The benefits of SaniDate compared to chlorine are extensive and obvious.

- SaniDate meets all criteria of the ideal sanitizer, and has none of the undesirable characteristics.
- Chlorine meets a few of the desirable criteria, yet delivers all of the undesirable characteristics as well, once pH control and labor costs are added to the investment.

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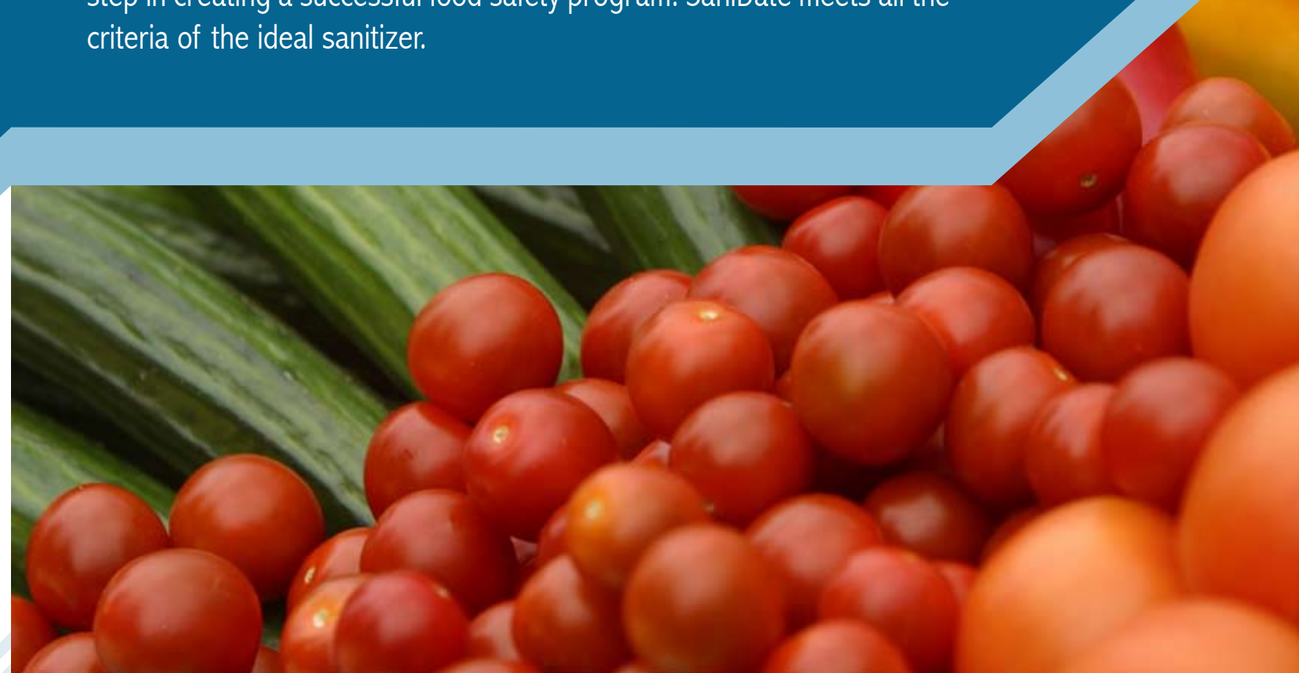
SaniDate®

Post Harvest Sanitation of Fruits and Vegetables

Proper and adequate post harvest sanitation is a vital component to ensure the elimination of food born pathogens in fresh fruits and vegetables. Choosing the correct water treatment application is the first step in creating a successful food safety program. SaniDate meets all the criteria of the ideal sanitizer.



