Sanitizing Product Contact Surfaces for Fresh Produce Production

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Sanitizing Product Contact Surfaces for Fresh Produce Production

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There are many opportunities for produce and produce contact surfaces to become contaminated with human illnesses. Direct market channels of sales pose many unique situations for contamination, and can be incredibly specific to the farm itself. In this picture a young girl touches tomatoes that are likely to be consumed raw. Her hands pose a risk, her cast poses a risk, the paper containers pose a risk. Additionally the farm stand workers also poses a risk, and her actions from produce display to sale all impact the final quality of the tomatoes sold. There are often many points to consider in each situation.
There are many types of cleaners and sanitizers available on the market. Regardless of what you choose be sure to read the label prior to making a decision.
What cleaner and sanitizer to use?

- Does it kill pathogens prevalent in foodborne illness outbreaks? Salmonella, E. coli, Listeria...
- Is the product approved for use on food-contact surfaces?
- Is the product certified by the EPA?
- Is the product compatible with the surfaces you intend to use it on?
- How quickly does it kill these pathogens?
- Will the surface remain wet long enough to meet the required kill time?
- How many steps are involved in the cleaning and sanitizing process?
- What are the water requirements for use?

Water temperature may need to be adjusted for use, the water may need a specific pH in order to be effective, and minerals in water can impact efficacy. Chlorine is most effective at a pH between 6.0 and 7.5. Test strips to monitor pH and chlorine concentration should be used. The “smell test” is not effective!

Liquid sodium hypochlorite (Chlorine) – wash water, surfaces, monitor pH (6.5-7) 100-150ppm for tanks [bleach= calcium hypochlorite, sodium hypochlorite and chlorine dioxide OK for food contact]
Ozone-$\$ initial investment, quick acting, fewer harsh byproducts than chlorine, must be generated onsite. Mobile systems can cost $10,000. There are no resistance issues known with the use of ozone.

Peroxyacetic acid with hydrogen peroxide –( also called peracetic acid) has safer byproducts and compares to chlorine in effectiveness, maintain 80ppm for effectiveness. Sanidate 5.0 = peroxyacetic acid, hydrogen peroxide, and acetic acid.
We tested out several sanitizers and cleansers against using just water. The tables were smeared with a leafy green and soil mix. An ATP detection meter was used to evaluate the table when it was dirty. The tables were then cleaned with a scrub brush and the label recommended cleaner and then sanitized according to the label directions. Once cleaned and/or sanitized the ATP was evaluated again to determine the effectiveness of the cleaning and/or sanitizing. All products were effective when the directions were followed. When the directions were not followed the ATP levels did not fall as expected. Just water and a scrub brush made the table look clean but there were still high levels of ATP found on the surface.
Thinking About Cleaning and Sanitizing

1. Who will be doing the cleaning and sanitizing?
2. What tools are needed to conduct appropriate cleaning and sanitizing?
3. What steps are required to conduct the cleaning and sanitizing?

Does the farm already have someone who can take on this responsibility, or does someone need to take it on, or be hired? What equipment is needed to effectively sanitize product contact surfaces at the farm? What needs to be purchased and how much will this cost? Are there identifiable short and long term goals to improve sanitizing of surfaces at the farm?
Develop instructions for the task!

On-farm sampling showed the biggest issues with contact surface sanitizing was employee turnover and vacations. Consistency is important for sanitation. Post instructions, train employees and review as needed.
How to clean and sanitize?

1. Chose an effective sanitizer that is labeled for food contact surfaces and has an EPA registration number.
2. Develop Standard Operating Procedures (SOP) for the sanitation step of product contact surfaces.

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How to clean and sanitize?
1. Remove any obvious dirt and debris from the food contact surface.
How to clean and sanitize?
2. Apply an appropriate detergent and scrub the surface.

2. Apply an appropriate detergent and scrub the surface.
3. Rinse the surface with clean water, making sure to remove all of the detergent and soil.
4. Apply a sanitizer approved for use on food contact surfaces. Rinsing may be necessary. Let the surface air dry.
Written instructions to achieve uniformity of the performance of a specific task or function

Step-by-step information on how to execute a task

A prescribed procedure to be followed routinely
The development of an effective SOP (standard operating procedure) is critical to the success and use of that SOP.

