UMass Agricultural Water Twilight Series

Part III: Post-harvest Water Quality and Sanitizer Use

9/30/20

RESOURCES and Q&A

Agricultural Water resources – UMass Food Safety for Farmers
https://ag.umass.edu/resources/food-safety/for-farmers/agricultural-water

Scroll down to "Postharvest water and FSMA" for a list of drop-down answers to questions, including:

- *How frequently do I need to test my postharvest water?*
- *What is the acceptable threshold of E. coli levels in postharvest water?*
- *How should I manage recirculated water?*

Pesticide information – sanitizers are considered pesticides and must be registered by EPA and used according to the label

- Massachusetts Pesticide Program
  https://www.mass.gov/orgs/pesticide-program
- Check sanitizer/pesticide registration status:
  - National Pesticide Information Retrieval Service (NPIRS)
    http://npirspublic.ceris.purdue.edu/ppis/
  - Kelly Solutions database (Massachusetts):
    http://www.kellysolutions.com/ma/

Produce Safety Alliance resources

- Introduction to Selecting an EPA-Labeled Sanitizer
- Labeled Sanitizers for Produce - Excel Tool Version 3.1 updated 7/19/20
  - Video Tutorial: How to Use the Excel Tool Labeled Sanitizers for Produce
- Records required by the FSMA Produce Safety Rule
  - *See Water Treatment Monitoring Record Template*
  - Template Records in Word format

Shared by Amanda Deering, Purdue University

- List of registered sanitizers
  https://ag.umass.edu/sites/ag.umass.edu/files/pdf-doc-ppt/deering_printable_version_of_sanitizer_list.pdf

Shared by Phil Tocco, Michigan State University

- Small Doser for Small Batch Produce Washing with Sanitizer (written by Chris Callahan, UVM)
  https://farmhack.org/tools/small-doser-small-batch-produce-washing-sanitizer

- Dose calculator for determining desired sanitizer amounts: http://blog.uvm.edu/cwcallah/files/2016/06/Sanitizer-Dose-Calculation.xlsx

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Meeting Q&A – summary of chat questions and answers. Some answers are paraphrased; see recording for full discussions.

Q: How do you measure the concentration of sanitizer in wash water?

A: (Amanda Deering) There are a lot of test strips, they look the same, based on a colorimetric test [the concentration of the sanitizer is indicated by the color that appears on the test strip]. Use the right strip for the product you are using. There are strips for free/available chlorine, or for PAA (peracetic or peroxyacetic acid) products. There are also strips for measuring pH. The only sanitizers you really need to measure pH of the water for are chlorine-based products [like bleach]. On either side of the recommended pH range (6.5-7.5), product efficacy tanks. If not in the right range, you're just using more and more product with no additional kill effect. In Indiana, we have hard water and a pH of 9 is not unheard of. Other sanitizers are pretty forgiving (PAA). As a small grower, probably don't want to invest in an ORP meter, which is a device that measures oxidation-reduction potential and is often used in chlorine systems. If using an ORP meter, the label will often say what the ORP value should be for the desired ppm. Even growers who use ORP also double check with strips. In general , use the strips, the right one for the product, get familiar with them, follow the directions, and make sure the strip measures the range of the product that you are trying to achieve.

A: (Phil Tocco) Make sure test strips are not expired. You get what you pay for with test strips, be thoughtful about getting good test strips, there is variation among the brands. Also, don't change brands mid-season, be consistent. Make sure you get the test strip for what you want to measure (there are free chlorine and total chlorine strips. You want free, or available, chlorine). Make sure that the target range is in the middle of the range that the test strip reads. Read the directions, they may vary even among the same brands for higher and lower range strips. Make sure that you are using the right concentration for the task and measuring using the test strip to make sure you are in the right range for that task. For example, Sanidate is labeled for different concentrations for sanitizing surfaces vs vegetable wash.

Q: If a sanitizer product label does list a specific concentration for a specific fruit or veg, can you only use it for that fruit of veg listed?

A: (Amanda Deering) Some will give parameters for fruit and veg wash, and then may list specific commodities. Most of the time when they list the specific commodities, they try to be pretty all-encompassing, most don't want to limit to a specific industry or crop.

Q: What happens if you use too much sanitizer? Is it harmful to workers, to the produce?

