

FACTORS THAT AFFECT UV-C PROCESSING

UV-C intensity

Exposure Time

UV-C Wavelength

Container Material

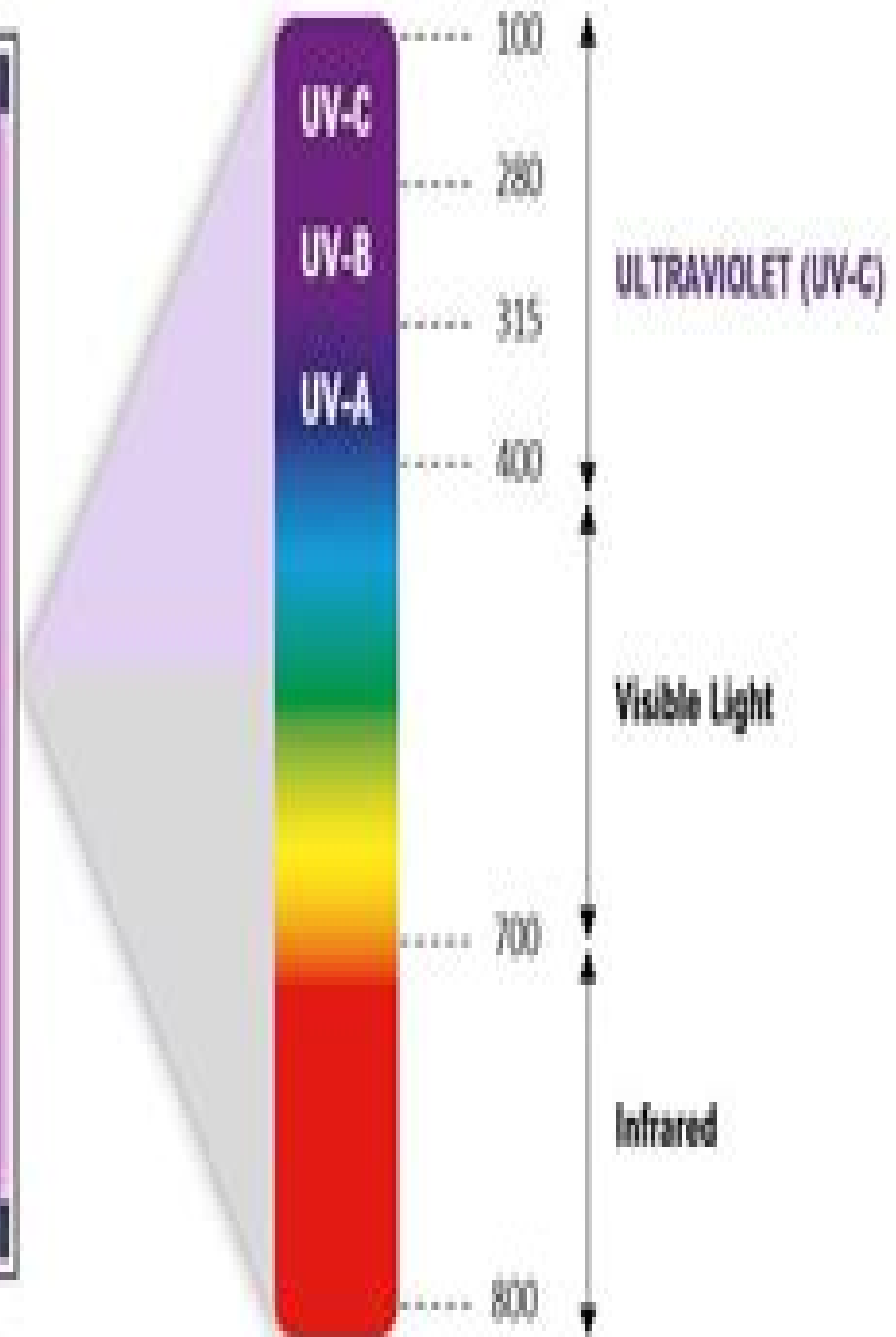
Liquid Depth

Flow Rate

Suspended Solids

pH

Turbidity



Application Of Pulsed Ultra Violet Light In Food Processing

**Eduardo Jacob Lopes, Leila Queiroz
Zepka, Mariany Costa Deprá**



Application Of Pulsed Ultra Violet Light In Food Processing:

Ultraviolet Light in Food Technology Tatiana Koutchma, Larry J. Forney, Carmen I. Moraru, 2009-03-06 The production of environmentally friendly sustainable chemical free food continues to challenge the food industry spurring on investigations into alternative food processing techniques that are more sophisticated and diverse than current practices Exploring one of these emerging solutions Ultraviolet Light in Food Technology Principles and Applications incorporates the fundamentals of continuous and pulsed UV light generation and propagation current food regulations recommendations for optimal UV reactor design selection and validation information on both commercially available and under development UV sources and the outlook for future food applications After reviewing essential terms definitions and current applications the book emphasizes the need to properly assess the physical and chemical properties in foods that influence the effectiveness of UV treatment and impact inactivation kinetics It also addresses the effects of UV processing on food quality before considering the engineering aspects of UV light treatment such as transport phenomena process calculations and continuous flow reactor geometries The book then describes the principles of validating UV reactors as well as the principles and applications of UV pulsed light including microbial inactivation in water meat fruits vegetables and packaging materials For anyone working in food research development and operations this resource provides broad accessible information on the science and applications of UV light technology It shows how UV light irradiation can be used as a physical preservation method in food processing

Food Processing Operations Modeling Soojin Jun, Joseph M. Irudayaraj, 2008-11-27 The second edition of Food Processing Operations Modeling focuses on novel processing technologies relevant to food safety and quality as well as new commercialized computational fluid dynamics software to model complex food processing systems Addressing engineering principles and backed by numerical approaches this edition features new chapters that provide in depth coverage of high pressure processing design and analysis pulsed electric field processing and modeling radio frequency heating ozone treatment and UV pasteurization of food materials The text updates new information on infrared heating of biological materials as well as modeling electrical resistance heating of foods

Nonthermal Light-Based Technologies in Food Processing C. K. Sunil, Megh R. Goyal, Preeti Birwal, R. Mahendran, 2025-02-10 Food preservation has existed since time immemorial with techniques that focused on prolonging shelf life of food products The current challenge though is to preserve food in terms of loss of nutrients texture and sensorial characteristics along with prolonging its shelf life This new volume Nonthermal Light Based Technologies in Food Processing explores and provides in depth knowledge and understanding of current and emerging light based technologies and their application in food processing This book also introduces the role of nonthermal technology for novel food product development In four detailed parts this handbook covers light based technologies ultraviolet UV light technology pulsed light PL technology and light emitting diode LED technology It details a range of modern and emerging light based food preservation technologies that include ozone ohmic heating high

pressure processing cold plasma pulsed electric field PEF microwave irradiation light based technologies ultraviolet pulsed light light emitting diode LED supercritical fluid extraction cold plasma and more Each technology is thoroughly covered starting with an introduction and proceeding to design applications and quality and regulatory aspects providing comprehensive knowledge and detailed explanations This book will be a valuable resource on nonthermal light based technologies in food processing for many academicians and professionals in the field of food science food technology and food engineering around the world It will also act as an important reference for researchers students scholars industries universities and research centers

Application of Pulsed Light in Food Processing Joshua Robert Cassar, 2021 Current food production practices do not eliminate microbial risks The Centers for Disease Control and Prevention estimates that over 9 million individuals become ill from foodborne associated illnesses annually Therefore there is a need to identify novel technologies processes and interventions to improve food processing consumer safety and product quality Pulsed light also known as pulsed ultraviolet PUV light is an emerging FDA approved technology that has potential to serve as an antimicrobial intervention in food processing Pulsed light is a non chemical non aqueous non thermal with short exposure and non ionizing light based technology that warrants consideration as an antimicrobial intervention There have been numerous studies that have reported the effectiveness of pulsed light for surface decontamination in the food industry This dissertation has been undertaken to evaluate the antimicrobial efficacy of pulsed ultraviolet light for surface decontamination in food systems Furthermore the antimicrobial characteristics of pulsed light s broad spectrum was also evaluated in this research In the first phase of this study three separate experiments were conducted to evaluate the antimicrobial efficacy of pulsed light on the surface of 1 high moisture reformed petfood 2 whole shell eggs and 3 a variety of food conveyor materials In phase I of this study the first experiment investigated the decontamination of high moisture reformed petfood Escherichia coli K12 inoculated samples were exposed to pulsed light using both a benchtop chamber system and a dynamic conveyor system Using the benchtop system samples were exposed with up to 10 pulses of pulsed light 0.25 J cm² per pulse and jostled between subsequent pulses to imitate a random movement in a commercial setting A modest microbial reduction ranging from 0.04 to 0.38 Log₁₀ CFU cm² was highly correlated with increasing number of pulsed light pulses R² 0.852 P

