



NEWS AND INFORMATION

December 2016

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Director's Update



Karan Khurana
1962 - 2016

Postharvest Community Loses Another Champion

Earlier this year we unexpectedly and prematurely lost a Postharvest Champion, colleague, and friend in the passing of Dr. Karan Khurana, Founder and CEO of Pulse Instruments and AquaPulse Systems. Karan was a great supporter to our postharvest wash water research and extension programs. He was an invited instructor for many years in our annual Fresh-Cut Products: Maintaining Quality & Safety workshop. His contributions to the applied and practical instructional program were sorely missed this past September during this year's workshop. He was also a valuable resource on technical issues surrounding postharvest wash water management systems and served on numerous industry association panels and Center for Produce Safety special issues workgroups.

I felt it timely to highlight his contributions as we move into a new phase of updating a number of highly downloaded extension publications on postharvest wash water management. Most of these materials benefit from my personal collaborative applied research work with Karan and his team and I regularly share this information in shortcourses and produce industry trainings related to the Food Safety Modernization Act final rules. Preparing for compliance under the Produce Rule, Preventive Controls Rule and their related provisions under the Foreign Supplier Verification Program have and will continue to be supported by the work and technical services developed under Karan's leadership and business development skills.

The outcome of a great amount of work in one of the last collaborative projects Karan dedicated his time to will be published in the Journal of Food Protection (likely the February 2017 issue) entitled **Guidelines to validate control of cross-contamination during washing of fresh-cut leafy vegetables** with co-authors D. Gombas, Y. Luo, J. Brennan, G. Shergill, R. Petran, R. Walsh, H. Hau, K. Khurana, B. Zomorodi, J. Rosen, R. Varley and K. Deng. With the patient and dedicated leadership of Mary Lou Tortorello, Ph.D. Chief, Food Technology Branch Division of Food Processing Science and Technology U.S. Food and Drug Administration, many of us contributed to the multi-year development of this manuscript but the listed authors, including Karan, comprised the instrumental group in finalizing this document through its many turbulent iterations.

This peer-reviewed special interest paper will be available as [open-access in JFP](#) and will include the following key topics;

- **Factors to Consider in Selecting Antimicrobial Chemicals**
- **Regulatory Overview for Antimicrobial Chemicals Used in the Produce Industry**
- **Understanding Cross-Contamination**
- **Factors Affecting Antimicrobial Efficacy**
- **Process validation for Preventive Controls**
- **Fixed and Variable Conditions for Validation of Antimicrobial Washes for Leafy Greens**
- **Validation Options**
- **Monitoring and Verification of Process Controls**
- **Profiles of Chlorine and Peroxyacetic Acid**
- **...and more**

We gratefully acknowledge the time we had with Karan and know that his contributions to knowledge and practical arts in postharvest technology and produce management will stand as his legacy for decades to come.

Continuing to Celebrate the 50 Year Anniversary of the Mann Lab



We had such a positive reaction to the sweet corn article in the November E-News, we decided we could amuse you with a 40-cent Market Research Report produced by the U.S. Department of Agriculture from sometime in the early 1970s.

[An Illustrated Guide to the Identification of Some Market Disorders of Head Lettuce](#) publication was created to help identify various disorders of lettuce, with illustrations and an appendix that lists source material and addresses of Federal and State agencies at the time.

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Please Give to the Postharvest Endowment



[It feels good to give.](#) We give information to anyone who visits our website. The Center receives minimal institutional support and operates predominantly on extension programming, external funding and private contributions. So a big thanks to all the contributors to our Endowment! To date, we have been able to continue offering and improving the valuable resources found at our website. Our endowment fund was established in 1989 as a main renewable revenue source to support extension and applied research activities related to fresh produce. There are three main funds associated with the endowment:

- **[Postharvest Student Support.](#)** Your gift provides access to students who would not otherwise afford to attend UC Davis, and also contribute to their professional development.

