



June 2012

## News from the UC Davis Postharvest Technology Center

### Director's Update



#### Short Course a Success

The last half of June has been extremely busy, but very rewarding, with the 34<sup>th</sup> Postharvest Technology Short Course in full swing as this is written. With a sold-out crowd of 92 participants from 25 countries, plus 55 lectures and labs taught by 20 instructors, and 21 postharvest operations visited on the field tour, it truly is a huge undertaking.

Feedback from the participants was very positive, including comments such as, "All topics covered were very informational. A lot of innovative ideas were presented, some of which I will use to the advantage of my company." "Attendees were very intelligent and I made a lot of valuable business connections and contacts that not only enriched the overall experience of the short course but will help with changes I hope to implement as a result of the information presented."

Every year I am impressed anew by the impact this course has on both the participants and the instructors. It takes a large body of scientific research and starting with basic principles, each topic is systematically covered, and then each of those building blocks are directly applied toward technology- or commodity-specific applications. There's so much interaction between the instructors and participants, and it's really a great educational opportunity for everyone. We hope those who weren't able to enroll in the course this year will consider joining us next year.

— [Beth Mitcham](#)

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### Postharvest Workshops @ UC Davis



#### September's Fresh-cut Products Workshop Filling Up Quickly

Dr. Marita Cantwell is the course organizer for the September 18-20, 2012 "Fresh-cut Products: Maintaining Quality & Safety Workshop" to be held on the UC Davis Campus. Participants will gain a working knowledge of established and new procedures for the fresh-cut product category through topic-related sessions and demonstrations.

The 2012 workshop will feature discussions on microbial food safety and the effects of temperature and modified atmospheres, and the sensory quality of fresh-cut fruit and vegetable products. The registration fee of \$1,150 for this 3-day workshop includes all instruction and instructional materials, lunches, and morning and afternoon breaks. For more information or to register online see the [web page](#), or contact [Ms. Penny Stockdale](#), Registration Coordinator.

#### November 5-6: Suslow Offers UCGAPs Practical Skill Building for On-Farm Risk Assessments Workshop

Dr. Trevor Suslow will be presenting a one-day workshop on November 5th that will provide entry-level information for those businesses beginning to respond to the need to have a food safety management plan that addresses key risks and controls that prevent contamination.

Growers, shippers, brokers, farm supervisors, and packinghouse managers will benefit from the development and improvement of skills in hazard identification and risk-based corrective actions that are essential to designing and implementing an on-farm safety plan.

There will also be a half-day optional "build your own on-farm food safety manual" session on November 6th. For more information or to register, visit the workshop's [web page](#), or contact [Ms. Penny Stockdale](#), Registration Coordinator.



## Specialists' Outreach Activities



### Bruhn slated to be honored by the International Association for Food Protection

At their July Annual meeting the International Association for Food Protection will recognize Christine Bruhn as a Fellow of the association in recognition of her research and educational leadership in food protection and food safety communications. Her distinguished career includes service to IAFP and the state affiliates organizations for over 25 years. She is being recognized for communicating science-based information to advance food protection with food professionals and the public.

Christine Bruhn was the first recipient of IAFP's Developing Scientist Research Award in 1986 and the Elmer Marth Educator's Award in 2005. Through her numerous publications and presentations, Dr. Bruhn is well known and recognized worldwide. As an expert in consumer attitudes and perceptions, she has served as an advisor to many national and international organizations and agencies on food safety and communication. Christine Bruhn recently served on the US Food and Drug Administration Risk Communication Advisory Committee and the US FDA Center for Food Safety and Applied Nutrition Research Review Subcommittee. Christine has previously been elected Fellow in two other professional associations also in recognition of her food safety educational and research in consumer attitudes and behavior.