1. Identify the flow of product through the packing process
2. Identify the biggest potential risks for product contamination
Well written SOP’s
  - Provide direction
  - Improve communication
  - Reduce training time
  - Improve work consistency

Goal
  - create a document that is easy for workers to understand
    - Helpful!
What surfaces need cleaning and sanitizing?
Worker health and hygiene training should be given at the start of each season, and repeat trainings may be needed throughout the season. Workers' hands and clothing can be a source of contamination. Training must include information on human pathogens, how they can be spread, and how they are a necessary part of reducing that risk.
Signage, with pictures, is an important way of reminding workers on how they can reduce risk.
Workers should be trained on how and when to use gloves. Operations that provide single use gloves to workers should train them to: wash hands prior to putting on the glove, remove and throw away the gloves prior to eating, bathroom breaks, and other activities that can contaminate the gloves, remove and replace gloves when they may have become contaminated (such as coming in contact with the floor etc.). Operations that provide reusable gloves should train workers on how to use the gloves, how to clean the gloves and where to store the gloves. Operations that only use gloves to cover a hand bandage must include glove use training.
Harvest bins should be made of material that is easy to clean and sanitize. These bins should only be used for harvesting, and in this case should not be used for holding personal belongings. This juice container could harbor human disease picked up at another location which could then be transferred directly to the produce, or onto the interior of the harvest bin and then onto the produce.
This harvest bin was found in the compost production area of the farm. There is potential here for the harvest bin to become contaminated with human pathogens from animal manures used in the composting process. Harvest bins that become damaged may be used for other tasks, but should be marked as such so they do not end up back into contact with produce.
Packing tables, lines, moveable belts should be cleaned daily when they are in use. Cleaning and sanitizing with an approved food surface sanitizer, following the label instructions and restricting the surface from any other use other than packing is important. A sanitized surface can become contaminated when workers use it as a break area, a storage location for clothing and bags, and if wild or domestic animals come in contact with it.
This is a washing machine that is used for drying of lettuce leaves. While this can be an accepted practice care should be taken to 1. take a part the machine to better understand water flow through it (there can be filters inside that could harbor human pathogens) 2. understand the potential for biofilms to form if the equipment is not properly cleaned and sanitized 3. monitor for rodent activity (inside of a washing machine is a nice safe place for rodents to store and consume food!)
This is an example of a filter inside of a washing machine. The filter can harbor and provide a breeding ground for human pathogens. Also notice the half eaten potato, brought into the washing machine by a mouse. Knowing the in’s and out’s of equipment used at the farm, and the ability to take things apart so that they can be properly cleaned is ESSENTIAL!
Temporary packing areas are acceptable, if they are constructed with food safety in mind, the product contact surfaces are cleanable and ponding of water is not an issue in the area.
Wash lines and dunk tanks are also considered product contact surfaces and should be included in your cleaning and sanitizing activities. Often equipment is re-used or old and can be difficult to clean or take apart. Retrofitting of equipment must take into account the ability to clean and sanitize. Some growers have cut holes into the sides of the equipment to allow access for cleaning.
Water that is used to clean and cool multiple produce items has the potential to become contaminated and impact all of the produce that is placed in the bin. Using a sanitizer in dunk tank water is recommended, but growers must be aware that the sanitizer only keeps the water safe, and does not sanitize the produce. When using sanitizers the sanitizer levels must be monitored, and when appropriate water pH levels monitored as well. Directions for sanitizers must be followed exactly for them to be effective. Wash water should be tested for generic *E.coli*, results should indicate non-detectable generic *E. coli* to be appropriate for use.
Containers used to cool and/or wash produce must be able to be cleaned and sanitized on a regular basis. This cement covered brick wash bin shows wear and tear, flaking cement, and cracks and crevices that make sanitation impossible. Additionally non-detectable generic E. coli water must be used for any and all postharvest activities where the water has the potential to come in contact with the produce.
Hydro-cooler water must also test as non detectable generic *E. coli*. Sanitizers should be used if the water is recirculated through the hydro-cooler, 100 ppm of chlorine is a standard recommendation. Labels should be consulted as to appropriateness of particular commodities. Consideration should be given to the length of time that the water is re-used. Any ice used in postharvest should also be tested for generic *E.coli.*, only test results showing non-detectable generic *E. coli* are acceptable.
Containers used for storage of produce, or transport to market locations also needs to be cleanable materials. Storage areas should have a rodent control program to prevent contamination of the containers when in use and when stored for later use.
Customers are often bring their own bags to markets to shop, and while this is great for recycling and reducing plastic waste it also comes with risks. Consumers should understand that food safety is important at the farm, the hoops you jump through to ensure a safe quality product, and that they have the potential to contaminate produce themselves. The consumer should take care to reuse bags that they know have not had meat, eggs or other questionable items in them. Sturdy reusable bags should be run through a wash and dry cycle regularly.
Sales displays like burlap should not come in contact with produce directly, but can still be used for displays. Burlap and wood cannot be sanitized. Any cloth items used should be machine washed and dried in a machine drier. Plastic inserts, when available, are advised for the use of surfaces such as wood.
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