A: (Amanda Deering) In leafy greens wash water, I have seen with high chlorine dioxide concentrations yellowing/browning of leaf edges. Too much PAA will burn skin and turn hands white. If concentrations are too high you get gassing off, which is dangerous for workers. Use the correct PPE, be careful with measuring, double check your math.

Q: How do you recommend lowering pH in hard water?

A: (Amanda Deering) Citric acid, which is food safe, will lower pH. Sanitizer companies will often sell an accompanying product to lower pH. There are commercial products available.

Q: Is there a danger of pathogens developing resistance because of use/overuse of sanitizers?

A: (Amanda Deering) Almost all fresh-cut industry use sanitizers. They worry about this, what happens if you start seeing resistance. Do have pathogens that are acid tolerant. Don't know of an *E. coli* strain that is chlorine tolerant. Is it possible? That's the fear. Can run 2 sanitizers together to avoid tolerance, which is a pain, but can help. [Following product label and using for appropriate applications at appropriate rate may also help with resistance management].

Q: I have found active chloride test strips that have a range of 25 to 2000ppm. Is this wide range reliable?

A: (Amanda Deering) You want it to be a little tighter than that, middle of that range.

Q: What about copper ionizers (and UV or ozone devices) for produce wash water?

A: (Amanda Deering) The most important thing is to check, does it have a label for fruit and veg washing for whatever is being generated out of that system? I would highly encourage you to get the data from the company, how they determined that efficacy data. Ask Extension, other party to help you look over that data. Ozone is very unstable, if can bubble it in right where you're using it, can be useful, but if it needs to move, is less effective. UV needs a long exposure time and with crops with a lot of nooks and crannies, like cantaloupe, it doesn't get in there well. You can use a chemical like chlorine and a device together, but need to make sure they are compatible, companies should be able to tell you this.

Q: Where do you recommend purchasing Tsunami or other products if you only need a small quantity over time?

A: (Amanda Deering) Don't have a great answer. If you keep products out of sunlight, keep them cool, products should last a while, not forever, but a while. Check farm stores, may have smaller containers.

Q: How do you get the cap off of a bottle of Sanidate and where do you get the spigot that fits onto the jug?

Bung nut wrench

A: (Phil Tocco) These little details are important, to be able to pour product directly into closed, safe containers. Increases safety and confidence.
You can get a bung cap opener cheaply from various places, including online. The spigot that fits into the opening is also easy to find. Here's one link: https://www.usplastic.com/catalog/item.aspx?itemid=24232; this and other parts are listed in Chris Callahan's easy-to-make sanitizer doser tool, instructions here: https://blog.uvm.edu/cwcallah/2015/06/16/doser-for-small-scale-vegetable-washing-with-sanitizer/

spigot

Q: Could you use iodine for cleaning then sanitizing the harvest bucket? I use Iodine for washing milk cans.

A: (Phil Tocco) I don't typically use iodine. First thing to point out is that cleaning and sanitizing are two different processes. You need to first remove soil by cleaning with a surfactant. It's important to know what you're trying to clean off (e.g., wax from waxing apples needs an alcohol based cleaner to break up the wax, rather than a water based cleaner). Then you can sanitize the clean surface. Iodophores tend to be a sanitizer, don't know any that are also cleaners.
(Don Stoeckel, Produce Safety Alliance) On the PSA's list of labeled sanitizers, LFI is one iodine-based product that is labeled for sanitizing food contact surfaces.

Q: You may also need to do dry cleaning (e.g., for onion or garlic storage containers or areas) rather than water-based cleaners. What is something that might be used to do a dry cleaning?

A: (Phil Tocco) The first step is cleaning. Can suck it up (or sweep or blow it out, but sucking is better, blowing can move dirt around) – Shop vac, esp. if it has a HEPA filter, is good first cleaning step. Next step, sanitize. Want non-water-based sanitizer, an alcohol quat [alcohol-based quaternary ammonium sanitizer]. Not recommending doing this every day, but think about cleaning and sanitizing the space, preparing it for dry products. Most folks may think about sweeping an area out, but important to think about sanitizing too.

Q: When calculating concentrations for PAA is the active ingredient PAA or the Hydrogen peroxide?

A: (Chris Callahan) PAA. The hydrogen peroxide is a buffer that helps PAA "last longer" in battle.