### Kader honored by Malaysia for his Postharvest Efforts

On June 25, the Deputy Prime Minister of Malaysia, Tan Sri Muhyiddin Yassin, presented an award for Excellent Contribution to Global Postharvest Horticulture to University of California, Davis Professor Emeritus Dr. Adel Kader. The award was presented at the 7<sup>th</sup> International Postharvest Symposium at the Putra World Trade Centre in Kuala Lumpur. This was a very well-attended event, with more than 600 people in attendance. Recently, the Malaysian government has targeted a 40 percent increase in agricultural productivity by 2020, and one of the key components of this goal is to significantly decrease their current 30-40 percent rate of postharvest losses.



For much of his career, Dr. Kader has focused on reducing horticultural postharvest losses worldwide through improved postharvest handling practices. Dr. Kader responded to this award saying, "I am honored by the recognition that I received from the International Society for Horticultural Science and the Malaysian Agricultural Research and Development Institute during the opening ceremony (25 June, 2012) of the 7th International Postharvest Symposium held in Kuala Lumpur, Malaysia."

### Dr. Barrett Invited Speaker in Turkey

Dr. Diane Barrett was an invited speaker at the international conference on Advanced Nonthermal Processing for Food Technology in Kusadasi, Turkey, from May 7-11, 2012. The conference featured speakers from numerous Turkish universities, some of them UC Davis graduates.

## Featured Postharvest Publication



### 25% Discount Offered on Fresh-cut Products: Maintaining Quality & Safety

We are offering a special 25% discount on our 2011 Fresh-cut Products: Maintaining Quality & Safety publication. This great resource consists of a binder, a portfolio with three separately-bound publications, and a flash drive containing hundreds of documents with all the latest information about fresh-cut produce. The regular price is \$175, but this month we're offering it for the discounted price of \$131.25! U.S. and Canada shipping addresses may order using our [online shopping site](#). Other addresses please use our [printable order form](#), and note "25%FC".

## Postharvest Endowment Fund

We are grateful for the recent generous contribution to the Postharvest Program Endowment Fund from:

**Gloria Lopez Galvez**

Interest from the endowment is used to support the continued development, maintenance and free access to the center's web site which is used to effectively communicate postharvest resources worldwide.

## What's New on Our Website

### New Additions to Postharvest Publications Organized by Topic Library

*This library currently contains more than 1,400 postharvest documents, organized by topic. It is searchable by title or author, and is one of the premiere sources of postharvest information.*

*Note: Many thanks to Dr. Mikal E. Saltveit who provided us with copies of many of his papers for this library resource. This month we include the remainder of the articles he sent us.*

#### Avocado

Obenland, David, Sue Collin, James Sievert, Fayek Negm, Mary Lu Arpaia. [Influence of maturity and ripening on aroma volatiles and flavor in 'Hass' avocado](#). Postharvest Biology and Technology 71 (2012) 41-50

#### Chilling Injury

Lin, W.C., and M.E. Saltveit. [Oxidative stress and chilling injury of mungbean seedlings](#). Acta Hort. 682 (2005) 1293-1296

Mangrich, Mary E., Rafael T. Martinez-Font, and Mikal E. Saltveit. [Radicle length and osmotic stress affect the chilling sensitivity of cucumber radicles](#). Crop Sci. 46 (2006) 398-403

Kang, Ho-Min, Kuen-Woo Park, and Mikal E. Saltveit. [Chilling tolerance of cucumber \(\*Cucumis sativus\*\) seedling radicles is affected by radicle length, seedling vigor, and induced osmotic- and heat-shock proteins](#). Physiologia Plantarum 124 (2005) 485-492

Saltveit, Mikal E., and Peter K. Kepler. [Effect of heat shock on the chilling sensitivity of trichomes and petioles of African violet \(\*Saintpaulia ionantha\*\)](#). Physiologia Plantarum 121 (2004) 35-43

Kang, Ho-Min, and Mikal E. Saltveit. [Reduced chilling tolerance in elongating cucumber seedling radicles is related to their reduced antioxidant enzyme and DPPH-radical scavenging activity](#). Physiologia Plantarum 114 (2002) 244-250

