#### THE FARMING SIDE

# 10

## Postharvest Handling and Safety of Perishable Crops

TREVOR SUSLOW, ELIZABETH MITCHAM, AND MARITA CANTWELL

Small farms, as mentioned in earlier chapters of this book, are usually defined on an economic basis as farms with an annual gross income of \$250,000 or less (United States Department of Agriculture [USDA] ERS, 2007). It is also true, though, that small-scale farm management issues can correspond to a farm's small physical footprint, the balance of family versus nonfamily labor, and the grower's degree of control over how the agricultural output reaches the ultimate consumer. Smaller farms often have to operate differently than bigger operations because they have more limited access to harvest and postharvest management equipment and technologies and to primary marketing channels and destinations. This chapter will give you an overview of general postharvest handling considerations for fruits and vegetables, focusing primarily on practices applicable to small-scale management with moderate to low annual sales of these commodities. Details of modern postharvest technologies and long-distance transportation, which can be capital intensive, are available from a variety of resources. For more information on this, see the online Postharvest Yellowpages (http://postbarvest.ucdavis.edu).

Besides the visual quality, sensory quality, and nutritive value of produce, any discussion of postharvest management of perishable horticultural foods that are eaten fresh must include an overview of food safety management. The need to minimize the potential for injury or illness to consumers is independent of a farm's scale or range of distribution and is the clear responsibility of primary producers and suppliers. Beyond the general reaffirmation of the need for commonsense measures to ensure food safety, this chapter gives some more specific guidance that can increase your awareness of preharvest risks and the need to plan for responsible postharvest management and meet the expectations of public health regulations (U.S. FDA, 2008).

#### PLANNING FOR POSTHARVEST QUALITY

The effort to achieve economic reward through the marketing of edible horticultural foods must begin well before harvest. Selection of the right seeds or perennial varieties or cultivars, including rootstocks, can be critical in determining the postharvest performance of any commodity. Individual cultivars vary in their inherent potential for firmness retention, uniformity of shape and characteristic color, disease and pest resistance, and shelf life in terms of visual quality and sensory quality (i.e., sugar-acid balance; aroma volatiles), to list just a few key traits. Small farm producers typically include or focus on specialty and heirloom cultivars and harvest strategies that maximize the sensory quality of produce, such as growing it to near full ripeness on the vine, in order to attract and satisfy direct-market consumer demand.

Both conventional and organic growers have recognized and responded to the expanding consumer demand for better flavor profiles in standard varieties as well as true heirloom and heirloomlike varieties. Heirloom varieties and those selected for novelty, ethnic culinary, or flavor traits are typically best suited for small-scale production and local marketing. Some heirloom or specialty varieties are not well adapted for growth in the arid Mediterranean climate of California and develop disorders or conditions in preharvest phases that become serious postharvest problems. Many variettes in this category simply do not hold up well to current postharvest handling and distribution methods. The main problems are bruising and cracking, compression damage in pallet loads, excessive softening, shriveling and wilting from water loss, and decay.

In addition to genetic traits, environmental factors such as soil type, temperature, wind during fruit set, frost, and rainy weather at harvest can adversely affect produce conformance with appearance (shape, uniformity, size) standards, storage life, suitability for shipping, and quality. Other local climatic factors such as

# **Postharvest Handling And Safety Of Perishable Crops**

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#### **Postharvest Handling And Safety Of Perishable Crops:**

Small Farm Handbook, 2nd Edition Laura Tourte, Ben Andrews Faber, 2011 Since its publication in 1994 the Small Farm Handbook has been an essential resource for California's small farmers and the agricultural professionals advising them selling over 4300 copies Now this invaluable reference has been updated and expanded for today's small scale producers. The handbook covers three essential areas Background skills and knowledge the business side and the farming side Within these broad areas you ll find specific chapters on Requirements for Successful Farming Growing Crops Raising Animals Farm and Financial Management Marketing and Product Sales Labor Management Also included are profiles of six small farm operators representing a sample of California's diverse agriculture Throughout you'll get a look at emerging trends and issues for California agriculture and innovative methods for better production and management all of which can lead to better farm performance Drawing upon the knowledge of 32 experts from the University of California No other publication covers the topics issues and facets of California's small scale agriculture with this depth or level of expertise From the basics to risk management specialty crops to marketing and product sales this guide covers the gamut

