



# OEFFA Organic Certification Fact Sheet

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## Post-Harvest Produce Handling

### What You Can't See Can Make You (and your customers) Sick

In the event an outbreak of a food borne illness is traced to a specific farm, health inspectors visiting the farm would likely find some type of contaminant somewhere on that farm. It is virtually impossible to eliminate every potential contaminant from the environment. Nonetheless, growers have a responsibility to implement systems that minimize the potential for contamination of their crops. Knowing the sources of contamination, prevention strategies, and the most effective cleaning and sanitation practices is a good start toward this goal. A detailed food safety assessment and thorough record keeping logs may also help farmers better manage their operations and better protect their customers from food borne illness. Growers should realize that it is preferable to prevent contamination of produce prior to harvest rather than attempting to eliminate contamination that has already occurred.

#### Sources of Contamination

Produce that is sold in an unprocessed or minimally processed form can be contaminated with a pathogen at any point in the production, transportation, marketing, or preparation process. The greatest risk for contamination is through human or animal feces. Water used in growing, washing and packing of produce can carry contaminants and potentially disperse them throughout a crop, field, or batch of product.

Most food-borne illnesses traced to consumption of fresh fruits and vegetables are due to the presence of bacteria on the produce, usually either salmonella or E. coli. Some parasites such as cryptosporidium and cyclospora have also been linked to food borne illness.

#### *In the Field*

Crops can be contaminated by pathogens by pathogens in animal feces from domestic animals in the field, from water that runs-off of adjacent property, or from contact with raw or improperly composted animal manure applied by the grower. The organic standards outline very specific requirements for composting animal manure (see §205.203(c) and/or OEFFA Fact Sheet #6) to reduce the risk of contamination from manure and composts made with manure.

Manure storage and compost handling sites near produce fields increase the possibility of contamination. Growers should consider the location of their compost and manure piles and maintain good records regarding manure sources, treatments, turning, temperatures, and application dates and rates. Growers should avoid leaving culled produce in the field, as the decomposing material act as reservoirs for potential contamination (let alone crop pests and disease).

#### *Harvest and Post-Harvest*

Contamination of produce in the harvesting process can result from transfer of pathogens from workers or from unsanitary harvest containers. All pickers and handlers should be trained in proper personal hygiene when handling the produce, and those with illnesses that cause nausea, vomiting or diarrhea should not be permitted to handle fresh produce.

Growers who are managing pick-your-own operations or CSA operations in which the customers are picking their own produce should educate those customers on the importance of proper personal hygiene practices. Managers should provide accessible and thoroughly stocked restroom facilities with signage emphasizing the importance of proper hand washing. An easily accessible first aid kit should be available to help pickers clean and treat open wounds that can lead to contamination of fresh produce.

The harvest bin and any container or tool that will come in contact with produce should be kept clean and should be sanitized prior to use. Sanitation and careful cleaning in the washing and packing area is also critical. Domestic and wild animals (especially rodents) should not be permitted in the wash area. Vehicles that are used for the transport of fresh produce should be cleaned and sanitized frequently. Managers should establish a protocol for cleaning and disinfecting harvest equipment, cleaning/processing facilities, and transportation. Growers should also consider keeping a log as a record of their cleaning and sanitation practices.

At the point of sale, if you direct market your produce, you should provide customers with clean, new bags or packaging to prevent contamination. If you plan to use labels, be sure they have been approved by the OEFFA certification office.

## Washing Produce

In general, a series of washes that do not reuse wash water is more effective than a single wash. Brush-washing produce that is not vulnerable to damage is a more effective method of removing possible contaminants. Growers should be diligent about cleaning and sterilizing brushes and all surfaces in the packing area.

The temperature of wash water is also an important factor in the washing and packing operations. Some produce, such as tomatoes, peppers, potatoes, apples and celery, must be washed in water that is at least 10° F warmer than the produce. If these crops are washed in water that is cooler than the produce, a pressure differential causes produce to “soak up” water from the wash tank. Any contaminants that were in the wash water are then pulled into the produce itself and additional washing will not remove them. To avoid internalization of pathogens growers can air-cool produce prior to washing or heat wash water.

