Food Safety in the Time of COVID19

Post Harvest Handling
Webinar Flow

- Introductions to the team and resources for farmers on keeping people safe
- Post Harvest Handling guidelines for reducing spread of pathogens
- Methods of preserving product quality
- Washing and packing processes and equipment.
- Difference between cleaning and sanitizing.
- General Q and A and resources
Mid Atlantic Food Safety Project: Building a Culture of Food Safety

- On-farm food safety workshops:
  - Land use, animals, soil amendments
  - Agricultural water
  - Worker training, Sanitation, Post harvest handling
- Webinars and video tutorials
- One-on-one GAP plan writing and implementation
- Toolkit and templates for Food Safety plans, records and SOP’s
- One-on-one guidance on compliance with FSMA or GAP certification
Mid-Atlantic Food Safety Project: Building a Culture of Food Safety

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Farmers on the Front Lines

- Farmers are already striving to grow the healthiest food possible for their families and communities and their ecological environment.
- Packing, processing and delivery also needs to be done in a safe and healthy manner.
- WHY? A lot of produce we grow is eaten raw and doesn’t go through kill step.
- Let’s talk about COVID-19!
From Frank Yiannas deputy commissioner for food policy and response at the FDA, 3/25/20

...gastrointestinal viruses like norovirus and hepatitis A ... make people ill through contaminated food, SARS-CoV-2, which causes COVID-19, is a virus that causes respiratory illness. This virus is thought to spread mainly from person to person. Foodborne exposure to this virus is not known to be a route of transmission.

For these reasons, we do not anticipate that food products would need to be recalled or withdrawn from the market for reasons related to the outbreak, even if a person who works in a human or animal food facility (e.g. a food packager) is confirmed to be positive for the COVID-19 virus.
Food Safety and COVID-19

• According to the FDA, there is no indication that this virus has spread via food.
• Looking at how related respiratory viruses like SARS-CoV-2 spread vs. gastrointestinal viruses like Norovirus.
• We have to look out for hard surfaces.
• Time to review, improve and reinforce your SOP’s and communicate them with your base of supporters and customers.
Tips For Post Harvest Handling

• Stay Away from Produce if Sick
• Practice Social Distancing
• Minimize the Number of Touches
• Wash Your Hands
• Cleaning, Sanitizing, and Drying
• Plan for Change

https://blog.uvm.edu/cwcallah/2020/03/18/considerations-for-fruit-and-vegetable-gro
wers-related-to-coronavirus-covid-19/
Accessing New and Wholesale Markets
Preserving Product Quality

Increasing Shelf-Life and Safety
Why Good Postharvest Handling is Important

- Preserves Quality
- Reduces Losses and Increases Shelf Life
- Protects Food Safety

Customer Satisfaction and Loyalty
Best Price
Product Specification Manual

Wholesale and Retail Product Specifications: Guidance and Best Practices for Fresh Produce

For Small Farms and Food Hubs

Included in our Farmer Resources
Preserving Product Quality

What Impacts Shelf life?

- Time, Temperature and Relative Humidity
- Respiration and Transpiration
- Physical Damage
- Pathogens (causing decay)

Food Safety is also quality issue

- Human pathogens
How Can We Increase Shelf-life?

- Harvest early in the morning
- Once harvested, keep produce out of direct sunlight or extreme temperatures.
- Provide shade while transporting product.
- Cool the product down as quickly as possible
- Preserve the Cold Chain - maintain product at optimum storage temperatures from harvest to consumer
How Can We Increase Shelf-life?

Cooling Methods

- Room cooling
- Forced-air cooling
- Hydro-cooling
- Top icing

Faster Cooling = Reduced Deterioration
How Can We Increase Shelf-life?