Kang, H.-M., and M.E. Saltveit. [Effect of chilling on antioxidant enzymes and DPPH-radical scavenging activity of high- and low-vigour cucumber seedling radicles](#). Plant, Cell and Environment 25 (2002) 1233-1238

Saltveit, Mikal E. [Heat shocks increase the chilling tolerance of rice \(\*Oryza sativa\*\) seedling radicles](#). J. Agric. Food Chem. 50 (2002) 3232-3235

Kang, Ho-Min, and Mikal E. Saltveit. [Chilling tolerance of maize, cucumber and rice seedling leaves and roots are differentially affected by salicylic acid](#). Physiologia Plantarum 115 (2002) 571-576

Kang, Hi-Min, and Mikal E. Saltveit. [Antioxidant enzymes and DPPH-radical scavenging activity in chilled and heat-shocked rice \(\*Oryza sativa\* L.\) seedlings radicles](#). J. Agric. Food Chem 50 (2002) 513-518

Hang, Ho-Min, and Mikal E. Saltveit. [Activity of enzymatic antioxidant defense systems in chilled and heat shocked cucumber seedling radicles](#). Physiologia Plantarum 113 (2001) 548-556

Saltveit, Mikal E. [Chilling injury is reduced in cucumber and rice seedlings and in tomato pericarp discs by heat-shocks applied after chilling](#). Postharvest Biology and Technology 21 (2001) 169-177

Mangrich, Mary E., and Mikal E. Saltveit. [Effect of chilling, heat shock, and vigor on the growth of cucumber \(\*Cucumis sativus\*\) radicles](#). Physiologia Plantarum 109 (2000) 137-142

Mangrich, Mary E., and Mikal E. Saltveit. [Heat shocks reduce chilling sensitivity of cotton, kenaf, okra, and rice seedling radicles](#). J. Amer. Soc. Hort. Sci. 125 (2000) 377-382

Rab, Abdur, and Mikal E. Saltveit. [Differential chilling sensitivity in cucumber \(\*Cucumis sativus\*\) seedlings](#). Physiologia Plantarum 96 (1996) 375-382

Jennings, Paul, and Mikal E. Saltveit. [Temperature and chemical shocks induce chilling tolerance in germinating \*Cucumis sativus\* \(cv. Poinsett 76\) seeds](#). Physiologia Plantarum 91 (1994) 703-707

#### Cold Chain

Kader, Adel, Elhadi M. Yahia, Editors. [Proceedings: Expert consultation meeting on the status and challenges of the cold chain for food handling in the Middle East and North Africa \(MENA\) Region](#). Food and Agriculture Organization of the United Nations. May 2012. 166 pgs.

#### Consumer Issues

Produce for Better Health Foundation. [It all matters! Fresh | Frozen | Canned | Dried | 100% Juice](#). 2012 4 pgs.

#### Fresh-cut Vegetables

Saltveit, Mikal E. [Effect of 1-methylcyclopropene on phenylpropanoid metabolism, the accumulation of phenolic compounds, and browning of whole and fresh-cut 'iceberg' lettuce](#). Postharvest Biology and Technology 34 (2004) 75-80

Loaiza-Velarde, Julio G., Mary E. Mangrich, Reinaldo Campos-Vargas, Mikal E. Saltveit. [Heat shock reduces browning of fresh-cut celery petioles](#). Postharvest Biology and Technology 27 (2003) 305-311

Kang, Ho-Min, M.E. Saltveit. [Wound-induced increases in phenolic content of fresh-cut lettuce is reduced by a short immersion in aqueous hypertonic solutions](#). *Postharvest Biology and Technology* 29 (2003) 271-277

Kang, Ho-Min, and Mikal E. Saltveit. [Wound-induced PAL activity is suppressed by heat-shock treatments that induce the synthesis of heat-shock proteins](#). *Physiologia Plantarum* 119 (2003) 450-455

