APPLICATION OF CDD-5000 IN HORTICULTURE

A Technology Review

Chlorine Dioxide Can Help You Solve Sanitation Issues In The Greenhouses And Nursery.

Horticultural operations are facing increasing pressure to solve sanitation issues related to water treatment. Some of the pressure is external originating from government regulations and consumer preferences. Most of the pressure, however, is internal and includes better disease management, integrating capture of irrigation runoff with recycling opportunities, elimination of biofilm and algae control.

The list of available water treatment technologies is a short one. When the unusual demands of horticultural production and post-production practices are considered, the list of technologies that offers effective solutions becomes even shorter. Chlorination, ultraviolet light, chlorine dioxide, ozone, copper and peroxide comprise the list most growers are considering. This article will present a technology review of chlorine dioxide and discuss its potential to solve sanitation issues in greenhouses and nurseries.

Biofilm, Sanitation's Epicenter

Biofilm is a living complex of organic and inorganic components that becomes established on surfaces that are in regular contact with water. Such surfaces include pressurized irrigation lines, non-pressurized recirculation system return lines, holding tanks, mixing tanks, containment vessels and so on. Largely comprised of highly adaptive bacteria, biofilm layers attach themselves to hard surfaces and then grow, becoming thicker and quite established over time.

In horticultural operations such as greenhouses and nurseries, common fertilizer injection actually serves as an accelerant to biofilm growth. Most growers are quite familiar with the presence of biofilm in their fertilizer lines. The layer of slimy growth is seen whenever a line is cut into for repair. Biofilm growth is not restricted to fertilizer lines, however, and is also common in clear water lines, although usually by a slightly less dramatic presence.

An interesting relationship exists between the bacterial complexes making up biofilm and algae. The relationship is a synergistic one; what one needs the other provides. In fact, they work so well together that biofilm is able to provide algae with sufficient energy to substitute for algae's need

for sunlight. Any grower who has scratched his or her head after cutting into an underground pipe and found it lined with green, algae-laden biofilm in the absence of sunlight has personally experienced this phenomenon. Consider this a highly evolved organic system, one that has survived the test of time.

It's no wonder most water treatment technologies are not capable of breaking biofilm down. The photo at right shows sections of PVC pipe cut longitudinally to show the inner surface; top - new line, middle - clear water line showing tan colored biofilm contamination, bottom - fertilizer line showing algae and biofilm complex.

Biofilm Propagates In 3 Phases :

1. **Attachment** – Any organics, bacteria, micro-organism stick to the surface of any of the parts in the distribution network of the water treatment plant. The process of the reproduction and growth start immediately.
2. **Growth** – The microbes secret a glue which prevents the biocide in water to reach the bacterial cell walls and supports in the growth of the microbes within. Hence the water with biocide would come only in the contact of the topmost surface of the films which will be most inert or burned by the biocide and the pathogens and organism propagates beneath the burned surface.
3. **Detachment** – The film simultaneously follows a process of detachment new microbes, bacteria's, etc, which intern would stick to a fresh surface.

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Chlorine Dioxide's Potential

Chlorine dioxide is widely viewed as one of, if not the most effective, sanitizing agents created by man. In horticulture it is injected via its liquid state into irrigation lines (Or by dropping tablets in the collection tanks of water).

One property of chlorine dioxide that provides a large part of its potential is it is a gas that is very soluble in water. With CDD 5000 / CHLORITAB – Chlorine dioxide can be produced and stored at the site. This stock solution is then injected into irrigation systems.With a recommended dose of 1 ppm which will be gradually reduced as per the microbial and quality requirements.

Connected to this solubility characteristic is that as a gas dissolved in water, chlorine dioxide is free to diffuse or move within its solution. Due to this property, its molecules are free to move about within an irrigation line. They capitalize on this freedom of movement by penetrating biofilm layers and killing the complex right down to its attachment sites along the hard surface it has colonized.

Connecting The Dots

Once it is understood that biofilm flourishes in horticultural operations, it encourages algae and it is capable of sustaining disease organisms, including waterborne plant pathogens, we can associate value to its control. Connecting these dots along the sanitation and disease control continuum allows our industry to hone in on how to eliminate the problems and improve operational sanitation significantly. Imagine the corner of a sub-irrigation bench with algae and crop debris. It can be assumed that such contamination is also capable of harboring plant pathogens, particularly those that are waterborne, as well as insects such as fungus gnats and shore flies.

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Greenhouse Vegetable Production

A large greenhouse CDD 5000, into its irrigation water and post-harvest water network to sanitize various production and post-production systems. First, constant injection to achieve a residual of 0.25 to 0.50 ppm in the irrigation water has removed pre-existing biofilm in the lines and prevents its re-establishment. A secondary benefit of this application is elimination of drip-emitter clogging resulting from organic matter deposition associated with biofilm growth and sloughing.
Algae control is another secondary benefit as the trough irrigation system is significantly cleaner with respect to algae buildup than prior to treatment.
Another advantage that chlorine dioxide offers with regard to vegetable and other edible crop sanitation is that because of its gaseous nature, any molecules not consumed in surface sanitation escape to the air and eliminate the need to rinse the product with water to remove any residual chemical.

