Hello and welcome to Food Safety for Wash/Pack Facilities, a training series brought to you by the CCE Cornell Vegetable Program. Implementing food safety practices in wash/pack facilities is critical for ensuring that foodborne pathogens are not introduced or spread as produce is sorted, graded, washed, and packed.

This is Caitlin Tucker, Program Assistant for the Cornell Vegetable Program. Throughout this series, I will walk you through principles of food safety, the ideal wash/pack facility layout, post-harvest water management, cleaning and sanitizing, and tips for cleaning larger washing equipment. Because food safety is a company-wide responsibility, we invite all farm employees to participate in this training.

Here are some highlights from Part 4: Cleaning & Sanitizing

- Cleaning and sanitizing equipment, tools, food contact surfaces is critical for preventing foodborne pathogens from establishing and/or spreading.
- "Wet" cleaning and sanitizing is a 6 step process.
- "Dry" cleaning is an option for those operations that do not typically introduce water into their wash/pack lines
- Efficient and thorough drying is important to eliminate moisture
- Power washers are a useful tool, but should be limited to outdoors use.

Let's begin!

Part 5: Cleaning Common Wash/Pack Equipment

Objectives for Part 5:

- Review importance of routine/maintenance and thorough or deep cleaning
- Provide step by step tips for cleaning brush washers
- Provide step by step tips for cleaning root barrel washers

Two Types of Cleaning Required

When cleaning larger, more intricate wash/pack equipment like brush washers or root barrel washers, there are two types of cleaning that should be done.

Thorough or Deep Cleaning

You want to start the wash/pack season off with a clean slate and a thorough/deep cleaning will allow for easier and quicker daily maintenance cleaning. This type of cleaning takes a lot of time and should be prioritized during the "off season" or as needed throughout the growing season. This type of cleaning is more detailed and the goal is to completely remove dried or caked on debris or vegetable matter, even in the tiniest cracks and crevices of equipment. In order to do this adequately, you must have knowledge of how to dissemble and reassemble wash/pack equipment.

Maintenance or Routine Cleaning

This is done daily, usually at the end of the day. This allows you to start each day of "clean". This type of cleaning consists of a quick rinse and scrub with detergent to clean off soil or vegetable debris. Remember to follow cleaning with a spray-down of sanitizer. Follow the sanitizer label instructions for concentration, application, rinsing, etc. Running a fan after cleaning and sanitizing will help dry down surfaces fasters, which will reduce the change of bacteria surviving on equipment.

Process for Cleaning and Sanitizing Larger Wash/Pack Equipment

Examine the equipment top to bottom – identify areas that are food contact surfaces. Identify all of the areas where debris might accumulate. Identify all areas where debris or dripping water can touch food contact surfaces

Disassemble the equipment if needed. To help with reassembly, use Standard Operating Procedures. Take pictures of videos along the way to use in creating SOPs.

Rinse the equipment off. Scrub with an appropriate tool and use detergent as necessary, making sure to follow the detergent label instructions, and finally rinse off the surface, use a sanitizer according to label instructions, and dry adequately to eliminate moisture that bacteria need to reproduce.

Tips for Cleaning Brush Washers

There are typically three sections that make up a brush washer and each has its own special cleaning considerations. The three sections are:

1) Conveyor
2) Brush Washer
3) Absorber

It is important that brush washers be cleaned thoroughly on a regular basis. Daily maintenance should occur after every use. To clean the brush washer thoroughly, you must first start with all sections connected. This is because the machine may need to be turned on and off in order to access many areas (such as the brushes or foam donuts). Afterwards, the machine needs to be disconnected from the conveyor and absorber in order to reach spaces internally.

Drive chain guards should be removed and drive chains should be disconnected and removed. The machine can be stood up on end to better reach the underside. Make sure you clean the top and bottom.