- **Postharvest Program Endowment.** These funds are the main support for the maintenance and improvement of the center website that is accessed by almost 30,000 users a month from all reaches of the world.
- **Postharvest Technology Center.** Giving to this fund will strategically support the highest priority activities. Our current priority is to leverage these funds for preliminary research to be used in application to federal and foundation grant programs and to expand our resources for distance-learning and global outreach.

Thank you in advance for your tax-deductible donation! Your support is greatly appreciated and will be used to help us carry on the mission of reducing postharvest losses and improving the quality and safety of produce around the world. You can [donate online here](#) or call the Postharvest Technology Center at 530-752-6941 to talk to us in person.

Postharvest Education at UC Davis



Looking to the Future: April Fruit Ripening Workshop, June Postharvest Technology of Horticultural Crops Short Course and September Fresh-cut Workshop

We are looking forward to our next years' workshops and short courses. By the time the next e-newsletter comes to your inbox we should have the Fruit Ripening Workshop open for enrollments.

To learn more about the courses, including topics and modules, please see the [website](#). If you have questions about registration or want to be notified when a course registration opens, contact our registration coordinator, Penny Stockdale at pastockdale@ucdavis.edu or 530-752-7672.

Featured Postharvest Bookstore Item



Receive 20% off this month's featured publication: Fresh-cut Products: Maintaining Quality & Safety Binder

Through the end of December, we're offering a 20% discount on the [Fresh-cut Products: Maintaining Quality & Safety publication](#). This large binder contains presentations from the actual workshop, three separately bound publications, and the flash drive containing dozens of supplementary documents is a valuable addition to your library. To order a copy, please use our [online order form](#) and note "FCB20" to receive your discount.

For a complete listing of all our publications see our [bookstore](#).

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Postharvest Specialists' Updates & Other News



Christine Bruhn Attends Codex Committee on Food Hygiene

Christine Bruhn was the keynote speaker at the 48th session of the Codex Committee on Food Hygiene in Los Angeles. Addressing delegates from around the world, her presentation, "Safe Food For Consumers," identified common food handling errors and stressed actions that Codex could take to advance food safety through policy and education.

Carlos Crisosto Travels to Mexico for Mango Round Panel

This month took Carlos to Mexico where he participated in a round panel discussion about "The future of Mango Industry in Mexico: Present and Future" in the EMEX (Exports Mexico) 2016. This event took place in Puerto Vallarta on November 10, 2016 and the panel was conducted by Manuel Michel Executive Director NMB, USA.

Trevor Suslow Splitting Time Amongst PTC and FSMA Trainings

Trevor continues to provide extension, outreach, and training for both the Postharvest Technology Center and FSMA Alliance grower trainings and Train the Trainer workshops. Two sessions were contributed at the 36th Annual Food Safety and Sanitation Workshop in Portland, OR organized by Washington State University Extension and attended by over 500 owners, managers, supervisors, line-workers, educators, technical service companies and consultants, and public health agency representatives. An abbreviated PDF version of the combined talks entitled **Listeria monocytogenes: Brief Background and Testing Methods** and **L. monocytogenes Testing: Lessons Learned from packing house EMPs** are available [here](#).

Trevor served as co-instructor at two Produce Safety Alliance Train the Trainer sessions conducted during November in Irvine, CA and in Salinas, CA hosted by Western Growers Association and Hartnell College. The Produce Safety Rule, which is now in effect, establishes science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption. This rule requires that at least one supervisor or responsible party for each farm must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the FDA. The Produce Safety Alliance (PSA) has developed this "standardized curriculum" recognized by the FDA through a nationwide collaboration including produce growers, extension educators, researchers, produce industry representatives, and government personnel. The PSA Train-the-Trainer courses enable participants to become a PSA trainer or PSA Lead Trainer who are able to train fresh produce growers to meet the regulatory requirements in the FDA's Produce Safety rule. Among the trainees, now holding PSA trainer certificates were UCD's Linda Harris, Erin DiCaprio, Alda Pires, and Adrian Sbodio. Marita Cantwell couldn't make these events but did complete the PSA training session recently in Portland. So look for announcements of future PSA Grower trainings for CA (and elsewhere) in English and Spanish at the PTC website.

