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AGRICULTURE



FOOD

CENTER FOR SUSTAINABLE AGRICULTURE



UNIVERSITY OF VERMONT

EXTENSION

CULTIVATING HEALTHY COMMUNITIES

Why Triple Rinse Greens?



- It greatly reduces the microbes that can make people sick
- It will extend the shelf-life of your product
- It will provide a cleaner, higher quality product that your customers will love!

For crops with soil on them where compost or manure has been used it is likely that *E. coli* and other pathogens will be in the wash water. To reduce the potential for cross-contamination triple or double wash produce. Adding chlorine or a peroxyacetic acid (OMRI allowed for organic growers), such as Sanidate,[®] to the final rinse will further reduce the levels of the pathogens that can make people sick as well as the fungi and molds that shorten produce shelf life.

WHERE TO GET INEXPENSIVE WASH TANKS AND SINKS



If you are washing large quantities of produce you may prefer to use 3 plastic or rubber stock tanks. Rubber ones can be sanitized with bleach or peracetic acid, which will corrode metal tanks. Cost for a 100 gallon tank: \$70



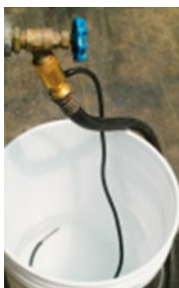
If you are not ready to invest in stock tanks or stainless steel sinks, you can use plastic storage bins that come in a wide variety of sizes. Rubbermaid makes a line that cost from \$6.00 for 3 gallons to \$17 for 31 gallon bins.

You can get inexpensive stainless steel sinks from restaurant auctions, Craigslist or used supply stores.

HOW TO USE DISINFECTANTS IN RINSE WATER

The purpose of disinfectant in rinse water is to reduce the microbes in the water to avoid cross-contamination. It can reduce the amount of pathogens in the water by 4-6 logs, but it cannot completely remove or kill pathogens already attached to the produce.¹ After harvest, thoroughly rinse off any soil on the produce with potable water, and then if you are immersing the product in a sink or dunk tank, (as opposed to spray rinsing on a pack line so that the water drains away) triple rinse (i.e. put through three separate baths). Adding a solution of 150 ppm chlorine (sodium hypochlorite), or peroxyacetic acid or Sanidate[®] at the highest labeled rate (0.5 fl. oz/10 gal. water) in the final rinse will reduce the levels of pathogens.

¹Produce Safety –What’s Going on Here?, powerpoint prepared by Shirley B. Bohm, RS, MPH, FDA/CFSAN/OFS – Retail Food Protection, National Environmental Health Association, June 21, 2007



If you have a mechanical packing line, that rinses produce with sprayers, you can purchase injectors that will add disinfectants to the spray. If you use your own spray set- up with a hose, you can rig it to a siphonject system to mix the disinfectant with your rinse water.

Disinfectants must be used properly to be effective. Excess organic matter and soil in the wash water, or an improper pH of the wash water will reduce the efficacy of both chlorine and peroxyacetic acid. Change your rinse water between each crop, or when the water starts to get brown and cloudy with a lot of soil.

VOF Standards for sanitizers in wash water permits the use of chlorine in wash water in direct contact with organic crops, but it must not exceed the Maximum Residual Disinfectant Limit under the Safe Drinking Water Act of **4ppm**. Chlorine used in dunk tanks will volatilize. You can use test strips (see below) to measure the levels to make sure you are within the limit. VOF policy allows Hydrogen peroxide, ozone, peracetic acid to be used in direct contact with organic produce.

Peroxyacetic Acid (OMRI approved for Organic)

Peroxyacetic acid is a mixture of hydrogen peroxide and peracetic acid that are OMRI approved for sanitizing produce. Sanidate is one such product, but there are others, such as Tsunami. Follow the instructions that come with the product. Add Sanidate at the labeled rate of 0.5 fl oz (1 tbsp) per 10 gal water to the final rinse. Use test strips or digital monitors to monitor the efficacy for Sanidate: <http://www.biosafesystems.com/Product-PH-SaniDate5.asp> or any other peroxyacetic acid product you use.

Chlorine

The disinfectant activity of a chlorine solution is determined by its pH. The pH level should be maintained between 6.0 and 7.0 to provide for greatest effectiveness without damage to produce and equipment. At a higher pH, chlorine is not a very effective germicide. At a lower pH, the solution becomes corrosive to metals. If the pH is decreased below 4.0, deadly chlorine gas is formed. Thus, the pH of the wash water should be checked periodically. This may be done with litmus paper (which changes color at different pH's), available test kits, or pH meters. The pH can be adjusted to a desired level by adding a weak acid or base, as is done in swimming pools. Adding 2 pints of 40 grain distilled white vinegar should adjust the solution's pH to between 6 and 7. Adding 1/4 pint wetting agent, such as liquid soap, will help the chlorine get into the nooks and crannies on the surface of produce. 100 -150 ppm of chlorine is an effective level of chlorine for most fruits and vegetables.

Amount of sodium hypochlorite (chlorine) to add to wash water for 100 - 150 PPM of		
Sodium hypochlorite, 5.25%		
Target PPM	Teaspoon chlorine /5 gallons water	Cup chlorine /50 gallons water
100	7 1/4	1 7/8
150	11	1/4
Sodium hypochlorite 12.75%		
100	3	3/5
150	4.5	1

Chlorine is highly poisonous and must be handled with care according to instructions. Make sure there is adequate ventilation to remove chlorine fumes from enclosed packinghouses. All workers handling chlorine should use protective equipment. Read the label before opening any container.

Ginger Nickerson, 12/5/11. Center for Sustainable Agriculture, University of Vermont,. <http://www.uvm.edu/~susagctr/Page=gaphome.html>

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