Application of Pulsed Ultra Violet Light in Food Processing Preetha Palanisamy, Deepa Jaganathan, 2014-12-03 Consumers are increasingly aware of the health benefits and risks associated with consumption of food To meet consumer s expectations the food industry is devoting considerable resources and expertise to the production of wholesome and safe products Pulsed light is one of the non thermal method of Food preservation Pulsed light PL consists of a successive repetition of short duration and high power flashes of broadband emission light 200-1000 nm could be a suitable for inactivating pathogenic and spoilage microorganisms

Nonthermal Processing in Agri-Food-Bio Sciences Anet Režek Jambrak, 2022-09-26 This book addresses important questions on the legislation regulations sustainability technology transfer safety of biomaterials and

mechanism of action of nonthermal processing on the molecular level of biomaterials and its impact on health The chapters take an interdisciplinary approach that is of interest to specialists from engineering physics chemistry agriculture life sciences and beyond with a focus on further development of existing and new applications of nonthermal processing and their combination with other methods in the processing of biomaterials agriculture biotechnology and the re use of waste and by products Nonthermal Processing in Agri Food Bio Sciences Sustainability and Future Goals aims to boost further developments and applications of nonthermal technologies to develop healthier products to ensure consumer approval for these innovative technologies and to improve the sustainability of biomaterials production The industrial application of nonthermal processing has led to an increase in innovative value products and the overall improvement of production capacity Nonthermal processes use less energy and chemicals reduce processing times have less environmental impact produce less waste and have the potential for industrial scale up and a return on investment in under 5 years According to The United Nations and the 2030 Agenda for Sustainable Development 17 goals should be incorporated within development projects and researchers are starting to use novel techniques to meet them In covering the fundamental engineering theories underlying nonthermal processing this book will aid in this mission The book overviews the advantages and disadvantages of novel technologies over to sustainability goals to correct steps for the scale up and return on investment The book includes the chemistry and physics of nonthermal processing technologies dedicated to specialists and researchers from a wide range of subject areas Interdisciplinary scientists and engineers sustainability experts can use this text to aid in their work in green technologies

Enzyme Inactivation in Food Processing Megh R. Goyal,Junaid Ahmad Malik,Ravi Pandiselvam,2023-08-04

Enzyme inactivation in fruits and vegetables is of utmost importance regarding food quality during storage This new volume explores important emerging technologies for the inactivation of enzymes in the design and preservation of food The book covers the basic concepts and chemical methods and then introduces novel processing technologies for inactivating food enzymes The new technologies are many pulsed electric field ultraviolet and light emitting diodes ohmic heating dense phased carbon dioxide cold plasma ultrasonication microwave processing radiofrequency extraction and others The volume also looks at the design of nutraceutical based functional foods specific foods for gut microbiodata the use of omega 3 fatty acids to fortify food products and the characteristics of dairy based dry powders and characteristics of millet starches It also considers the role of the bioactive compounds and metal ions for catalases secreted by medicinal plants and mushrooms for enzyme inactivation and biosensing along with the role of bionanomaterials in nanoencapsulation and catalysis

Contributions of Chemical Engineering to Sustainability Juan Gabriel Segovia-Hernandez,Nelly Ramírez-Corona,Valentina Aristizábal-Marulanda,2024-05-02 This book discusses the recent advancements in chemical engineering and their role in achieving the United Nations 2030 Agenda and Sustainable Development Goals SDGs Addressing these goals involves tackling intricate and interdisciplinary challenges Chemical engineers have been diligently addressing a diverse array of

issues across academia society and industry with the aim of positively impacting these goals The book offers essential insights and detailed analyses for each SDG It explores the challenges encountered within various applications and proposes solutions based on foundational engineering principles The book s content is tailored to professionals students and researchers across diverse fields including engineering environmental science and biotechnology

