

Flooded Food and Garden Plants

How should I handle flooded food and produce from my garden?

Damaged Food

Throw out most food because floodwaters can contain a host of bacteria that may make the food unsafe or cause it to spoil. When in doubt, throw out food that may have been damaged or spoiled in the flood.

Commercially-canned foods are usually safe after being in flood waters if the metal can appears undamaged. Cans should be discarded if they are swollen/bulging at the can ends, rusty, creased or dented in the can seam/lid areas, or crushed. Undamaged cans still must be washed and sanitized before they are opened and used. For additional safety, thoroughly cook the canned food before eating it.

To clean and sanitize cans:

- Mark the contents on lids of cans with indelible ink, and remove paper labels.
- Wash the cans in a strong detergent solution, using a scrub brush.
- Immerse the containers for 15 minutes in a cold (60-70F) chlorine solution of 2 teaspoons chlorine bleach per 1 quart of water.
- Air-dry the cans.

Food from the garden is best handled with caution. It's risky to eat any of the produce, so discard it for safety's sake.

Source: The First Steps to Flood Recovery: <http://www.extension.purdue.edu/floodpub/>

Flooded Fruit and Vegetable Crops

Q. If a vegetable or melon field is flooded: What is the risk level and what are recommendations depending on type of crop and stage of growth?

A. Risk can be described as follows:

- Crop set or present: Very High Risk. Crop is considered adulterated by the FDA and may not be sold for consumption without violating FDA regulation.
- Plant emerged, no fruit set: High Risk. The potential presence of microorganisms in the plant as well as in the soil could result in indirect contamination of the crop post flooding.
- Planted but not emerged: Still High Risk for reasons given above.

PURDUE AGRICULTURE

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- Replanting: Moderate Risk. The soil contamination may be as high as that achieved with treating with uncomposted manure. A minimum of 120 days between the recession of waters and harvest is needed to reduce this risk.

Q. Is it also possible to test the soil? What would you test for? Who would do the tests? What would the results mean? Is this a worthwhile course of action?

A. Testing the soil is not a consistent method for determining the risk of microbial contamination; however, it may be useful for determining the presence of chemical hazards. Soil often contains the microorganisms that we use as indicators of fecal contamination and the numbers are not useful unless you know their relative levels prior to the flood. Trying to rely on a test to assure the soil is not contaminated would be very risky.

Soil testing for chemical hazards should be discussed with local health and agricultural specialists who can make you aware of hazards suspected in your region.

Q. Can I spray anything on the soil or on the crop to reduce risk of foodborne illness?

A. No, there are no sprays that would be appropriate for either the soil or the crop to reduce the risk. Any sanitizer would become ineffective based on the level of organic material present. Washing does not eliminate pathogens, so recommendations focus on reducing the risk by discarding affected crops, incorporating, covering and incorporating again next spring. If a field frequently floods, using it solely for agronomic or non-edible ornamental crops is recommended.

Q. Do bacteria enter into the tissue of the plant and then move to other parts of the plant that were not contacted or perhaps were not even present at the time of the flood water?

A. This is a possibility. We have seen evidence in research that microorganisms could be drawn into plant tissues and potentially transferred to produce this way. We cannot prove at this point that this does happen in field conditions; however, the risk that it could is considered great enough that we do not recommend harvesting from plants that have been affected by a flood.

Q. Can flooded fields be replanted to veggies - if so when, which veggies, what should be done prior to planting?

A. Flooded fields should be treated as if they had been treated with uncomposted manure. They are considered a very high risk for contamination with microorganisms that can cause foodborne illness as well as potentially harmful chemicals washed in from other areas.

With manure we recommend incorporation and a minimum of 120 days between incorporation and harvest. Even with this amount of time, a risk for fecal contamination could still exist. Much less risk can be achieved via incorporation and planting with a cover, agronomic, or non-edible ornamental crop and incorporating again pre-planting the next season.

Q. My buyer requires third party food safety certification; what should I do about flooded fields?

A. Contact the fresh produce safety certification company that you will be working with. They can let you know what practices they specifically recommend and the types of documentation they would expect to see. Often this involves writing out the steps you take to discard flood affected produce, and how you work with the affected fields to reduce the risk of microbial contamination. At this time each audit or certifying company has its own standards and it is best to be certain of what those are before the auditor comes out.

Q. My greenhouse was flooded. I grow edible herbs in pots on the benches. The water did not contact the benches. Are the herbs safe?

A. If you can assure absolutely no contact with the flood waters (including splashing) then your risk for direct microbial contamination is not higher than it was before. However, be aware that the greenhouse itself has been contaminated so your risk for indirect contamination of the herbs is greater. Steps should be taken to clean and sanitize the greenhouse with special care given to avoid splashing flood residue onto the produce or inadvertently transferring microbial contamination through hand or glove contact.

Q. Pots containing perennial small fruit crops (blueberries, grapes, brambles) were flooded. The entire plant was covered. What is the risk level? What if only the soil in the pot was flooded?

A. These plants are at a very high risk for microbial contamination. Fruit from these plants should be discarded this season to reduce your risk. Even if the only the soil was affected there is at least a moderate risk that the contamination could lead to foodborne illness. It would be like side dressing with a manure slurry. A minimum of 120 days from contamination to harvest is needed and a full season is preferable.

Q. Should I do anything more than standard Good Agricultural Practices (GAPS) in the way of crop management or harvest/post-harvest handling?

A. As stated above the crop and field should be treated as if they had been treated with uncomposted manure. In most cases this means discarding the crop, incorporating, planting a cover or agronomic crop, incorporating again and using the field the following season. Beyond that careful adherence to Good Agricultural Practices throughout production, harvest and post harvest is very important.

Q. Where is the line that demarcates 'legal but risky' from 'illegal'?

A. The FDA focuses on whether there is a probability that a food has become "adulterated." Adulteration is the term used to state that something has happened to the food to cause it to be injurious to health. The FDA clearly states that crops that have come in contact with flood waters are considered to be adulterated. That puts any grower trying to salvage a crop from a flood in the territory of engaging in violating FDA regulations. Legal but very risky behavior is harvesting from plants that had not set prior to or during the flood or from crops planted immediately after the flood.

Source: Liz Maynard, Regional Extension Specialist, Commercial Vegetable and Floriculture Crops, Purdue University

Related Resources

After the Storm: Garden, Landscape and Turf Triage
<http://www.ces.purdue.edu/CES/Marion/HortConLinks04.htm>

Disaster Recovery Resources for Indiana
<http://www.ces.purdue.edu/eden/>

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