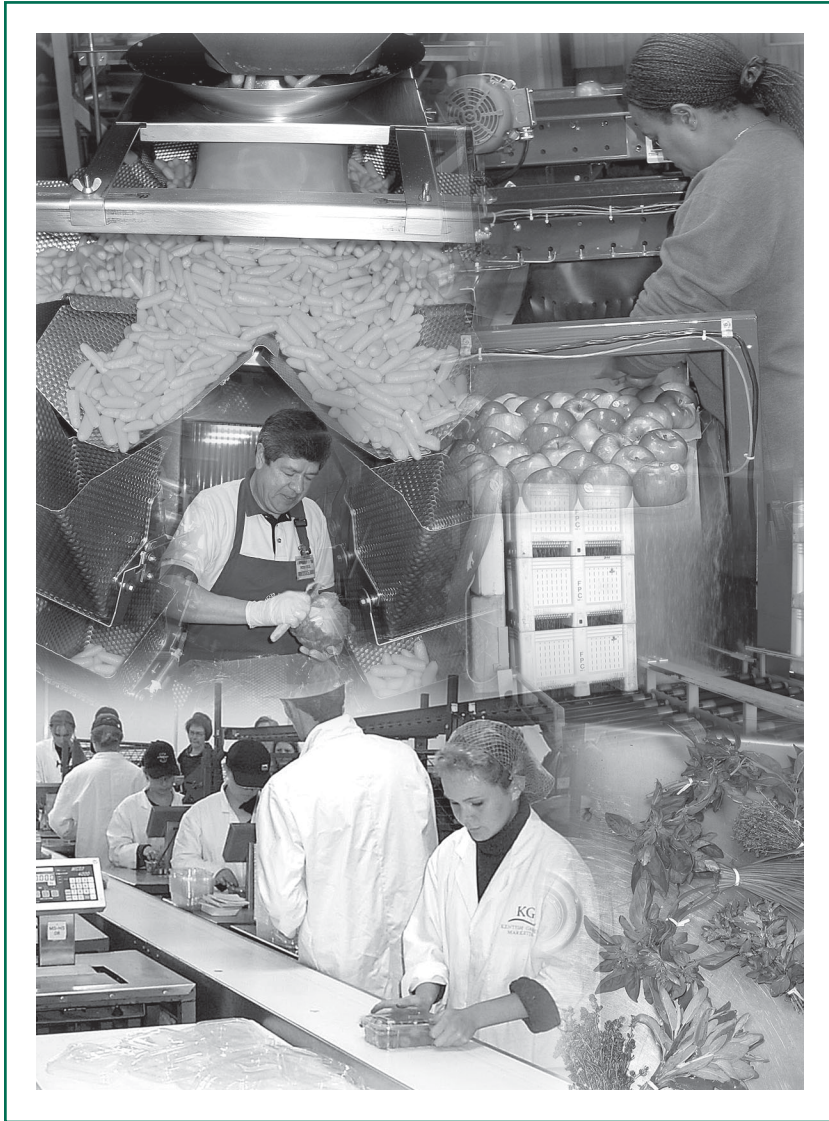


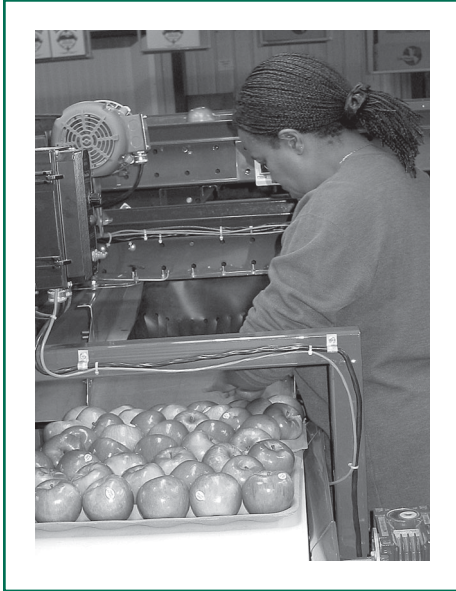
## Food Safety Begins on the Farm: A Grower Self Assessment of Food Safety Risks



