

Post-harvest Handling of Fruits and Vegetables

Best Practices To Ensure On-farm Food Safety



Good agricultural practices usually cover pre-harvest practices, while good handling practices deal with post-harvest practices for fruits and vegetables.

After the fields have been harvested, minimizing microbial contamination of the produce must continue to be a priority. Specific strategies should be implemented during produce transportation, washing, grading, packing and storage to minimize the potential of microbial contamination.

Key components of post-harvest handling of fruit and vegetables

Any surfaces produce comes into contact with after harvesting must be clean and sanitized. This includes equipment used to move produce, such as conveyor belts or harvesting containers.

Separate injured, diseased or decayed produce from healthy crops to prevent the spread of pathogens. Also, any produce that will be consumed raw, which comes into contact with the floor or ground after harvest, should be discarded.

Cooling the produce is a high priority for maintaining quality and reducing food safety risks. Cooling of produce extends the storage life of fruit and vegetable crops and reduces the reproduction of spoilage microorganisms and many foodborne pathogens. It is advised to remove “field heat” immediately after produce is harvested.

Cooling produce

Use the chart below to determine ideal storage conditions of various fruit and vegetable crops:

Produce	Optimum Storage Temperature (degrees Fahrenheit)	Relative Humidity (percentage)
Asparagus, beets, broccoli, Brussels sprouts, cabbage carrots, cauliflower, collards, sweet corn, grapes, kale, green shallots, lettuce, pears, green peas, radishes and spinach	45	90-95
Snap beans	40-50	95
Cucumbers, eggplant and sweet peppers	45-50	90-95
Cantaloupes	40	90
Watermelons	40-50	80-85
Green tomatoes	50-70	90
Ripe tomatoes	50-60	90
Garlic and onions	50	65-70
Hot peppers	50	60-65
Pumpkins and winter squash	55-60	70-75
Sweet potatoes	55-60	80-85

These temperatures should be maintained throughout the “cold chain.”

Harvest → Storage → Shipping → Retail Display (roadside stand, farmers market, grocery, etc.)

Any water or ice that is used to maintain the temperature of produce **MUST** be made from potable water.

Harvesting containers

Harvesting containers should be clean, sanitized and properly stored to reduce the risk of microbial contamination of fresh produce.

Several factors may influence potential food safety risks associated with harvesting container handling, including the type of material (wood versus plastic), harvesting bin storage design (nested versus non-nested stacking) and type of produce being handled.

Wood bins are subject to weathering, which can result in rough surfaces that can harbor various pathogens. Plastic bins have been cited as more resistant to weathering, with surfaces that are easier to clean and sanitize.

Packing produce

If produce is graded and repackaged, the following items must be addressed:

Workers

- Workers who are ill from or who have been exposed to any disease that is likely to be transmitted through food should be excluded from contact with produce for the length of the illness or the appropriate period where symptoms might develop after exposure. Workers with infected wounds, skin complaints, vomiting or diarrhea must be excluded from contact with produce as long as the symptoms exist.
- Prior to grading or repackaging produce, workers always must wash their hands. Hands also must be washed after using the restroom, smoking or eating.
- If workers are required to wear gloves during

grading, they must wear disposable gloves and replace gloves after every break or wear reusable gloves that have been washed every time.

Produce

- Inspect produce for damage. Cuts, bruises and insect or disease damage on individual fruits or vegetables can harbor unwanted microbes. Damaged fruits or vegetables should be culled.
- Culls must be removed from the packing area on a daily basis. They should be placed in trash bins with lids.

Labeling produce

- A labeling system must be used to maintain traceability from the field of origin to the retail outlet for all produce. As fruit and vegetable crops are removed from harvest bins and go through the supply chain, they must be sorted and labeled in a manner that allows a producer to recall any and all produce from a particular field, date or facility at any point during the supply chain.

Example of a label that meets good agricultural practices standards:

FARM NAME: The South's Best
Produce Type: Tomatoes
Date Harvested: 7/8/2015
Field of Origin: Field B-1
Storage Temperature: 65 F
Purchaser: Robertson's Produce

Record keeping

Standard operating procedures, as well as dates and signatures by each of the required items, must be kept.



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Authors

Kathryn Fontenot, Ph.D., LSU AgCenter School of Plant, Environmental and Soil Sciences
Achyut Adhikari, Ph.D., LSU AgCenter School of Nutrition and Food Sciences
Charles Graham, Ph.D., LSU AgCenter Pecan Research-Extension Station
Fatemeh Malekian, Ph.D., Southern University Agricultural Research and Extension Center
Melanie L. Lewis Ivey, Ph.D., LSU AgCenter Department of Plant Pathology and Crop Physiology

William B. Richardson, LSU Vice President for Agriculture
Louisiana State University Agricultural Center
Louisiana Agricultural Experiment Station
Louisiana Cooperative Extension Service
LSU College of Agriculture

Pub.3443 (Online Only) 9/15

The LSU AgCenter and LSU provide equal opportunities in programs and employment.

This fact sheet was developed as part of the LSU AgCenter on-farm food safety risk management project. This project was funded by Southern Extension Risk Management Education Project No. 21665-03.