

have not damaged peaches. Still, excessive amounts of chlorine will result in peach skin discoloration.

**Dump tanks**

Water used in cleaning and cooling should have 100 to 150 ppm free chlorine concentration. Chlorination can be done with gas injection or by adding bleach or calcium hypochlorite tablets. Water pH should be maintained between pH 6.5 and 7.5 to maintain recommended free chlorine levels. Excessive chlorine causes gassing off (objectionable chlorine odor). The gas can irritate workers' skin, is corrosive to equipment, and increases sanitation costs.

Fruit should never be in contact with water for prolonged periods. In some cases fruit can absorb water and anything suspended in the water. Free water in fruit or in wounds usually encourages the growth and survival of microorganisms, including pathogens harmful to both humans and plants.

**Pest control**

The openness of production areas and many packing facilities makes it almost impossible to exclude birds, rodents,

domestic animals, or other pests. Daily cleaning, monitoring for signs of pests, elimination of potential nesting locations, and constant vigilance in attending to these tasks will help reduce risks.

**Vehicles**

Because of their role in temperature management, trucks are an important factor in food safety as well as peach quality. Prior to loading, trucks should be inspected for cleanliness. If there are traces of odors or visible signs of foreign matter, these should be removed. Pressure cleaning with an appropriate disinfectant is preferred. In addition to cleanliness, truck condition should be inspected. Any item in disrepair that would prevent proper temperature management of the load must be repaired, including door seals, condition of walls and insulation, air delivery chutes, bulkheads, etc.

Peaches and trailers should be adequately precooled before loading.

Refrigeration systems are designed to maintain temperature, not to remove field heat.



Good Agricultural Practices

for the

Production and Handling of Peaches

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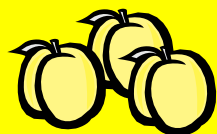
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## Introduction

To date, fresh peaches have never been implicated as the cause of an outbreak of foodborne illness. However the potential for a food safety crisis exists for all produce items. Here are some key issues that should be part of any food safety program.

## Preharvest

### Field sanitation

Since peaches are a tree crop and picked fruit is never in contact with the soil, fecal contamination from past land use is not a serious concern. Fruits that fall to the ground, called “drops” or “windfalls,” should never be harvested unless the finished product receives a heat-kill step, such as pasteurization or cooking.

“Drops” should never be harvested for sale as fresh-market fruit.

Soils may become incidentally contaminated with animal feces, for example, from deer browsing in peach orchards, which may leave contamination behind.

### Land-use history

Of greater concern to the production of peaches is the possibility of toxic residues in the soil. Heavy metals from sewage sludge or excessive pesticide residues affect fruit quality.

### Fertilizer use

Organic fertilizer used for peaches should be properly composted and applied directly to the soil after fruit harvest is completed. This will allow several months for any living microbes to die before the next fruit set.

Raw animal manure must be composted unless it is incorporated into the soil not fewer than 90 days prior to the harvest of a product, like peaches, whose edible portion does not have direct contact with the soil.

Fully composted manure should still be handled in such a way that contact between the material and the edible portion of the crop is avoided.

“Fully composted” means organic matter has been maintained between 131°F and 170°F for 3 days, using an in-vessel or static aerated pile system, or maintained at between 131°F and 170°F for 15 days, using a windrow composting system. During this period, the materials must be turned a minimum of 5 times (National Organic Program, *Final Rule Sec. 205.203*).

### Irrigation

Water is always one of the primary fresh produce food safety concerns. A distinction is made between field agricultural water and processing water used in the packing house. For peaches, several agricultural water-related precautions should be considered.

Practically all peach production locations require irrigation. Water may be applied in furrows, through micro-sprinklers under the tree, or by overhead systems. Drip irrigation seldom is used for peaches. Compared to any other form of irrigation, overhead irrigation is more likely to spread pathogens into the tree canopy. Water used as a means of frost protection must be potable (safe for drinking).

The quality of source water is a key concern. Surface waters, such as lakes, ponds, streams, etc., should be tested. The presence of the bacterium *Escherichia coli* (*E. coli*) is an indicator of fecal contamination. Do not irrigate from a pond or lake if animals were grazing nearby or had access to the water.

Underground (well) water is less likely to have fecal contamination, although such situations have been documented. Pesticide residues and heavy metals are generally of more concern in underground sources of water.

### Pesticide mixing

Pesticides should be mixed and applied according to label instructions. Potable water should be used. At least one docu-

mented case of a foodborne illness resulted from the mixing and application of pesticides with contaminated water.

If you need to test your water, use a reputable, certified laboratory and be sure that you keep the records of the test results. The laboratory should be able to provide you with tolerances for allowable populations of microbes in the water.

### Worker hygiene

Many managers are uncomfortable with the topic of employee hygiene, but it is one of the most important components of a food-safety program. Employees must be trained on a regular basis so that new employees receive information and the message to long-term employees is fortified. The topics of proper toilet habits, hand washing, health screening, and hygiene in the home all are important. Training ideally is conducted in the native language of the employees and always with sensitivity to the culture of the worker.

## Harvesting

### Harvest containers

Picking bags, buckets, boxes, bins, gondolas, and all other harvest containers should be cleaned and inspected on a regular basis. They should be free of foreign contaminants like rodent droppings, bird nests, or other organic material. Ideally, they should be washed and sanitized with approved detergents and disinfectants. Physical hazards, such as nails, splinters, staples, etc., also should be removed from containers. Using plastic rather than wood bins reduces contamination risk.

### Employee hygiene

The number and types of toilets that must be present in the field are regulated by both federal (OSHA) and state agencies. Toilets should be supplied with toilet paper and equipped with a hand-washing station that has water, soap, and single-use towels.

### Vehicles

The same rules that apply to harvest containers also apply to field vehicles. One additional point is that tractors and trailers should not be driven through livestock areas and then taken to the orchard without first being cleaned and sanitized properly.

## Postharvest Handling

### Packinghouse equipment

Sanitation throughout a packing facility requires little more than the systematic application of common sense to the cleaning task. At the end of each day, remove fruit from conveyors and from underneath the packing line and other areas. Sweep all areas. Pressure-washing with an industrial disinfectant is preferred, although in practice this is difficult to achieve on a daily basis. Wash out drain pans under equipment, floor drains, and any other place where water might accumulate.

### Water

Processing and rinse water MUST be potable.

While it is possible to hand-pack peaches without the use of water, most commercial packing houses use water in hydrocoolers, dump tanks, or sometimes both. Water-quality management for good sanitation is a requirement any time processing or rinse water is used. Addition of a disinfectant to the water does not imply that water will disinfect the peaches. Rather, water is sanitized to prevent waterborne microorganisms from spreading.

### Hydrocoolers

Hydrocooler water is recirculated. Presorting and prerinsing fruit before hydrocooling minimizes the amount of soil and organic matter that enters hydrocooler water. At least 100 ppm free chlorine should be maintained in hydrocooler water.

In California, reports have indicated that concentrations of 300 to 500 ppm chlorine