Catching breath for just a minute... the November activities continued with a special session on Postharvest Quality and Safety and Overview of FSMA regulations for a visiting delegation of twenty government inspection and public health officials from Liaoning Province in China. Joining Trevor to interact with the group were Dr. Kaiping Deng, Research Assistant Professor, IIT and Institute for Food Safety and Health, who presented an overview of the FSMA rules and structure, and Keith Refsnider, Director of Global Food Safety Driscoll's, who shared his experiences in building quality and safety programs in China.



Liaoning Delegation in Davis

Kaiping (Co-Lead of the Sprout Safety Alliance), Adrian Sbodio, and Maha Hajmeer (CA Department of Public Health, Food and Drug Branch) joined Lead Instructor, Trevor, in offering the 2.5 day Sprout Safety Alliance Sprouter Training & Certificate Course. The 12 module training was well received and information about future Train the Trainer and Sprouter trainings can be found at <https://www.ifsh.iit.edu/ssa>.



Adrian Sbodio presenting Sprout Seed Treatments



Angelos Deltisidis Returns to Thailand and Bangladesh

The primary purpose of Angelos' trip was to check the status of the construction that has been ongoing since 2015 for the USAID associate award, led by the Nutrition Innovation Lab at Tufts University as "Bangladesh Aquaculture-Horticulture for Nutrition Collaborative Research Program". Angelos works part time for the Postharvest Technology Center and part time for the Horticulture Innovation Lab which is a subawardee of the project, and is working towards implementing three innovative technologies in the region, namely the CoolBot cool room, the UC Davis Chimney Dryer and Floating Gardens.



Coolbot Cool Room

Among many other activities during his trip, Angelos discussed issues that there have been facing with the CoolBot cool room installations and ways to solve them. He was given a tour at the center where he saw the technologies being implemented



Chimney Dryer

Angelos also visited communities where the UC Davis Chimney Dryer technology has

been implemented and did a refresher training while ensuring that the dryer is in good condition after the long rainy season.

He also spent time touring the floating gardens experimental sites and discussing ideas of different sizes and designs for the floating gardens which include an iron-reinforced base and a trellis.



Floating Gardens

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Resource Spotlight



Postharvest Tomato Health—A webcast

Our friends at the Plant Management Network, who partner with over 80 universities, non-profits and agribusinesses and is a nonprofit publisher, have shared a link to a webcast that many of you might find useful.



Improve Post-Harvest Tomato Health and Handling Practices with New Webcast

Many health issues can develop after tomatoes are harvested from the field, caused either by pathogens, physical injury, environmental extremes, or a combination of these factors.

The Plant Management Network (PMN) has released a new presentation entitled "[Maintaining Tomato Health After Harvest](#)" to help professionals avoid common problems that reduce the quality and marketability of field-grown tomatoes.

The webcast, developed by Jerry A. Bartz, Associate Professor and Postharvest Pathologist at the University of Florida, provides advice on how to:

- Minimize damage due to rain, cold and other extremes
- Properly pick, cull, store and transport ripening tomatoes
- Maintain sanitary conditions from harvest to consumer

The 19-minute presentation will remain open access in the [Focus on Tomato](#) webcast resource. The Plant Management Network is a nonprofit publisher of applied, science-based resources that help enhance the health, management, and production of agricultural and horticultural crops. Partnering with over 80 universities, nonprofits, and agribusinesses, PMN provides materials covering a wide range of crops and contemporary issues through the online [PMN Education Center](#).

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On Our Website

Stay up-to-date with the Postharvest Technology Center by joining our [LinkedIn Group](#)



New Publications on our Website

Clara Pons, Cristina Martí, Javier Forment, Carlos H. Crisosto, Abhaya M. Dandekar, Antonio Granell (2015). [A genetic genomics-expression approach reveals components of the molecular mechanisms beyond the cell wall that underlie peach fruit woolliness due to cold storage](#). *Plant Mol Biol* DOI 10.1007/s11103-016-0526-z.

