GAPs and GHPs for the Urban Farm:
Water & Surfaces

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WATER

- Production (irrigation)
- Post-harvest processing
- Surface run-off

Production Water

- Three sources of risk related to production water
  - Water source & quality
    - Public water supply, ground water, surface water
  - Application method
    - Water that does not contact the harvestable portion
    - Water that contacts the harvestable portion
  - Timing of application
    - At planting or close to harvest

Municipal Water

- US EPA has established Federal drinking water standards and California has similar standards
- Required to be tested annually in California
- Must meet State drinking water standards
- Obtain copy of test results or current certificates of compliance

Preventing Contamination of Water from Public Water Supplies

- Public water supplies are treated to meet microbial drinking water standards but distribution systems can introduce risks, therefore:
  - Assess your connection to the public water supply and distribution system downstream
  - Test the water if you have any concerns about the water source
  - Have a back up plan if you think water in the distribution system may be unsafe

Captured Rainwater

- If capture rainwater is used only to irrigate crops, it does not need to be potable
  - Confirm with San Diego Co Environmental Health Dept
- Captured rainwater should be examined weekly
  - prone to rodents, mosquitoes, algae growth, insects and lizards
  - may seep chemicals, insects, dirt or animals droppings
- Captured rainwater should not be used to wash harvested produce or for handwashing

CDFA's Small Farm Food Safety Guidelines Related to Water

- **If you use only municipal water, you do not need to get your water tested so you can ignore the water testing requirement in this slide**
- Test **all** your water sources, including for irrigation, handwashing, human consumption and produce wash water.
- Prior to planting, test irrigation water and, if contaminated, find the source and fix it or request that your water supplier do so
- During the growing season, test irrigation water as close to point-of-use as possible at least once during the growing season
- Ensure that water used for spray applications of pesticides and fertilizers is not contaminated

FSMA Water Quality Criteria for Water Used During Growing Activities*

- Each source of production water (including captured rainwater) must be tested to evaluate whether its water quality profile meet the following criteria:
  - **126 or less** colony forming unites (CFU) generic *E. coli* per 100 mL water geometric mean (GM)

    AND
  - **410 or less** CFU generic E. coli per 100 mL water statistical threshold value (STV)
- This requirement is difficult to understand. But it basically means that your testing costs will be more than your water cost savings from harvesting rainwater

*SOURCE: Produce Safety Alliance Train the Trainer, Module 5.1, slide 21

Method of Irrigation

- Overhead (sprinkler)
  - Higher risk: A direct water application method resulting in contact with produce
- Flood (surface, furrow)
  - May avoid direct contact with produce
  - Consider risk of contact with contaminated soil during harvest or from splash
- Drip (trickle, subsurface, micro, under canopy)
  - Lower risk: Produce generally not in direct contact (except root crops), reduces foliar diseases, improves water use efficiency

Corrective Measures

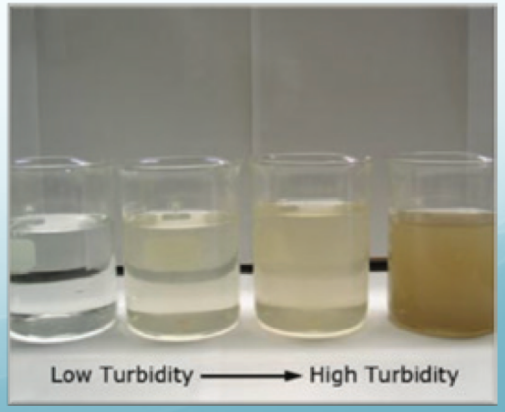
- If there is a problem with your water, be cautious until you know more!
- Re-inspect water system for contamination sources – Manure runoff, migratory birds, septic tank leaching
- Use corrective actions that address contamination sources under your control
- Keep in mind state, county, and federal regulations
- Implement strategies to prevent contamination from happening
- Confirm that the changes were effective

Post-Harvest Water

- Rinsing/washing
  - Single Pass (eg. spray)
  - Batch or dump tank water
- Ice making
- Handwashing
- Cleaning and sanitizing
  - tanks, tubs and surfaces

Key Water Quality Variables in Post-Harvest Wash Water

- Quality at start of use
  - No detectable generic *E.coli* in 100 mL of sample
- pH
  - Can impact the effectiveness of antimicrobial treatments
- Temperature
  - Must be monitored to minimize potential for infiltration
  - Higher risk of infiltration if temperature of product > water temp
- Turbidity
  - Can be used to manage water change schedule



Post-Harvest Produce Wash

- Clean/Sanitize Wash bin following SOP
- Water must have no detectable generic *E. coli* in 100 mL sample at the beginning of use.
- Do not use captured rainwater unless tested
- Small amount of chlorine (or other sanitizer) can be included to keep microbial content in water down.
- It does NOT sterilize produce.
- Treatments of water that contact the produce, including the use of sanitizers, must be registered by EPA for that use.