Postharvest Handling Robert L. Shewfelt, Stanley E. Prussia, 2012-12-02 Postharvest Handling A Systems Approach introduces a new concept in the handling of fresh fruits and vegetable Traditional treatments have been either physiologically based with an emphasis on biological tissue or technologically based with an emphasis on storage and handling This book integrates all processes from production practices through consumer consumption with an emphasis on understanding market forces and providing fresh product that meets consumer expectations Postharvest physiologists and technologists across the disciplines of agricultural economics agricultural engineering food science and horticulture along with handlers of minially processed products within the fresh produce fruit and vegetable processing industries will find this to be an invaluable source of information Uses a systems approach that provides a unique perspective on the handling of fresh fruits and vegetables Designed with the applied perspective to complement the more basic perspectives provided in other treatments Provides the integrated interdisciplinary perspective needed in research to improve the quality of fresh and minimally processed products Emphasizes that the design of handling systems should be market driven rather than concentrating on narrow specifics Bioresource and Stress Management Ratikanta Maiti, Aruna Kumari, Ashok Kumar Thakur, Narayan Chandra Sarkar, 2016-07-20 This book is a compilation of recent global measures to conserve bio resources and manage biotic and abiotic stresses It highlights emerging issues related to agriculture abiotic and biotic stress factors ethnic knowledge climate change and global warming as well as natural resources and their sustainable management It also focuses on the consolidated efforts of scientists and academics engaged in addressing a number of issues related to resource management and combating stresses in order to protect the Earth Crop production and productivity have been significantly improved however there have been no corresponding practical advances in sustainable agriculture This book offers a wide

range of affordable approaches to managing bio resources with a focus on sustainability Lastly it describes research highlights and future areas of research Post-Harvest Physiology and Crop Preservation Morris Lieberman, 2012-12-06 Emphasis in agricultural research for many years has concen trated on crop production This emphasis has become more important in recent years with the realization that the population worldwide is outstripping the food supply There is however another side to increasing the availability of the food supply This simply involves preservation of the harvested crop for human consumption The losses incurred in harvesting handling transportation storage and marketing crops have become a greater problem as the distance from the farm to the ultimate consumer increases In the Western world where modern transportation storage facilities and marketing technology are widely used post harvest technology requires a large input of energy which increases costs considerably There fore losses are more significant and the ability to provide fresh fruits and vegetables out of season at reasonable costs will depend on reduced post harvest losses throughout the marketing chain from the farm gate to the ultimate consumer The reduction in post harvest losses depends on proper use of current technology and further developments derived from a broad spectrum of scientific disciplines Biochemistry plant physiology plant pathology horticulture agronomy physics engineering and agricultural economics all provide knowledge which has been useful and will be useful in the future for improving post harvest technol ogy and crop preservation This volume records the Proceedings of the NATO Advanced Study Institute on Post Harvest Physiology and Crop Preservation held at Sounion Greece April 28 May Postharvest Handling Wojciech J. Florkowski, Nigel H. Banks, Robert L. Shewfelt, Stanley E. Prussia, 2021-12-05 8 1981 This newly revised fourth edition of Postharvest Handling brings new and updated chapters with new knowledge and applications from postharvest research The revised edition brings back the aspects of preharvest conditions and their effects on postharvest quality and features new chapters on the increasingly important role of transportation and logistics It emphasizes consumers and systems thinking for postharvest chains for fresh produce This book also explores current challenges including oversupply waste food safety lack of resources sustainability and best practices for systems to thrive in spite of these challenges This unique resource provides an overview of postharvest systems and their role in food value chains and offers essential tools to monitor and control the handling process Written by a team of experts in Postharvest Systems and Handling this book continues to be the most practical and up to date resource for postharvest physiologists and technologists across the disciplines of agricultural economics agricultural engineering food science and horticulture along with businesses handling fresh or minimally processed products Features new chapters on packaging transportation and logistics and postharvest in the context of systems approach Brings aspects of pre harvest conditions and their effects on postharvest quality Provides an overview of the postharvest system and its role in the food value chain offering essential tools to monitor and control the handling process Postharvest Handling of Horticultural Crops Raju L. Bhardwaj, Yogesh Kumar Sharma, Latika Vyas, 2021-12-22 This book covers the importance of post harvest technology in horticultural crops

