

# Filling in the: *Good - Agricultural - Practices*

## Produce Disinfection

By: Wes Kline

At the New Jersey Vegetable Conference, Dr. Steven Sargent (University of Florida) discussed disinfecting materials for produce in the packing shed. Following is a summary of that presentation.

The best method to eliminate human pathogens on produce is to prevent contamination. Washing/disinfecting methods are not always 100% effective. At the present time, no mitigation method will totally eliminate pathogens once they have contaminated a food product without adversely affecting produce quality and freshness.

There are several major classes of chemical sanitizers: halogens (chlorine and iodine), acid sanitizers, hydrogen peroxide and ozone. The ideal disinfectant should have a wide range or scope, rapid kill, stability, tolerant to broad range of conditions, readily solubilized with some detergency, low in toxicity, environmentally compatible and inexpensive.

**Chlorine** is the most common chemical that has been used for a long time. The benefits of chlorination include: relatively inexpensive, can effectively reduce pathogens in dump tanks, hydro coolers, etc., reduces the transfer of decay organisms to healthy fruit and can kill some existing pathogens on fruit surfaces. The effectiveness of chlorine depends on the water pH, chlorine concentration, contact time, content of organic matter in the water, water temperature and type/growth stage of the pathogen. The pH should be maintained between 6.5 and 7.5. The concentration will depend on the product being disinfected, but is generally used in the 50 to 200 ppm range with 1-2 minute contact time. However, as the organic matter increases in the water the chlorine concentration decreases. The solution pH and chlorine content should be checked on an hourly basis even if an automated system is used.

**Chlorine dioxide** is one alternative to chlorine. It is highly reactive, less pH sensitive, less corrosive and more environmentally friendly than chlorine. However, there may be toxicity issues, it is light and temperature sensitive, is not approved for all applications and is more costly than chlorine.

**Iodophors** (iodine + surfactant) is broad spectrum, less irritating than chlorine, has low toxicity, effective at a wide pH range (2-8), less corrosive than chlorine, stable with a long shelf life and has a visual color. However, it will stain porous plastics, is more expensive than chlorine and has an odor.

**Peroxy compounds** (hydrogen peroxide and peroxy acids) such as Tsunami and StorOx have low foam, are effective at a wide temperature range, leave no residue, are generally non-corrosive, relatively tolerant to organic soil, environmentally friendly, have broad spectrum activity, broad pH range (up to 7.5), and active against biofilms. Peroxy compounds are corrosive to soft metals, have an odor at concentrated solutions, can be an irritant at concentrated solutions and have varied activity against fungi.

**Ozone** is a more powerful bactericide/virucidal than chlorine and has broad spectrum activity. It is pH and temperature sensitive, sensitive to organic and inorganic compounds and corrosive. There may be toxicity and safety issues in addition to being more costly than chlorine.