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Director's Note

I find it so rewarding to work with fruits and vegetables! They are so important for human health, are key components of delicious foods and cultural traditions, and the produce industry is important to the economy of many parts of the world. Unfortunately, these valuable crops are also perishable and can contribute to high food losses!

If you have attended one of our workshops in the past, you surely remember learning about the importance of temperature management. Temperature has a profound effect on produce quality after harvest and post-harvest life. Each fruit and vegetable has an optimum temperature range for post-harvest storage and shipping that can reduce the rate of deterioration. Some products need temperatures close to the freezing point, while others prefer a warmer temperature (think mango). You can find specific recommendations for your crops of interest in our [Produce Fact Sheets](#). There are a range of methods that can be used to efficiently cool produce after harvest, with pros and cons for each. Check out our [Cooling Manual](#) for the details you need to know to select and efficiently use various cooling methods – a steal at \$15..

However, some products need to ripen further after harvest before they are ready to process or consume. Ripening requires much warmer temperatures applied in a uniform and controlled manner to achieve a precise level of ripening. You can learn everything you need to know about commercial ripening of fruit and fruit-vegetables (think tomatoes) by attending our [Fruit Ripening & Ethylene Management Workshop](#) in April. See you there.



*Interim Director,
Beth Mitcham*

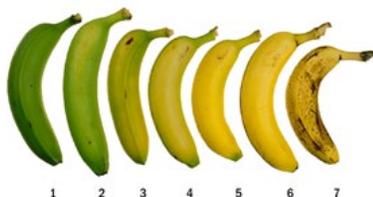


*Associate Director,
Irwin R. Donis-Gonzalez*

Beth and Irwin

Postharvest Education at UC Davis

BANANA RIPENESS CHART



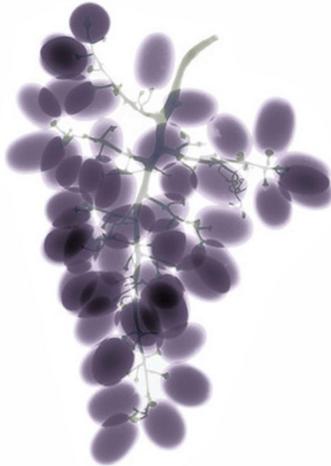
April 5-6, 2022

Fruit Ripening & Ethylene Management Workshop

This workshop is intended for shippers and fruit handlers (wholesale and retail), and produce managers who are involved in handling and ripening fruits and fruit-vegetables. The workshop focuses on how to increase profits by reducing losses at the receiving end, and delivering ready-to-eat, delicious fruits and fruit-

vegetables to the consumer. For more information, please visit our [website](#). We do offer discounts for students, residents of developing countries and students in developing countries. Please contact Pam Devine for a coupon code at pwdevine@ucdavis.edu if you believe you qualify for a discount. **This hybrid workshop will be offered in person on the UC Davis campus and virtually.**

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May 23-25, 2022

Emerging Technologies to Address Grand Challenges in the Produce Industry

The UC Postharvest Technology Center, and The Department of Biological & Agricultural Engineering, in collaboration with the World Food Center at UC Davis, are hosting a workshop as part of the UC Davis World Food Center's Aligning the Food System Workshop Series that will bring together academics, extension experts, and industry representatives to discuss and propose solutions to challenges (labor shortages, sustainability needs, consumer demands) facing the produce industry. The purpose is to identify critical needs to address these challenges, and lay out future directions in produce-handling technology.

The event will focus primarily on emerging technological solutions, and research and development activities that have the potential to revolutionize the way fresh produce is harvested, handled, stored, transported and distributed from farm to table. The aim is to create a produce supply chain that is prepared to ensure the integrity, safety and nutritional quality consumers desire in the modern age.

The workshop will be divided into several modules following a hybrid model, including keynote speeches, interactive activities and demonstrations. Selected research academics and industry representatives will highlight cutting-edge information on current produce trends, key challenges, and potential technological solutions. In addition, a round table discussion for each module will be moderated by an extension expert that will enable a dialogue with the selected experts, with the goal of conceptualizing technological solutions to identified challenges. For more information please visit our [website](#). **This hybrid workshop will be offered in person on the UC Davis campus as well as virtually, and at a discounted registration fee thanks to support from the UC Davis World Food Center!**

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June 13-17, 2022

Postharvest Technology of Horticultural Crops Short Course

The Postharvest Technology of Horticultural Crops Short Course is an intensive study of the biology and current technologies used for handling fruits, nuts, vegetables and ornamentals in California. Learn about the latest technologies used for handling fruits and vegetables after harvest, and the underlying biology principals.

