

Cornell University Cooperative Extension

Farm Food Safety:

Standard Operating Procedure for Washing Produce with a Bleach Sanitizing Solution



This standard operating procedure will guide you through the steps necessary to wash produce in a food safe manner. From calculation of sanitizer rates to washing procedures, many variables can affect the safety of produce on your farm. Use this SOP to learn how to use sanitizers in your produce washing procedure, for training employees and future

Preparation

Prior to mixing the Sanitizing Solution

1. Use a **germicidal** bleach like Clorox (not household bleach).
2. Calculate the amount of bleach required to achieve the desirable free chlorine concentration using the equation on the next page.
3. Inspect washtubs and clean them if necessary.
4. Fill washtubs with the target amount of potable water.

Materials

- 3 wash tubs/basins
- Potable water
- Plastic or metal long handled spoon
- Chlorine bleach of a known concentration
- Measuring device for bleach
- pH test strips
- *Total available or free* chlorine test strips
- White Vinegar
- ORP meter (*optional*)
- pH meter & buffer solutions (*optional*)

Mixing the Sanitizing Solution

1. Add the calculated amount of bleach to the each washbasin (50 ppm for the first and second 10ppm for the third); stir using the plastic or metal stirring spoon.
2. Measure pH of chlorine and water solution (target pH is 7.0, acceptable range is 6.5-7.5), it will likely be higher.
3. Adjust pH if needed, adding white vinegar $\frac{1}{2}$ or 1 tsp at a time. Stir and retest with pH strips.
4. Use a **free chlorine** test strip to measure the **free chlorine** concentration, following instructions on the container.

If target chlorine concentration is not achieved, add small increments of bleach until the target is achieved.

5. Alternatively, use an ORP meter, follow the instructions on the equipment's package for how to measure the oxidation-reduction (ORP) value. Values from 600-700 are acceptable.
6. Proceed to produce washing once free chlorine and pH are within acceptable ranges.
7. Use this calculated amount of sanitizer for future wash water solutions. Double check levels with monitoring strips.

Washing Produce with a Sanitizing Solution

Calculating Bleach Levels

First, determine your desired ppm of free chlorine, the volume of wash water per washbasin and the NaOCl (sodium hypochlorite) concentration in your bleach. **The current recommended levels are no less than 25 ppm for the 1st two basins and 5 ppm for the 3rd basin.** Because free chlorine levels drop quickly as organic matter is introduced, start with levels of 50 ppm for the 1st two basins and 10 ppm for the 3rd. Use the formulas below to calculate the amount of bleach per washbasin for your given volume of water. Once you have determined the amount of bleach needed for a given quantity of water, you can use that level in the future without recalculating. Double check levels with monitoring strips.

$$\text{Volume bleach needed} = \frac{\text{Desired ppm free chlorine} \times \text{volume of wash water}}{\% \text{ NaOCl in bleach} \times 10,000}$$

Example:

We want to make a 50 ppm sanitizing solution in 5 gallons of water using germicidal bleach that is a 8.25% concentration of NaOCl.

$$\text{Volume bleach needed} = \frac{50 \text{ ppm free chlorine} \times 5 \text{ gal of wash water}}{8.25\% \text{ NaOCl in bleach} \times 10,000}$$

$$\text{Volume bleach needed} = \frac{250 \text{ ppm} \cdot \text{gals}}{82500 \text{ ppm}} = 0.003 \text{ gals}$$

$$\text{Now convert the amount of bleach needed to tsp} = 0.003 \text{ gals} \times \frac{768 \text{ tsp}}{1 \text{ gal}} = 2.3 \text{ tsp}$$

$$\frac{50 \text{ ppm} \times 3840 \text{ tsp}}{8.25 \times 10000 \text{ ppm}} = \frac{192000 \text{ ppm} \cdot \text{tsp}}{82500 \text{ ppm}} = 2.3 \text{ tsp}$$

Conversion factors

1% = 100 ppm (parts per million)

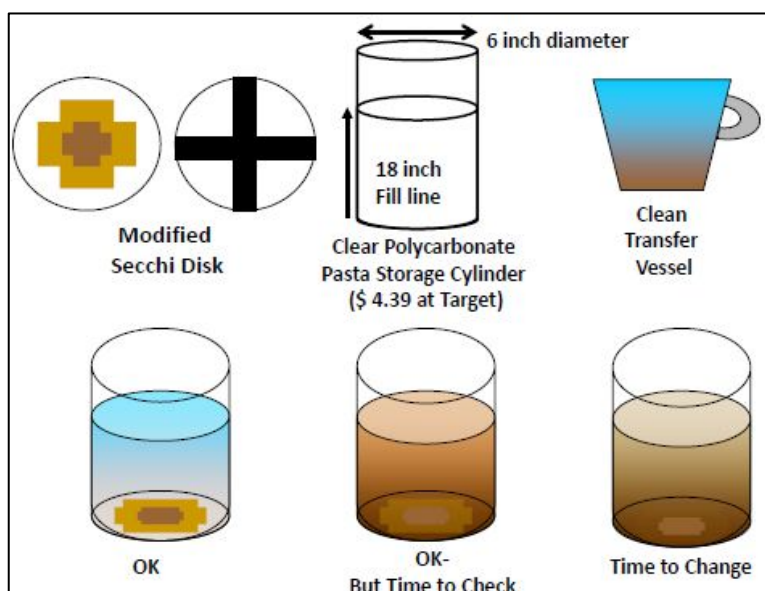
1 gal = 768 teaspoons

5 gal = 3840 teaspoons



Testing Turbidity

1. Attach a turbidity indicator card to the bottom of a clear container (6"x18" or about 5.5qt or a 1/2gal mason jar).
2. Fill container with water from sanitizer or rinse bucket
3. Looking down from the top of the container, look at the card on the bottom of the container.
4. If you can see the white area, then the water does not need to be changed.
5. If you can see the light brown area, the water is still usable but you will have to change it soon.
6. If you can see only the dark brown area, or cannot see the card at all, change the water.



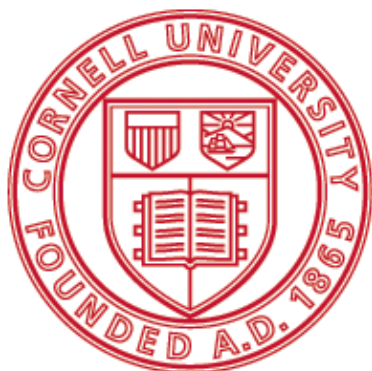
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Washing Procedure

1. Place produce into the first tank. It must stay in this first rinse at least 1 minute.
 - ⇒ Depending on type of produce, dunk, re-dunk, agitate or whatever is necessary to remove debris and soil from produce.
2. Dunk produce in each of the two rinse containers. This will allow for further cleaning and will remove residual chlorine.
 - ⇒ Add a small amount of chlorine to even the rinse containers (target between 5 and 10 ppm free chlorine) to prevent the build-up and cross-contamination of pathogens to produce.
3. After a few batches, check the free chlorine level and turbidity of the wash solution. Free chlorine levels will fall and turbidity will increase as organic matter comes off produce.
4. Periodically test the turbidity of the rinse water.
5. Replace sanitizing solution if turbidity is too high or if free chlorine levels are too low.
6. Clean and sanitize all wash containers and food contact surfaces after done.

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