



February 2014

News from the UC Davis Postharvest Technology Center

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Director's Update

140+ Scholarship Applications!

We have received nearly triple the applications for the 2014 Postharvest Technology Short Course scholarship as we received in prior years. The scholarship committee will now review all applications for the individual who best fits the goals of this scholarship. The winner will be announced in the March 2014 issue of the e-newsletter. We would like to be able to award a higher percentage of the applicants. Please consider making a donation to support this [scholarship opportunity](#).



Exciting Times Ahead

I am happy to report that the Postharvest Technology Center will play a key role in offering the ISHS Third International Conference on Fresh-cut Produce: Maintaining Quality & Safety, scheduled for September 13-16, 2015, followed by an optional technical tour on September 17-18. The conference will be convened by Dr. Marita Cantwell on the UC Davis campus. Stay tuned for future announcements as the team puts together all the details for this exciting international conference!

--Beth Mitcham



Postharvest Education at UC Davis



20th Annual Fruit Ripening and Retail Handling Workshop will be held March 25-26, 2014

Enrollments are coming in quickly for the March 25-26, 2014 "Fruit Ripening & Retail Handling" workshop which will be held at the UC Davis Alumni Center and organized this year by Dr. Beth Mitcham. The enrollment fee for the workshop is \$795, and includes all instruction, demonstrations, course materials, coffee breaks, lunches and an evening network reception. Topics will include ripening facilities and equipment, temperature management, recommendations for ripening specific fruits, ethylene inhibition and control, tools to control ripening, and more. We hope that you will join us at this workshop! To learn more, or to enroll, we invite you to visit the [web page](#) or contact our Enrollment Coordinator, [Ms. Penny Stockdale](#).

36th Annual Postharvest Technology Short Course

Enrollments are also open for the June 16-27, 2014 Postharvest Technology Short Course. The course provides a one or two-week intensive study of the biology and current technologies used for handling fruits, vegetables and ornamentals in California. The first week will be held at the UC Davis Conference Center, and will include lectures and demonstrations on a broad spectrum of Postharvest Topics. The second (optional) week is a field tour visiting a variety of postharvest operations throughout California. The enrollment fee for the 1-week session is \$1975 and the enrollment fee for the 2-week session is \$2995 (plus additional required lodging fees). To learn more, we invite you to visit the [web page](#) or contact our Enrollment Coordinator, [Ms. Penny Stockdale](#).

Featured Postharvest Bookstore Item

25% Discount on Strawberry Resources

Through the end of March we are offering a 25% discount on our two Strawberry titles: [Handling Strawberries for Fresh Market](#) (regularly \$5.00), and the [Organic Strawberry Production Manual](#) (regularly \$30.00).

These in-depth resources include all the information you'll need for producing and handling strawberries, including helpful information about the postharvest handling of these delicate fruit.

We invite you to order a copy for your library today. U.S. addresses only, please use our [online store](#). International addresses, please use our printed [order form](#). Please use the code "Straw25" to receive the discount.



Postharvest Positions

Postharvest Technology Business Manager

A leading cold chain logistics group has the strategic objective of better understanding the needs of their "end customers" – shippers and growers of fresh produce. The group aims to develop new sources of revenue by launching products and services that apply postharvest technologies to increase perishable fruit/vegetable/food shelf life and extend transit times. The newly created Business Manager position reports to the Senior Product Manager and will be responsible for: applying postharvest expertise to identify new market opportunities in cold chain logistics and container refrigeration; regularly meeting with shipper/grower customers to understand their needs, analyzing customer inputs and insights and translating these into new product development opportunities; developing business plans and financial justification for these new products; tracking and monitoring competitor activities related to post harvest technologies and developing appropriate responses to competitive threats; presenting cold chain logistics products and services to growers and shippers of fresh produce. International travel is required, up to 30%.

Minimum qualifications include: Degree in Postharvest technology or related subjects, MBA would be a plus; 7 to 10 years of Postharvest experience required; experience demonstrating commercial or business acumen strongly preferred; demonstrated ability to work in a multi-functional team environment; highly motivated self starter with the ability to work remotely; solid communications and presentation skills; must be fluent in English and Spanish verbal and written. Portuguese desired; experience in managing customer relationships, providing thought leadership in the area of cold chain transportation logistics in the context of the customer's business.

Interested applicants please send your detailed resume and a cover letter in MS Word format with current and expected salary to recruithr168@gmail.com All applications will be treated with strictest confidence. We regret that only shortlisted candidates will be notified.

