

Home Gardening Food Safety: Washing the Fruits (and Vegetables) of Your Labor Properly¹

Eshani Persaud, Amy Simonne, and Karla P. Shelnutt²

Having a home garden has become popular recently. It is a great way to enjoy fresh fruits and vegetables—foods that are an important part of a healthy diet. However, just because you have your own garden and control how it is treated does not make the fruits and vegetables you grow safer than those you buy in the store. To reduce the chance of getting sick from foodborne illnesses, you must wash the fruits and vegetables you grow before eating them raw or cooked. This publication helps you learn the proper way to clean your fruits and vegetables so you can enjoy them safely.

Food Safety of Fruits and Vegetables

Over the past 15 years, there has been an overall decrease in foodborne illnesses (CDC, 2011); however, more than 9 million people still suffer from foodborne illnesses every year (Painter et al., 2013). According to the CDC, most foodborne illnesses are due to leafy vegetables and plants that harbor harmful disease-causing microorganisms such as viruses (norovirus), bacteria (certain types of *E. coli* and *Salmonella*) and parasites (Painter et al., 2013; Oregon State University Extension, 2011).

Contamination can come from manure, water, or contact with animals or insects. Some fruits and vegetables are harder to clean, so washing them properly helps reduce the

risk of illness. Leafy greens can be a major problem because they have many layers and crevices where bacteria can thrive. This is especially important for children and people with a weakened immune system (e.g., elderly people, pregnant women, and people with diabetes, HIV, or cancer) because they are more susceptible to foodborne illnesses.



Figure 1. Make sure to properly wash fresh fruits and vegetables from your garden to avoid foodborne illness.
Credits: iStock

1. This document is FCS80032, one of a series of the Department of Family, Youth and Community Sciences, UF/IFAS Extension. Original publication date: November 2013. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
2. Eshani Persaud, BS, dietetic intern, Master of Science-Dietetic Internship Program, Amy Simonne, PhD, professor, Department of Family, Youth and Community Sciences, and Karla Shelnutt, PhD, RD, assistant professor, Department of Family, Youth and Community Sciences; UF/IFAS Extension, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

Take Precautions

After harvesting your fruits and vegetables, it's time to clean them. For more information on harvesting, see the publication ENH971 *Edible Landscaping* (<http://edis.ifas.ufl.edu/ep146>). Start by washing your hands thoroughly for 20 seconds with soap and warm water (FDA, 2011). If you need a way to time yourself, sing "Happy Birthday" twice from beginning to end to make sure you are washing long enough. You can dry your hands either by air-drying them or by using a clean towel or paper towel. Cover up any cuts to prevent bacteria from entering your food.

Make sure the area where you are handling your fruits and vegetables is clean, including the kitchen counter and any kitchenware that may be used. For example, use clean cutting boards, knives, bowls, colanders, and containers while preparing produce. Different types of produce should not be mixed together when cleaning because this can lead to cross-contamination. For example, don't wash leafy greens, berries, or root vegetables together. Keep these key steps in mind to reduce cross-contamination and the risk of foodborne illnesses.

Water – The Leading Option When Washing Produce

There isn't a washing method that completely removes all microbes. But, the USDA and FDA recommend rubbing firm fruits and vegetables such as melons briskly with your hands or a produce brush while rinsing them under cold, clean water for a few minutes as an effective way to clean them (USDA, 2011; FDA, 2013). Avoid using the sink to wash produce because the drain can contain germs. Instead, use a clean bowl. Make sure any visible dirt is gone. Cut and remove small bruised spots that are confined to a single area because they can harbor bacteria, and throw away any produce that looks rotten or has deep bruising (FDA, 2011). Be aware of sites that might be difficult to clean such as the stem and blossom ends of an apple. Cut and remove those ends once you have washed the fruit. Remove the outer layers of leafy produce before washing; the outer leaves can conceal bacteria because they come into contact with more pathogens (Zander & Bunning, 2010).

The FDA does not recommend using commercial washes. Why spend money on commercial fruit and vegetable cleaning products when they are no more effective and perhaps even less effective than using water (Crowe, Bushway, & El-Begearmi, 2011)?



Figure 2. Using a colander to hold small fruits, such as berries or cherries, is the best way to wash them under cool, clean running water.

Credits: iStock

What About Household Products?

Studies have shown that household products such as white distilled vinegar, lemon juice, rice vinegar, and apple cider vinegar can be slightly more effective than just plain tap water for washing homegrown produce, especially leafy greens in salad and floral greens such as broccoli, cauliflower, or artichoke (Chang & Fang, 2007; Vijayakumar & Wolf-Hall, 2002). Although some people use baking soda to clean fruits and vegetables, it has not been shown to be an effective cleaning agent (Yang, Kendall, Medeiros, & Sofos, 2009). White distilled vinegar has been shown to reduce *Salmonella* on produce within 10 minutes of contact time at room temperature (Yang et al., 2009). To make a vinegar solution at home, mix ½ cup of white distilled vinegar with 2 cups of water. Spray the vegetables with this solution or dip them in it and then re-rinse the produce under clean water. There is a chance that using these alternatives may affect taste and texture (Davis & Kendall, 2005).

To Scrub or Not to Scrub?

Washing removes excess dirt and bacteria that may be on the produce. Use a brush to scrub produce that has firm outer coverings or thick skins, such as melons, apples, carrots, potatoes, and cucumbers (Zander & Bunning, 2010). Germs on the outside of fruits and vegetables with hard skins can get on the knife and into the inner flesh if they are not washed before cutting. When washing delicate

produce, such as blueberries or spinach, place them in a colander and rinse with cold, clean running water. Wipe the excess water or other solution with a disposable paper towel or use a clean salad spinner after washing—these are both effective ways to further eliminate water and ward off harmful organisms (Crowe, Bushway, & El-Begearmi, 2011). Avoid contact between produce and used kitchen towels or rags because this can add bacteria. Table 1 can be used as a guide when washing produce. It identifies different types of produce and specific washing instructions for each. In the table, you will find information on whether to scrub the produce, the type of washing method and liquid recommended, and how long to wash the produce.