### **Lettuce**

Saltveit, Mikal E., Liangchun Qin. [Heating the ends of leaves cut during coring of whole heads of lettuce reduces subsequent phenolic accumulation and tissue browning](#). *Postharvest Biology and Technology* 47 (2008) 255-259

Saltveit, Mikal E., Young-Jun Choi. [Aromatic- and cinnamoyl esters inhibit wound-induced phenolic accumulation in excised lettuce \(\*Lactuca sativa\* L.\) leaf tissue](#). *Postharvest Biology and Technology* 46 (2007) 222-229

Saltveit, Mikal E., Young-Jun Choi, and Francisco A. Tomás-Barberán. [Mono-carboxylic acids and their salts inhibit wound-induced phenolic accumulation in excised lettuce \(\*Lactuca sativa\*\) leaf tissue](#). *Physiologia Plantarum* 125 (2005) 454-463

Saltveit, Mikal E., Young-Jun Choi, and Francisco A. Tomás-Barberán. [Involvement of components of the phospholipid-signaling pathway in wound-induced phenylpropanoid metabolism in lettuce \(\*Lactuca sativa\*\) leaf tissue](#). *Physiologia Plantarum* 125 (2005) 345-355

Choi, Young-Jun, Francisco A. Tomás-Barberán, Mikal E. Saltveit. [Wound-induced phenolic accumulation and browning in lettuce \(\*Lactuca sativa\* L.\) leaf tissue is reduced by exposure to \*n\*-alcohols](#). *Postharvest Biology and Technology* 37 (2005) 47-55

Campos-Vargas, Reinaldo, Hiroyuki Nonogaki, Trevor Suslow, and Mikal E. Saltveit. [Heat shock treatments delay the increase in wound-induced phenylalanine ammonia-lyase activity by altering its expression, not its induction in Romaine lettuce \(\*Lactuca sativa\*\) tissue](#). *Physiologia Plantarum* 123 (2004) 82-91

Campos, Reinaldo, Hiroyuki Nonogaki, Trevor Suslow, and Mikal E. Saltveit. [Isolation and characterization of a wound inducible phenylalanine ammonia-lyase gene \(\*LsPAL1\*\) from Romaine lettuce leaves](#). *Physiologia Plantarum* 121 (2004) 429-438

### **Marketing**

Cook, Roberta L. [The lettuce/leafy greens sector, Part 3 or a three part series: fundamental forces affecting growers and marketers](#). *Blueprints* (2012) 65-69

Calvin, Linda, Suzanne Thornsby, Roberta Cook. [Recent Trends in the Fresh Tomato Market](#). *Vegetables and Pulses Outlook VGS-350* (2012) 26-35

Cook, Roberta. [Tendencias del retail y su impacto en la categoría de arándanos y berries en los EEUU](#), (PPT) given at the International Blueberry Symposium May 23, 2012

### **Physiological Disorders**

Cabrera, Roberto M., and Mikal E. Saltveit. [Survey of wound-induced ethylene production by excised root segments](#). *Physiologia Plantarum* 119 (2003) 203-210

Saltveit, Mikal E., Galen Peiser, and Abdur Rab. [Effect of acetaldehyde, arsenite, ethanol, and heat shock on protein synthesis and chilling sensitivity of cucumber radicles](#). *Physiologia Plantarum* 120 (2004) 556-462

### **Small-Scale Postharvest Practices**

Stiling, James, Simon Li, Pieter Stroeve, Jim Thompson, Bertha Mjawa, Kurt Kornbluth, Diane M. Barrett. [Performance evaluation of an enhanced fruit solar dryer using concentrating panels](#). *Energy for Sustainable Development* 16 (2012) 224-230

### **Tomato**

Luengwilai, Kietsuda, Mikal Saltveit, Diane M. Beckles. [Metabolite content of harvested Micro-Tom tomato \(\*Solanum lycopersicum\* L.\) fruit is altered by chilling and protective heat-shock treatments as shown by GC-MS metabolic profiling](#). *Postharvest Biology and Technology* 63 (2012) 116-122