Postharvest Physiologist Position at UC Davis (*repeat announcement*)

UC Davis is recruiting a new Postharvest Physiologist at the Assistant to Associate level. We are especially looking for candidates who have experience with modern biology tools but also a strong foundation in postharvest biology and interest to research topics relevant to postharvest handling of horticultural crops. The successful candidate will establish a vigorous and dynamic research program as well as an innovative teaching program at both the undergraduate and graduate levels. The research will focus on postharvest biology of horticultural crops. It is expected that the research program will draw upon practical knowledge of postharvest processes and technology as well as upon related disciplines in genomics, plant pathogen interactions, biochemistry or plant developmental biology especially in areas such as senescence or fruit ripening. An intended outcome of these discoveries will be identification of processes or traits that can be manipulated to improve postharvest handling strategies and ultimately postharvest quality of fruits, vegetables or ornamentals. The position is a 9-month tenure track appointment. This position will include an appointment in the Agricultural Experiment Station, which includes the responsibility to conduct research and outreach relevant to the mission of the California Agricultural Experiment Station.

A Ph.D. in plant biology, horticulture, biochemistry, genetics or related discipline is required, with experience and documented interest in postharvest plant biology. International experience is desirable. Candidates should begin the application process by registering online at <http://recruitments.plantsciences.ucdavis.edu>. Please include statements of research goals for this position and teaching philosophy, *curriculum vitae*, publication list, copies of 3 of your most important research publications, copies of undergraduate and graduate transcripts (if within 5 years of either degree), and the names, e-mail addresses, and telephone numbers of at least five professional references. For technical or administrative questions regarding the application process please email kgeer@ucdavis.edu. Review of the applications will begin April 1, 2014. The position will remain open until filled.

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Postharvest Giving



Thanks to Our Contributors!

We extend our sincere appreciation to the following individuals who have recently contributed to the Postharvest Technology Center:

- Matthew J. Doppke
- Min Chi Hsu

See a complete listing of our [contributors](#), or make an [online gift](#) to the Postharvest Technology Center as an individual or on behalf of your company. All contributions are tax deductible within the U.S.

Postharvest Specialists' Updates & Other News

Dr. Marita Cantwell invited to lecture at Wageningen

Dr. Marita Cantwell has been invited to participate as a lecturer at the October 14-17, 2014 [Postharvest Course](#) at Wageningen UR. This course will give an in-depth overview of the issues surrounding postharvest handling of fresh produce.

ISHS Board visits UC Davis

UC Davis hosted the International Society for Horticultural Sciences Board on campus February 7. The group learned more about campus programs in the Horticulture Innovation Lab (horticulture for development), Postharvest Technology Center, and Fruit and Nut Research and Information Center, and toured the new winery and brewery at the Robert Mondavi Institute on campus.

Dr. Adel A. Kader made Fellow of the ISHS

On behalf of Commission Quality and Postharvest Horticulture (CMPH) Prof. Dr. Adel A. Kader (member of CMPH) has been awarded an ISHS Fellow (Posthumous) by the ISHS Council. Fellow of the ISHS is awarded to ISHS members for high meritorious achievement in horticultural science.

2013 Dr. Adel A. Kader Award for Young Scientists

At the June 2013 International Controlled & Modified Atmosphere Research Conference, held in Trani, Italy, Chairat Burana from Thailand but studying at Tokyo University of Agriculture and Technology, and Francisca A. Ansah from University of Ghana, were selected to receive the Dr. Adel A. Kader Award for Young Scientists. The award was created in memory of Dr. Kader's longstanding and sincerely held belief that students should be encouraged and given the means to attend scientific meetings as a way of inspiring them in their developing careers. *(Contributed by Giancarlo Colleli, University of Foggia)*

Citrus Postharvest Pest Control Meeting in Oxnard

Dr. Mary Lu Arpaia is organizing the 2014 Citrus Postharvest Pest Control Meeting, which will be held in Oxnard, California on April 1-2, 2014. This 1-½ day meeting focuses on postharvest pest control treatments with an emphasis on disease management and resistance management. Although citrus is emphasized, there are normally several talks on other fruit crops as well. For more information visit the [webpage](#). Points toward the Produce Professional Certificate Program may be earned from this meeting.

Irving Eaks, Avocado and Citrus Champion

Irving Leslie Eaks passed away February 1, 2014, at the age of 90 years. He was Plant Physiologist and Lecturer Emeritus in the Department of Biochemistry.

Dr. Eaks was born on May 24, 1923, and spent his childhood on a farm in Delta, Colorado, with his parents, Elvis Augustus Eaks and Irene Clara Springer Eaks. He raised crops and livestock, hunted for meat, and drove the horses for the hay wagon.

