



Director's Update

Revisiting FSMA Ag-Water Test Methods

After several rounds of review by the participating panelists, the [Center for Produce Safety \(CPS\) Board of Directors](#), trade associations, and federal and state regulatory agency representatives, the Issue Brief, REPORT ON AGRICULTURAL WATER TESTING METHODS COLLOQUIUM was posted on the [CPS website](#).

On April 6 and 7, 2017, the Center for Produce (CPS) sponsored a panel discussion in Irvine, CA in an effort to resolve the most pressing issue anticipated in grower implementation and compliance: FSMA Produce Safety Rule (PSR) water testing requirements. The panel was hosted and facilitated by Western Growers, and the UC Postharvest Technology Center co-facilitated and led technical preparations of panel deliverables.



In practical terms, the final rule on Produce Safety only recognizes U.S. Environmental Protection Agency's (U.S. EPA) Method 1603 (M1603) to analyze agricultural water for generic *Escherichia coli* (*E. coli*). Provisions of the PSR allow for a method of equivalent accuracy, precision, and sensitivity, the absence of a completed FDA guidance document defining the criteria for determining accuracy, among other concerns, created an untenable uncertainty around the 'equivalency' of well-established alternatives for the regulated community. Anticipating this panel, I provided some background in February's E-Newsletter and point to the newly released Issue Brief for additional scientific details and panel recommendations. The paper also discusses the status of anticipated FDA actions to comprehensively revisit current ag-water provisions and intention to extend ag-water compliance dates.

Following this panel and consensus on the Issue Brief narrative, the FDA confirmed that current provisions provide sufficient flexibility for growers to select methods recognized as scientifically valid (such as [40 CFR 136.3 Table IA](#) provided by EPA). During the interim period of assessment, FDA advised growers to continue their current water testing practices. Until more is defined and certain, initiating significant and costly changes to sampling regimes and testing programs is not warranted. We certainly encourage growers to establish a baseline of microbial water quality to assess their on-farm situation and seek help, as needed, to take the first steps in sensible testing levels following industry Best Practices.

Updating and Clarifying Chlorine Use in Organic Postharvest Handling

One of the most frequently downloaded extension articles we have published through UC ANR is [8198 Making Sense of Rules Governing Chlorine Contact in Postharvest Handling of Organic Produce](#), first prepared in 2000 and released online in 2006. Extension specialists often face the challenge of keeping up with needed revisions due to changing industry practices, regulatory standards, or clarifications of current provisions. While a great system for extension communication, our peer-review publication system can be slow and sometimes a barrier to continually update information with many other concurrent demands. As the older information has recently generated questions during organic certification audits, this has certainly become a priority on my list of needed updates. Regardless, I thought it prudent to share here, and in other channels, as we understand the immediate industry need and prepare for a timely release of an updated version.

Jacob Guth, Food Safety Program Manager for California Certified Organic Farmers (CCOF) was kind enough to bring the antiquated material to my attention as growers following and citing the guidance for use of hypochlorites (chlorine) in 8198 are not consistent with current standards for approval. Back in 2000 and 2004, based on interactions in several CCOF grower meetings, I wrote that "Due to food safety concerns, the CCOF has recently modified this threshold (4 ppm) to permit 10 ppm residual chlorine measured downstream of the wash step." To summarize the misinformation relative to their requirements based on the NOP and update guidance, chlorine dosing of postharvest water above 4 ppm for any use that results in direct contact with product cannot be labeled "100% Organic" regardless of a final rinsing of the product at or below this dose. For a product to make a 100% organic claim, processing aids must be certified organic. Chlorine use is allowed-restricted, but is not certified organic. If dose treatments exceed a 4 ppm measured

concentration, products may only be labeled “Organic”. As explained in 8198, with some industry-allowed exceptions at the time of publication, chlorine residual in water must be at or below 4 ppm at the point of product removal from water, or given a final rinse at or below this level.

