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FOOD SAFETY AND GARDEN FLOODING

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Heavy rains followed by flooding can negatively affect plants in the garden. When plants are exposed to floodwater for prolonged periods of time the roots are deprived of oxygen and the plants can suffocate and die. For vegetables and other tender plants, several days of flooding can cause rapid rotting and death. In addition, contamination of fruits and vegetables by floodwater can create a food safety hazard.



As floodwater moves into your garden it can come into contact with raw sewage overflow, farm and domestic animal waste, river or pond water, compost piles, and agricultural run-off, all of which are sources of human pathogens and hazardous chemicals. If your garden has been exposed to floodwater, human and foodborne pathogens such as norovirus, *Salmonella*, pathogenic *E. coli*, Hepatitis A, Giardia and Cryptosporidium, have likely been introduced into the garden. Gardeners and other people who mishandle and/or consume fresh produce exposed to floodwater are at risk of gastrointestinal illnesses (i.e., vomiting, stomach cramps and diarrhea).

Not all produce in the garden is equally at risk of becoming contaminated by pathogens present in floodwater. Factors such as the level of submersion, crop type, crop maturity and the method of food preparation all need to be considered when determining the best way to handle produce exposed to floodwaters.

Guidelines for Handling Produce Exposed to Floodwater

Discard produce that has come into direct contact with floodwater

The most conservative approach to handling any produce that comes into *direct* contact with floodwater is to destroy it. Fruits and vegetables do not have to be completely submerged in floodwater to become contaminated with pathogens. Produce that has had indirect contact with floodwater, for example by



splashing, does not have to be destroyed but should not be harvested or consumed immediately. Wait 72 hours prior to harvesting, then thoroughly clean and cook the product before eating it. Root and tuber crops such as carrots, beets, onions and radishes, are not protected from floodwater and should not be consumed raw. Whether exposed directly or indirectly to floodwater, any produce that is meant to be eaten raw should not be consumed.

High-risk crops should not be consumed

Several crops present a higher food safety risk than others. Leafy greens, berries and other soft fruits, and cantaloupe should be thrown away as pathogen removal by washing or sanitation is nearly impossible.

Consider crop maturity

Plants with fruit (i.e., tomatoes, strawberries, peppers) that have not fully matured or ripened at the time of flooding present an unknown food safety risk in terms of foodborne pathogens. If immature fruit have not come into *direct* contact with floodwater they can be left on the plant and consumed once they are mature (ripe). Any fruit *directly* exposed to floodwater, whether ripe or not, should be destroyed.

Contaminated produce should not be preserved

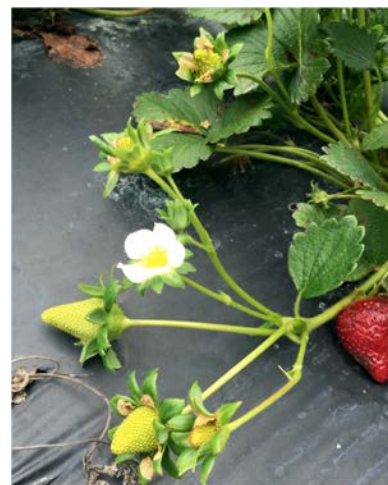
The quality of produce exposed to floodwater is likely low and therefore it is not recommended for home food preservation. Floodwater may contain hazardous chemicals as well as foodborne and human pathogens, which can affect the quality of the produce. As preserving will not change the quality of the produce it may provide an environment for harmful bacteria and viruses to grow and/or survive.

Wash hands and surfaces to prevent cross-contamination

Cross-contamination is the physical movement of harmful microorganisms from contaminated produce to other food, surfaces or gardeners. After handling produce exposed to floodwater thoroughly wash your hands with soap and water for at least 30 seconds and dry your hands with a disposable paper towel. Remove soil, plant debris, and sap from garden tools and harvesting containers and then sanitize them with a disinfectant such as Lysol, diluted bleach (one part bleach to nine parts water), or rubbing alcohol (ethanol or isopropyl). These practices will also prevent the spread of plant diseases. A resource on disinfecting gardening tools is provided under Suggested Resources.

Do not immediately replant your garden

Soil saturated with floodwater is a source of human pathogens and parasites. Limited information is available on the persistence of foodborne pathogens in soils following a flooding event. To minimize the potential of product re-exposure by contaminated soil, do not replant into soil for 2–3 months.



Consider raised bed gardening

One way to prevent direct contact of floodwater with fruits and vegetables is by raising the soil level using raised beds. Beds should be 18 to 36 inches tall and filled with a mixture of peat moss, compost and clean soil to optimize drainage. Details on how to build a raised bed are provided in the fact sheet “Home Garden Series—Raised Beds,” which is listed under the Suggested Resources section below. Raised garden beds also prevent soil compaction and erosion, improve soil drainage, and serve as barriers to pests such as small animals, slugs and snails.

Suggested Resources

Fontenot, K., and Johnson, C.E. 2015. Home Garden Series—Raised Beds. Pub#3360. School of Plant, Environmental and Soil Sciences, LSU AgCenter, Baton Rouge, LA.

University of Florida. 2015. Disinfecting Your Garden Tools. University of Florida-IFAS Extension, Gainesville, FL. Available online at gardeningsolutions.ifas.ufl.edu/care/tools-and-equipment/disinfecting-tools.html.

References

Centers for Disease Control and Prevention. 2011. Guidance on Microbial Contamination in Previously Flooded Outdoor Areas. Department of Health and Human Services, Atlanta, GA.

Lewis Ivey, M.L., Xu, W., and Fontenot, K. 2016. Food Safety and You: Microbial Safety of Fresh Produce in Home Gardens After Flooding. Pub#3536. LSU AgCenter, Baton Rouge, LA.

Schmid, D., Lederer, I., Much, P., Pichler A.M., and Allerberger, F. 2005. Outbreak of norovirus infection associated with contaminated floodwater, Salzburg, 2005. *Eurosurveillance* 10.

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