Luengwilai, Kietsuda, Diane M. Beckles, Mikal E. Saltveit. [Chilling-injury of harvest tomato \(\*Solanum lycopersicum\* L.\) cv. Micro-Tom fruit is reduced by temperature pre-treatments](#). *Postharvest Biology and Technology* 63 (2012) 123-128

Milczarek, Rebecca, Mikal E. Saltveit, T. Casey Garvey, Michael J. McCarthy. [Assessment of tomato pericarp mechanical damage using multivariate analysis of magnetic resonance images](#). *Postharvest Biology and Technology* 52 (2009) 189-195

Saltveit, Mikal E. [Aminoethoxyvinylglycine \(AVG\) reduced ethylene and protein biosynthesis in excised discs of mature-green tomato pericarp tissue](#). *Postharvest Biology and Technology* 35 (2005) 183-190

Saltveit, Mikal E. [Influence of heat shocks on the kinetics of chilling-induced ion leakage from tomato pericarp discs](#). *Postharvest Biology and Technology* 36 (2005) 87-92

## Postharvest Positions

### Lecturer Position at UC Davis

The Department of Plant Sciences is offering temporary lecturer positions in International Ag Development and Plant Sciences. The list of courses that may be available during academic year 2012-13 include: IAD 10, IAD 103, IAD 170, IAD 202N, IAD 203N, PLS 021, and other courses as needed. (See <http://www.plantsciences.ucdavis.edu/plantsciences> for full course descriptions.)

Candidates may be asked to teach 1 to 2 courses for the year depending on programmatic need and candidate's availability. Qualifications include appropriate professional degree, e.g. doctorate or master's degree (or 30 units of graduate coursework); demonstrated teaching ability; a developing record of scholarly or professional achievement in an area of expertise related to the subject area of the course.

Temporary lecturers are selected to fill specialized positions which require professional as well as academic expertise. Temporary lecturers may be selected to fill teaching needs occasioned by leave of regular faculty or to enhance and compliment the strengths of faculty teaching related courses. Therefore, in any given year, open positions and requirements for individuals to fill them will vary. Salary is commensurate with experience and course load.

Applications are due by August 1, 2012 for first consideration; open until filled. Applicants should submit a curriculum vitae, list three references, identify which courses they are interested in teaching, and submit reprints or other examples of their scholarly or professional attainments and teaching evaluations. Candidates may be asked for further evidence of scholarly or creative work at a later date. Email inquiries may be sent to [bkniijar@ucdavis.edu](mailto:bkniijar@ucdavis.edu).

### AVRDC Postharvest Specialist Position in Arusha, Tanzania

The Asian Vegetable Research and Development Center (AVRDC) - The World Vegetable Center is seeking a Postharvest Specialist to facilitate research on technologies, methods, infrastructure and constraints across all aspects of vegetable postharvest systems (harvesting, packing, storing, transportation, processing, retailing, etc.), manage related projects and develop technologies, methods and policy advisories to support the goal of increased availability and consumption of vegetables at their Regional Center for Africa (RCA) in Arusha, Tanzania. A PhD in postharvest biology, postharvest physiology, horticulture, or food technology with extensive experience in postharvest research in developing countries is preferred. Good skills in application of quantitative and qualitative research methods, and proficiency in English (written and spoken) are required.

The candidate must be able to work as a member of interdisciplinary teams in a multicultural, multinational environment, and be able to interact effectively as a service provider and a project leader, and be willing to travel frequently. The position has competitive pay and benefits. The initial appointment is for three years, and may be extended. Submit application with Curriculum vitae, recent passport-size photograph, and complete contact information for three referees by email to [human.resources@worldveg.org](mailto:human.resources@worldveg.org) before July 11, 2012.