Chlorine levels are verified by periodically monitoring “lot” values, but accuracy and precision is not prescribed. A scientifically valid Standard Operating Procedure (SOP) to ensure a chlorine level of 4 ppm or less in final rinse water is allowed. For dump/flume tanks where chlorine-treated water is in contact with organic produce, an SOP is recognized on inspection as acceptable *if* it specifies how tank water will be kept below 4 ppm. This can be challenging to achieve, and ongoing monitoring for record-keeping is prudent. For organic sprouts, hyperchlorination above 4 ppm may be applied to edible sprout seeds per NOP 205.601a2. Treated sprouts can be labeled “100% Organic” provided the sprouted seeds are only washed in water that meets the same requirements (e.g. less than 4 ppm).

Not surprisingly, there is much more to this story, which we will incorporate into a future, hopefully prompt, revision and updating of 8198.

Postharvest Education at UC Davis



Fresh-Cut Products: Maintaining Quality & Safety Workshop September 26-28, 2017

This workshop provides an intensive and substantive overview of fresh-cut production, processing, packaging, distribution and quality assurance. Participants gain a working knowledge of established and new procedures through topic-related sessions and demonstrations.

Registration is now open!

[Read More](#)



Produce Safety Alliance Grower Training November 7, 2017

This course presents an integrated approach to understanding Food Safety Modernization Act specifications by blending fundamental, applied, and practical food safety knowledge. Completing this course satisfies the FSMA Produce Safety Rule requirement outlined in § 112.22(c).

Registration is now open!

[Read More](#)



Advanced Produce Safety Workshop November 8-9, 2017

An interactive two-day workshop with a focus on microbial produce safety systems from preharvest to postharvest. This workshop aims to build a foundation of awareness and improved understanding of the current scientific basis for produce microbial safety systems.

Registration is now open!

[Read More](#)

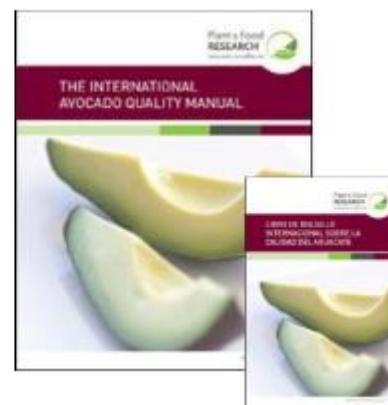
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Sale! Receive 20% off Avocado Manuals

Manual: This comprehensive avocado quality resource is printed on heavyweight gloss paper and comprises 70 pages (8.5” x 11”) of information, including 85 photographs, with sections on assess quality, ripening, external quality, internal quality, cultivars, and damage scenarios.

Pocketbook: This handy pocketbook is intended to serve as a field companion to The International Avocado Quality Manual. The fully laminated booklet comprises 70 pages (3.6” x 6”) of information, including 49 photographs, with sections on assessment of quality, ripening, external quality, internal quality, and damage scenarios.

Click [here](#) to go to the avocado page in our bookstore. Use sale code 20AVO to apply your discount. For a complete listing of all our publications see our [bookstore](#).



Postharvest Specialists' Updates & Other News



Christine Bruhn Presents at the Partnership for Food Safety and the Institute of Food Technologists Annual Meeting

Christine Bruhn and postdoctorate researcher Betty Feng presented a webinar for the Partnership for Food Safety, *People Do Follow the Leader!* Their work showed that the effectiveness of food safety education was increased when people were able to identify family or friends who actually followed recommended behavior. They evaluated a curriculum with both adults and high school students and demonstrated increased food safety knowledge and led to greater compliance with hand washing and monitoring cooking and refrigerator temperatures.

Betty Feng and Christine Bruhn also presented a poster at the Institute of Food Technologists annual meeting in Las Vegas which reported that people are more likely to order higher risk foods, such as undercooked burgers or salads with raw eggs, at an upscale restaurant as compared to a more conventional food establishment.

