Sanitation & PostHarvest Handling

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Food Safety Basics for Urban Farmers

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Good Sanitation and Postharvest Handling Practices

- Are essential to ensure food safety
- Will improve produce quality and shelf life

- FSMA: Must use clean water that is free from generic *E. coli* for all sanitation steps
  - –no detectable generic *E. coli*/100 mL in water used to contact food contact surfaces.


Produce of USA
GROWN & PACKED BY: MIKE NAYLOR FARMS
DINUBA, CA. 93618

Keep Harvested Produce Covered

- Protects produce from the sun
- Protects produce from contamination by birds and other creatures

To Maximize Produce Quality

- Harvest during the coolest part of the day
  - To minimize water loss
- Shade the harvested produce in the field
  - Covering harvest boxes with a foam-backed reflective pad reduces heat gain
- If possible, move the harvested produce into a cold storage unit as soon as possible
  - For some crops, such as berries, tender greens and leafy herbs, even 1 hour in the sun is too long

Sanitation Practices

- **Basic Concepts**
  - Good housekeeping
  - Providing facilities and training workers so practices are implemented properly
  - Eliminating pests and debris
  - Minimizing standing water
- **Cleaning and Sanitizing**
  - Use a 4 step cleaning and sanitizing process when possible for equipment and tools such as harvest containers, packing tables, and packing lines

*SOURCE: Produce Safety Alliance Train the Trainer, Module 6.1, slide 5

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!

*SOURCE: Produce Safety Alliance Train the Trainer, Module 6.1, slide 16

Sanitation

- Use a 4 step cleaning and sanitizing process when possible for equipment and tools such as harvest containers, packing tables, and packing lines
  - Clean
  - Scrub
  - Rinse
  - Then sanitize
- **Cleaning** removes food and other types of soil from a surface such as a countertop. The first part to any sanitation program is to keep things clean.
- **Sanitizing** reduces the number of pathogens on that **clean** surface to safe levels.

Cleaning and sanitizing harvest bins

Cleaning & Sanitizing

- Dispose of wastewater daily away from production areas
- Label all cleaning products “Harvest Equipment Only”
- Require workers to wear waterproof aprons, rubber gloves and goggles when cleaning and sanitizing
- Update your FSMA written Farm Cleaning Record daily

Clean Field Harvesting Equipment, Bins, Tools
with 1 Tab chlorine bleach (5.25%)/gallon

- Step 1: Place harvest containers next to sanitized surface (plastic) that has been pre-rinsed, scrubbed with detergent, rinsed & sanitized
- Step 2: Pre-rinse all buckets to remove visible soil
- Step 3: Scrub buckets with detergent, then rinse
- Step 4: Scrub buckets, dip in bleach, then air-dry and stack
- Step 5: Check water with chlorine test strips for proper strength, before cleaning more items

CDFA's Small Farm Food Safety Guidelines during Harvest/Post Harvest

- Clean and sanitize harvesting equipment at least once a day or more often, if needed
- High-pressure wash, rinse and sanitize all crop harvest bins
- Cover clean bins to avoid contamination
- Remove field soil from the outside of bins prior to moving them into packing areas
- Use clean water and ice made from clean water during field packing

Packing Under a Tree

- Provides shade but also creates risk of contamination from birds and falling objects
- Washing & packing surfaces can’t be kept clean
- Increased risk if packing boxes/crates are placed on the ground
- Use designated hoses; ensure that the end does not touch the ground
- Use an awning or pop-up tent instead if possible

Keep Harvested Produce Covered

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Washing Produce

with chlorine solution

½ tsp. bleach (5.25%) in 6 gallons of water = 5 ppm

Use chlorine test strips to determine chlorine content

- Start with potable water - pH of between 6 and 7.5
- Use pH test strips to determine pH
- Change water in the dump tanks at least daily
- Change water when chlorine content < 5ppm
- Rinse produce with potable water prior to packaging
- Not all produce needs to be washed!

