific industrial issues and the economic benefits of IR heating. Infrared Heating for Food and Agricultural Processing is a well-organized resource for food processing engineers and also quality control and safety managers in food processing and food manufacturing operations. The 1st World Conference and Technology Exhibition on Biomass for Energy and Industry, held in Sevilla in June 2000, brought together for the first time the traditional European Conference on Biomass for Energy and Industry and the Biomass Conference of the Americas, thus creating the largest and most outstanding event in the worldwide biomass sector - a vital reference source for researchers, manufacturers, and policy makers involved or interested in the use of biomass for energy and industry. This book contains selected papers presented during technical and plenary sessions at the World Renewable Energy Congress, the world’s premier conference on renewable energy and sustainable energy. All papers were rigorously peer reviewed. The Congress, held at Murdoch University in Perth, Western Australia from February 5-9, 2017, with the theme of “Transition Towards 100% Renewable Energy”, featured keynote speakers and parallel technical sessions highlighting technical policy, and investment progress towards achieving 100% renewable energy ranging in scale from households to cities to large regions, with a focus on the challenges and opportunities transforming the global energy systems. The book highlights contributions from thought leaders involved in the supply, distribution, consumption, and development of sustainable energy systems. Presents Drying Breakthroughs for an Array of Materials Despite being one of the oldest, most energy-intensive and in some cases least efficient processes in the food industry, 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. Page 1/4
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 that are high valued, heat-sensitive pharmaceuticals, nutraceuticals, and some foods. It also introduces innovative techniques, such as heat-pump drying, which allow both industrial and small-scale operations to improve their bottom line. Four New Chapters: Spray-Freezing 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. 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...
field of food safety and related fields, such as nutrition, food science and technology and environment and to share and learn from state-of-the-art expertise with the rest of the food safety community. Assembled with the objective of facilitating the work of those working in the field of food safety and related fields, such as nutrition, food science and technology and environment - this work covers the area of food safety technology, this is no longer a comprehensively and pedagogically suitable, which meets strict needs such as: contributions by the foremost authorities in their fields; unbiased and concise overviews on a multitude of food safety subjects; references for further information, and specialized and general definitions for food safety terminology. In maintaining confidence in the safety of the food supply, sound scientific information is key to effectively and efficiently assessing, managing and communicating on food safety risks. Yet, professionals and other specialists working in this multidisciplinary field are finding it increasingly difficult to keep up with developments outside their immediate areas of expertise. This single source of concise, reliable and authoritative information on food safety has, more than ever, become a necessity. Still the Most Complete, Up-To-Date, and Reliable Reference in the Field. Drying is a highly energy-intensive operation and is encountered in nearly all industrial sectors. With rising energy costs and consumer demands for higher quality, dried products, it is increasingly important to be aware of the latest developments in industrial drying technology. This is the second publication stemming from the International Congress on Engineering in Food, the first being Food Engineering Interfaces, based on the last ICEF10. The theme of ICEF 11, held in Athens, Greece in May 2011, is “Food Process Engineering in a Changing World.” The conference explored the ways food engineering contributes to the solutions of vital problems in increasing population and complexity that is under the severe constraints of limited raw materials, energy, and environment. Engineers and scientists are finding food material handling, processing and preservation – drying, advances in food process technology, novel food processes, functional foods, waste engineering, food process design and economics, modeling food safety and quality, and innovation management. 