During World War II, Irv was a sergeant serving under General Patton. He witnessed the liberation of the last prisoners from Dachau. Under the G.I. Bill he was awarded scholarships to attend Colorado A & M (now Colorado State) University. There he met Catherine Delp in Biology class.

In 1948, Irv and Cathy were married and moved to California, where he earned his M.S. in 1950 and Ph.D. in 1953, both in Plant Physiology, from UC Davis. His work under Leonard Morris on chilling injury development in harvested cucumbers led to Irv being offered a position in postharvest physiology at the Citrus Experiment Station as a Junior Plant Physiologist in 1952. He rose to Plant Physiologist and Lecturer (the equivalent of full professor) in 10 years. He retired in 1991 and was awarded emeritus status in 1994.

Dr. Eaks made significant contributions, both to the basic understanding of factors influencing the postharvest physiology of citrus and avocado fruit and to the practical problems of fruit handling. With citrus he elucidated the factors involved in chilling injury development and used this information to develop good handling recommendations for the state's citrus crop. He was one of the first researchers to examine citrus off-flavor development and developed a simple dye test for looking at peel injury, a test still used by packinghouses today worldwide. Irv also contributed to our knowledge of postharvest physiology and handling of avocados. As he had with citrus, he studied chilling injury development as well as the response of the fruit to ethylene. His work on ethylene and avocado formed the basis of the "ripe" revolution that occurred in the 1980s, once Irv provided the basic guidelines for successful avocado ripening. Ethylene ripening of avocado contributed to the exponential increase in US avocado consumption. He was known as a careful, meticulous researcher whose data could be relied on. He taught doctoral students from wherever citrus or avocados could be grown and traveled extensively as lecturer, consultant, and expert witness.

Dr. Eaks is survived by his children, Joanne Eaks Wilson, Gerald Edward Eaks, and Jeanette Eaks. He was preceded in death by his wife of 64 years, Catherine Delp Eaks. *(Contributed by Mary Lu Arpaia)*

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What's New on Our Website

Recently Translated into French

Produce Facts: Recommendations for Maintaining Postharvest Quality of [Paw Paw](#), and [Chile Pepper \(Piment\)](#) were recently translated into French, with thanks to Gabrielle Turcotte and Florence Zakharov.

New this month in the "Postharvest Publications Organized by Topic" Library

This extensive [free postharvest resource library](#) currently offers more than 1,900 articles on a wide variety of topics.

Avocado

Liu, X., J. Sievert, M.L. Arpaia, M.A. Madore, [Postulated physiological roles of the seven-carbon sugars, mannoheptulose, and perseitol in avocado](#). *Journal of the American Society of Horticultural Science* 127 (2002) 108-114.

Cherry

Feng, X., J.D. Hansen, B. Biasi, J. Tang, E.J. Mitcham, [Use of hot water treatment to control codling moths in harvested California 'Bing' sweet cherries](#). *Postharvest Biology and Technology* 31 (2004) 41-49.

Clayton, M., W.V. Biasi, I.T. Agar, S.M. Southwick, E.J. Mitcham, [Sensory quality of 'Bing' sweet cherries following preharvest treatment with hydrogen cyanamide, calcium ammonium nitrate, or gibberellic acid](#). *HortScience* 41 (2006) 745-748.

Food Safety

Danyluk, M.D., M. Nozawa-Inoue, K.R. Hristova, K.M. Scow, B. Lampinen, and L.J. Harris, [Survival and growth of Salmonella Enteritidis PT 30 in almond orchard soils](#). *Journal of Applied Microbiology*. 104 (2008) 1391-1399.

Moyne, A.L., M.R. Sudarshana, T. Blessington, S.T. Koike, M.D. Cahn, L.J. Harris, [Fate of Escherichia coli O157:H7 in field-inoculated lettuce](#). Food Microbiology 28 (2011) 1417-1425.

Melons

Morales-Hernández, L., A.M. Hernández-Anguiano, C. Cháidez-Quiroz, G. Rendón-Sánchez, T.V. Suslow, [Detection of Salmonella spp. on cantaloupe melon production units and packaging facility](#). Agricultura Técnica en México 35 (2009) 135-145.

Selma, M.V., A.M. Ibáñez, M. Cantwell, T. Suslow, [Reduction by gaseous ozone of Salmonella and microbial flora associated with fresh-cut cantaloupe](#). Food Microbiology 25 (2008) 558-565.