Room Cooling

Get the product into ambient refrigeration as quickly as possible after harvest.
CAUTION...Chilling Injury Threshold

<table>
<thead>
<tr>
<th>Product</th>
<th>Internal/Probe Temperature</th>
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<tbody>
<tr>
<td>Beans, Cucumbers, Eggplant, Okra, Peppers</td>
<td>45°F</td>
</tr>
<tr>
<td>Melons</td>
<td>45°F-50°F</td>
</tr>
<tr>
<td>Tomato</td>
<td>50°F</td>
</tr>
<tr>
<td>Winter Squash</td>
<td>50°F</td>
</tr>
<tr>
<td>Sweet Potato</td>
<td>55°F</td>
</tr>
<tr>
<td>Basil</td>
<td>45°F</td>
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Moderately Sensitive
- Snap Beans
- Peppers
- Winter squash
- Tomatoes
- Watermelon
- Parsley

Highly Sensitive
- Basil
- Cucumbers
- Eggplants
- Pumpkins
- Summer squash
- Sweet Potatoes
### Winter squash

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<td><strong>Washing/Processing</strong></td>
<td>Wipe clean or mechanical brush</td>
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<td><strong>Size/Appearance</strong></td>
<td>Fairly uniform size for the variety, well-matured and not broken or cracked; rind should resist thumb nail pressure verifying it is free from soft rot or wet breakdown. Tolerance is 10% (2% for soft rot or wet breakdown or serious damage by dry rot)</td>
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| Packing | **Wholesale**: 35 - 45 lb. - 1 1/9 bushel box  
|         | **Retail**: 800-900 lb. bulk container |
| Optimal Storage | Cooling 85°F -95°F  
| Temp 50°F -55°F; Humidity 50-70% |
| Shelf Life | 2-3 months |

### Cabbage

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<th>Quality cabbage will be crisp and firm with a good green color and compact head. Should be easy to harvest and should not have loose leaves intact.</th>
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</tr>
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<td><strong>U.S. #1</strong></td>
<td>Heads should be firm, tight and heavy for its size with the absence of insects and dirt and free of decay. Cut several cabbages in half to ensure it is worm free. Tolerance is 10% (2% for soft decay). Stems should be cut to not extend more than ¼ inch beyond the point of attachment of the outermost leaves. Tip: The heads are crisp and fresh if they squeak when rubbed together.</td>
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|          | **Retail**: 50 lb. wax box |
| Optimal Storage | Temp 32 – 35 F; Humidity 98-100% |
| Shelf Life | 1-6 months |
Methods to Reduce Pulp Temperatures More Quickly

Forced-air Cooling

Can be done on a small or large scale - fans and a tarp set up inside a cooler

Removes excess moisture:
  Useful for crops that need to stay dry for quality such as berries or salad mix or remove moisture from salad mix

Less handling than some dunk tank hydrocooling

More efficient use of the energy in cold storage, especially for large quantities of product

Can cool packaged product
Strawberries - Rejected by Buyer

Occurred within 24 hours of buyer receiving

Caused by the fungus, *Botrytis cinerea*

The greatest cause of postharvest strawberry losses.

To avoid, store strawberries at 32°F within one (1) hour of harvest.

The pathogenic fungus continues to grow even at 32°F, however growth is very slow at this temperature.

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<tr>
<th>General Characteristics:</th>
<th>Quality strawberries have a bright red color, firm, flavorful, and free from defect and decay.</th>
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<td>U.S. #1 Size/Appearance</td>
<td>Fairly uniform shape, minimum ¾&quot; in diameter, free of damage, mold and decay; shall be firm and not overripe; Each strawberry must have not less than ¾ of its surface showing a pink or red color. Tolerance is 10% (5% for serious damage and 2% for decay; 0% for mold)</td>
</tr>
<tr>
<td>Packing</td>
<td>Wholesale: 8 – 1# clamshells packed in corrugated flat.</td>
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<tr>
<td>Optimal Storage</td>
<td>Temp 32°F; Humidity 80-85%</td>
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<td>Shelf Life</td>
<td>7 days</td>
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COOLING RATE
Cauliflower: single head, trimmed in carton

- Refrigerated Room about 5.5 hours
  with no forced air
- Forced Air Cooling about 1.5 hours
- Hydro-cooling about 7 minutes
  (water 32°F)
Hydrocooling