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# Postharvest Handling

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## Postharvest Handling and Packing Facilities

Once produce has been harvested, care must be taken to prevent either direct or cross contamination of the crop during grading, washing, packing and shipping. Several foodborne illness outbreaks in fruits and vegetables have been traced back to packing operations. Implementing GAPs and Good Manufacturing Practices (GMPs) during

post harvest handling and packing can reduce microbial risks to fruits and vegetables. Adopting post harvest GAPs and GMPs are also good for produce quality since most practices that reduce growth of human microbial pathogens will also reduce post harvest decay.

Cool produce quickly after it has been harvested. Target pulp temperatures should optimize produce quality and ideally will minimize microbial growth. Maintaining this “cold chain” from harvest to storage to shipping to retail display is essential to reduce microbial (and plant) pathogen growth.

Water used for washing, cooling, or icing produce must be potable. Wash water and dump tanks can spread pathogens through cross contamination. Disinfection of this water can reduce these risks. Avoid cooling water bath temperatures that are more than 10°F cooler than the produce pulp temperature, so that water is not drawn into produce. This concern is highest for tomatoes, peppers, apples, potatoes, mangoes and cantaloupes.

The produce handling facilities, packing areas and trucks used for shipping must be kept clean through scheduled washing and sanitizing programs. Produce waste should be properly disposed of and runoff from produce fields should be prevented from entering

packing areas. Birds, rodents, insects, and other pests should be excluded from the packing areas.

One of the most important practices to reduce post harvest microbial contamination of produce is worker education and training. Trained workers are important and valuable because they can identify factors that increase fruit damage during packing such as rough handling and sharp edges on packing lines. Damaged or cut fruit can harbor pathogens and decay organisms. Effective training that encourages good communication and worker participation is a valuable postharvest tool.

Finally, keep records so that each package leaving the farm can be traced to the field of origin and the date on which it was packed. Traceback information is essential for both third party auditing for food safety as well as for inspectors in the event of a foodborne illness outbreak.




*Trained workers are important and valuable because they can identify factors that increase fruit damage during packing such as sharp edges on packing lines.*

# Packing House Sanitation and Safety

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Rodent, bird, and insect exclusion from packing areas</b> 	All storage and packing areas are inspected daily for rodents, birds and insects. Pest control procedures (traps, screening and doors) are used to exclude or remove pests. SOPs are in place for pest control and service reports are available.	All storage and packing areas are inspected weekly for rodents, birds and insects. Pest control procedures (traps, screening and doors) are used to exclude or remove pests.	Rodent, bird and insect activity is apparent and inadequate controls are being applied. Monitoring is sporadic	Rodent, bird and insect activity is apparent in the packing area but no controls have been applied.
<b>Soil removal from produce and bins in the field, to prevent contaminating wash water or other loads of produce</b>	Soil is removed from produce and bins while in the field. Bins are cleaned and sanitized prior to returning to field.			Bins are commonly moved into the packing area without inspecting for dirt.
<b>Screening or covering of overhead light bulbs</b>	All lighting fixtures in the packing area are screened to contain glass if light bulbs should break.			Any light fixtures are not screened or covered in the packing area.
<b>Backflow devices and water source</b>	Backflow devices are installed separating dump and flume tanks from the water source at each point of use.			Backflow devices are not installed.

# Packing House Sanitation and Safety

## Good Agricultural Practices

## Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Packing line sanitation</b>  	All packing lines are washed with soap and water, and sanitized at the end of each day. Brushes and sponges are inspected and cleaned daily. SOPs are in place and records are kept.	Packing lines are washed with soap and water on a regular schedule. Problem areas may be spot sprayed with sanitizers. Records are kept.	Crop and soil residue is removed and packing areas are cleaned but not washed on a regular schedule.	Packing lines are not cleaned except at the beginning of the season.
<b>Packing line inspection</b>  	Packing lines are inspected before each operation, to assure there are no sharp edges or drops in elevation that may bruise produce, especially since pathogen survival is higher in bruised flesh. Records are kept.	Packing lines are inspected weekly for sharp edges or drops and records are kept.	Packing lines are inspected or checked only once at the beginning of the harvest season.	Packing lines are not inspected for drops or sharp edges that may cut or bruise produce.
<b>Use of food grade oils and lubricants</b>	Only food grade approved and labeled oils or lubricants are used in the packing facility.			Food grade oils and lubricants are not always used in the packing area.

