

Modern Drying Technology Energy Savings

Modern Drying Technology, Volume 4 Solar Drying Technology Drying and Energy Technologies Sustainable drying technologies of food Introduction to Plant-Based Latex Advanced Drying Technologies for Foods Energy Research and Power Engineering 2014 Drying Technology in Agriculture and Food Sciences Advances in Heat Pump-Assisted Drying Technology Sustainable Food Drying Techniques in Developing Countries: Prospects and Challenges Drying Technologies For Foods Process Engineering Tech Notes Papermaking Science and Technology Future Material Research and Industry Application Preserving Grain Quality by Aeration and In-store Drying Proceedings Special Issue on Drying and Dewatering in Energy Fields Solar Drying Technology Heat and Mass Transfer in Porous Materials Evangelos Tsotsas Om Prakash J.M.P.Q. Delgado Pankaj B. Pathare Laleh Khodaie Arun S Mujumdar W.Y. Fan Arun S. Mujumdar Vasile Minea Mahadi Hasan Masud Prabhat K Nema Khine Soe Thaung Bruce R. Champ Arun Bhagat J.M.P.Q. Delgado

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this five volume series provides a comprehensive overview of all important aspects of modern drying technology concentrating on the transfer of cutting edge research results to industrial use volume 4 deals with the reduction of energy demand in various drying processes and areas highlighting the following topics energy analysis of dryers efficient solid liquid separation techniques osmotic dehydration heat pump assisted drying zeolite usage solar drying drying and heat treatment for solid wood and other biomass sources and sludge thermal processing

this book offers a comprehensive reference guide to the latest developments and advances in solar drying technology covering the concept design testing modeling and economics of solar drying technologies as well as their impact on the environment the respective chapters are based on the latest studies conducted by reputed international researchers in the fields of solar energy and solar drying offering a perfect blend of research and practice explained in a simple manner the book represents a valuable resource for researchers students professionals and policymakers working in the field of solar drying and related agricultural applications

this book provides a comprehensive overview of essential topics related to conventional and advanced drying and energy technologies especially motivated by increased industry and academic interest the main topics discussed are theory and applications of drying emerging topics in drying technology innovations and trends in drying thermo hydro chemical mechanical behaviors of porous materials in drying and drying equipment and energy since the topics covered are inter and multi disciplinary the book offers an excellent source of information for engineers energy specialists scientists researchers graduate students and leaders of industrial companies this book is divided into several chapters focusing on the engineering science and technology applied in essential industrial processes used for raw materials and products

this book is an updated reference about the fundamentals applications and modeling of sustainable energy based drying systems in the food industry it includes the economic assessment quality control and safety parameters of the drying techniques drying is one of the most important food preservation techniques sustainable drying uses little or no fossil fuel input and low cost technologies this book reviews the alternative sources of energy for drying fresh produce it includes relevant case studies from some developing countries the book is meant for researchers and industry experts in food processing food engineering and agriculture key features covers the drying technology on a vast array of food types like fruits vegetables fish and meat highlights the alternative energy sources for drying fresh produce discusses modeling and simulation approaches reviews energy and exergy assessment of sustainable drying

latex bearing plants have been known for their contribution to human health latex a complex mixture produced in some plants acts as a reservoir of secondary metabolites with high medicinal value this semisolid exudation from plants contains several chemical components that are synthesized via different biosynthetic pathways and acts as their first line of defense recently chemical components derived from natural plant latex and their synthetic analogs have been used in medicine as analgesics antimicrobial agents antiproliferatives and anticancer drugs several ethnobotanical studies of latex plants have revealed the pharmacological potential of latex however the continuous exploitation of laticiferous plants for industrial and medicinal use has placed them at risk of extinction thus several researchers have developed potential cultivation methods to conserve these plants this book presents the uses of latex and discusses prospects for its potential utilization in the pharmaceutical sector agriculture and industry the

recent advancement in plant based latex has accelerated the development in all areas of natural products this book illustrates cutting edge advances in the field of plant based latex and is a useful reference for teachers undergraduate and postgraduate students research scholars and general readers

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

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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

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

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 preservations 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

drying is an important unit operation used in the industry for processing and preservation of food products food industry always looks for cost effective and energy efficient drying techniques to commercially succeed in their ventures and to fulfill demand of high quality dried food products although a large volume of technical literature is available on drying of foods it is still quite challenging for scientists and engineers to improve upon the existing drying systems and quality of the products the book consists of 14 chapters detailing freeze drying atmospheric freeze drying swell drying multi flash drying electro hydrodynamic drying pulse combustion drying foam mat drying ultrasound assisted drying and fluidized bed drying it also includes chapters which are commodity specific such as mushroom drying drying and roasting of cocoa and coffee beans 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 calculation procedures for dryers is also covered which would be helpful to improve dryer operation and efficiency

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objectives of aeration and in store drying basic principles of aeration and in store drying design of aeration and in store drying systems economics of aeration and in store drying case studies on aeration and in store drying concluding session

solar energy is quite simply the energy produced directly by the sun and collected elsewhere normally the earth it is an essentially inexhaustible source potentially able of meeting a significant portion of energy needs of nation with minimum adverse environmental consequences the sun drying products are unhygienic infectious test less and loose original color the overall dimension of solar collector is 1200 x 900 x 200 mm and of drying cabinet is 600 x 600 x 1000 mm solar intensity on collector surface was about 20 to 25 more that on horizontal surface the drying air temperature in case of dryer ranged from 320 c to 640 c grapes dried in both the models of solar dryer retained good color and pungency as compared to sun drying

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