CHEMICAL SANITATION

An ideal chemical sanitizer SHOULD:

- Be approved for direct contact with raw fruits and vegetables
- Be approved for food contact surface applications
- Provide a wide range or scope of activity
- Adequately reduce microorganisms to a safe level with a minimal contact time
- Be safe to handle
- Remain stable under all types of process conditions – High or low agitation, various pH ranges, high organic loading rates, short and long retention times
- Be tolerant of a broad range of environmental conditions – Temperature changes; high & low light; various humidity levels

An ideal chemical sanitizer should NOT:

- Require significant labor to manage and monitor
- Be cost prohibitive
- Require an added step of post-rinse requirement with potable water
- Compromise product quality and sensory characteristics (flavor, taste or appearance)
- Develop undesirable disinfection byproducts
- Create "sodium injury" on fruits and vegetables
- Lose efficacy due to turbidity

Liquid sodium hypochlorite (NaOCl) is the most commonly used form of Chlorine in post harvest operations which include use in hydro-coolers, flume tanks, spray bars and cooling water in fruit/vegetable packing houses.

NaOCl is often the erroneously chosen chemical based on a perceived low cost as compared to alternatives. The error lies in the actual versus perceived use cost.

The effectiveness of NaOCl is greatly dependant on the water pH and the cleanliness of the water source. At a pH of 6.5, chlorine in the form of Hypochlorous Acid (HOCl) is indeed an effective antimicrobial agent; however, many packing houses do not monitor or manage the water pH due to the added cost of testing and acid injection to properly control the alkalinity. Chlorine demand is also typically misunderstood, since chlorine becomes bound to organic matter, soil and other debris, which eliminates the effectiveness. Last but not least, the actual residual of chlorine required to kill or control microbes continuously increases, as some microbes may potentially become resistant to chlorine with extended use.

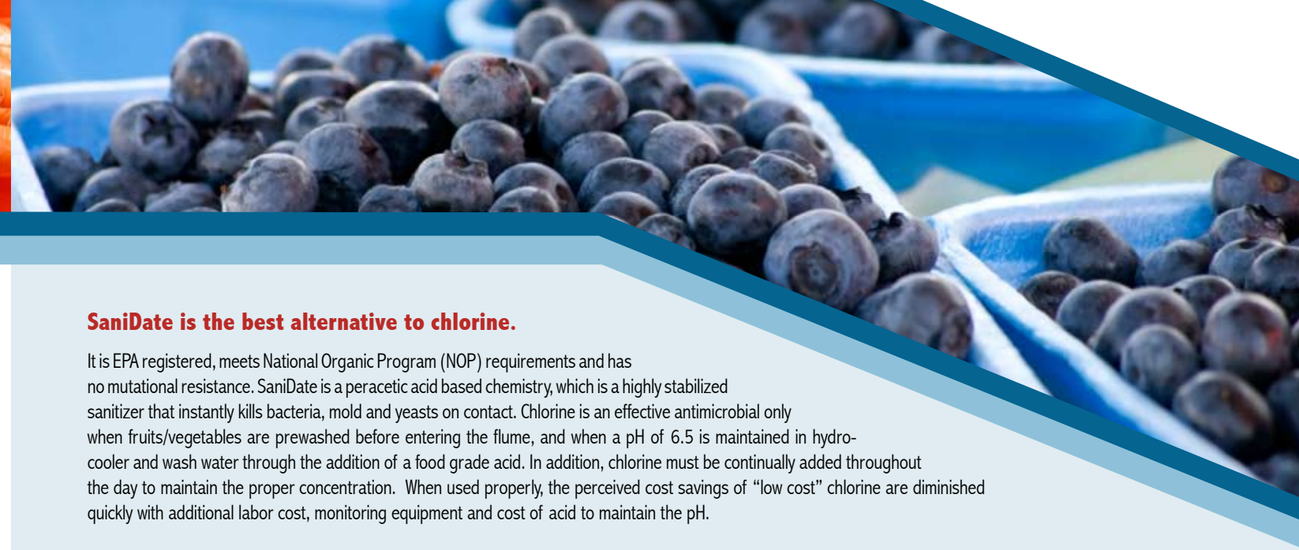
Water quality also has a very strong impact on HOCl availability, which is the important factor in determining the disinfection potential.

