

Washing Produce

All produce should be washed before serving or processing to remove dirt and debris. However, washing will not remove gross contamination by foodborne pathogens or chemical contaminants or pathogens that get inside the product. While the washing step does wash off some pathogens if they are on the surface of produce, these can be dispersed into washing water and contaminate any fruits or vegetables that are washed afterwards. For this reason, produce should be washed under running potable (drinkable) water or using a chemical disinfectant approved for washing produce when washing by submerging or soaking in water. These disinfectants are designed to inactivate any bacteria that are introduced to the water, drastically limiting the possibility of cross contamination.



Choosing a disinfectant

A number of disinfectants are approved for washing produce. When evaluating chemical disinfectants check the label for the following information:

- ◆ EPA registration and FDA clearance (21 CFR Part 173.315 or Generally Recognized as Safe status) for use in washing produce.
- ◆ Minimum and maximum use levels.
- ◆ Methods for determining concentration.
- ◆ Recommended contact time.
- ◆ Effect of organic matter (soil and plant exudate) on activity.

As an example, sodium or calcium hypochlorite are commonly used as produce wash water disinfectants. Their use level is typically in a range between 50-200 parts per million (ppm) of free chlorine. Free chlorine [hypochlorous acid (HOCl)] is reduced by organic matter as well as alkaline water with a pH greater than 8. Therefore, we recommend measuring free chlorine and pH to make sure the levels are correct for disinfection and changing the water regularly to keep organic matter and debris from building up in the wash water. More information on the use of chlorine in produce wash water can be found in "Postharvest Chlorination" at: <http://anrcatalog.ucdavis.edu/pdf/8003.pdf>.

Steps to follow for washing produce:

- 1. Remove soil and other debris.** If produce has been grown in the soil you should use a vegetable brush with light pressure to remove soil before washing (Figure 1).
- 2. Measure and mix disinfectant.** Mix the disinfectant according to the manufacturer's instructions, to achieve the desired concentration in the washing solution. Water used for washing produce must be potable. When washing warm tomatoes, apples or melons, the water should be within 10 °F of the fruit pulp temperature. This is because warm tomatoes and melons can draw a vacuum if immersed in cold water due to air cells contracting within the fruit, and pull in wash water. If the wash water is contaminated, anything in that water, including foodborne pathogens, will be internalized or sucked into the produce.
- 3. Check the concentration of the disinfectant.** Verify that the proper concentration of disinfectant is in the water at startup and at regular intervals to make sure that the proper concentration of disinfectants is maintained. This is most commonly done with paper test strips that are immersed into the solution and compared to color standards that indicate the concentration of compound. Make sure you are using the correct test strip for your disinfectant. This value should be recorded as part of your HACCP plan. The concentration of disinfectant in the water will vary by product.
- 4. Always follow label directions.** Read the label and make sure you are using a product that is safe for food and for the produce you are washing. Follow all personal protective equipment (PPE) recommendations. Also, store and dispose of disinfectants according to the label instructions.



Figure 1. Use a vegetable brush to remove soil before washing.

This project was supported all, or in part, by a grant from the National Institute of Food and Agriculture, United States Department of Agriculture (Award Number 2009-51110-20161) and a Tennessee Specialty Crop Block Grant (32506-09813).

Publication #FDNS-E-168-28, J.A. Harrison, F.J. Critzer and A.L. Wszelaki. February 2015. SP 768-D

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