### *Cleaning Substances*

The most common cleaning substance used is water with the addition of chlorine materials such as calcium hypochlorite, sodium hypochlorite, or chlorine dioxide. The bleach or other chlorine solution may not contain any unapproved synthetic substances like dye or fragrance.

Chlorine can be added to wash water at a concentration of 50 – 200 ppm (parts per million, or mg/L) total chlorine. Produce should be in contact with chlorinated water for 1-2 minutes. The chlorine residue must not exceed 4 ppm which was established as the maximum residual disinfectant limit under the Safe Drinking Water Act. In other words, the final produce rinse must be potable, containing no more the maximum chlorine levels found in municipal water. Use of chlorine as an antimicrobial therefore requires a grower to greatly dilute the effluent prior to discharge. One gallon of wash water that contains 50 ppm chlorine would have to be diluted with 13 additional gallons of water before discharge.

Other disinfectants permitted to come in contact with organic produce include vinegar (must be from an organic source), peracetic acid, ethyl alcohol (also from an organic source), and hydrogen peroxide. If you plan to use hydrogen peroxide, vegetables should first be washed with water to remove excess soil. They may then be sprayed with a 3% solution of hydrogen peroxide. Continue reading to learn about how the use of these substances may affect the labeling status for the produce.

## Containers

Reusing boxes from the grocery store for transporting produce is not an acceptable practice for organic growers. The exception to this would be if you reused boxes and lined them with new, food-grade liners. Of course you may reuse your own containers for transport if they are used exclusively for organic product.

The rules expand a bit as far as disinfectants for containers in comparison to what can be used in direct contact with organic products. The same substances discussed in the section above apply, as well as isopropyl alcohol, synthetic detergents and cleaners, and even dish soap. Just be sure that your cleaner of choice does not contain quaternary ammonium compounds and is not antibacterial. In all cases, the equipment or harvest containers must be rinsed completely free of the substances used to clean them so that the produce does not become contaminated.

## “100% Organic” or “Organic?”

If a product is labeled as “100% Organic,” it may not be processed with any non-organic substances whatsoever. Chlorine is one exception, but must not exceed the amount of chlorine permitted by the Safe Drinking Water Act. For example, if chlorine is used to clean apples, the wash water at no point can contain more than 4 ppm if the grower wants to label them as “100% Organic Apples.” The grower cannot use peracetic acid, hydrogen peroxide, or other synthetic substances in the disinfecting of the produce if the label will read “100% Organic.” All ingredients or processing agents in a “100% Organic” product must be organic.

Under the NOP rules, an organic product must have at minimum 95% organic ingredients. In the case of produce, the use of *approved* synthetics to disinfect would move the produce into the “Organic” category.

Consumers should be aware that growers may choose to use the label “Organic” versus the lengthier “100% Organic” even if they haven’t used any synthetic processing aids and their produce truly is 100% organic.

## Resources

ATTRA Publication: IP116 – Postharvest Handling of Fruits & Vegetables. Available at 1-800-346-9140 or <http://www.attra.org/attra-pub/postharvest.html#postharvest>

Food Safety Begins on the Farm: A Grower’s Guide. 2000. Anusuya Rangarajan, Elizabeth A. Bihn, Robert B. Gravani, Donna L. Scott, and Marvin P. Pritts. Available at [www.gaps.cornell.edu/educationalmaterials.html](http://www.gaps.cornell.edu/educationalmaterials.html)

Post Harvest Handling for Organic Crops. 2000. Trevor Suslow. Davis: University of California. ANR Publication 7254. Available at <http://anrcatalog.ucdavis.edu>

Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables. U.S. Dept. of Health and Human Services. FDA. Center for Food Safety and Applied Nutrition. 1998. Available by calling 1-888-723-3366.

Key Points of Control and Management of Microbial Food Safety for Growers, Packers, and Handlers of Fresh-Consumed Horticultural Products. Trevor V. Suslow. Davis: University of California. Vegetable Research and Information Service. Available at <http://vric.ucdavis.edu>