These contaminants in water have a MODERATE impact on chlorine stability, measurement, and efficacy:

- Iron
- Manganese
- Nitrites
- Hydrogen Sulfide (rotten egg or sulfur smell in water)
- Sugars
- Starches

These contaminants in water have a STRONG impact on chlorine stability, measurement, and efficacy:

- Ammonia
- Copper
- Nickel
- Cobalt
- Proteins
- Amino acids
- UV light
- pH



SaniDate is the best alternative to chlorine.

It is EPA registered, meets National Organic Program (NOP) requirements and has no mutational resistance. SaniDate is a peracetic acid based chemistry, which is a highly stabilized sanitizer that instantly kills bacteria, mold and yeasts on contact. Chlorine is an effective antimicrobial only when fruits/vegetables are prewashed before entering the flume, and when a pH of 6.5 is maintained in hydro-cooler and wash water through the addition of a food grade acid. In addition, chlorine must be continually added throughout the day to maintain the proper concentration. When used properly, the perceived cost savings of "low cost" chlorine are diminished quickly with additional labor cost, monitoring equipment and cost of acid to maintain the pH.

SaniDate has many advantages over chlorine as related to the finished product, equipment investment and water discharge back into the environment. Labor cost for controlling product residual within proper range is substantially reduced when the BioSafe Systems dosing system is utilized. The only labor required with this system is simply turning on the pump at start-up and turning off at the end of the day. The proper concentrations are maintained and recorded. No pH adjustment is necessary, so this additional cost is eliminated. In terms of discharge back into the environment, SaniDate chemistry is actually approved for injection in wastewater effluent (within regulated levels), discharging directly to the environment, without detoxification. Chlorine fed for bacteria control in wastewater must be detoxified with reducing agents before discharging to the environment, further increasing the cost.

Some additional SaniDate advantages include but are not limited to:

- Reduces chemical usage. There is no need to add acid to control pH or reducing agent to de-chlorinate wastewater.
- Does not require a final rinse before packaging. Many disinfectants must be fully rinsed before packaging.
- Provides immediate control of bacteria and fungi. To achieve effective kill rate, chlorine requires a minimum of 1-minute contact time while SaniDate 12.0 is effective at 20 seconds. (Great in spray bar applications.)
- Does not reduce product palatability. It will not adulterate flavor, texture, color, odor or quality. Chlorine residual on fruits and vegetables leave a highly objectionable taste and odor.
- Does not develop harmful disinfection byproducts. SaniDate dissolves into water and oxygen. Chlorine and bromine develop trihalomethanes, chloroform, bromodichloromethane.
- Does not cause sodium injury on fruits and vegetables. Chlorine delivered by sodium hypochlorite injection leads to reduced shelf life at higher feed rates due to "sodium injury".
- Does not lose efficacy due to turbidity. Chlorine quickly loses effectiveness as a sanitizer when in contact with organic matter, dirt, rust and oils.
- Remains effective with pH changes. Chlorine looses effectiveness in alkaline pH values.
- An effective bio-film remover. Chlorine is not effective as a biofilm remover, except at very high dosages, at which levels cause high corrosion rates and finished product quality issues.
- Not corrosive. Chlorine adds chloride, which is corrosive to Stainless Steel, resulting in corrosion and pitting in flume tanks, chillers, hydro coolers and other equipment. Corrosion (pits) act as niche sites for microbiological proliferation.
- Does not add salt. Chlorine adds salts to process waste water, which may impact wastewater clarification and biological degradation of waste products.
- Has no discharge restrictions because it degrades to water. Chlorine adds chlorides and oxidizing biocide to downstream wastewater facilities.
- Does not generate dangerous gasses. Chlorine becomes a safety hazard if added to water with a pH less than 5. Chlorine Gas is released at an acidic pH, which can be deadly.

For more information, call 888.273.3088 (toll-free). Visit www.biosafesystems.com.

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