fruit growth development and post harvest physiology fruit maturity indices harvesting of fruits and vegetables initial handling of fruits and vegetable after harvesting precooling of horticulture produce transportation etc It is a rich source of modern engineering technologies for income generating concept for agro based industries. The book is specially dedicated to the sub sector of the fruits and vegetables plants dealing with the fresh primary product from the product reception following the harvesting up to the storage and before launches it to the market This book will serves as a comprehensive guide for all the people who focuses on post harvest management skills Note T F does not sell or distribute the hardback in India Pakistan Nepal Bhutan Bangladesh and Sri Lanka Food safety, security and sustainability ,2025-06-08 This Festschrift honors the remarkable career of Prof Dr h c Huub Lelieveld celebrating his 80th birthday and the 20th anniversary of the Global Harmonization Initiative GHI Spanning a distinguished career across industry academia and public service Huub's dedication to excellence innovation and ethics has profoundly impacted all those who have worked with him from colleagues at Unilever to members of the GHI This compilation of research papers contributed by friends and colleagues who have collaborated with Huub explores diverse and significant topics close to his heart These include the realization of food culture nutrition food safety religious food regulations during times of conflict food fortification novel food technologies like irradiation improving religious slaughter practices safe cassava consumption and sustainable food futures and environmental responsibility and planetary health Each article serves as a tribute to his vision and legacy highlighting his lasting influence on global food science and public health Food Safety and Quality in the Global South Matthew Chidozie Ogwu, Sylvester Chibueze Izah, Nontuthuko Rosemary Ntuli, 2024-08-01 This book focuses on sustainable food systems in the Global South as highlighted by the United Nations Sustainable Development Goal 2 which seeks to end global hunger through food and nutrient security It addresses the organoleptic properties of food that contribute to food quality as well as aspects of food safety such as the systematic handling preparation packaging contamination and storage within the food system to ensure food quality is maintained while preventing food borne illnesses The book assesses the state of food quality in the Global South and promotes the establishment of critical control points for food quality monitoring and maintaining adequate nutrient levels in food while keeping out organic inorganic and synthetic contaminants The book also contains recommendations for corrective actions including consumer information systems and remedial health actions The book systematically connects food safety and quality in the Global South with broader health and sustainable development implications including the rising concern of non communicable diseases This comprehensive book delves into various aspects of food safety and quality in the Global South offering insights into challenges solutions and emerging trends across multiple disciplines This book serves as a valuable resource for academics researchers policymakers and practitioners involved in food science public health and sustainable development The diverse range of topics covered contributes to a holistic understanding of the complexities involved in ensuring safe and high quality food in the unique context of the Global South