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. By far the most commonly encountered and energy-intensive unit operation in all almost industrial sectors, industrial drying continues to attract the interest of scientists, researchers, and engineers. The Handbook of Industrial Drying, Fourth Edition not only delivers a comprehensive treatment of the current state of the art, but also serves as a consultative reference for streamlining industrial drying operations. New to the Fourth Edition: Computational fluid dynamic simulation Solar, impingement, and pulse combustion drying Drying of fruits, vegetables, sugar, biomass, and coal Physicochemical aspects of sludge drying Life-cycle assessment of drying systems Covering commonly encountered dryers as well as innovative dryers with future potential, the Handbook of Industrial Drying, Fourth Edition not only details the latest developments in the field, but also explains how improvements in dryer design and operation can increase energy efficiency and cost-effectiveness. Seafood is a broad term that covers various aquatic mollusks, crustaceans and echinoderms that are used as food. They have economic and ecological importance and have been consumed as food for centuries. Shellfish provide high quality protein with all the desirable nutritional and functional characteristics, and shellfish are highly perishable. Because of this, shellfish must be handled and processed properly, quickly and stored properly to maintain their quality. In recent years, there are many different processing methods used around the world. Shellfish are very perishable foods and must be preserved just after catching or harvesting. This makes the preservation of seafood a critical issue in terms of quality and human health. To date there have been a number of books on seafood processing and preservation, but all of them have been mostly focused on fish. Shellfish Processing and Preservation is the first reference work to focus specifically on shellfish, providing comprehensive coverage of the production methods, biological makeup and preservation methods of all major shellfish species. Individual sections focus on crustaceans such as shrimps and prawns, crabs and lobsters plus molluscs including mussels, scallops and oysters. Cephalopods such as squid and octopus are also covered in depth. For each species processing and preservation methods such as chilling, freezing, canning and curing are examined, plus the important safety aspects specific to each shellfish type. Shellfish Processing and Preservation is an essential publication for any researchers or industry professionals in search of a singular and up-to-date source for the processing and preservation of shellfish. Pinch analysis and related techniques are the key to design of inherently energy-efficient plants. This book shows engineers how to understand and optimize energy use in their processes, whether large or small. Energy savings go straight to the bottom line as increased profit, as well as reducing emissions. This is the key guide to process improvements for process engineers, experienced and newly qualified engineers alike, exploring the application of pinch technology to industrial systems and related problems and the latest trends in characterization and development of composite materials and structures. This book also provides researchers and scientists with the latest trends in characterization and development of composite materials and structures. The expression 'composite materials' indicates a wider range than the expression 'composite material' which is many times limited to classical fibre reinforced plastics. The idea of composed structures and materials is to join different components in order to obtain in total better properties than one of the single constituents can provide. In this collection, well known experts present their research on composed materials such as textile composites, sandwich plates, hollow sphere structures, reinforced concrete as well as classical fibre reinforced materials. This book focuses on Chemical Engineering and Process engineering, covering interdisciplinary innovation technologies and sciences closely related to chemical engineering, such as computer image analysis, modelling and IT. The book presents interdisciplinary aspects of chemical and biochemical engineering interconnected with process systems engineering, process safety and computer science. Vegetables are an important article of commerce both in developed and developing economies. Many studies point to importance of vegetables in our diet. Handbook of Vegetables and Vegetable Processing serves as a reference handbook on vegetables and vegetable processing containing the latest developments and advances in this fast growing field. The book can be considered as a companion to Y. H. Hui's popular Handbook of Edible Fruits and Fruit Processing (2006). Handbook of Vegetables and Vegetable Processing is contemporary in scope, with in-depth coverage of new interdisciplinary developments and practices in the field of vegetables emphasizing processing, preservation, packaging, and nutrition and food safety.