Figure 3. You can use a scrub brush or your hands to clean tomatoes while washing them under cool running water. You should rinse and rub them for five seconds and then re-rinse them. Credits: iStock

Summary

Growing a home garden is a fun and convenient way to have a variety of fruits and vegetables available to eat. It is critical to make sure your fruits and vegetables are safe to eat by using proper washing techniques. Use the information in this publication to make sure your food tastes good and is safe for you to eat!

References

- Centers for Disease Control and Prevention (CDC). (2011). *Incidence of foodborne illness, 2010*. Retrieved from <http://www.cdc.gov/Features/dsFoodborneIllness>
- Chang, J., & Fang, T. (2007). Survival of *Escherichia coli* O157:H7 and *Salmonella enterica* serovars Typhimurium in iceberg lettuce and the antimicrobial effect of rice vinegar against *E. coli* O157:H7. *Food Microbiology*, 24(7–8), 745–751.
- Crowe, K., Bushway, A., & El-Begearmi, M. (2011). *Food safety facts: Best ways to wash fruits and vegetables*. University of Maine Extension. Retrieved from <http://umaine.edu/publications/4336e/>
- Davis, J. G., & Kendall, P. A. (2005). Preventing *E. coli* from garden to plate. Colorado State University Extension. Retrieved from <http://www.ext.colostate.edu/pubs/foodnut/09369.html>
- Food and Drug Administration (FDA). (2013). *Raw produce: Selecting and serving it safely*. Retrieved from <http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm114299.htm>
- FDA. (2011). *7 Tips for cleaning fruits, vegetables*. Retrieved from <http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm256215.htm>
- Kilonzo-Nthenge, A., Chen, F. C., & Godwin, S. L. (2006). Efficacy of home washing methods in controlling surface microbial contamination on fresh produce. *Journal of Food Protection* 69(2), 330–334.
- Oregon State University Extension. (2011). *Food safety starts in the garden*. Retrieved from <http://extension.oregonstate.edu/gardening/food-safety-starts-garden-0>
- Painter, J., Hoekstra, R., Ayers T., Tauxe, R., Braden, C., Angulo, F., et al. (2013). Attribution of foodborne illnesses, hospitalizations, and deaths to food commodities by using outbreak data, United States, 1998–2008. *Emerg Infect Dis*. <http://dx.doi.org/10.3201/eid1903.111866>
- USDA. (2011). *Washing food: Does it promote food safety?* Retrieved from <http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/washing-food-does-it-promote-food-safety/washing-food>

Vijayakumar, C., & Wolf-Hall, C. (2002). Evaluation of household sanitizers for reducing levels of *Escherichia coli* on iceberg lettuce. *J Food Protection* 65, 1646–1650.

Yang, H., Kendall, P., Medeiros, L., & Sofos, J. N. (2009). Inactivation of *Listeria monocytogenes*, *Escherichia coli* O157:H7, and *Salmonella typhimurium* with compounds available in households. *Journal of Food Protection*, 72(6), 1201–1208.

Zander, A., & Bunning, M. (2010). *Guide to washing fresh produce*. Retrieved from <http://www.ext.colostate.edu/pubs/foodnut/09380.html>

Table 1. Washing guide for specific produce groups

Produce	Scrub Brush	Method	Washing Liquid	Contact Time
Melons (watermelon, cantaloupe, and honeydew)	Yes	Wash before cutting	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Citrus fruits	Yes	Wash before peeling	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Apples, pears, plums, peaches, and mangoes	Yes	Cut and remove stem and blossom ends after washing	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Small fruits and berries (grapes, strawberries, blueberries, blackberries, raspberries, and kiwi)	No	Rinse in colander	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Tomatoes, cucumbers, and bell peppers	Yes	Cut and remove stem and blossom ends after washing	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Root vegetables (carrots, potatoes, turnips, and radishes)	Yes	Remove any visible dirt	Cool tap water ¹	Rinse and rub 5 seconds, re-rinse
Leafy vegetables (lettuces, cabbage, Chinese cabbage, Brussels sprouts, spinach, and kale)	No	Remove outer layers before washing	Cool tap water or white distilled vinegar/lemon juice solution ^{*, 1, 2}	Soak for 2 minutes, rinse for 15 seconds ¹
Stem vegetables (asparagus, celery, and fennel)	No	Remove ends after washing	Cool tap water or white distilled vinegar/lemon juice solution ^{*, 1, 2}	Soak for 2 minutes, rinse for 15 seconds ¹
Floral vegetables (artichoke, broccoli, and cauliflower)	No	Soak in a clean bowl; drain in a colander	Cool tap water or white distilled vinegar/lemon juice solution ^{*, 1, 2}	Soak for 2 minutes, rinse for 15 seconds ¹

*1/2 cup white distilled vinegar/lemon juice with 2 cups water

¹ Kilonzo-Nthenge, A., Chen, F. C., & Godwin, S. L. (2006). Efficacy of home washing methods in controlling surface microbial contamination on fresh produce. *Journal of Food Protection* 69(2), 330-334. Retrieved from <http://www.ingentaconnect.com/content/iafp/jfp/2006/00000069/00000002/art00012>

² Davis, J. G., & Kendall, P. A. (2005). Preventing *E. coli* from garden to plate. Colorado State University Cooperative Extension. Retrieved from <http://www.ext.colostate.edu/pubs/foodnut/09369.html>