



Packinghouse Best Practices To Support the FSMA Produce Safety Rule

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Introduction

The Food Safety Modernization Act (FSMA) Produce Safety Rule covers packinghouse activities in several portions of the regulation. These include Subpart D – Health and Hygiene (of workers); Subpart E – Agricultural Water; Subpart K – Growing, Harvesting, Packing, and Holding Activities; and Subpart L – Equipment, Tools, Buildings, and Sanitation (U.S. FDA 2015). In addition, Subpart O – Records, describes required recordkeeping. Applying the practices required by the Produce Safety Rule to packinghouses is an important element to ensure the safety of fruits and vegetables. This publication provides an overview of packinghouse best practices to support the Produce Safety Rule.

Packinghouse Considerations

Types of Packinghouses

Packing areas can typically be divided into two categories:

- **Open:** An area that is open to the environment; may be under roof (e.g., pavilions, pole barns, field packing areas).
- **Closed:** A structure with walls, doors, and windows; provides ability to exercise greater control over the indoor environment and restrict or control pests and personnel access.

Flow of a Packinghouse

It is important to develop a proper pattern, or flow, of produce movement through a packinghouse to prevent

contamination from disease-causing microorganisms. When developing a map of the flow of produce in a packinghouse, identify areas of concern for the highest risks of product contamination, and implement practices to manage those risks. Packinghouses may be divided into zones so growers can prioritize cleaning and sanitizing efforts. While food-contact surfaces are the highest priority, it is important to clean and sanitize each zone because pathogens may spread from one zone to another.

Zones of a Packing House

Zone 1: Direct food contact surfaces.

Zone 2: Surfaces adjacent to Zone 1, such as spray nozzles and sidewalls.

Zone 3: Other areas inside the packing area, such as the floor.

Zone 4: Areas outside of the packing area, such as loading docks, employee break areas, etc.

Key Factors to Reduce the Risk of Contamination in a Packinghouse (from the Produce Safety Alliance Course Manual 2016)

1. Use proper cleaning and sanitizing methods.
2. Assign designated holding areas for produce.
3. Provide proper hygiene facilities for workers.
4. Avoid the establishment of standing water and condensation.

5. Develop a pest management plan.
6. Maintain general organization throughout the operation.

Cleaning and Sanitizing in Packinghouses

Cleaning and sanitizing are key components described in the Produce Safety Rule. Protocols should be developed based on risks identified in your facility. For example, procedures for cleaning and sanitizing food contact surfaces should take into consideration the commodity and amount of product handled each day. Certain commodities, like root vegetables, may carry more organic debris into the packinghouse facility than produce grown above the ground and will require that equipment and facilities be cleaned and sanitized more frequently.

Cleaning vs. Sanitizing: What is the difference?

- **Cleaning:** The physical removal of dirt from surfaces through the use of clean water and detergent.
- **Sanitizing:** Treatment of a cleaned surface with heat or sanitizers to reduce or eliminate microorganisms.

It is impossible to sanitize a surface that has not been cleaned.

Another aspect that should be considered when maintaining a packinghouse is whether equipment can be fully cleaned and sanitized. For example, wood is commonly used in many packinghouses and packing operations. However, wood may be difficult to clean and sanitize due to its porosity. While wooden crates are still commonly used for some crops, many packers use plastic and nonporous material to enhance equipment sanitation.

Steps for Cleaning and Sanitizing

1. Remove dirt and debris from food contact surfaces.
2. Apply water and an appropriate detergent, if needed, and scrub the surface.
3. Rinse the surface with clean water, removing all detergent and any remaining debris.
4. Apply sanitizer approved for use on food contact surfaces. The Produce Safety Alliance maintains a list of EPA-labeled sanitizers

available for download its website. Go to <https://producesafetyalliance.cornell.edu/files/shared/documents/PSA-Labeled-Sanitizers-for-Produce.xlsx> to download the list, or go to <https://producesafetyalliance.cornell.edu/resources/general-resource-listing/> and scroll down to “Sanitation.”

5. After using the sanitizer, rinsing may be necessary. Let air dry.

Hazards in Packing Houses

Microbial Hazards

Disease-causing bacteria such as *Salmonella*, *E. coli*, and *Listeria* have been responsible for foodborne illness outbreaks originating from fresh produce. Outbreaks from fresh produce have affected many people and have resulted in severe illness and sometimes death. Microbial hazards may be introduced when fresh produce is being handled and packed for storage and shipping. Human pathogens can be spread by workers to produce; providing training programs for worker health and hygiene can reduce the risk of microbial contamination. Maintaining the cleanliness of food contact surfaces, and sanitizing when necessary, reduce potential microbial hazards. Programs that consider equipment and facility maintenance also improve safety by avoiding known risk factors like dripping condensation; pooling of water; and the presence of trash, culled produce, and pests. While the FSMA Produce Safety Rule curriculum mainly focuses on microbial food safety hazards, other types of hazards also must be considered in a packing facility: physical and chemical hazards.