Monitor and change batch water as necessary to minimize build up of organic matter

Choosing an Antimicrobial Sanitizer

- Chlorine sanitizers are commonly used – Affordable and available
  - Corrosive, highly reactive
- Many non-chlorine chemical options – Ozone, peroxyacetic acid, hydrogen peroxide, etc.
- Organic formulations are available
  - Tsunami, Spectrum, Sanidate, VigorOx 15 F&V, etc.
- Check with organic certifier
  - Must be labeled for use on produce

Alternatives to chlorine for cleaning and sanitizing surfaces and for produce wash waters.

You can go to the Organic Materials Review Institute (OMRI) website & search in their data base for products that are allowed for use in organic production and processing. http://www.omri.org/omri-lists

About OMRI

The Organic Materials Review Institute (OMRI) is a national nonprofit organization that determines which input products are allowed for use in organic production and processing. OMRI Listed—or approved—products may be used on operations that are certified organic under the USDA National Organic Program. OMRI's funding comes from a variety of sources, including sales of publications, grants, donations, and subscriptions. Mainly, however, the organization generates income through fees collected for the review of products intended for use in organic production or processing.

The following are some of the recommended products for “organic sanitizers” on the OMRI list:

ProOxine (Bio-Cide International Inc.)
Oxcide (Chem Fresh, INc.)
Oxine (Bio-Cide International inc.)
San-I-King, No. 451 (Hydrite Chemical Co.)
Sterilox Sanititzer and Disinfectant (Sterilox Food Safety/Division of PuriCore, Inc)
The Disinfectant Answer (Environmental Care and Share)

In addition to approved chlorine based materials, it also lists Hydrogen Peroxide, and Peracetic Acid.

Anything on the OMRI list is allowed or restricted for use by CCOF. Sanitizers can be used as long as "Residual chlorine levels in water shall not exceed the Maximum Residual Disinfectant Limit under the Safe Drinking Water Act, currently 4 mg/L (4ppm) expressed as chlorine, or 0.8 mg/L (0.8 ppm) expressed as chlorine dioxide".

It may be difficult to find small amounts of the above food grade “sanitizers”. Possible source of small amounts might be Home Brew or Home Canning supply places.

Follow the Label!

- Always read and follow label instructions
  - You must use the product only as labeled
- Direct contact with produce vs. food contact surface
  - You should use the correct amount of antimicrobial product (in ppm or other measurement)
- Understand factors that affect efficacy
  - Temperature, pH, sunlight, and how it is affected by organic load

ULTRA CLOROX® BRAND REGULAR BLEACH (EPA Reg. No. 5813-50)
[REGISTERED AS Clorox® Regular-Bleach]
FOR FRUIT & VEGETABLE WASHING
It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Thoroughly clean all fruits and vegetables in a wash tank. Prepare a sanitizing solution of 25 ppm available chlorine. After draining the tank, submerge fruit or vegetables for 2 minutes in a second wash tank containing the recirculating sanitizing solution. Spray rinse vegetables with the sanitizing solution prior to packaging. Rinse fruit with potable water only prior to packaging.

Cleaning and Sanitizing Solutions

Item	Soap/ Cleanser	Chlorine/ Sanitizer Chlorine (5.25%)	How much water	PPM (parts per million) pH 6<7.5	How often?
Harvest Buckets	Dish soap	1 Tablespoon	1 gallon	150 PPM	Daily
Wash Container	Dish soap	1 Tablespoon	1 gallon	150 PPM	Daily
Produce Wash Water	--	½ teaspoon	6 gallons	5 PPM	Daily or when necessary
Drinking Water Container	Dish soap	1 Tablespoon	1 Gallon	150 PPM	Once a week
Hand Washing container	Dish soap	1 Tablespoon	1 gallon	150 PPM	Once a week
Restroom Facility	409	--	--	--	As needed (at least 1x/mo.)