Good for crops that can handle higher moisture levels such as broccoli, kale, roots, apples

Multiple methods
Hydrocooling

Dunking

This simple method can be used in the field
Hydrocooling

Single pass spray

Image: Spiral Path Farm PA, Freddie Segro
Hydrocooling

Recirculated, temperature controlled water
Treated with chlorine sanitizer

Image: Sunny Acres Coop PA. E. Beggins
Hydrocooling

- DIY hydrocooler
- Recirculated, temperature controlled water
- Field packed wax bins of broccoli
- A barrel of SaniDate to treat recirculated water
Hydrocooling

Dump tank
Reused batch water
Water treated with chlorine
Postharvest Agricultural Water

Sanitizer Use in Hydrocooling and Wash Systems

Single pass vs. Recirculating vs. Dump Tank

- Single Pass Spray
  - Potable Water
  - Drain

- Multi-Pass Recirculated
  - Sanitizer Recommended

- Dump Tank
  - Sanitizer Recommended
Methods to Reduce Pulp Temperatures More Quickly

Top icing

Ice placed directly on top of the product or ice slurry pumped into boxes to fill up air spaces

Melting ice pre-cools the broccoli before cold storage or is used to maintain temperature during storage, transport and distribution

Good for crops with a high respiration rate such as broccoli.
How Can We Increase Shelf-life?

Relative Humidity

- Cooling has a drying effect on product.
- Relative humidity is the recommended % of moisture in the air during storage.
- Raise humidity by using a humidifier or placing wet burlap sacs in the storage area.
- Decrease humidity by using fans.
- Optimum Temperature and Humidity = Extended shelf-life.
Relative Humidity

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Respiration and Shelf-Life

• Harvested produce respires – takes in oxygen and breathes out carbon dioxide

• Respiration causes release of heat and transpiration releases water

• Which leads to shriveling and deterioration

• Temperature and humidity impact rates of respiration and transpiration

Example: Respiration Rate of Strawberries

<table>
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<tr>
<th>Temperature</th>
<th>32 °F</th>
<th>50° F</th>
<th>68° F</th>
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<tr>
<td>ml CO₂/kg-hr</td>
<td>6-10</td>
<td>25-50</td>
<td>50-100</td>
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Preserving the Cold Chain

Minimizing temperature fluctuations from harvest to customer

- Get product into cool storage as quickly as possible after harvest
- Pack product in a temperature-controlled area
- Deliver in a refrigerated vehicle
- Wrap pallets of chilled product to keep cool
- Load product into a pre-cooled vehicle as quickly as possible and at coolest time of day
Prevent Physical Damage

Handle product with care to prevent any physical damage

Damaged crops are vulnerable to pathogens

Crops such as berries are best field packed to minimize handling

Pack carefully in appropriate packaging to avoid damage in transport
How Can We Increase Shelf-life?

**Ethylene Producers**
- Apples
- Cantaloupes
- Honeydew
- Peaches
- Pears
- Tomatoes

**Ethylene Sensitive**
- Snap Beans
- Lettuce
- Cabbage
- Cucumbers
- Eggplant
- Peas
- Potatoes
- Broccoli

- Ethylene ripens fruits but leads to spoilage in some produce.
- The effect of ethylene slows down at lower temperatures
- Can you segregate crops in storage and transport or minimize exposure time?
Post Harvest Food Safety

• Train all personnel on health and hygiene
  • Wash hands often and well, wear clean clothes, don’t work when sick, don’t share bodily fluids, teach when and how to wear gloves
• Provide toilet and handwashing facilities that are clean, stocked, and easily accessible
• Clean and sanitize food contact surfaces correctly and regularly
• Design and build packing areas that are easy to keep clean
• Store equipment neatly and off the ground
• Make clear what equipment is clean and what is dirty
• Use only potable water for washing hands, produce and food contact surfaces
• If you treat water with a sanitizer do it correctly – follow label directions
• Control pests in the packing and storage areas
• Do not allow pets in the packing and storage areas
From Family Farmed

Purchase online at https://familyfarmed.org/farming/ - $80
Equipment variations
Washing/Packing Alternatives
Varying farm sizes determine the washing and packing facilities.