Non-Thermal Processing Technologies for the Dairy Industry M. Selvamuthukumar,Sajid Maqsood,2021-11-08 The dairy industry usually adopts conventional methods of processing various milk based food products which can destroy nutrients and minimize organoleptic qualities An alternative approach for this is the non conventional method of non thermal processing techniques Not only does this enhance the nutritional profile of the various processed products but increases the consumer acceptability There are some emerging non thermal processing techniques such as pulsed light cold plasma high pressure processing ultrasonic UV pasteurization or ozone treatments which can be successfully employed in dairy processing industries to enhance product acceptability safety and quality aspects Non Thermal Processing Technologies for the Dairy Industry describes several emerging non thermal processing techniques that can be specially employed for the dairy processing industry The book narrates the benefits of using pulsed light cold plasma high pressure and ultrasonic during processing of various dairy products Key Features Addresses techniques used for extraction of functional food components from various dairy products by using super critical CO2 extraction technology Explains application of ozone and cold plasma technology for treating dairy processing waste waters with efficient recycling aspects Discusses the importance of using biopreservatives in shelf life extension of several dairy food products Portrays scope and significant importance of adopting UV pasteurization in processing market milk along with safety and environmental impacts over processing This book solves the issue of waste generation in dairy industries and further advises recovery of such waste for efficient recycling process In addition to being useful for dairy technologists it is a great source for academic scholars and students looking to gain knowledge and excel in the non thermal procesing area

Future Crops and Processing Technologies for Sustainability and Nutritional Security Soumya Ranjan Purohit,Vasudha Sharma,Meena Kumari,Kasi Muthukumarappan,Joanna Kane-Potaka,2024-09-06 Our current food system faces challenges across the board from ensuring food security and reducing environmental impact to managing costs and minimizing waste Fortunately cutting edge food processing technologies play a critical role in paving the way for a more sustainable future Taking a two track approach Future Crops and Processing Technologies for Sustainability and Nutritional Security presents sustainable technologies and emerging crops that are capable of ensuring nutritional security There are various crops that are nutritious but under utilized Crops covered in the book are those that are climate resilient and exhibit less use of water and zero discharge to environment such as millets and legumes like chickpea groundnuts and pigeon pea KEY FEATURES Provides a comprehensive literature review on the opportunities and challenges in achieving sustainability and nutritional security Presents compatible relevant crops to

address both sustainability and nutritional security Discusses the emerging technologies crops food products to justify sustainability and potential to ensure nutritional security This book also provides information on all aspects related to the processing and use of sustainable technologies and crops The use of technologies like 3D printing novel drying method high pressure processing high voltage treatments and the proper combination of conventional methods are addressed

Ultraviolet Light in Food Technology Tatiana Koutchma,2019-05-20 UV light is one of a number of emerging non thermal food processing technologies that can be used in a broad range of applications producing food products with longer shelf life more safe and with higher nutritional quality The new edition of Ultraviolet Light in Food Technology Principles and Applications will present recent understanding of the fundamentals of UV light along with new applied knowledge that has accumulated during the 7 years since the first edition published in 2009 The new edition of the book will have 11 chapters including 2 new chapters on chemical destruction with UV light and food plant safety along with 6 chapters greatly expanded and updated

Nonthermal Processing Technologies for Food Howard Q. Zhang,Gustavo V. Barbosa-Cánovas,V. M. Balasubramaniam,C. Patrick Dunne,Daniel F. Farkas,James T. C. Yuan,2011-02-04 Nonthermal Processing Technologies for Food offers a comprehensive review of nonthermal processing technologies that are commercial emerging or over the horizon In addition to the broad coverage leading experts in each technology serve as chapter authors to provide depth of coverage Technologies covered include physical processes such as high pressure processing HPP electromagnetic processes such as pulsed electric field PEF irradiation and UV treatment other nonthermal processes such as ozone and chlorine dioxide gas phase treatment and combination processes Of special interest are chapters that focus on the pathway to commercialization for selected emerging technologies where a pathway exists or is clearly identified These chapters provide examples and case studies of how new and nonthermal processing technologies may be commercialized Overall the book provides systematic knowledge to industrial readers with numerous examples of process design to serve as a reference book Researchers professors and upper level students will also find the book a valuable text on the subject