Postharvest Technology of Horticultural Crops: Fresh-Cut and Processed Horticultural Products Marita I. Cantwell, Diane M. Barrett, 2023-12-21 Fresh cut products are estimated to account for about 18 to 20 percent of the value of fresh fruit and vegetables marketed through retail and food service channels in the United States From salad mixes to baby carrots broccoli and cauliflower florets to slaw mixes these products continue to grow in popularity with consumers For the consumer fresh cut fruit and vegetables offer several potential benefits They can reduce meal preparation time provide more uniform quality and increase access to healthy produce For the processor successful fresh cut products can actually be more cost effective because of reduced waste for the end user Concerns about fresh cut products include their variable shelf life the need for temperature control microbial food safety and inconsistent overall product quality including flavor and nutrition Whereas most food processing techniques stabilize products and lengthen their storage and shelf life fresh cut processing increases the perishability of fruit and vegetables This volume addresses the physiology of fresh cut fruits and vegetables treatments for maintaining quality optimal storage temperatures and modified atmospheres The chapter on processed products covers the principles of horticultural crop preservation the importance of raw material quality and common unit operations and technologies used for processing horticultural crops The advantages and disadvantages of various technologies are addressed followed by general information on packaging and quality control Crop Post-Harvest: Science and Technology, Volume 1 Peter Golob, Graham Farrell, John E. Orchard, 2008-04-15 World wide losses of crops post harvest through microbial action pests diseases and other types of spoilage amount to millions oftons every year This essential handbook is the first in athree volume series which covers all factors affecting post harvestquality of all major fruits vegetables cereals and other crops Compiled by members of the world renowned Natural ResourcesInstitute at the University of Greenwich Chatham UK the comprehensive contents of this landmark publication encourage interactions between each sector of the agricultural community inorder to improve food security food safety and food quality intoday s global atmosphere Through the carefully compiled and edited chapters internationally respected authors discuss ways to improve harvestyield and quality drawing on their many years practical experience and the latest research findings applications and methodologies Subjects covered include an introduction to the systems used in post harvest agricultural processes physical and biological factors affecting post harvest commodities storageissues pest management food processing and preservation foodsystems the latest research and assimilation of this work and current trade and international agreements An invaluable glossary showing important pests pathogens and plants is also included Crop Post Harvest Science and Technology Volume 1 Principles and Practice is a must have reference book which offers the readeran overview of the globalisation of post harvest science technology economics and the development of the storage and handling of perishable and durable products Volumes 2 and 3 willgo on to explore durables and perishables individually in more detail with many case studies taken from around the globe This 3 volume work is the standard handbook and reference forall professionals involved in the harvesting shipping storage and processing of

crops including agricultural and plant scientists food scientists and technologists microbiologists plantpathologists entomologists and all post harvest shipping and storage consultants Libraries in all universities and researchestablishments where these subjects are studied and taught shouldhave multiple copies on their shelves The State of Food Security and Nutrition in the World 2022 Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development, United Nations Children's Fund, World Food Program, World Health Organization, 2022-07-06 This year s report should dispel any lingering doubts that the world is moving backwards in its efforts to end hunger food insecurity and malnutrition in all its forms We are now only eight years away from 2030 but the distance to reach many of the SDG 2 targets is growing wider each year There are indeed efforts to make progress towards SDG 2 yet they are proving insufficient in the face of a more challenging and uncertain context. The intensification of the major drivers behind recent food insecurity and malnutrition trends i e conflict climate extremes and economic shocks combined with the high cost of nutritious foods and growing inequalities will continue to challenge food security and nutrition This will be the case until agrifood systems are transformed become more resilient and are delivering lower cost nutritious foods and affordable healthy diets for all sustainably and inclusively Postharvest Technology of Horticultural Crops: Atmospheric Environment Elizabeth J. Mitcham, Adel Kader, Michael S. Reid, Mikal Saltveit, 2023-12-21 Drawing on the expertise of the University of California s Postharvest Technology Center this publication discusses commercial uses of modified or controlled atmosphere technology which can be used during transport temporary storage or long term storage of horticultural commodities destined for the fresh market or processing In modified atmospheres and controlled atmospheres gases are removed or added to create an atmospheric composition around a commodity that is different from that of air Modified or controlled atmosphere technology can be used during transport temporary storage or long term storage of horticultural commodities destined for the fresh market or processing Chapter 1 discusses how modified or controlled atmosphere technology can be used during transport temporary storage or long term storage of horticultural commodities destined for the fresh market or processing Chapter 2 discusses the ways biologically important gases are sampled analyzed and mixed Since the rate of respiration of plant tissue is tightly coupled to its overall metabolic rate and often inversely proportional to shelf life the measurement and control of respiration are of vital interest in devising strategies to maintain quality after harvest Chapter 3 discusses the role of Ethylene in the postharvest life of many horticultural crops Sometimes this role is beneficial promoting faster and more uniform ripening before retail distribution and sometimes it is deleterious speeding senescence and reducing shelf life This chapter addresses the properties of this gas and ways to both harness its beneficial effects and avoid undesirable results during the postharvest handling of perishable commodities Postharvest Handling and Diseases of Horticultural Produce Dinesh Singh, Ram Roshan Sharma, V. Devappa, Deeba Kamil, 2021-09-15 Postharvest Handling and Diseases of Horticultural Produce describes all the postharvest techniques handling pre cooling postharvest treatment edible coating and storage of