At the Institute of Food Technologists meeting Christine Bruhn addressed “Why scientists must help educate the public about new food and agriculture technologies.” She noted that without communication, adoption of important innovations may be significantly delayed. Christine shared research which showed that 10 years ago people were overall more positive toward products developed by genetic engineering than today. Currently there are several thousand labels in the supermarket that claim the food is not genetically modified. She believes that the failure to communicate about the benefits of newer technologies like genetic engineering has left consumers open to misinformation about potential risks. It is her belief that if those who know don’t communicate, those who don’t know will, and the public and society may lose the advantages these innovations offer. [Director’s Note: We respect and acknowledge Dr. Bruhn’s knowledge and experience in consumer communication and communication around the topic of genetic engineering of food crops. We are personally aware that she recognizes that achieving adoption and acceptance of products developed with transgenic technologies is more complex than simply communicating about the recognized or potential benefits. This update is a brief glimpse of her efforts towards illuminating the issue and we are happy to include it here.]



Roberta Cook Speaks at the London Produce Show and Talks with Jim Prevor of the *Perishable Pundit*

In addition to speaking about broad fresh produce trends and retail consolidations at the June 7-9 London Produce Show, Roberta Cook sat down with Jim Prevor for an interview about NAFTA and the changing trade landscape in the U.S. Here is a highlight of the interview:

I’ve put together a comprehensive set of current trade stats to show the volume of produce moving between the three countries and illustrate each country’s role—particularly in fresh vegetable trade. Currently, the U.S. imports 69% of its fresh vegetable from Mexico, 16% from Canada and only 15% from other countries. Fresh fruit imports are more diverse, with 44% from Mexico, only 2% from Canada and 54% from other countries. As far as U.S. exports go, 74% of U.S. fresh veg exports go to Canada, 4% to Mexico, and 22% goes to other countries; 36% of U.S. fresh fruit exports go to Canada with 11% destined for Mexico, and 53% to other countries.

Trade has grown rapidly between all countries with which the U.S. has Free Trade Agreements, led by Canada and Mexico. The renegotiation of NAFTA could have a major impact on fresh produce trade within the North American region and elsewhere. It could result in growers seeking to send products to other countries and thus affect markets worldwide. It could also impact U.S. trade policies and tariffs with respect to other regions.

To read the full interview, click [here](#).



Angelos Deltsidis Travels to Guinea to Establish a Regional Center for Innovative and Affordable Technologies

International Postharvest Specialist Angelos Deltsidis traveled to Guinea, West Africa in late June. The UC Davis Horticulture Innovation Lab, in collaboration with Winrock International and the Guinea USAID mission is establishing a regional center at the Agricultural Research Institute of Guinea (IRAG) located in Kindia, Guinea. The new center will be showcasing innovative affordable technologies and training trainers and farmers from all over the country. In establishing the Center, Angelos worked with UC Davis program officer Andra Williams who is based in Kindia and the four newly hired interns-AVENIRs (Mamadou Kann, Kadiatou Sidibé, Fatoumata Cissoko and Paul Lamah) as well as Peace Corps Volunteer Gabriel Wyland who is directly involved with the project.

Angelos also gave two trainings on how to establish two basic low cost technologies, namely the CoolBot operated cool room and the UC Davis chimney dryer that are used to reduce the postharvest losses of fresh fruits and vegetables. The team is preparing for the setup of a series of technologies before the opening of the center.



Trevor Suslow—More water, water and a STEC and Listeria floater

Trevor was co-presenter and moderator with Hank Giclas, Senior Vice President Science, Technology & Strategic Planning at Western Growers, for the special session on the Ag-water Test Method panel, mentioned above, during the annual CPS Research Symposium in Denver, CO. Included in this and a related session, the results of a western survey of surface water sources were also shared. The report on the multi-state study with collaborators Channah Rock in AZ and Ines Hanrahan in WA will be posted on the CPS website. Our results showed a predominance of compliant microbial water quality test results using the Colilert QuantiTray 2000 format and a membrane filtration protocol. The prevalence of pathogens in large volumes of surface water processed by capture filtration and enrichment was very low across all sample sites.