- As I just mentioned chain guards need to be removed. This exposes axles, chains, & other hard to reach spaces…
- To separate the absorber, disconnect chains…
- Clean internally where debris accumulates including rough welds…

Cleaning Tools

- Various diameter bottle brushes, Dryer vent brush, Multi-purpose paint scraper, Long handle sponge scrubber, Personal protective equipment for your protection and fans to aid in drying. You should feel free to experiment with other tools that might make the job easier.

Interior Access and Cleaning

To adequately clean the interior, you need interior access.

- It is very hard to just reach in and try to clean.
- Most machines come with riveted top plates on either side of motor. These rivets should be removed and replaced with machine screws or thumb screws to allow plates to be replaced for safety after cleaning.
- It is important to note that flaps, brushes, interior housing, sill plates, etc. are all food contact surfaces.

When cleaning the interior, it is best to do so before debris can dry

- Backpack/pump sprayer can be used to apply detergent or simply to loosen debris
- You will need to turn the machine on and off to get all of the bristle bundles
- Be sure to clean interior housing walls, the underside of the plate where the motor sits above, and the undersides of the removed access plates
- We strongly advise that you do not clean the equipment while it is running

Focus on Brushes

Brush washers have sets of 10 or more spinning soft bristle brushes, and each brush has many bristle bundles. The overhead tubes have nozzles that spray water onto produce below. This results in debris getting lodged within the bundles, between bundles, and between brush axle and housing. If these bristle brushes are not adequately cleaned, debris spreads by nozzle spray and the spinning action of the brushes.

To clean these, get creative:

- Try using a custom-made scrubby on a stick
- Cut a scrubby sponge into a triangle shape that fits between two sets of brushes. On the widest section of the triangle, make a hole, and glue in a long dowel
- Or you could try a stiff bottle brush that is 1/4" inch diameter or smaller to get into bundles
- Dryer vent brushes also work well for getting in between brushes & bristle bundles.
- In order to reach into the abyss of the brush washer, you will need access from either side of machine. The Motor housing panel sits above blocking clear visible access.
- Use a food grade grease-cutting detergent as needed
- A back pack sprayer or low volume water hose can be used to rinse off debris and detergent as you clean. rinse of
- Don't forget to clean legs, cross bars, support bars, screw heads, holes, and rough welds. As you are cleaning check for signs of rusts. This is a sign that moisture is collecting in spaces and is not adequately drying. These collection points can also serve as harborage points for pathogens.
- Inspect for rust

The Absorber

The Absorber is made up of foam "donuts" set onto spinning axles. These Absorber donuts spin and "wick" off water from produce coming out of brush washer. Debris ultimately gets smeared onto donuts, between donuts, and axles entering housing.

Here are some tips for cleaning Donuts:

- If debris and oils are smeared onto the donuts, a detergent is going to be needed to break down the debris.
- Scrubbies or sponges can be used to scrub off vegetable matter
- To access all sides of the donuts, you will need to turn the machine on then off to rotate the donuts
- When doing this, take extra precautions while the machine is running!!
- Be sure to clean drive cylinders from underneath absorber as well.
- Multi-purpose paint scraper tool or small diameter bottle brushes can be useful in cleaning between donuts. , but take care to not gauge or tear the foam donuts with sharp tools. This would only create more harborage points for pathogens that would be difficult to clean.

Foam donuts should be replaced, as needed, and at least annually. Having 2 sets can be helpful. This allows you to quickly add the clean set of donuts, while being able to set aside the dirty set to clean separately for future use.

Don't Forget to Clean Underneath

- Use a flexible brush to reach into areas where housing blocks view
- Avoid the use of power washers – they can easily spray a fine mist of debris and contamination all over facility
- Consider putting the equipment on wheels for easy moving
- Be sure to clean support rods/bars, legs & supports, the underside of donuts, drive cylinders, and the underside of drip pan, outlet tube, & corners

Cleaning and Sanitizing Takes Time

Time Required to Disassemble and Reassembly Equipment

Here's a look at the time involved with disassemble and assembly.