the horticultural produce available to handle perishable horticultural food commodities covering the areas of horticulture agricultural process engineering postharvest technology plant pathology and microbiology Postharvest diseases of major fruits and vegetables with their causal agents are described. The integrative strategies for management of postharvest diseases include effectively inhibiting the growth of pathogens enhancing the resistance of hosts and improving environmental conditions with results that are favourable to the host and unfavourable to the pathogen growth including biotechnological approaches Adopting a thematic style chapters are organized by type of treatment with sections devoted to postharvest risk factors and their amelioration The chapters are written by experts in the fields of plant pathology horticulture food science etc Core insights into identifying and utilizing appropriate postharvest options for minimizing postharvest losses and enhancing benefits to end users are also provided Features Presents the most recent developments in the field of postharvest handling technologies and diseases in a single volume Includes postharvest diseases of cut flowers fruits vegetables and tuber crops Appropriate for students researchers and professionals Written by experts and can be used Postharvest Technology of Horticultural Crops: Cooling and Storage James F. Thompson, Irwin R. as a reference resource Donis-González, Tom Rumsey, Farzaneh Khorsandi, Erin DiCaprio, 2023-12-21 About one third of fresh produce harvested worldwide is lost at various points in the distribution system between production and consumption While it is impossible and uneconomical to eliminate these losses completely it is possible to reduce them by at least half and increase food availability The first chapter of this volume describes both proper temperature management practices for perishable commodities and the commercially used methods for cooling fruit vegetables and cut flowers It is written for a person who is initially investigating produce cooling a professional designer who needs design details and an operator who wants a better understanding of practical operation guidelines The chapter contains a complete discussion of design for forced air coolers hydrocoolers and vacuum coolers the most commonly used cooling methods that people with a good background in industrial refrigeration can design The second chapter is an overview of cold storage for perishables It describes the unique issues associated with designing a cold storage for perishables Worker safety and food safety for cooling and storage systems have become important issues for the industry and they are discussed in chapters 3 and 4 The volume concludes with chapter 5 which describes the effects of air temperature and humidity on postharvest quality and temperature and humidity Energy Efficient Technologies for Food Safety, Quality, and Security Hamad, Ahmed measurement methods Alhussaini, Singh, Pallavi, Saxena, Dipali, Haghi, A.K., 2025-05-13 Safety in the food industry is of paramount importance for ensuring the quality and integrity of food products One of the key issues is maintaining safety and quality as preservation methods become more varied and complex Individual technologies can be combined to achieve the right balance of safety quality and shelf life for particular products A deep understanding of the complexities and innovations in food processing address critical challenges and help chart a course towards a safer and more sustainable food future Energy Efficient

