

Use of Sanitizers in Postharvest Water

The Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR) sets a standard for preventing contamination from agricultural water for post-harvest use. Only use water that has been tested and confirmed to meet the standard of no detectable generic *E. coli* in a 100 mL water sample for postharvest use. Postharvest water refers to water used for rinsing, cooling, or icing harvested produce. It also includes water used for handwashing and cleaning food contact surfaces.

Postharvest water, even if it is clean at the start, can become contaminated by produce that contacts the water. One way to maintain water quality is to add sanitizers to all batch/bulk water. Adding a sanitizer does not clean each individual piece of produce, but it helps to prevent **cross-contamination** from the water to the produce by limiting the buildup of **pathogens** and other microorganisms in the water.

Using a sanitizer in the water can also help reduce the risk of pathogenic biofilm buildup on food contact surfaces when using single pass spraying of produce. (**Biofilm** is a cluster of microbes that are attached to a surface, particularly in a moist environment.)

Understanding the Terms

Always remember that cleaning, sanitizing, and disinfecting of food contact surfaces are not the same, although these terms are often used interchangeably.

Cleaning: Physically removes dirt and debris from food contact surface using clean water and detergents. Cleaning works by using warm, soapy water to physically remove impurities. It does not kill the germs but removes them from the surface.

Sanitizing: Reduces pathogens on the food contact surface to non-harmful levels.

Disinfecting: Kills almost all pathogens/germs on food contact surfaces using chemicals.

Cleaning always needs to be done before sanitizing and disinfecting!



What is a sanitizer?

Sanitizers are antimicrobial pesticides that, when used properly, lower the number of bacteria to safe limits. Sanitizers are usually used on surfaces that come into contact with food or in water. The antimicrobial product label will outline allowed uses, such as for water or food contact surfaces, as well as approved concentrations.

How are sanitizers regulated?

In the USA, sanitizers are considered antimicrobial pesticides, and their use is regulated by the US Environmental Protection Agency (EPA). Just like other pesticide types, **the label is the law**. Make sure the sanitizer you choose is labeled for the intended use and follow the use instructions.

Do not use untreated surface water for postharvest uses. If you use surface water, you must treat

the water (using a validated, controlled treatment) before use and regularly monitor it to make sure the treatment is effective.

Use the sanitizers in the water system, but not directly in the water source, such as into the pond.

Details on EPA pesticide regulation can be found at: <https://www.epa.gov/pesticide-registration/antimicrobial-pesticide-registration>

Understanding Sanitizer Labels

All sanitizers approved by the EPA have labels, and the **label is the law**.

If a grower uses a sanitizer that does not have an EPA label, the grower should be able to prove that the product is suitable for the intended use (such as washing fresh produce) and for reducing contamination risks.

Things to look for on the product label:

- Name of the product.
- EPA registration numbers
- Ensure that the sanitizer is labeled for its intended use, for instance nonporous food contact surfaces or fruit and vegetable wash water.
- Active ingredients.
- Hazards to humans and domestic animals.
- Proper storage and disposal of the product or the containers.
- Directions for use and proper concentration.
- Efficacy statement regarding the microorganism(s) the particular sanitizer controls.