= 1 Tablespoon (1 TBL)
1 Teaspoon
½ Teaspoon
¼ Teaspoon

Disposal of Used Water

- Waste water from produce washing or cooling must be disposed of properly so that it does not serve as a source of contamination to produce and fields.
- Handwashing stations should have catch basins if not connected to a drain
- Check state, local and EPA regulations on discharging water into sewers, leach fields, and/or surface waters

Preventing Surface Runoff: Hedgerows & Ditches

SURFACES

Keeping Things Clean

- Consider everything that touches or impacts produce must be kept clean during harvest and post-harvest handling:
  - Packing and picking containers
  - Packing equipment
  - Restroom facilities
  - Hands and clothing
  - Postharvest water
  - Buildings (i.e., coolers, storage areas)
  - Transport vehicles

Cleaning vs. Sanitizing
What is the difference?

- **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!

Harvest Equipment

All harvesting equipment is cleaned and sanitized following a standard operating procedure, during harvest season on a daily basis and recorded.

What happens when you stack your dirty buckets?

No bucket, no mud!

Clean Produce Washing Containers

How to Clean and Sanitize Harvest Bins and Tools

- 1: Rinse with clean water; use brush if necessary
- 2: Scrub with dish soap
- 3. Rinse in clean water
- 4: Sanitize with chlorine & water
  - 1 Tablespoon bleach (5.25%) to 1 gallon water
  - Test water with chlorine strips to make sure = 150ppm
  - pH: 6—7.5
- 5: Air Dry or wipe with clean gloves and clean paper towel

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Clean Toilet and Handwashing Station

See Handwashing sign

Clean Toilets

- Toilets are screened, and have self closing doors.
- Spot clean as needed with 409 or other cleanser.
- Wash with water and 409 when needed (at least 1x/month)
- Must have toilet paper, handwashing station, covered trash.
- Remove trash as needed.
- Keep record of cleaning and when unit is serviced.
- Keep records for 2 years.

Clean Handwashing Station

- Handwashing station is next to toilet.
- Water for washing is drinking water quality.
- Soap, paper towel and trash can with lid required.
- Waste water does not cause unsanitary conditions.
- Handwashing container is cleaned and sanitized weekly or as needed with properly labeled scrub brush.
- Cleaning and resupply record are maintained.

Clean Packing Shed

- Packing & Storage areas are cleaned regularly, before loading with product.
- Materials used include broom, or power washing ground with food safe cleanser.
- Clean all ledges of spider webs, nests, dust and debris. Remove all sources of food for rodents.
- Spot cleaning as needed.
- Avoid Standing Water
- Trash cans are emptied.
- Label and store cleaning materials separately.

Remove garbage

Clean Storage of Packaging Materials

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

Clean Transportation

Vehicles are clean & produce covered

Produce is kept cool & covered

Is this a clean way to transport?

More an issue of quality than of food safety

Covered Transport!

Microbial risks aren't the only ones!

- Most of the contamination of fresh produce is caused by microorganisms
  - e.g., *E. coli* O157:H7, *Salmonella*, *Listeria monocytogenes*
- BUT, there are two other types of contamination issues to consider
  - Chemical risks – Physical risks

Chemical Food Safety Risks

- Chemical hazards include pesticides, detergents, sanitizers, and other chemicals used on the farm
- To reduce chemical food safety risks:
  - Keep chemicals locked and stored in an area away from produce packing and storage areas
  - Train workers and develop detailed SOPs for them to follow
  - Keep SDS on site in case of an emergency
  - Use only food grade lubricants, oils, and chemicals according to their labeled use
  - Use non-reactive materials that will not leach into produce

Physical Food Safety Risks

- Physical risks include wood, metal, glass, plastic or other foreign objects that can end up in the produce
- To reduce physical food safety risks:
  - Screen or cover overhead light bulbs or replace with shatterproof fixtures
  - Inspect bearings and other moving equipment to make sure they are in good working condition and not introducing metal parts or pieces into the fresh produce
  - Cover packing materials and produce containers to reduce the risk of physical hazards entering

Corrective Actions

- If a food safety risk is identified in the irrigation or produce wash water, produce packing, storage, or transportation vehicles:
  - Immediately assess the situation
  - Has produce been affected?
  - Can it still be sold or does it need to be thrown away?
- Determine the cause of the problem
- What needs to be done to correct it?
- Adjust practices to address risks, keep records, and monitor to make sure the corrective actions have fixed the problem

Questions?


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