# Packing House Sanitation and Safety

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Storage of containers used for packing and shipping produce</b>	Containers used for packing and shipping produce are stored in an area that is covered, and preferably isolated from the packing area, to insure that bins are not exposed to rodents, dust, or condensation.	Boxes for packing produce are stored in the packing area, off the ground and preferably, under plastic cover.		Boxes are stored in the open, on the floor, exposed to dust and animals or outside.
<b>Cull pile management</b>	Cull piles from harvest or packing operations are not located near packing house areas <b>AND</b> are removed and either composted or field spread weekly.	Cull piles from harvest or packing operations are not located near packing house areas <b>AND</b> are removed and either composted or field spread every two weeks.	Cull piles from harvest or packing operations are located near packing house areas, <b>AND</b> are removed once per year.	Cull piles are located near packing house areas <b>AND</b> are never removed. The pile decomposes in the same place year after year.
<b>Handwashing practices of workers</b>	All workers practice proper handwashing and wash their hands before work, before and after meals, eating, and toilet use.	All workers practice proper handwashing, but do not always wash their hands at the critical times.	Very few workers wash their hands properly or at the critical times.	Handwashing is not monitored or a priority.
<b>Quality of gloves when used on the packing line</b>	Workers wash hands and change to new disposable gloves, particularly after meals, smoking or using toilet facilities.	Workers wash hands and wear nondisposable gloves that are washed and sanitized daily.		Workers wear nondisposable gloves that are not washed and sanitized daily.

# Packing House Sanitation and Safety

## Good Agricultural Practices

## Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Worker clothing</b>	When smocks or aprons are used by workers who handle produce, these garments are cleaned or changed daily and are not worn outside the packing area.	Smocks or aprons are used by workers, and they are cleaned or changed weekly.	Some smocks or aprons are used but there is no policy in place about use.	
<b>Shipping truck sanitation</b> 	Prior to loading produce on a truck or other conveyance, the vehicle is inspected for proper temperature, cleanliness, odors, and debris, and cleaned and sanitized, if needed. Records are kept.	Prior to loading produce on a truck or other conveyance, the vehicle is inspected for cleanliness, odors, and debris, and rinsed, if needed. Records are kept.	The trucks are usually inspected and appear clean, however no washing or sanitizing is done. No records are kept.	The trucks are not inspected for cleanliness; produce is just loaded on the truck. No records are kept.
<b>Standard operating procedures (SOPs) and record keeping to assure attention to food safety risk management</b> 	SOPs are in place for packing shed sanitation <b>AND</b> record keeping includes routine verification of practices.	There are SOPs and record keeping in place, but verification is done sporadically.	There are SOPs in place, but no records are kept to verify actions.	There are no SOPs or record keeping for reducing food safety risks.

# Packing House Sanitation and Safety Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Rodent, bird, and insect exclusion from packing areas								
Soil removal from produce and bins in the field, to prevent contaminating wash water or other loads of produce								
Screening or covering of overhead light bulbs								
Backflow devices and water source								
Packing line sanitation								

# Packing House Sanitation and Safety Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Packing line inspection								
Use of food grade oils and lubricants								
Storage of containers used for packing and shipping produce								
Cull pile management								
Handwashing practices of workers								



# Packing House Sanitation and Safety Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Quality of gloves used on the packing line								
Worker clothing								
Shipping truck sanitation								
Standard operating procedures (SOPs) and record keeping to assure attention to food safety risk management								