Washing Produce

- Water must be potable or microbially safe
- Clean and sanitize wash tanks, tubs and food contact surfaces regularly
- Chlorine will not sterilize produce

Use of Chlorine on Organic Produce

source: Trevor Suslow, UC Cooperative Extension Specialist, UC Davis, tvsuslow@ucdavis.edu

- Organic growers, shippers, and processors may use chlorine within specified limits
- All forms of chlorine are restricted materials as defined by existing organic standards
- California Certified Organic Farmers (CCOF) recently modified the threshold to permit 10 ppm residual chlorine measured downstream of the wash step
- Growers certified by other agencies should check with their certifying agent

PEROXYACETIC ACID

$H_2O_2 + CH_2COOH \rightleftharpoons H_3COOH$

Hydrogen Peroxide	Acetic Acid	Peroxyacetic Acid

- Break-down products: acetic acid, O_2, CO_2, H_20

- Permitted dosage (FDA):
  - Cleaning surfaces 85 – 300 ppm
  - Contact with food 85 ppm maximum
    - Typical rates 30-35 ppm

Peroxyacetic Acid (PAA) - Advantages

- Less impacted by organic matter and soil
- Low foaming
- Very good biofilm penetration
- Very good on molds and spores

Peroxyacetic Acid - Disadvantages

- More expensive than hypochlorite at effective dose
- Corrosive to soft metals and skin
- Strong, pungent odor of concentrate and dilute forms (worker discomfort & safety)
- Varied activity against fungi
- Prolonged exposure may cause product damage
  - build up of acetic acid in water
  - may cause sliming, browning, translucency
- Need to monitor water turn-over closely

Storage of Packaging Materials

- Boxes, bags and other materials used for packaging should be kept:
  - In a dry location
  - Off the ground
  - Pest-free

If re-using cardboard packing boxes, line the box with a new food-grade plastic liner

Postharvest Processing & Storage

- Provide sanitary and hygiene facilities and an area for smoking, meals, breaks and personal item storage for employees away from processing and storage areas
- Use a potable water source for processing and use ice made from potable water
- Wash, rinse and sanitize storage facilities

To Maximize Produce Quality

- Do not load refrigeration rooms beyond their cooling capacity
- Do not compromise high quality produce by commingling it with damaged or decaying product
- Only use cleaned and sanitized packing or transport containers
- Store produce at the proper temperature (see Tables 10.1 and 10.2)

Postharvest Ethylene Effects
(see Table 10.1 & 10.2)

- Do not store ethylene-producing fruits (apples, apricots, pears, cantaloupe) near ethylene-sensitive crops. Ethylene damage symptoms include:
  - Yellowing or loss of green color in cucumbers, kale, spinach and broccoli
  - Yellowing and leaf drop in many Asian greens
  - Softening and off-flavor development in peppers, summer squash and watermelon

Transporting Produce

- Ensure that vehicles have not carried sewage, manure or hazardous materials
- Clean and sanitize vehicles that have carried live animals or harmful substances
- Keep pallets, scales, carts, & forklifts clean

CoolBot Cooling Unit

	CoolBot + 18K BTU A/C		Traditional Walk-In Cooler Refrigeration System
Refrigeration Unit Upfront Cost (1)	CoolBot 18K BTU Window A/C **Total**	$349 559 **$908**	Top Mount Self Contained Refrigeration Unit (1.5 HP) **$3,448**
Installation (2)	Designed for easy installation by end users		Requires expensive professional installation
Operating Costs (3)	40% less energy usage versus a traditional walk-in cooler refrigeration system		

https://www.storeitcold.com/

Good Sanitation and Postharvest Handling Practices

- Growing produce takes a lot of effort
- Following good sanitation and postharvest handling practices also takes a lot of effort
- Start with the easy stuff, like cleaning & sanitizing your harvest bins
- Doing so will:
  - Protect the food safety of your crops
  - Will improve your profitability
  - Will increase your customers' satisfaction with your produce