

Best Practices for Use of Produce Containers

Review and Revision: Lavonne Meyer | Food Safety Field Specialist
Original Publication: Joan Hegerfeld-Baker, Ph.D. | Instructor & Food Safety Specialist

Equipment and containers used by growers to harvest and market produce need to be kept clean. This requires diligence in care and maintenance to prevent foodborne illness and keep high quality products.



Photo taken by Rhoda Burrows, SDSU Extension Horticulture State Specialist

Prevent Contamination

Equipment and containers used for harvesting, transporting, and displaying produce can pose a risk for contamination of food if not properly cleaned, sanitized, and maintained. The following conditions can expose equipment and containers to food contamination:

- not cleaning and sanitizing before and after use
- allowing animals and birds in the area where equipment and containers are stored
- using a pickup bed or cart used to haul nonfood items or animals
- allowing contact with waste water, or water that is not tested for safety
- workers handling containers or equipment in a manner that would increase the risk of contamination
- storing in an area that is unprotected

Avoid Contact with Soil

While harvesting, produce should be placed in clean and sanitary field containers, rather than on the ground. Field containers should be cleaned and sanitized on a regular basis, as well as be free of contaminants such as mud, industrial lubricants, metal fasteners or splinters. To reduce pathogens spread by shoes, do not allow workers to stand in field bins during harvest.

Types of Containers

Plastic field bins and totes are preferred to wooden containers since plastic surfaces are easier to clean and sanitize. Wooden containers or field totes are almost impossible to sanitize since they have a porous surface. Wood or metal fasteners such as nails may accidentally be introduced into produce. Before reusing cardboard field bins, they should be visually inspected for cleanliness, and lined with a clean plastic bag that is intended for food to prevent the risk of cross contamination. Trash bags often contain chemicals that can leach into food; therefore, do not use as a food container during harvesting, transporting, or marketing.



Cleaning and Sanitizing Equipment

All food contact surfaces (sorting bins, tables, tools, utensils, display baskets) should be cleaned and sanitized before and after use. Pressure wash, rinse, and sanitize all crop containers, tools and packing house surfaces prior to each day's harvest. Sanitizers should be used on surfaces only after thorough cleaning with abrasion to remove organic materials such as dirt or plant materials. The two sanitizers most commonly used contain chlorine (bleach) or quaternary ammonium (quats) compounds. Refer to Table 1: Sanitizer Characteristics to compare bleach and quats sanitizers. Cleaning agents and sanitizers are in the physical states of compressed gas, powders, or concentrated liquids; therefore extreme care is required when handling.

Table 1: Sanitizer Characteristics:

	Bleach	Quats
Common uses	All food contact surfaces	Food and Non-food contact surfaces, porous materials, drains and walls
Concentration	25-200 ppm	as per manufacturer's directions
Effectiveness in killing germs	Highly effective	Variable – depending on microorganism; more effective than chlorine on yeasts, molds and <i>Listeria</i> ; less effective on <i>Salmonella</i> and <i>E.coli</i>
Speed	Fastest	Moderate
Stability over time	Good	Excellent
Temperature	55-120° F	55-120° F
Effectiveness in hard water	Effective in hard water	Less effective in hard water
Corrosion	Causes light to moderate corrosion on metals	None

To Effectively Clean and Sanitize Containers and Equipment, use the following protocol:

1. Remove all visible debris (organic matter such as dirt, plant materials, and insects) and other possible contaminants using a pressure spray and an all-purpose soap or detergent if needed.
2. Rinse thoroughly – soap and organic matter bind with the sanitizing solution, decreasing its effectiveness in killing germs.
3. Apply a sanitizer with a clean cloth or spray using the dilutions on Table 2: Chlorine Sanitizing Dilutions or the label directions from another type of sanitizer.
4. Test the sanitizer solution using test strips. Test strips are available at many restaurant supply companies, hardware or pool and spa stores.

Use of steam to clean equipment should be avoided since steam may actually cake organic materials and form a biofilm, which renders equipment almost impossible to sanitize. Steam may also aerosolize bacteria and actually spread contamination throughout the packing house facility. A biofilm is a matrix that is formed by microorganisms allowing them to attach and survive for an extended time on a surface. Once formed, biofilms are very difficult to remove.

Table 2: Chlorine Sanitizing Dilutions

Concentration (ppm*)	Chlorine (5.25%)	Water (gallons)	Use	Note
100 ppm	1.5teaspoons	1	Table tops, dishes, utensils	To effectively sanitize, water must maintain a temperature between 55° F and 125° F
200 ppm	1tablespoon	1	Table tops, dishes, utensils	
400 ppm	2 tablespoons	1	Produce storage containers	

Packaging Materials

All packaging materials should be made of food contact grade materials to assure that toxic compounds in the packaging materials do not leach out of the package and into the produce. Empty boxes and plastic bags should be stored in an enclosed storage area to protect from insects, rodents, dust, dirt, and other potential sources of contamination.

Reference:

Parker, A. 2007. Effective Cleaning and Sanitizing Procedures. Good Aquacultural Practices Program. Joint Institute of Food Safety and Applied Nutrition. University of Maryland and Johnson Diversey Corporation. http://jifsan.umd.edu/pdf/gaaps_en/14%20GAqPs%20Manual%20SOPs.pdf