# Postharvest Handling of Produce

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Soil removal from produce and bins in the field, to prevent contaminating wash water or other loads of produce</b>	Soil is removed from produce and bins while in the field. Bins are cleaned and sanitized prior to returning to field.			Bins are commonly moved into the packing area without inspecting for dirt.
<b>Water quality for washing produce and making ice</b> 	Water for washing produce and making ice is potable from a municipal or ground water source. Results of annual water tests are on file.	Water quality for washing produce or making ice has not been tested, but the source is also the farm drinking water.	Water quality for washing produce or making ice is from a ground water source that has not been tested.	Water for washing produce or making ice is not potable <b>OR</b> is from a surface water source.
<b>Water quality management in dump tanks, flumes, hydrocoolers, or other batch water tanks</b> 	Wash water is changed several times a day, and chlorine or other disinfectant is added and levels monitored continuously, to maintain appropriate levels (crop dependent). Water pH is monitored and adjusted to between 6.5 and 7.5.		Water is changed twice per day. Disinfectant is added and pH is adjusted. Disinfectant levels and pH are monitored every 1 to 2 hours.	Disinfectants are not used in dump tank, flume water, or hydrocoolers. Water is changed sporadically based upon a visual assessment of clarity or cleanliness.

# Postharvest Handling of Produce

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Temperature management of water in dump tanks</b>  	Water temperature in dump tanks and flumes is regularly monitored to be no more than 10°F cooler than produce. SOPs are in place to insure adjustments as produce core temperature changes.	Water temperature in dump tanks and flumes is frequently monitored to be no more than 10°F cooler than produce.		Water temperature is not monitored in dump tanks or flumes.
<b>Ice storage and handling</b>  	Ice reservoirs are cleaned and sanitized monthly and there is no direct hand contact with ice. Cleaning schedule and records of cleaning dates are kept.	Reservoirs are cleaned and sanitized 2 times per season and there is no direct hand contact with ice. Records of cleaning dates are kept.	Reservoirs are cleaned and sanitized only once, at the beginning of the season. No records are kept and there is no ice handling policy.	Reservoirs are not cleaned or sanitized. No ice handling policy exists. Employees use farm tools or hands to dispense ice.
<b>Backflow devices and water source</b>	Backflow devices are installed separating dump and flume tanks from the water source.			Backflow devices are not installed.
<b>Cleaning and sanitation of containers used for harvest, packing and shipping</b>	New containers are used for all packing. Previously used plastic bins are inspected, and washed, rinsed and sanitized prior to each use.	Previously used wooden bins are inspected and washed, rinsed, and sanitized prior to each use. Worn out wooden bins are replaced with plastic bins.	Used wooden or plastic bins or boxes are washed, rinsed and sanitized occasionally, based upon visual assessment of cleanliness.	Used wooden or plastic bins or boxes are not washed, rinsed or sanitized <b>OR</b> containers are collected from random sources.

# Postharvest Handling of Produce

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Storage of containers used for packing and shipping produce</b>	Containers used for packing and shipping produce are stored in an area that is covered, and preferably isolated from the packing area, to insure that bins are not exposed to rodents, dust, or condensation.	Boxes for packing produce are stored in the packing area, off the ground and preferably, under plastic cover.		Boxes are stored in the open, on the floor, exposed to dust and animals or outside.
<b>Maintenance of a cold chain to minimize growth of pathogens</b>  	After produce is cooled, it is immediately placed in temperature controlled storage until sale or shipping. Temperature controlled trucks are used for shipping. Temperature in produce containers and cold rooms is monitored and records are kept.	Cooled produce is maintained in temperature controlled storage until sale or shipping. Temperature controlled trucks are used. No temperature records are kept.	Cooled produce is stored in areas until sale. Non-temperature controlled trucks are used.	No effort is made to maintain a cold chain or monitor produce temperature.
<b>Cleaning of temperature controlled produce storage</b>  	Storage areas are cleaned of soil and debris daily and washed and sanitized regularly. SOPs are in place for sanitation, and records verify implementation.	Storage areas are cleaned weekly but not sanitized on a schedule. There are SOPs but these are not verified regularly.	Storage areas are cleaned only sporadically. There are no SOPs in place.	Storage areas are cleaned only once at the beginning of the season.