Outdoor Nursery Production

An outdoor nursery in when switched to chlorine dioxide injection with a main objective of improving drip emitter performance. With year-round production and an irrigation system that captures runoff in a surface pond for reuse, clogging of drip emitters due to biofilm accumulation was a major problem.
The pyramidal accumulation of algae and biofilm clogging the emitter tip causing failure.

Constant inspection of drip lines and replacement of clogged emitters had grown into a full-time responsibility for one employee of this nursery. Chlorine dioxide treatment has eliminated the problem with minimal attention now being required to maintain the drip lines.

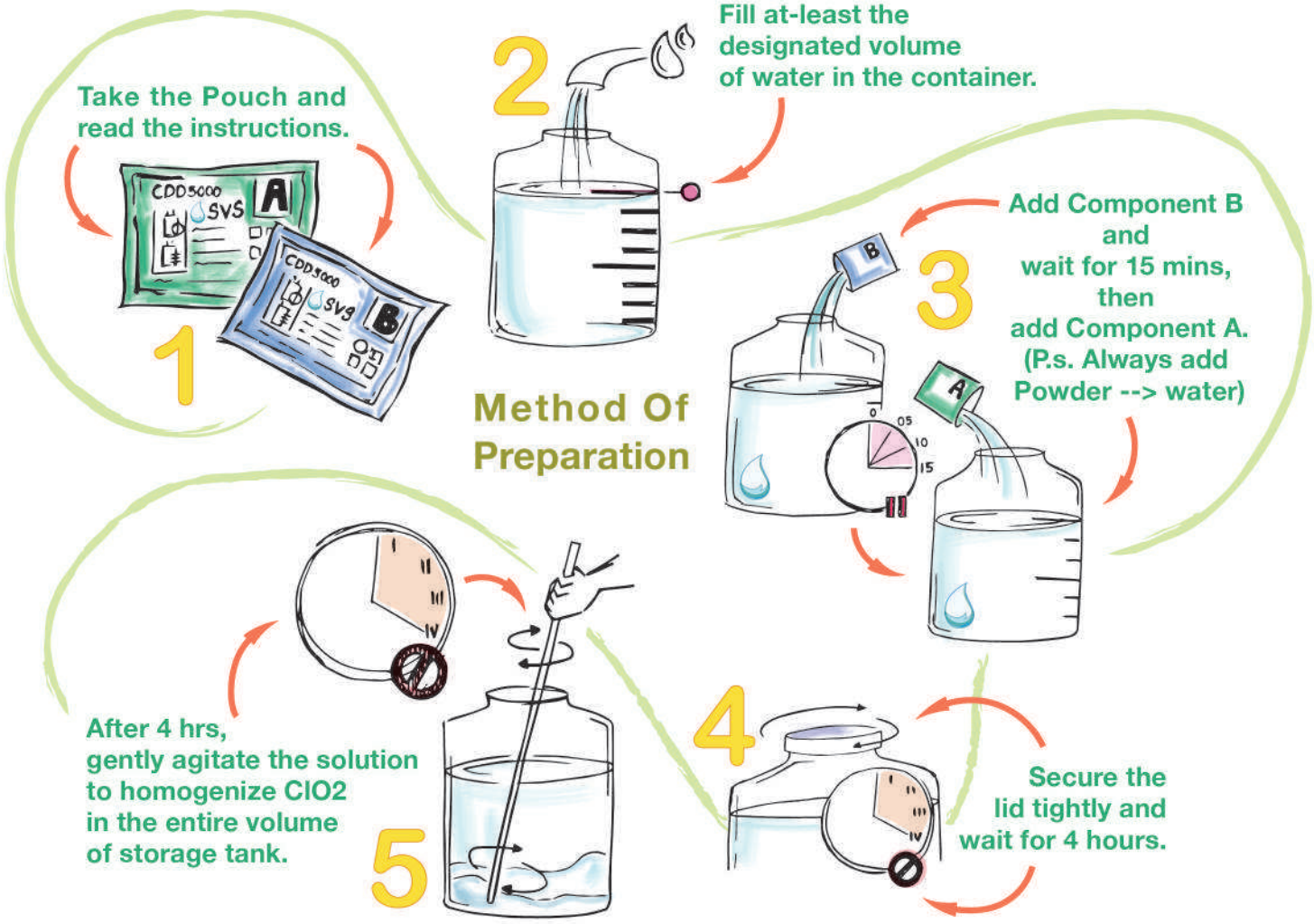
Greenhouse Ornamental Production

The ranks of greenhouse growers using, trialing and considering chlorine dioxide includes those with the following objectives:

- Elimination of biofilm from irrigation lines and holding tanks
- Elimination of drip emitter clogging
- Significant reduction of algae
- Treat irrigation water for disease control
- Treat captured runoff water for re use

Recommended Dose Rate :

- 1 kg for 300000 (300 M3) Litre of water for Water disinfection.
- 100 g for 1000 Sq Feet farm for Air Fumigation.



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Automatic application of ClO_2 is done with the help of E-Dosing Pumps :

Range Of Packaging Available:

- 1 kg
- 2 kg
- 5 kg
- 10 Kg
- 100 g
- 200 g
- 500 g

Contact Us:

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