Ornamental Crops

Doi, M., M.S. Reid, [Postharvest characteristics of cut Camellia japonica L. 'Kumasaka'](#), Postharvest Biology and Technology 7 (1996) 331-340.

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Postharvest Calendar

- March 25-26, 2014. [20th Annual Fruit Ripening & Retail Handling Workshop](#). UC Davis campus
- March 25-26, 2014. [Opportunities in Phytosanitary Irradiation for Fresh Produce Workshop](#). Chapman University, Orange, CA
- April 1-2, 2014. [Citrus Postharvest Pest Control Meeting](#). Oxnard, CA
- April 26-30, 2014. [Global Cold Chain Alliance Convention & Expo](#). San Diego, CA
- May 5-6, 2014. [Juice Processing Course](#). UC Davis Campus
- May 26-29, 2014. [The International Food Congress: Novel Approaches in Food Industry](#). Kusadasi, Turkey
- June 10-13, 2014. [V International Conference Postharvest Unlimited](#). Lemesos, Cyprus
- June 16-27, 2014. [36th Postharvest Technology Short Course](#). UC Davis
- August 17-22, 2014. [XXIX International Horticultural Congress](#). Brisbane, Australia
- August 25-29, 2014. [Small-Scale Postharvest Horticultural Technologies Short Course & Study Tour](#). Bali, Indonesia
- September 16-18, 2014. [19th Fresh-cut Products: Maintaining Quality & Safety](#). UC Davis campus
- October 14-17, 2014. [Postharvest Technology Course](#). Wageningen, The Netherlands
- November 4-6, 2014. [2nd Annual Produce Safety Workshop](#). UC Davis campus

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Ask the Produce Docs

Q. We are in the process of setting up a food coop and have been gathering information about produce handling procedures. It seems to be common practice among a couple coops we have visited to immerse newly delivered leafy greens in lukewarm water. This is done, I presume, to firm up the texture of potentially wilted produce and to lengthen shelf life. I have a couple questions about this:

1) If the product is going straight to the display cooler and not into a walk-in cooler, is this still advisable, given that the immersion warms up the product?

2) Is immersion still a good idea if the product has been kept well chilled and shows no wilting? Mostly my concern here is about the potential risk of contamination from additional handling.

Any advice you could give me would be greatly appreciated. Your website has been immensely useful over the last year, but I could not find information on this specific question. (M.D.)

A. Probably there is no single answer, since there are always details in a particular handling system that could make a difference. It is true that leafy products absorb warm water more rapidly than cold water, but the difference due to temperature is not large. Most leafy products will absorb cold water easily and therein lies the concern with



hydrocooling and sanitation. I would harvest and handle the product so that the water immersion step is not needed. Pay attention to protecting it from water loss in the field (where water loss rate is high). Harvest in the morning when cooler and protect product from direct sun and air movement. Use a paper or plastic cover to the crate or carton or use a thin plastic liner in the carton box. Also reduce the time from harvest to moving to product into a cold room—reduce all delays to cool.

With those general comments, here are my answers to your questions:

1) *If the product is going straight to the display cooler and not into a walk-in cooler, is this still advisable, given that the immersion warms up the product?*

I am assuming the lettuce is displayed as single heads and that its temperature is 50-70F (10-68C) range after water immersion (I would use cold rather than warm water). Then it likely will cool to the temperature of the display cooler fairly quickly; the cooler should be managed so there is rapid turnover and in your case I would guess you do not need long shelf-life. So even if the lettuce did not cool down to ideal temperature (below 41F), shelf-life and quality would still be adequate.

2) *Is immersion still a good idea if the product has been kept well chilled and shows no wilting? Mostly my concern here is about the potential risk of contamination from additional handling.*

In this case there is no need or advantage to freshen the product with a water immersion and I agree about increasing the contamination risk. We manage using the principle of “cold and dry” to minimize bacterial growth on leafy greens and others.

Frankly many consumers do not like water on their leafy greens although misting systems are used in some supermarkets. The water often leads to more rapid browning and decay (depend on temperature and lettuce quality).

In summary I would suggest focusing on minimizing water loss during postharvest handling and not immersing the heads. If you find that is not possible without significant quality loss and dehydration, then yes pay attention to the water sanitation. Frequent changes of water will help but if doing a batch system you would want to include a disinfectant. Check out some of the sanitation related publications by Trevor Suslow at <http://ucfoodsafety.ucdavis.edu/>.

--[Marita Cantwell](#)

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End Notes and Disclaimers

Postharvest Questions. If you have a perplexing 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 monthly e-newsletter as PDF documents.

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