<p>PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS</p>	<p>CHLORILIZER PLUS</p>	<p>FOR INSTITUTIONAL AND INDUSTRIAL USES DO NOT STORE IN OR ABOUT DWELLING DIRECTIONS FOR USE #0251</p>								
<p>DANGER. Corrosive, may cause severe skin and eye irritation or chemical burns to broken skin. Causes eye damage. Wear safety glasses or goggles and rubber gloves when handling this product. Wash after handling. Avoid breathing vapors. Vacate poorly ventilated areas as soon as possible. Do not return until strong odors have dissipated.</p>	<p>Active Ingredient: Sodium Hypochlorite.....12.5% Inert Ingredients.....87.5% Total.....100.00%</p>	<p>It is a violation of federal law to use this product in a manner inconsistent with its labeling. Note: This product degrades with age. Use within one month of receipt. Use a chlorine test kit and increase dosage, as necessary, to obtain required level of available chlorine.</p>								
<p>ENVIRONMENTAL HAZARDS</p>	<p>KEEP OUT OF REACH OF CHILDREN DANGER</p>	<p>STORAGE AND DISPOSAL</p>								
<p>This product is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other water unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to the discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewer treatment plant authority. For guidance, contact your state water board or Regional Office of the EPA.</p>	<p>FIRST AID</p>	<p>Store this product in a cool dry area, away from direct sunlight and heat to avoid deterioration. In case of spill, flood areas with large quantities of water. Product or rinsates that cannot be used should be diluted with water before disposal in a sanitary sewer. Do not reuse container but place in trash collection. Do not contaminate food or feed by storage, disposal or cleaning of equipment.</p>								
<p>PHYSICAL OR CHEMICAL HAZARDS</p>	<p>IF INHALED:</p> <ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice. <p>IF ON SKIN OR CLOTHING:</p> <ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice. <p>IF IN EYES:</p> <ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes. Then continue rinsing eyes. • Call a poison control center or doctor for treatment advice. <p>IF SWALLOWED:</p> <ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person. <p>Have the product container or label with you when calling a poison control center or doctor or going for treatment advice.</p>	<p>SANITIZATION OF NONPOROUS FOOD CONTACT SURFACES</p> <p>Rinse Method - A solution of 100 ppm available chlorine may be used in the sanitizing solution if a chlorine test kit is available. Solutions containing an initial concentration of 100 ppm available chlorine must be tested and adjusted periodically to insure that the available chlorine does not drop below 50 ppm. Prepare a 100 ppm sanitizing solution by thoroughly mixing 1 fl. oz. of this product per 10 gallons of water. If no test kit is available, prepare a sanitizing solution by thoroughly mixing 2 fl. oz. of this product per 10 gallons of water to provide approximately 200 ppm available chlorine by weight. Clean equipment surfaces in the normal manner. Prior to use, rinse all surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. If solution contains less than 50 ppm available chlorine, as determined by a suitable test kit either discard the solution or add sufficient product to reestablish a 200 ppm residual. Do not rinse equipment with water after treatment and do not soak equipment overnight. Sanitizers used in automated systems may be used for general cleaning but may not be re-used for sanitizing purposes.</p>								
<p>CONTAINER ADVICE KEEP CONTAINER CLOSED</p>	<p>NOTE TO PHYSICIAN:</p> <p>Probable mucosal damage may contraindicate the use of gastric lavage.</p> <p>See Side Panel for Additional Precautionary Statements</p>	<p>AGRICULTURAL USES</p>								
<p>HANDLING: Always wear protective clothing including goggles, rubber gloves and apron. Wear respiratory protection if local exhaust ventilation is inadequate. Vent container frequently, and more often in hot weather to relieve pressure. Loosen closure cautiously when opening and replace closure after each withdrawal. Do not use pressure to empty since the container is not a pressure vessel. Wash thoroughly after handling. Empty containers: The empty container retains product vapor and residue. Never add any chemicals to this empty container because violent and dangerous reactions may occur. FOLLOW ALL LABEL WARNINGS EVEN AFTER THE CONTAINER IS EMPTY.</p>	<p>HMIS HAZARD RATING</p> <table border="1"> <tr> <td>HEALTH</td> <td>3</td> </tr> <tr> <td>FLAMMABILITY</td> <td>1</td> </tr> <tr> <td>REACTIVITY</td> <td>1</td> </tr> <tr> <td>PERSONAL PROTECTION</td> <td>D</td> </tr> </table>	HEALTH	3	FLAMMABILITY	1	REACTIVITY	1	PERSONAL PROTECTION	D	<p>FRUIT AND VEGETABLE WASHING: Thoroughly clean all fruits and vegetables in a wash tank. Thoroughly mix 5 fl. oz. of this product in 200 gallons of water to make 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.</p> <p>FOOD EGG SANITIZATION: Thoroughly clean all eggs. Thoroughly mix 2 fl. oz. of this product per 10 gallons of warm water to produce a 200 ppm available chlorine solution. The sanitized temperature should not exceed 130°F. Spray the warm sanitizer so that the eggs are thoroughly wetted. Allow the eggs to thoroughly dry before casing or breaking. Do not apply a potable water rinse. The solutions should not be re-used to sanitize eggs.</p> <p>DISINFECTATION OF DRINKING WATER</p> <p>PUBLIC SYSTEMS: Mix a ratio of 1 fl. oz. of this product per 100 gallons of water. Begin feeding this solution with a hypochlorinator until a free available chlorine residual of at least 0.2 ppm and no more than 0.6 ppm is attained throughout the distribution system. Check water frequently with a chlorine test kit. Bacteriological sampling must be conducted at a frequency not less than prescribed by the National Interim Primary Drinking Water Regulations. Contact your local Health Department for further details.</p>
HEALTH	3									
FLAMMABILITY	1									
REACTIVITY	1									
PERSONAL PROTECTION	D									
<p>E.P.A. Reg. No. 833-16 E.P.A. Est. No. <input type="checkbox"/> 833-PA-1, <input type="checkbox"/> 35939-GA-1, <input type="checkbox"/> 833-LA-1 <input type="checkbox"/> 83199-SD-1, <input type="checkbox"/> 47862-CA-1, <input type="checkbox"/> 40849-GA-1, <input type="checkbox"/> 1270-TX-1</p>	<p>NOTIFICATION</p> <p>833-16</p> <p>The applicant has certified that no change, other than those reported to</p>	<p>EMERGENCY RESPONSE</p> <p>For emergency assistance involving chemicals call CHEMTREC day or night at (800) 424-9300.</p> <p>In case of fire: Use water spray, dry chemical or CO₂. Do not use a direct water stream. Use water spray to cool nearby containers exposed to fire. Firefighters should wear self-contained breathing apparatus. In case of spill: Wear protective equipment including rubber boots, rubber gloves, rubber apron, chemical goggles, and respiratory protection. Flush small spills into waste treatment system with lots of water. For large spills, contain, neutralize with dilute sodium bisulfite, flush neutralized material to waste treatment system with lots of water. Avoid contact with acids. Do not use combustible materials, such as sawdust to absorb spills. Comply with all governmental regulations on reporting releases.</p>								
<p>NET CONTENTS: 833-16 LOT NO.:</p> <p>CHEMTREC EMERGENCY 800-424-9300 (Chemtrec Customer Number: CCN837) 09/11/2018</p>	<p>AFCO ZEP</p>	<p>SOLD BY: ALEX C. FERGUSSON, LLC 5121 COFFEY AVENUE CHAMBERSBURG, PA 17201 TEL. 1-800-345-1329</p>								