Non-Thermal Technologies for the Food Industry C. Anandharamakrishnan,V. R. Sinija,R. Mahendran,2024-02-29 Depending on the mechanisms involved in non thermal technologies such as ozonization irradiation ultrasound processing plasma processing and advanced oxidative processes interaction with food molecules differs which might lead to desirable reactions Non Thermal Technologies for the Food Industry Advances and Regulations explores the possibility of using non thermal technologies for various purposes such as shelf life extension reduced energy consumption adhesion and safety improvement Further it reviews the present status of these technologies international regulations and sustainability aspects in food processing including global case studies Features Provides a comprehensive overview of all the non thermal processing technologies that have potential for use within food manufacturing Covers novel disinfectant technologies and packaging methods for non thermal processing Includes electro spraying and electrospinning low temperature drying techniques cold

plasma techniques hydrodynamic cavitation oscillating magnetic field processing and so forth Focus on topics such as the valorization of agri food wastes and by products and sustainability Reviews CIO2 in combined hybrid technologies for food processing This book is aimed at researchers and graduate students in food and food process engineering *Food Processing Technologies* Amit K. Jaiswal, 2016-08-05 The processing of food generally implies the transformation of the perishable raw food to value added products It imparts benefits such as the destruction of surface microflora and inactivation of deleterious enzymes such as peroxidase leading to a greater shelf life of the food It also enhances color and texture while maintaining quality of products and makes them edible However it also has an inevitable impact on nutritional quality attributes such as increase or decrease in certain vitamins and bioactive metabolites among others Food Processing Technologies Impact on Product Attributes covers a range of food processing technologies and their effect on various food product attributes such as bioactive compounds safety and sensory and nutritional aspects of the food upon processing There are eight major parts in the book Part I covers the conventional processing technologies Parts II III IV and V deal with various novel processing technologies including impingement processing technologies electro magnetic processing technologies physico mechanical processing technologies and electro technologies Part VI introduces chemical processing technologies Part VII comprise irradiation processing technology and the final part is focused on biological processing technology detailing the application of enzymes in food processing Numerous studies were carried out to find the impact of these processing technologies on various aspects of food and associated health promotion properties Both positive and negative results were obtained based on nature of foods processing type and duration of processing and this book covers these results in depth **Handbook of Seafood Quality, Safety and Health Applications** Cesaretti Alasalvar, Kazuo Miyashita, Fereidoon Shahidi, Udaya Wanasundara, 2011-06-15 The global market for seafood products continues to increase year by year Food safety considerations are as crucial as ever in this sector and higher standards of quality are demanded even as products are shipped greater distances around the world The current global focus on the connection between diet and health drives growth in the industry and offers commercial opportunities on a number of fronts There is great interest in the beneficial effects of marine functional compounds such as omega 3 polyunsaturated fatty acids Seafoods are well known as low calorie foods and research continues into the nutritional effects on for example obesity and heart disease In addition by products of marine food processing can be used in nutraceutical applications This book is a resource for those interested in the latest advances in the science and technology of seafood quality and safety as well as new developments in the nutritional effects and applications of marine foods It includes chapters on the practical evaluation of seafood quality novel approaches in preservation techniques flavour chemistry and analysis textural quality and measurement packaging the control of food borne pathogens and seafood toxins New research on the health related aspects of marine food intake are covered as well as the use of seafoods as sources of bioactives and nutraceuticals The book is directed at scientists and

technologists in academia government laboratories and the seafood industries including quality managers processors and sensory scientists Non-Thermal Processing Technologies for the Fruit and Vegetable Industry M.

Selvamuthukumaran,2022-11-02 Fruits and vegetables rapidly spoil due to growth of microorganisms which further render them unsafe for human consumption The traditional methods of food preservation which involves drying canning salting curing and chemical preservation can significantly affect food quality by diminishing nutrients during heat processing This can alter the texture of the products leave chemical residues in the final processed products which in turn has greater impact over consumers safety and health concerns To combat this problem various current non thermal food processing techniques can be employed in fruit and vegetable processing industries to enhance consumer satisfaction for delivering wholesome food products to the market thus increasing demand Non Thermal Processing Technologies for the Fruit and Vegetable Industry introduces the various non thermal food processing techniques especially employed for fruits and vegetables processing industries it deals with the effect of several non thermal processing techniques on quality aspects of processed fruits and vegetable products and keeping quality and consumer acceptability Key Features Describes the high pressure processing techniques employed for processing fruit and vegetable based beverages Discusses the safety aspects of using various innovative non thermal based technologies for the fruits and vegetables processing industries Explains ozone application cold plasma ultrasound and UV irradiation for fruits and vegetables with their advantages disadvantages process operations mechanism for microbes in activation etc Presents the commercially viable and economically feasible non thermal processing technologies for fruit and vegetable industry This book addresses professors scientists food engineers research scholars students and industrial personnel for stability enhancement of fruit and vegetable based food products by using novel non thermal food processing techniques Readers will come to know the current and emerging trends in use of non thermal processing techniques for its application in several fruit and vegetable based food processing industries **Thermal vs.**