Jonathan Fresnedo-Ramírez, Marco C. A. M. Bink, Eric van de Weg, Thomas R. Famula, Carlos H. Crisosto, Terrence J. Frett, Ksenija Gasic, Cameron P. Peace, Thomas M. Gradziel (2015). [QTL mapping of pomological traits in peach and related species breeding germplasm](#). *Mol Breeding* (2015) 35:166 DOI 10.1007/s11032-015-0357-7.

Giuseppe Ferrara, Andrea Mazzeo, Carmela Pacucci, Angela Maria Stella Matarrese, Annalisa Tarantino, Carlos Crisosto, Ornella Incerti, Ilaria Marcotuli, Domenica Nigro, Antonio Blanco, Agata Gadaleta (2016). [Characterization of edible fig germplasm from Puglia, southeastern Italy: Is the distinction of three fig types \(Smyrna, San Pedro and Common\) still valid?](#) *Scientia Horticulturae* 205 (2016) 52-58.

Postharvest Positions

Monrovia Summer 2017 Internships

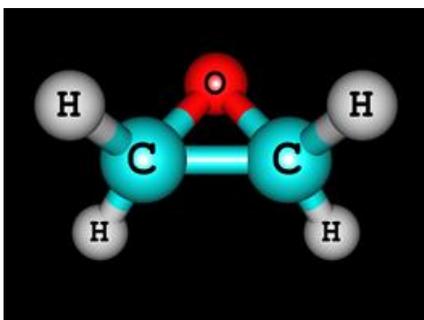
Monrovia is offering paid summer internships for 9 weeks beginning in June and ending in August at four different nurseries around the country. These internships are available in Sales, Operations, Marketing and I.T., and vary by location. Find out everything you need to know at monrovia.com/internship. If you'd like to contact someone about these internships, please email Claudia Santana at csantana@monrovia.com or call her at (626-513-0230).

Postharvest Calendar

- February 7, 2017. [FRUTIC Symposium](#). Berlin Germany
- February 8-10, 2017. [Fruit Logistica](#). Berlin, Germany
- April 18-19, 2017. [Fruit Ripening & Ethylene Management](#). UC Davis Campus
- July 2-6, 2017. [IX International Peach Symposium](#). București, Romania.
- July 18-20, 2017. [IX Congreso Iberoamericano de Tecnología Postcosecha y Agroexportaciones](#). UC Davis campus
- October 17-20, 2017. [International Postharvest Unlimited Conference \(ISHS\)](#). Madrid, Spain

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Ask the Produce Docs



Q. Our team has been utilizing UC Davis' expertise in the cold storage of perishables and other commodities for the past several years and we have been very successful in implementing what we have learned in our own 50,000 SF (and growing) cold storage facility. We import fresh fruit and vegetables via the regional port and we pride ourselves on keeping the cold-chain of the product intact throughout the inbound / outbound process.

With the wide range of commodities that we are handling, ethylene outputs from the product have become an area of concern for us. We have recently purchased two high quality ethylene scrubbers, and have implemented them in the facility. However, we do not currently have a method of identifying the PPM of ethylene in the cold storage air.

Given your expertise, would you have any idea of a monitor or mobile monitoring device that exists to check ethylene levels? I have been searching for over a week now to no avail. Thanks for the assistance, and I truly appreciate the work you all do for the community. (C.G.)

A. Measuring ethylene contamination in storage areas remains a difficult task because the active levels of ethylene are so low (50 parts of ethylene in a billion parts of air, or even less). Several promising new developments for ultra-sensitive measurement using nano-technology have been reported in recent years, but none has yet come to the market place. Measurement at these low levels still requires expensive instrumentation, usually a gas chromatograph (\$20,000). Photoacoustic ethylene detection is extremely sensitive and reliable, but the equipment is even more expensive (\$40,000). Our recommendations for preventing the effects of ethylene in mixed storage are:

1. Maintain tight control of storage temperatures
2. Store ethylene-producing and ethylene sensitive products in different areas if at all possible
3. Ventilate each storage area with fresh air, drawn in from above the building, with a minimum flow of 1 air exchange per hour.

--Michael Reid

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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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