# Postharvest Handling of Produce

## Good Agricultural Practices

## Practices Requiring Attention





Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Refrigerated or cold room loading and management</b>	The quantity of produce does not exceed cooling capacity of the refrigerated room. Wet produce is not stored above dry produce, and condensation from coolers does not drip onto produce.	The quantity of produce placed in the cold room may occasionally exceed cooling capacity of the room. Wet produce is not stored above dry produce and coolers do not drip on produce.	The quantity of produced placed in the cold room regularly exceeds cooling capacity of the room. Wet produce is sometimes stored above dry produce.	No assessment has been made of the arrangement of boxes in refrigerated storage, or the flow of produce through the storage area. Water may drip from coolers onto produce. Produce loading regularly exceeds cooling capacity of the room.
<b>Transportation of produce</b> 	Refrigerated or temperature controlled trucks are used to move produce, at temperatures that optimize crop post-harvest quality. Temperatures are printed on manifests to ensure maintenance of the cold chain. Temperature is monitored and records are kept.	Refrigerated or temperature controlled trucks are used to move produce, at temperatures required to optimize crop post-harvest quality. Records are not kept.	Refrigerated or temperature controlled trucks are used only for shipping produce longer than two hours.	Trucks used for transporting produce are not temperature controlled.
<b>Shipping truck sanitation</b> 	Prior to loading produce on a truck or other conveyance, the vehicle is inspected for cleanliness, odors, and debris, and cleaned and sanitized, if needed. Records are kept.	Prior to loading produce on a truck or other conveyance, the vehicle is inspected for cleanliness, odors, and debris, and rinsed, if needed. Records are kept.	The trucks are usually inspected and appear clean, however no washing or sanitizing is done. No records are kept.	The trucks are not inspected for cleanliness; produce is just loaded on the truck. No records are kept.

# Postharvest Handling of Produce

## Good Agricultural Practices

## Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<b>Traceback and record keeping</b> 	<p>A traceback system is implemented on the farm. All produce harvested and shipped from the farm is coded by field, harvest date and crew, <b>AND</b> records are maintained for easy access by grower, auditor or inspector.</p>	<p>A traceback system is implemented on the farm. All produce harvested and shipped from the farm is coded by field, harvest date and crew, <b>BUT</b> the records are not maintained in a format that is easy to access by grower, auditor or inspector.</p>	<p>A partial traceback system has been implemented on the farm. Records of production and harvest are only kept for some produce crops, depending on the market.</p>	<p>No records are kept of crop production or harvest to allow tracking of practices or traceback.</p>
<b>Standard operating procedures (SOPs) and record keeping to assure attention to food safety risk management</b> 	<p>SOPs are in place for produce washing, cooling, storage and shipping <b>AND</b> record keeping includes routine verification of practices.</p>	<p>There are SOPs and record keeping in place, but verification is done sporadically.</p>	<p>There are SOPs in place, but no records are kept to verify actions.</p>	<p>There are no SOPs or record keeping for reducing food safety risks.</p>





# Postharvest Handling of Produce Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Soil removal from produce and bins in the field, to prevent contaminating wash water or other loads of produce								
Water quality for washing produce and making ice								
Water quality management in dump tanks, flumes, hydrocoolers, or other batch water tanks								
Temperature management of water in dump tanks								
Ice storage and handling								

# Postharvest Handling of Produce Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Backflow devices and water source								
Cleaning and sanitation of containers used for harvest, packing and shipping								
Storage of containers used for packing and shipping produce								
Maintenance of a cold chain to minimize growth of pathogens								
Cleaning of temperature controlled produce storage								

# Postharvest Handling of Produce Action Plan

Date: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Field or Commodity: \_\_\_\_\_

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Refrigerated or cold room loading and management								
Transportation of produce								
Shipping truck sanitation								
Traceback assistance and record keeping								
Standard operating procedures (SOPs) and record keeping to assure attention to food safety risk management								