Physical Hazards

Physical hazards include foreign material such as wood, metal, glass, plastic, etc., that may cause injury to consumers if present in fresh produce. Physical hazards can be managed by using guards on light fixtures and metal detectors for finished products, and scheduling inspections of equipment and packing areas.

Chemical Hazards

Chemical hazards arise from improperly applied pesticides or from chemicals or sanitizers stored near produce. Chemical risks can be mitigated by storing chemicals away from produce in a locked area and making sure workers are trained to handle chemicals according to the label instructions. Workers should also know how to respond to chemical and sanitizer spills and leaks.

Pest Management

Pests may increase the risk of produce contamination. Pest management plans with routine monitoring should be implemented to exclude and discourage pests. Pest management plans vary depending on the type of packing establishment. For a packinghouse that is open to the environment, pests must be deterred from becoming established and removed when they are present. Closed packing facilities should exclude pests altogether. Both facility types should have pest management plans in place before the start of production. An example of pest management includes having numbered traps for rodents that are marked on a map of the packing area. This would facilitate monitoring and recordkeeping.

Sanitary Design

Equipment and tools must be properly designed so they can be adequately cleaned and sanitized. Surfaces that directly contact food should be nontoxic, nonabsorbent, and corrosion resistant (e.g., stainless steel). Equipment and adjacent spaces should be easily accessible. Brushes, rollers, and nozzles should all be removable for proper cleaning and sanitizing.

Some packinghouses may have older equipment that cannot be properly sanitized, like equipment made from wood, but this does not mean that it cannot be cleaned. Methods that can be used to reduce risks from these types of surfaces include:

- Developing routine cleaning schedules.
- Air drying wooden surfaces after cleaning.
- Discarding materials that cannot be properly cleaned.
- Ensuring new materials can be properly cleaned and sanitized.

Some growers retrofit or repurpose equipment to meet new processing needs. Growers must use caution in doing so because repurposing equipment may introduce new risks. For example, new welds can create places for pathogens to thrive. To prevent the introduction of new hazards when retrofitting equipment, the following methods can be used:

- Retrofit with materials that can be cleaned and sanitized (e.g., no carpet).
- Consult the manufacturer of the equipment about the new purpose.

- Make sure seams are smoothly bonded.
- Prevent the accumulation of dirt, filth, food particles, and organic material to minimize growth of pathogens.
- When feasible, invest in equipment that can be properly cleaned instead of retrofitting.

Cold Storage Areas

Cold storage is not required by the FSMA Produce Safety Rule. However, if you choose to use cold storage areas, use best practices to minimize risks. It is important to regularly inspect cold storage areas to make sure they remain clean and that all equipment is functioning properly. It is also important to create pest management and sanitation plans for these areas. Key factors for maintaining the integrity of cold storage include:

- Monitoring any condensation or dripping that could contaminate produce.
- Inspecting all doors and windows to ensure a proper seal.
- Monitoring and recording the temperature of the cooler, at least at the beginning of each day.
- Frequently calibrating devices used to record and monitor temperature to ensure they are accurate and precise.

Transportation

Transportation of produce may involve using various types of vehicles including open trucks, closed trucks, vans, and wagons. Regarding produce that is covered by the Produce Safety Rule, FSMA requires trucks to be cleaned and sanitized properly before transporting produce. Any vehicle that could potentially carry produce or items that come in contact with produce (for example, harvest bins or tables for displaying produce at market) must be treated in a way that minimizes the risk of contamination. For example, if a truck transports live animals, it must be cleaned and sanitized before being used to transport produce that is covered by the rule. All trucks should also be inspected for cleanliness prior to transporting covered produce.

Corrective Actions

When a food safety risk is identified in a packing area, a corrective action should be taken and documented. Food safety risks that may need corrective actions involve risks identified in packing, washing, storage, or transportation of fresh produce. Examples of when corrective actions are needed include:

- Pest infestation.
- Contamination of the packing line by blood or other body fluids.
- A clogged drain with pooling water.

Corrective actions should not only fix a situation immediately, but also prevent the situation from recurring. Monitoring of corrective actions is important to ensure problems have been fixed.

Recordkeeping

Records are needed to ensure that a job has been successfully completed and establish when it was completed. In packinghouses, records of cleaning and sanitizing equipment, tools, and containers must be kept. Other required records include pest management,

building maintenance and monitoring, worker training, packing area and cold storage cleaning and monitoring, and vehicle inspections. Facilitate recordkeeping by using clipboards or other means of documentation where the activity occurs, and be sure to retain all records for at least two years.

References

Produce Safety Alliance. 2016. Grower Training Course Manual. <https://producesafetyalliance.cornell.edu/curriculum/english-grower-manual-electronic-public-release/>.

U.S. FDA (United States Food and Drug Administration). 2015. Standards for the Growing, Harvesting, Packing and Holding of Produce for Human Consumption. <https://www.gpo.gov/fdsys/pkg/FR-2015-11-27/pdf/2015-28159.pdf>.

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Produced by Virginia Cooperative Extension, Virginia Tech, 2024

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