- Maintaining separate area for farm staff to wash hands and use facilities.
- First priority is to KEEP EVERYTHING CLEAN:
  - BEFORE HARVEST/DAILY OPERATION
  - DURING HARVEST
  - POST HARVEST
  - TRANSPORTING
Keep in mind fruits and vegetables (produce) can be and **generally are eaten raw** - not cooked or processed to kill microorganisms.

**Possible Contaminants:**
- E.coli
- Salmonella
- Listeria monocytogenes

Two Additional risks:
- Chemical – pesticides, detergents, sanitizers, chemical used on the farm.
- Physical – glass, wood, metal, plastic foreign objects which can be found in the produce.
Cleanliness is the Key
Hands
Gloves/Hats
Clothes
Aprons
Packing equipment
Post harvest water
Building supplies: coolers, storage including
Transport Vehicle
• Ensure all staff is trained
• Provide facilities and training
• Eliminate pests, weeds, and debris (including feces, insects, infestations, etc.)
• Basic housekeeping & general hygiene is essential
• Practice to implement proper procedures
Inspected prior to loading – clean and free from physical debris and odors from previous use.

Refrigeration inspection includes
Units are functioning properly at proper temperature prior to loading.

This photo by Unknown Author is licensed under CC BY-SA
Standard Operating Procedures

Outlines tasks necessary and procedure for performance (packing area).
List SOP’s and Food Safety Plan on-site and visible.
Write Clear and Concisely for all to read and understand.
Tested by someone other than writer/farmer for clarity

- Cleaning and Monitoring Cold Storage Areas
- Inspecting Vehicles prior to loading Fresh Produce
- Cleaning Vehicle used to transport Fresh Produce
- Implement cleaning and sanitation practices – ensures correct procedures
- Monitoring Pests
- Cleaning and Sanitizing Solutions
- Cleaning and Sanitizing Produce Washing Lines
SOP Areas
SOP for Staff Requirements

- Gloves, Aprons, etc. for handling/packing
- Elevated floor storage with crates or shelving.
Do Not Put On Clean Gloves With Dirty Hands!!!

Glove Use SOP

1. Wash or sanitize your hands before putting on gloves.
   a. Hand sanitizer does not usually substitute for handwashing except in the current crisis.

2. Remove gloves before doing anything that would require you to wash your hands (using a toilet, using a handkerchief/tissue, handling contaminated material, smoking, eating or drinking, touching animals or waste, etc.) and put on new gloves before returning to work.

3. Remove and replace with clean gloves if they are torn, damaged or contaminated.

4. Store gloves in a dry, safe place

Clean hands are safer than mishandled gloves.
Disinfect vs Sanitize

In this time of Covid-19 we may be confusing disinfecting and sanitizing. They are not the same thing.

**Sterilize** refers to the statistical destruction and removal of all living organisms. - kill step - e.g. hospitals disinfect instruments

(Pasteurize is lower heat and kills only some microorganisms so food still has nutrient value)

**Disinfect** refers to inanimate objects and the destruction of all vegetative cells (not spores). - kill step - e.g. hospitals disinfect surfaces

**Sanitize** refers to the reduction of microorganisms to levels considered safe from a public health viewpoint. - risk reduction - e.g. food handlers sanitize surfaces and hands

Bleach may be used to disinfect surfaces, but the concentration is higher for COVID-19 than for everyday sanitation: 5 tablespoons bleach per gallon of water
Cleaning and Sanitizing

How to do it, and what’s the difference!
Develop Practices That Reduce Risks

- Practices may include:
  - Converting to equipment that can be easily cleaned and sanitized
  - Cleaning and maintaining coolers
  - Cleaning transportation vehicles
  - Cleaning and sanitizing food contact surfaces
  - Implementing or reinforcing worker training
  - Establishing pest control programs
Cleaning vs. Sanitizing

What is the difference and why does it matter?