## Postharvest Calendar: Upcoming Conferences, Courses and Workshops

- July 8-13, 2012. [2012 Gordon Research Conference on Plant Senescence](#). Stonehill College, Easton, MA.
- July 20-22, 2012. [PMA Food Service Conference and Exposition](#). Monterey, California.
- September 18-20, 2012. [17th Annual Fresh-cut Products: Maintaining Quality & Safety Workshop](#). UC Davis campus.
- September 18-20, 2012. [II Asia Pacific Symposium on Postharvest Research Education and Extension: APS2012](#). Bogor, Indonesia
- October 15-19, 2012. [9th International Conference on Controlled Atmosphere and Fumigation in Stored Products](#). (CAF 2012). Antalya, Turkey.
- October 16-19, 2012. [X International Symposium on Postharvest Quality of Ornamental Plants](#). Porto de Galinhas, Pernambuco, Brazil. Contact Prof. Fernando Luiz Finger (55) 3138991128 or [ffinger@ufv.br](mailto:ffinger@ufv.br).
- October 26-29, 2012. [PMA Fresh Summit International Conference and Exposition](#). Anaheim, California.
- October 27, 2012. [UC Davis Reception at the Anaheim Marriott](#), PMA Fresh Summit International Conference and Exposition
- November 5-6, 2012. [UC GAPs Practical Skill-Building for On-Farm Risk Assessments](#). UC Davis campus.
- November 25-28, 2012. [Postharvest Africa 2012](#): The 7th Technical Symposium of CIGR Section VI and 2nd International Conference on Postharvest Technology & Innovation. Stellenbosch, South Africa.
- April 23-24, 2013. [35th Annual Citrus Postharvest Pest Control meeting](#). Santa Barbara, California
- June 17-28, 2013. [35th Annual Postharvest Technology Short Course](#). UC Davis
- June 23-27, 2013. [VII International Cherry Symposium](#). Plasencia, Spain.
- September 17-19, 2013. [18th Annual Fresh-cut Products: Maintaining Quality & Safety Workshop](#). UC Davis campus

## Ask the Produce Docs



**Q.** What is the best way for storing tomato juice – at what temperature and for how long could we store it without it losing quality?

We want to test juice from our fresh market tomatoes for such things as brix, acid, sugars, and ascorbic acid. We don't have time to run these tests immediately after we extract the juice. (K.J.)

**A.** We have procedures that we use for our microwaved tomato juice analysis on my website - direct link below. We are evaluating processing varieties, and there we can use a microwave process that mimics a hot break and inactivates enzymes and kills microorganisms. In your case with fresh market tomatoes I would suggest freezing the samples in small vials (Eppendorf tubes or whatever volume you need for each specific test) and analyzing them later. If you freeze at -20°F you can probably store them 3-4 weeks without too much ascorbic acid loss. The factors you are interested in are not otherwise affected by freezing. Hope this helps!

[http://www.fruitandvegetable.ucdavis.edu/Research\\_Group\\_960/Tomato\\_Analysis\\_Procedure\\_Manual/](http://www.fruitandvegetable.ucdavis.edu/Research_Group_960/Tomato_Analysis_Procedure_Manual/)

—[Diane Barrett](#)

**Q.** One of our customers has posed the question "Does leaving the lights on in a banana room reduce mold growth? Is it worth the energy cost?" (T.L.)

**A.** I am not aware of visible light having the effect of reducing mold growth, at least the decay that affects bananas. And even if light did reduce decay, lights in the top of the room would not illuminate the bulk of the fruit in the room.

I can see no value in having lights on during the ripening process, except of course for safety of an operator inspecting the fruit.

—[Jim Thompson](#)



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- If you have a perplexing postharvest question that you'd like answered, please send it to [postharvest@ucdavis.edu](mailto:postharvest@ucdavis.edu)
  - Link to a data store of all our previous "[Ask the Produce Docs](#)" questions and answers, or link to archived copies of our [monthly E-Newsletter](#) as PDF documents.

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