Sharing of the ag-water issues and current research outcomes continued at the IAFP meeting in Tampa, FL at a Symposium entitled *Getting to the Reality of Implementation: Produce Safety Rule Water Quality Requirements* with a presentation **Implementation Programs Benefit from Ag Water Surveys and On-farm Preparedness Assessments**. Water testing compliance also dominated the interactive round-table at IAFP appropriately titled *The Devil Is in the Details: Experiences with Early Implementation of the FSMA Produce Safety Rule and Efforts to Fill the Information Gaps...* might have received the award for the longest session title.

Adrian Sbodio from the Suslow Lab attended the IAFP meeting, presenting *Valuation of Alternative Sanitizers to Chlorine Disinfection or Reducing Foodborne Pathogens in Avocados, Melon, Citrus and Cucumbers*. Adrian also stood in for Suslow Lab Project Scientist Janneth Pinzon and lead author on a poster entitled *Single marker detection and virulence gene profiling of non-O157 STEC in produce and associated farmscape samples*.

Rounding out the month to date, Trevor participated as a speaker in the well-attended **Listeria monocytogenes Intervention and Control Workshop for the Produce Industry**, held in Plano, TX, expertly organized and moderated by Jennifer McEntire of United Fresh and Jim Gorny of PMA. Look for announcements of future regional dates for this timely and informative nuts and bolts workshop.

On Our Website

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New Publications on our Website

Amanda B. Gunter, Anne Hermans, Whynn Bosnich, Douglas A. Johnson, Linda J. Harris & Steve Gleddie 2016. [Protein engineering of *Saccharomyces cerevisiae* transporter Pdr5p identifies key residues that impact *Fusarium* mycotoxin export and resistance to inhibition.](#) *MicrobiologyOpen* 2016, 5(6):979–991

Sergio Tonetto de Freitas, Cassandro Vidal Talamini do Amarante, and Elizabeth J. Mitcham, 2016 [Calcium Deficiency Disorders in Plants](#), *Postharvest Ripening Physiology of Crops*, 478-502

Postharvest Calendar

- July 2-6, 2017. [IX International Peach Symposium](#). București, Romania.
- September 26-28, 2017. [Fresh-cut Products: Maintaining Quality & Safety Workshop](#). UC Davis Campus
- October 17-20, 2017. [International Postharvest Unlimited Conference \(ISHS\)](#). Madrid, Spain
- November 7, 2017. [Produce Safety Alliance Training](#). Davis area
- November 8-9, 2017 [Advanced Produce Safety Workshop](#). Davis area
- November 29-December 1, 2017. [IX Congreso Iberoamericano de Tecnología Postcosecha y Agroexportaciones](#). Santiago, Chile

Ask the Produce Docs



Q. I have been looking for information on what causes vertical burst on zucchini. We have had several loads come in and after the fact we are seeing this issue I need to explain why this is happening and I have been unable to find any information on the subject. Anything you may have to help would be greatly appreciated. (L.K.G.)

A. I have never seen this problem, but I suspect that these zucchinis were soaked or hydrocooled and perhaps left too long in water. Since zucchinis are susceptible to water loss and the associated loss in visual quality, it is common to cool them with water. They will absorb significant amounts of water through the delicate skin (3-4%). Also if they are fully or excessively hydrated and then packaged with a film liner to prevent water loss, there can be splitting. What type of packaging is being used? Also they look on the mature side and seeds continue to grow inside at warmer temperatures. Another consideration is handling, any drops or rough transport with turgid product might lead to cracking. Obviously I am speculating, but I hope that it may assist you with asking some questions about the initial handling of the product to resolve the issue.

Marita Cantwell

End Notes and Disclaimers

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 monthly e-newsletter as PDF documents.

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