Coverage includes chapters on the biology, horticultural biochemistry, microbiology, nutrient and bioactive properties of vegetables and their significant commercialization by the food industry worldwide. Full chapters are devoted to major vegetables describing aspects ranging from chemistry to processing and preservation. World-renowned editors and authors have contributed to this essential handbook on vegetables and their production, technologies, and controls. Coverage includes biology and classification, physiology, biochemistry, flavor and sensory properties, microbial safety and HACCP principles, nutrient and bioactive properties. In-depth descriptions of key processes including, minimal processing, freezing, pasteurization and aseptic processing, fermentation, drying, packaging, and application of new technologies. Entire chapters devoted to important aspects of over 20 major commercial vegetables including avocado, table olives and textured vegetable proteins. Unparalleled expertise on important topics from more than 50 respected authors. 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 pro-effective water and energy use as well as wastewater treatment in the food industry. Opening chapters provide an overview of key drivers for better management. Part two is concerned with assessing water and energy consumption and designing strategies for their reduction. These include auditing energy and water use, and modelling and optimisation tools for water minimisation. Part three reviews good housekeeping procedures, measurement and process control, and monitoring and intelligent support systems. Part four discusses methods to minimise energy consumption. Chapters focus on improvements in specific processes such as refrigeration, drying and heat recovery. Part five discusses water reuse and wastewater treatment in the food industry. Chapters cover water recycling, disinfection techniques, aerobic and anaerobic systems for treatment of wastewater. The final section concentrates on particular industry sectors including fresh meat and poultry, cereals, sugar, soft drinks, brewing and winemaking. With its distinguished editors and international team of contributors, Handbook of water and energy management in food processing is a standard reference for the food industry. Provides an overview of key drivers for better management. Reviews technologies for improvements in efficiency of water and energy use and waste water treatment. Examines house keeping procedures and measurement and process control. Alternative green food processing technologies have gained much technical and industrial attention in recent years as a potential means of reducing costs and promoting consumer awareness of corporate environmental responsibility. However, utilizing green principles is now becoming an effective business approach to enhance vegetable oil processing profitability. Two years have passed since the first edition of Green Vegetable Oil Processing was published. The Revised First Edition includes much of the content of the first edition, but incorporates updated data, details, images, figures, and captions. This book addresses alternative green technologies at various stages of oilseed and vegetable oil processing. This includes oil extraction technologies such as expeller, aqueous and supercritical methods, and green modifications of conventional unit operations such as degumming, refining, bleaching, hydrogenation, winterizing/dewaxing, fractionation, and deodorization. While most chapters describe soy oil processing, the techniques described equally applicable to oils and fats in general. Documents the current state of green oil processing technologies available today. Addresses alternative green technologies at various stages of oilseed processing includes technologies already in commercial use and some that are still in developmental stages. Consumer-driven technologies have kept the food industry at the forefront of technological innovations. For example, the redefinition of the once accepted compromise between convenience and quality is just one of the current issues driving the development of new products. An overview of a range of solutions for these challenges includes: Innovation in Food Engineering: New Techniques and Products addresses not only new or alternative technologies but also new products, materials, and additives that have emerged as a response to current and emerging issues faced by the food industry. This book provides a comprehensive overview of modern processing technologies and their use to develop new or improved food products and ingredients that meet consumers increased demands for quality and safety. Each chapter in the Innovative Techniques section begins with a critical review of the fundamentals of the new or modified technique, its advantages, and relevant results. They include a description of the actual industrial scenario where the technique can be applied, emphasizing benefits and economical relevance of this sector. The chapters in the New Materials, Products, and Additives section identify the potential of the new or modified product, discuss its production route, and compare it with traditional alternatives. While there are many books available on both topics, this is one of the first to cover processing technologies and their use to produce new and improved food products. Written by internationally recognized experts and pioneers and comprehensive in scope, this text highlights promising techniques and remaining challenges. In the constantly changing global marketplace, keeping up with new developments is important keeping ahead of them is essential. This book keeps you up to date on the latest technology and paves the way for future developments. Food Engineering Handbook, Two-Volume Set provides a stimulating and up-to-date review of the latest. Conventional and Advanced Food Processing Technologies focuses the practical (application, machinery, theoretical (model, equation) and cutting-edge (recent trends), making it ideal for industrial, academic and reference use. It consists of two sections, one covering conventional or well-established existing processes and the other covering emerging or novel processes that are expected to be employed in the near future for the processing of foods in the commercial sector. All are examined in great detail, considering their current and future applications with added examples and the very latest data. Conventional and Advanced Food Processing Technologies is a comprehensive treatment of the current state of knowledge on food processing technology. In its extensive coverage, and the selection of reputed research scientists who have contributed to each topic, this book will be a definitive text in this field for students, food processors and researchers.