

# BioDox™

CONCENTRATED LIQUID STERILIZER



## ***Will the next assault of Fusarium destroy your plantation? It shouldn't.***

Although Fusarium is considered a root and soil pathogen, it can affect many parts of your plant as the fungal infection spreads through your plant from the roots up. The fungal root disease spreads up through the vascular system, and depending on the species of Fusarium, it can even affect the buds.

The different names for Fusarium diseases depend, in part, on the type of Fusarium species, as well as on the crop being affected, and where it is affecting.

So we have names like *Vascular Wilt Fusarium*, *Root Rot Fusarium*, or *Stem Cancer Fusarium*, to describe the illnesses. Therefore, in spite of Fusarium being considered a soil-borne disease, it can travel up to affect different areas of a plant. If a Fusarium attack is not caught in time, it can mean the destruction of a plantation. Not an ideal situation by far.

Though there are different ways in which Fusarium attacks and infections are being controlled—with lesser or greater success—using different biological and [1] chemical applications, [2] one stands out: Aqueous Chlorine Dioxide.

## **Aqueous Chlorine Dioxide and BioDox™:**

**BioDox** is a solution in water of chlorine dioxide (also known as “aqueous chlorine dioxide”). Chlorine Dioxide is not a chlorinated chemical compound, and acts differently on pathogens than most other disinfectants. In the article: “Modelling inactivation by aqueous chlorine dioxide of *Dothiorella gregaria* Sacc. and *Fusarium tricinctum* (Corda) Sacc. spores inoculated on fresh chestnut kernel,”[3] it states that:

*Chlorine dioxide (ClO<sub>2</sub>) is a powerful sanitizer that has broad and high biocidal activity. It is more stable and has a higher oxidizing capacity than chlorine. In addition, unlike chlorine, ClO<sub>2</sub> does not react with organic compounds to produce harmful carcinogenic by-products (Chen et al. 2011).*

As *Fusarium* affects a wide range of plants across the world, the application of chlorine dioxide will depend on the type of plantation. However, studies like the above, published in the *Applied Microbiology* issue of 2011,[4] bring to the forefront the need to find new solutions to problems as widespread as *Fusarium*, especially since it tends to affect a wide range of crops, with not one but a whole series of diseases resulting in stunted plants and loss of crop that can be severe.

*Chestnuts inoculated with *D. gregaria* and *F. tricinctum* were subsequently washed with ClO<sub>2</sub> solutions at different concentrations (3, 5 and 7 mg/l) with a ratio of 1 kg:5 l (Chestnut / ClO<sub>2</sub> solution) at 22°C and withdrawn at different times (1, 2, 5, 7, 10 and 15 min) to determine viable counts of spores. Our preliminary experiment indicated that ClO<sub>2</sub> concentration was constant throughout the 15-min treatment.*

In other words, the concentration of chlorine dioxide solution ranged from between 3 ppm (mg/L.) to 7 ppm (mg/L.), ranging from 60 seconds of exposure, to 15 minutes. And the results, according to the study were “remarkable.”[5]

*The treatment with 7 mg/l ClO<sub>2</sub> for 15 min reduced *F. tricinctum* by 4-6 log cycles, while a 5-0 log reduction in *D. gregaria* was detected under the same treatment condition.[6]*

In the case of **BioDox™**, the recommended application depends on if it is being used for pathogen prevention or for infection outbreak control. Please reference the chart attached for application amounts and timing for each. For prevention, less product is generally needed. It can be applied as a root drench, for soil sterilization, as a foliar spray, as well as the disinfection of surfaces, areas, and equipment. This enables the destruction of different *Fusarium* species, including the inactivation of spores, through the use of **BioDox™**.

Breaking down the *Fusarium* life cycle involves all of the above.

The added benefit is that **BioDox™** does not produce resistant strains of any pathogens, since it kills through oxidation, rather than toxicity, and it leaves no residues in the environment.



Manufactured in the USA by BioCentric Solutions  
12400 Loma Rica Dr. Grass Valley, CA 95945  
[www.biocentric.solutions](http://www.biocentric.solutions)

## The BioCentric Solutions Ethos

**BioDox™** was developed by BioCentric Solutions, a company that believes in creating the most effective solutions to dangerous pathogens without harming people or our planet. Our mission is to create safe and effective solutions that improve the health of the world around us.

# BioDox™



## Pathogen Prevention

Plant Life Cycle	CLONE		VEG					FLOWERING					
WEEK		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Soil Sterilization	25ppm	25ppm											
Root Drench		2.5ppm	2.5ppm		2.5ppm	5ppm		2.5ppm					
Foliar Spray			25ppm		25ppm		25ppm		50ppm		50ppm		50ppm

## Infection Outbreak Control

Plant Life Cycle	CLONE		VEG					FLOWERING					
WEEK		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Soil Sterilization	25ppm	25ppm											
Root Drench		2.5ppm		5ppm		5ppm		5ppm		5ppm			
Foliar Spray		25ppm	25ppm		25ppm		25ppm		50ppm	50ppm	50ppm	50ppm	50ppm

### Soil Sterilization

Soil Sterilization is a critical step to insure that colonies of pathogens are reduced or eliminated before the plants are introduced to the soil. This is accomplished by using a 25ppm solution of Biodox in the water system for the farm. This solution travels from the water tank through the pipes and emitters to then fully saturate the soil. Depending on conditions, 60-80 gallons per yard is applied and allowed to completely dry back. It is recommended to allow the product to dissipate for three days before introducing new plants into the soil. Biodox is a gas in solution and will completely dissipate. Additional benefits of this approach include cleaning the tank, lines and emitters of biofilm. Soil Sterilization is recommended at the beginning of the growing season, or between harvesting and planting the next round.