- **Cleaning**: Physical removal of dirt (soil) from surfaces which can include the use of clean water and detergent
- **Sanitizing**: Treatment of a cleaned surface to reduce or eliminate microorganisms

**Important point**: You cannot sanitize a dirty surface. Cleaning always comes first!
Cleaning vs. Sanitizing
What is the difference and why does it matter?

You cannot sanitize a dirty surface.

Cleaning always comes first!
Cleaning vs. Sanitizing
What is the difference and why does it matter?
Cleaning vs. Sanitizing

What is the difference and why does it matter?

Four Steps:

1. Remove dirt & debris.
2. Apply an appropriate detergent and scrub.
3. Rinse with clean water. Be sure to remove all dirt and detergent.
Cleaning vs. Sanitizing

*What is the difference and why does it matter?*

**Cleaning**

- Physical removal of soil, dust, grease and microbes from a surface.
- Includes using a soap or detergent to scrub these contaminants from a surface.
- Rinsing off larger debris before scrubbing will make the process more effective.
- Wet, scrub, rinse and air dry.
- Always use potable (drinkable) water during the cleaning process.
Cleaning vs. Sanitizing

What is the difference and why does it matter?

Sanitizing

• Decreases the number of microorganisms.
• Soil, grease, or dust inactivate sanitizers (clean and rinse first!)
• Sanitizers are pesticides: Follow all label directions and all relevant state pesticide regulations.
• Consider the safety for workers and the environment, stability, water quality, pH, and non-corrosiveness.
• Use sanitizers that are approved for use on food contact surfaces based on the label information.
Cleaning vs. Sanitizing

What is the difference and why does it matter?

Sanitizing

• Use sanitizers approved for food contact surfaces
• Measure sanitizer amounts and follow label for specific instructions.
• The concentration is measured in parts per million, or ppm, and will be specified on the product label.
Testing Sanitizer Strength

- Purchase test strips to determine the concentration of your sanitizing solution. Follow the instructions for each type of test strip and use a test strip designed for a specific sanitizer.
- Test the concentration of your sanitizing solution when it is initially mixed.
- Test periodically during use, to ensure the concentration is still at an effective level.
- Sanitizing solutions can lose effectiveness over time due to exposure to air, organic materials, soap or other factors that cause the chemical to dissipate.
Cleaning & Sanitizing Process

1. Wet the area with potable water, rinse off any visible debris.
2. Scrub surface with soap or detergent and potable water to physically remove soil.
3. Rinse surface with potable water.
4. Apply sanitizer following manufacturer’s directions.
5. Allow contact with surface for recommended time.
6. Allow surface to air dry. Don’t use a cloth towel to dry. Cloth towels can re-contaminate the surface.

*Note: sanitizing may not be necessary in all cases where a cleaning step is necessary.*

Excerpted from Penn State Extension
Approved Sanitizers

More than 70 products on the Produce Safety Alliance "Labeled Sanitizers for Produce" Tool

Sanidate

Bleach

Tsunami

Oxidate

Peraclean
Sanidate 5.0

Germicidal Bleach
Creates Value for Your Customers…!
Creates Value for **YOU**!

- Reduces the likelihood of contamination
Creates Value for **YOU**!

- Reduces the likelihood of contamination
- Improves efficiency
Creates Value for YOU!

- Reduces the likelihood of contamination
- Improves efficiency
- Gains you customers
Creates Value for **YOU**!

- Reduces the likelihood of contamination
- Improves efficiency
- Gains you customers
- Increases quality
Creates Value for **YOU**!

- Reduces the likelihood of contamination
- Improves efficiency
- Gains you customers
- Increases quality
- **Prolongs shelf life**
Resources: click links below

- Google Drive Folder of COVID 19 food safety resources
- Food Safety Toolkit
- UVM clearinghouse
- Safety Protocols For Food Distribution & Purchases During COVID-19
- Two Farmers Farm COVID-19 Preparedness Plan
- Examples of Standard Operating Procedures
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