The course is designed for produce handlers, quality control personnel, service companies, research and extension workers, and other professionals interested in current advances in produce handling, storage, transportation, safety and marketing. For more information, please visit our [website](#). We do offer discounts for students, residents of developing countries and students in developing countries. Please contact Pam Devine for a coupon code at

pwdevine@ucdavis.edu if you believe you qualify for a discount. **This hybrid workshop will be offered in person on the UC Davis campus and virtually.**

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Our Website & Social Media

New Publications on our Website

James F. Thompson, Michael S. Reid, Lucia Felix, Irwin Donis-Gonzalez, Bertha Mjawa, and Jane Ambuko 2017. [DryCard™ — A low-cost dryness indicator for dried products](#). *AIMS Agriculture and Food*, 2(4): 339-344 DOI: 10.3934/agrfood.2017.4.339

Mycotoxin contamination of dried foods is a significant health hazard in humid areas of the world and disrupts trade in many parts of the world. Fungal development can be halted if the water activity of dried products is kept below 0.65. This preliminary study evaluated the color response and response time of a low-cost humidity indicator that estimates water activity. Developed with support from the USAID-funded Horticulture Innovation Lab, the DryCard™ includes a strip of humidity indicator paper with a simple scale to interpret results. It has a consistent color response to relative humidity and its response time is fast enough to be used in practical situations for estimating water activity. The card can be reused many times. It is a crucial and inexpensive tool to assist producers and processors in ensuring their crops have been adequately dried and dry-stored. More information about the DryCard can be found on the Horticulture Innovation Lab [website](#), including where to purchase cards.

Lisa Kitinoja, and Diane M. Barrett 2015. [Extension of small-scale postharvest horticulture technologies - A model training and services center](#). *Agriculture* 2015, 5(3), 441-455

This older report describes a Postharvest Training and Services Center (PTSC) model of providing a mechanism to improve produce handling after harvest in emerging economies around the world. The report shares details about the program's success and sustainable introduction of improved postharvest practices. Development professionals working with horticultural crops should consider incorporating PTSCs their development projects.

Follow Us:



Postharvest Calendar

- March 3-5, 2022. [Southern Exposure](#), Southeast Produce Council, Orlando, FL
- March 17, 2022. [Trade in transition: Enhancing Trade Frameworks](#), Dubai, UAE. Offered Online and in-person.
- April 5-6, 2022. [Fruit Ripening & Ethylene Management Workshop](#), UC Postharvest Technology Center, Davis, CA. Offered in person and remotely.
- April 21-23, 2022 [Viva Fresh Expo](#), Texas International Produce Association, Grapevine, TX
- May 23-25, 2022. [Aligning the Food System - Emerging technologies to address grand challenges in the produce industry](#). UC Postharvest Technology Center. Davis, CA. Offered in person and remotely.
- May 29- June 2, 2022. [ISHS International Symposium on Postharvest Pathology](#), Cyprus University of Technology, Cyprus
- June 13-17, 2022. [Postharvest Technology of Horticultural Crops Short Course](#). UC Postharvest Technology Center, Davis, CA
- August 14-20, 2022. [International Horticulture Congress](#). Angers, France
- September 20-22, 2022. [Fresh-cut Workshop: Maintaining Quality & Safety](#), UC Postharvest Technology Center, Davis, CA
- October 25-27, 2022. [Fresh Summit](#), Produce Marketing Association, Orlando, FL
- November 11-15, 2024. [Postharvest 2024](#), ISHS International Postharvest Symposium, Rotorua, New Zealand

Ask the Produce Docs



Q. I am interested in how the current vent percentages that are seen in various fruit clamshell packages were derived. I understand the purpose of the venting but I am wondering if the percentages used by the various manufacturers are based upon data or were something that they put in because they considered it to be “enough”. Would you have any idea about this?

A. Yes, many studies have evaluated the ideal design and vent percentage. I typically use the rule of thumb that a clamshell/package needs to have around 5% of the total area vented, as this offers a happy medium between proper air distribution for initial (pre) cooling, ideal temperature management, and appropriate mechanical strength. New 3D computational flow dynamics modeling has offered alternative designs and allow us to visualize the appropriate air movement and pressure loss within different designs and packages.

I can continue to write about this, but instead I recommend that you read this linked article: [Design of Packaging Vents for Cooling Fresh Horticultural Produce](#). This article is a great source of information, and even though it seems as long answer to your question, it contains pertinent information.

The type of product is also important to define the type of package and vent area.

Irwin Donis-Gonzalez

Postharvest Questions. If you have a postharvest question you'd like answered, please send it to postharvest@ucdavis.edu, and we'll see if one of our specialists can help.

Archived Items. Link to a data store of all our previous “Ask the Produce Docs” questions, or link to [archived copies](#) of our e-newsletter as PDF documents.

Frequency of Distribution. This publication is produced regularly, or as special issues by the UC Postharvest Technology Center.

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Editorial Review. Beth Mitcham

Writing and Coordinating Publisher. Pam Devine, Beth Mitcham, Irwin Donis-Gonzalez

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Our answers to “Ask the Produce Docs” questions represent the best understanding of the current state of knowledge at the time of the latest update, and does not represent an exhaustive review of all research results. Answers are for guidance only, recommendations may vary from those listed because of, but not limited to, geographical differences, cultivar differences, maturity at harvest or ripeness, growing conditions, grade and quality at harvest, temperature management practices after harvest, and use of special treatments. The UC Postharvest Technology Center and individuals answering the questions are not responsible for any losses, injury to you, any other person or any property. Further, users agree to release the UC Postharvest Technology Center and individuals answering the questions from any and all claims and liability related to use of any content.



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