### Root Drench

Root Drench is a soil treatment with Biodox performed while the plant is in the soil. The dosage is one tenth of the dosage used for soil sterilization. A preventative approach includes using a 2.5ppm solution regularly and a 5ppm solution if there are symptoms of infection. The root drench method allows for colonies of pathogens to be reduced without destroying good microbes or causing lock out. This allows the beneficial microbes an opportunity to dominate the terrain. Apply product through the watering system during the watering cycle between feedings. Allow the soil to dry back as much as possible until plants begin to show signs of wilt, then resume watering and feeding as usual. For preventative maintenance use a 2.5ppm (1oz per ten gallons) solution every other week throughout Veg and the first six weeks of flowering. If there is an infection, use Biodox at a 5 ppm solution (2oz per ten gallons) every week until symptoms subside and then every other week until harvest.

### Foliar Spray

Foliar applications are critical to maintain a sterile environment. Third party studies show that using Biodox as a plant wash removes biofilm from the leaves allowing for greater photosynthesis, creating higher yields and terpenes. Most importantly, Biodox targets pests like PM, Boytritis, and many others agricultural pathogens by selectively oxidizing them in a way no other chemical does. It discourages and oxidizes small pests like mites, aphids and thrips without toxicity or residue. Biodox can be used during the curing phase after harvest to discourage spider mites or pm without reducing THC or terpene content. Biodox is completely non-toxic and made of compounds not tested for in DCC testing, making it ideal for the last weeks of flowering.

[1] Punja, Zamir K., and Li Ni. "The Bud Rot Pathogens Infecting Cannabis (*Cannabis Sativa* L., *Marijuana*) Inflorescences: Symptomology, Species Identification, Pathogenicity and Biological Control." *Canadian Journal of Plant Pathology*, vol. 43, no. 6, Nov. 2021, pp. 827–54. DOI.org (Crossref), <https://doi.org/10.1080/07060661.2021.1936650>. "How Do You Prevent Deadly *Fusarium* From Infecting Cannabis?" - RQS Blog: <https://www.royalqueenseeds.com/blog-how-to-protect-your-weed-plants-from-a-fungal-fusarium-invasion-n609> "How to Prevent and Get Rid of *Fusarium* in Cannabis" - La Huerta: <https://www.lahuertagrowshop.com/blog/en/how-to-prevent-and-get-rid-of-fusarium-in-cannabis/>

[2] Korukluoglu, Mihriban, et al. "The Fungicidal Efficacy of Various Commercial Disinfectants Used in the Food Industry." *Annals of Microbiology*, vol. 56, no. 4, Dec. 2006, p. 325. DOI.org (Crossref), <https://doi.org/10.1007/BF03175025>.

[3] "Modelling inactivation by aqueous chlorine dioxide of *Dothiorella gregaria* Sacc. and *Fusarium tricinctum* (Corda) Sacc. spores inoculated on fresh chestnut kernel.]" Z. Chen<sup>1</sup> and C. Zhu<sup>2</sup>. College of Life Sciences, Shandong Agricultural University, Taian, Shandong, China. College of Food Science and Engineering, Shandong Agricultural University, Taian, Shandong, China. *Letters in Applied Microbiology*. ISSN 0266-8254.

[4] *Letters in Applied Microbiology*. ISSN 0266-8254.

[5] Increasing ClO<sub>2</sub> concentration (3–7 mg/l) and extending treatment time (1–15 min) could enhance the inactivation efficacy of ClO<sub>2</sub> treatment on both fungal spores. Moreover, the shapes of the survival curves of the two strains were, to some extent, similar, with a remarkable initial drop in microbial counts followed by a tailing caused by the decreasing inactivation rate. "Modelling inactivation (...)"

[6] "Modelling inactivation by aqueous chlorine dioxide of *Dothiorella gregaria* Sacc. and *Fusarium tricinctum* (Corda) Sacc. spores inoculated on fresh chestnut kernel." *Letters in Applied Microbiology*. ISSN 0266-8254.



Manufactured in the USA by BioCentric Solutions  
12400 Loma Rica Dr. Grass Valley, CA 95945  
[www.biocentric.solutions](http://www.biocentric.solutions)

## The BioCentric Solutions Ethos

**BioDox™** was developed by BioCentric Solutions, a company that believes in creating the most effective solutions to dangerous pathogens without harming people or our planet. Our mission is to create safe and effective solutions that improve the health of the world around us.