Non-Thermal Food Processing Methods Sitara Nambeesan,2025-01-03 Thermal vs Non Thermal Food Processing Methods explores the essential techniques employed in the modern food industry to ensure food safety and quality We cover various thermal processing methods such as pasteurization sterilization canning and drying alongside non thermal methods using ultrasound and radio frequency waves Our book provides detailed explanations of each process the equipment used and the overall food processing workflow By understanding these methods readers can gain valuable insights into how food is processed and made safe for consumption This comprehensive guide is perfect for students professionals and anyone interested in the food processing industry We aim to equip readers with the knowledge needed to excel in this field

Novel Food Preservation and Microbial Assessment Techniques Ioannis S. Boziaris,2014-04-14 Demand for minimally processed foods has resulted in the development of innovative non thermal food preservation methods such as high pressure sonication ozone and UV treatment This book presents a summary of these novel food processing techniques It also

covers new methods used to monitor microbial activity including spectroscopic methods FT IR and Raman molecular and electronic noses and DNA based methods

Handbook of Fruits and Fruit Processing Nirmal K. Sinha, Jiwan Sidhu, Jozsef Barta, James Wu, M. Pilar Cano, 2012-06-20 HANDBOOK OF FRUITS AND FRUIT PROCESSING SECOND EDITION Fruits are botanically diverse perishable seasonal and predominantly regional in production They come in many varieties shapes sizes colors flavors and textures and are an important part of a healthy diet and the global economy Besides vitamins minerals fibers and other nutrients fruits contain phenolic compounds that have pharmacological potential Consumed as a part of a regular diet these naturally occurring plant constituents are believed to provide a wide range of physiological benefits through their antioxidant anti allergic anti carcinogenic and anti inflammatory properties Handbook of Fruits and Fruit Processing distils the latest developments and research efforts in this field that are aimed at improving production methods post harvest storage and processing safety quality and developing new processes and products This revised and updated second edition expands and improves upon the coverage of the original book Some highlights include chapters on the physiology and classification of fruits horticultural biochemistry microbiology and food safety including HACCP safety and the regulation of fruits in the global market sensory and flavor characteristics nutrition naturally present bioactive phenolics postharvest physiology storage transportation and packaging processing and preservation technologies Information on the major fruits includes tropical and super fruits frozen fruits canned fruit jelly jam and preserves fruit juices dried fruits and wines The 35 chapters are organized into five parts Part I Fruit physiology biochemistry microbiology nutrition and health Part II Postharvest handling and preservation of fruits Part III Product manufacturing and packaging Part IV Processing plant waste management safety and regulations Part V Production quality and processing aspects of major fruits and fruit products Every chapter has been contributed by professionals from around the globe representing academia government institutions and industry The book is designed to be a valuable source and reference for scientists product developers students and all professionals with an interest in this field

Smart Food Industry: The Blockchain for Sustainable Engineering Eduardo Jacob Lopes, Leila Queiroz Zepka, Mariany Costa Deprá, 2023-12-01 Smart Food Industry The Blockchain for Sustainable Engineering Volume I Fundamentals Technologies and Management is a comprehensive overview of the current state of knowledge about food engineering and processing under sustainable engineering perspective This book includes disruptive approaches that will potentially enable the food industry for the transition to sustainable production Divided into four parts the book explores i fundamentals of sustainable food ii conventional technologies in the food industry iii sustainable emerging technologies in food industries and iv sustainable management in food industries The book is an invaluable reference resource for students researchers graduates and professionals in general who wish to gain knowledge in the engineering and food processing area as well as about sustainable food industry practices

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