Some Important Things to Consider

- Follow the label directions to limit the possible risks to humans, wildlife, and the environment.
- EPA- approved sanitizers will always include the EPA registration and label.
- Pesticide regulations could vary from state to state. Consult with state regulatory agencies for the regulation of pesticide use.

How to Select Sanitizers for Intended Use

- Always consider worker and environmental safety when choosing sanitizers.
- Remember to follow label use instructions for appropriate personal protective equipment (PPE) when handling and mixing sanitizers.
- Some sanitizers may be corrosive when interacting with the environment.

Commonly Used Sanitizers

A number of chemical sanitizers are labeled for use in postharvest water including options for organic certified produce. Commonly used sanitizers include chlorine, chlorine dioxide, peroxyacetic (peracetic) acid, and hydrogen peroxide.

Understanding Personal Protective Equipment (PPE)

- Remember to follow label use instructions for (PPE) use when handling and mixing sanitizers
- Long sleeve shirt and pants.
- Chemical resistant gloves.
- Non-absorbent rubber boots.
- Eye goggles or face shields.

Use PPE fully especially when using undiluted sanitizers.

Mixing the Sanitizers in Proper Concentration

- The concentration of the active ingredient must be routinely monitored, along with other requirements of the label use instructions such as pH, turbidity, water temperature, etc to ensure that the treatment is effective and reduces risks
- Make sure the sanitizer is not expired for the best effectiveness.
- Follow the instructions regarding storage conditions to limit degradations and effectiveness.
- Use appropriate test kits or test strips to measure the desired concentration of the finished sanitizing solution.
- The concentration of the sanitizing solution is described in terms of parts per million (ppm), so it is important to measure the ratio of sanitizer and mixing solution.

Make sure the water used for mixing sanitizers is potable in all cases!

Record Keeping

Always keep records after using sanitizers. Records may include name of sanitizer, purchase and opened date, surface, tools or equipment that sanitizer was used for, method of use, etc.

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