Technologies for Food Safety Quality and Security explores the latest advancements in technology aimed at ensuring the safety and quality of our food supply It discusses the mechanisms application conditions and advantages and disadvantages of selected food preservation techniques Covering topics such as food security post harvest packaging and sustainable packaging solutions this book is an excellent resource for food safety consultants auditors and practitioners policymakers professionals researchers scholars academicians and more Sustainable Agriculture for Food Security Acharva Balkrishna, 2021-10-01 Sustainable Agriculture for Food Security A Global Perspective takes an analytical approach to issues related to current agricultural practices It looks at global geographical data and key statistical reports to aid readers in comparing understanding and making agricultural decisions The book is divided into chapters with each dealing with a specific problem and its solutions keeping in mind the context of geographical variations. The book first provides a historical overview of the socioeconomic importance of agriculture around the world along with a discussion on threats and opportunities in the agricultural sector It goes on to explore the importance of water sources for agriculture including rain fed agriculture practices water harvesting techniques sustainable irrigation practices and irrigation water management Guidance on the usage of agrochemicals and solutions to their detrimental effects from non standardized consumption is also addressed The volume also includes a discussion on organic farming methods certification standards and key restrictions in crop production Part 2 goes on to examine postharvest management practices used in different geographical areas along with analysis on the role of technology and obstacles in implementation The commercialization of agriculture through food processing branding and retailing is reviewed along with suggestions on available marketing platforms and promotional aspects It goes on to outline the situational analysis of food adulteration as well as norms and regulations of food security at the international level Lastly the concept of biofortification is explained along with methods and strategies of biofortified food production The impact of biofortification over socioeconomic development of a specific country is also analyzed Written for a wide audience this volume is a thoughtful overview and analysis of the increasingly necessary topic of sustainable agriculture for food security and will be of interest to faculty and research scholars working professionals social activists policymakers farmers and institutions and organizations involved in agricultural education research and development **Ouality Handling** and Evaluation Ramdane Dris, S. Mohan Jain, 2007-05-08 Food quality is becoming an ever increasing important feature for consumers and it is well known that some food crops are perishable and have a very short shelf and storage life An effective quality assurance system throughout the handling steps between harvest and retail display is essential to provide a consistently good quality supply of fresh food crops to the consumers and to protect the reputation of a given marketing label Food manufacturing companies all over the world are incre ingly focussing on quality aspect of food including minimally processed food to meet consumer demands for fresh like and healthy food products To investigate and control quality one must be able to measure quality related attributes Quality of produce encompasses sensory attributes nutritive values

chemical constituents mechanical properties functional properties and defects Successful postharvest handling of crops requires careful coordination and integration of the various steps from harvest operations to consumer level in order to maintain the initial product quality Maturity at harvest is one feature of quality of perishable products it has great influence on their postharvest behavior during marketing Safety assurance can be part of quality assurance and its focus on minimizing chemical and microbial contamination during production harvesting and postharvest handling of intact and fresh cut of commodities Essentially electromagnetic often optical prop ties relate to appearance mechanical properties to texture and chemical properties to flavor taste and aroma Developing smart agri-food supply chains Professor Louise Manning, 2021-12-07 Highlights current issues that challenge the safety of agri food supply chains e g food adulteration malicious contamination Assesses the recent developments implemented to improve safety and quality at all levels of the agri food supply chain including the use of smart agri food systems Emphasis on the need for improved tracking and traceability systems of food products to prevent and manage potential threats to safety Preventing food losses and waste to achieve food security and sustainability Prof Elhadi M. Yahia, 2020-03-24 The first comprehensive review of the causes and prevention of food losses and waste FLW bringing together leading experts from around the world Multi dimensional approach in addressing the problem of FLW from a range of perspectives key stages in the supply chain different types of commodity and different regions in the world Valuable case studies from different regions on practical measures to tackle FLW The Role of Post-harvest Management in Assuring the Quality and Safety of Horticultural Produce Adel A. Kader, Rosa Sonya Rolle, Food and Agriculture Organization of the United Nations, 2004-01-01 Basic approaches to maintaining the safety and quality of horticultural produce are the same regardless of the market to which this produce is targeted This bulletin reviews the factors which contribute to quality and safety deterioration of horticultural produce and describes approaches to assuring the maintenance of quality and safety throughout the post harvest chain Specific examples are given to illustrate the economic implications of investing in and applying proper post harvest technologies Criteria for the assessment of post harvest needs the selection of post harvest technologies appropriate to the situation and context and for extending appropriate levels of post harvest information are also discussed

Unveiling the Magic of Words: A Report on "Postharvest Handling And Safety Of Perishable Crops"

In some sort of defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their ability to kindle emotions, provoke contemplation, and ignite transformative change is truly awe-inspiring. Enter the realm of "**Postharvest Handling And Safety Of Perishable Crops**," a mesmerizing literary masterpiece penned by way of a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve in to the book is central themes, examine its distinctive writing style, and assess its profound effect on the souls of its readers.

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