- Removing chain guards and chains takes about 20 minutes
- Disconnecting the conveyor and absorber (including unbolting leg connections and sill plates) takes approximately 25-30 minutes
- Removal of upper plates takes about 5 minutes
- Picking up the machine, standing it on end, cleaning the interior; and sanitizing takes approximately 30-45 minutes
- Drying the brush washer with a fan can take 60min or more depending on how many fans are used.
- Reconnecting the conveyor and absorber; and replacing the plates – 35 minutes
- Reconnect chain and chain guards, will take about 30 minutes

Altogether, this is 3.5 to 4 hours. Keep in mind it may very well take you longer the first time around.

Cleaning Takes Time

- Cleaning the absorber starts with the plate connecting it to the brush washer
- Each line of donuts must be cleaned. This will take approximately 30-45 minutes
- The Underside drive cylinders will take 20-30 minutes
- Cleaning the Housing and around the axles will take approximately 20 minutes
- Cleaning Legs and drip pans will take approximately 15 minutes

To emphasize the importance of regular cleaning and sanitizing, here is a side-by-side comparison of the length of time it takes to clean parts of the brush washer if done daily versus if debris is allowed to dry on:

- Cleaning the interior housing, sides, underside, roller brushers, the exterior housing, chain guards, drip pans, etc. will take approximately **1 hour and 45 minutes to clean if done daily**. If debris is allowed to **dry on, cleaning these parts will take approximately 4 hours and 15 minutes.**

Cleaning Root Barrel Washers

Barrel Washers with Wooden Staves

Requires cleaning thoroughly *more frequently depending on use.* Maintenance cleaning after each use.

- Again, the key here is to not let debris/crud dry on!
- Similar to brusher washers, cleaning barrel washer will take time, so be sure to have appropriate tools and space to facilitate that.
- Wooden barrels washers have an added concern in that wood can absorb moisture and stay damp providing the perfect environment for bacteria to survive and reproduce.
- They are also more challenging to clean due to the numerous spaces between staves, and other nooks and crannies.

Focus on the Priority Areas

- Watch how machine works – where does debris and soil accumulate?
- In order to adequately clean all spaces, understand that the barrel needs to be rotated
- Lots of water will spill out through cleaning and sanitizing so it is important that you have good drainage for floors or gravel for ground seepage.

Tools for Cleaning Wooden Barrel Washers

Some of the tools that the Cornell Vegetable Program has trialed in cleaning wooden barrel washers include custom made scrubbies, bottle brushes attached to handles, and backpack sprayers.

Cleaning Suggestions

- Using long-handled tools to reach the interior

- Brush off debris when the equipment is dry starting first with the exterior and then the interior.
- Use hot water if needed to get off dried on crud
- Use a backpack pump sprayer with water/detergent mix to adequately reach all spaces between staves and the interior and follow up with a water rinse, and then adequately dry.

Additional Tips…

- Having a detailed SOP for cleaning this machine will be useful
- Determine a cleaning regime that is fast but effective
- Since the barrel must be rotated while cleaning, dirt and debris on the exterior will drop into the interior
- When cleaning interior, some dirt/debris will seep back onto exterior
- Balance this initially, then repeat for final rinse, both sides should be finished

In Summary

- Wash/Pack equipment requires frequent maintenance cleaning and yearly deep cleaning
- Use SOPs to standardize cleaning, provide instruction for disassembly and reassembly
- Cleaning takes time! Prioritize deep cleaning in the off-season.
- Have an assortment of scrubbies, brushes, long handled tools, backpack sprayer, to aid with cleaning

Conclusion

Thank you for watching Part 5: Cleaning Common Wash-Pack Equipment**.** If you have any questions or would like clarification or help identifying resources, do not hesitate to reach out. You can reach Extension Specialist Robert Hadad via email at rgh26@cornell.edu or by phone at 585-739-4065. You can reach Program Assistant, Caitlin Tucker, at cv275@cornell.edu or by phone at 573-544-4783.

If you would like to learn more about the Cornell Vegetable Program visit cvp.cce.cornell.edu.