

Broad Spectrum Oxidising Biocide for Aquaculture Industry

AN IDEAL SANITIZER FOR CLEAN SHRIMP PRODUCTION



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KloSant
Potent Oxidising Biocide



Please visit us @ www.neospark.com

KloSant

Potent Oxidising Biocide

For sanitizing water, pipelines and equipments In Aquaculture operations

Introduction

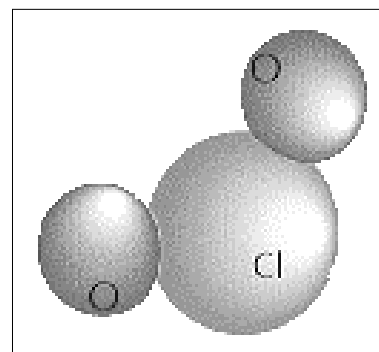
KloSant is a biosecurity product providing Chlorine Dioxide with suitable stabilizers for sanitizing water and contact surfaces of all multi-use containers, utensils, and equipment used in the aquaculture operations. **KloSant** is safe, effective with proven efficacy for potential use in aquaculture of both hatcheries and farms.

KloSant is extremely effective against all bacteria, viruses, mold, fungi, and algae, including spore-formers. It is 2.5 times more potent than Chlorine, 50 times more effective than sodium hypo Chlorite and calcium hypochlorite (Bleaching powder).

Chemistry

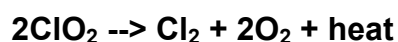
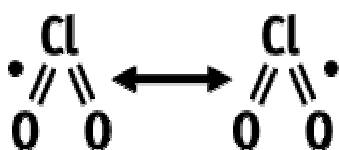
Chlorine Dioxide has the chemical formula ClO_2 . It is a highly reactive oxidant and used for all practical areas of sanitation and disinfection. It must be generated on site using appropriate activator to release the potency.

KloSant is one of the best-quality chlorine-oxygen compounds. Especially because of its oxidizing and very little chlorinating effect it is most effective and, at the same time, environment-friendly sanitizer. **KloSant** is even suitable to treat organically polluted wastewater.



Mode of KloSant action

KloSant on application releases profound molecular oxygen gas (O), which is detrimental to pathogenic microorganisms. **KloSant** acts mainly by the oxidative attack rather than the metabolic block.



KloSant acts as an oxidizing agent and reacts with several cellular constituents, including the cell membrane of microbes. By "stealing" electrons from them (oxidation), it breaks their molecular bonds, resulting in the death of the organism by the break up of the cell.

Since **KloSant** alters the proteins involved in the structure of microorganisms, the enzymatic function is broken, causing very rapid bacterial kills. The oxidative attack on many proteins simultaneously is behind the potency of **KloSant** and explains why the cells of microorganisms are unable to mutate to a resistant form.

In addition, because of the lower reactivity of chlorine dioxide, its antimicrobial action is retained longer in the presence of organic matter.

Why KloSant is effective in low dosages?

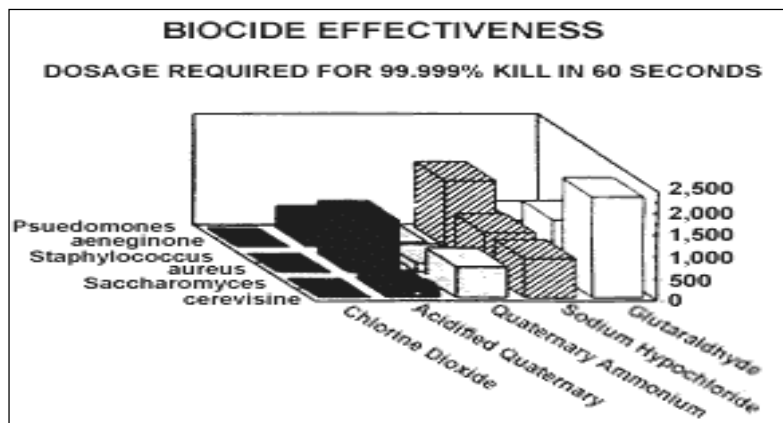
This fact is explained by the term oxidation capacity or electron transfer capacity of the oxidants. Oxidation Capacity explains how many electrons are transferred during an oxidation/reduction reaction. Because the chlorine atom in **KloSant** has an oxidation number of +4, **KloSant** can accept 5 electrons and work efficiently than other compounds.

Oxidants	Oxidation capacity (Electron transfer)
O ₃ (ozone)	2e ⁻
H ₂ O ₂ (hydrogen peroxide)	2e ⁻
HOCl (hypochlorite)	2e ⁻
HOBr (hypobromide)	2e ⁻
ClO₂ (KloSant)	5e⁻

Kinetics of KloSant Sanitation

The following graph shows a comparison of dosages of several commonly used biocides used as hard surface sanitizers.

Comparison of the dosage required to achieve a 5-Log reduction in viable bacteria at 60-second contact time



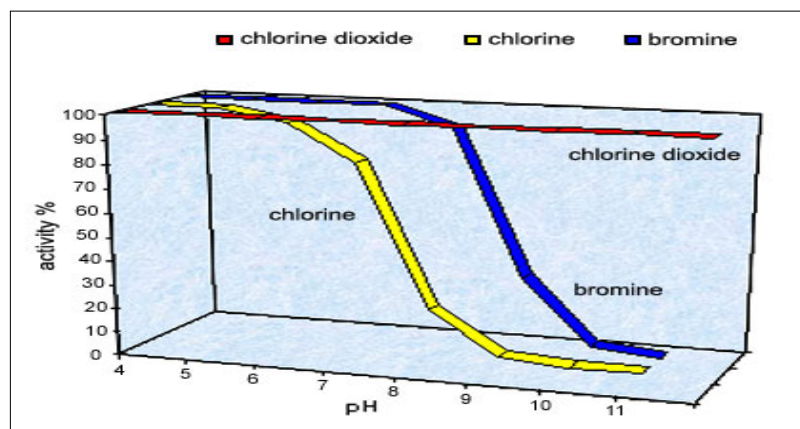
In this graph the disinfectants like Quaternary Ammonium Compounds, Sodium Hypochlorite and Glutaraldehyde requires the dose of more than **500 ppm** to bring about 5-log reduction in viable bacteria at 60 seconds contact time. It is clear from this figure that chlorine dioxide reacts very rapidly, achieving a 99.999% reduction in viable bacterial cells in one minute at low dosage when compare to other disinfectants.

Contact time

Bactericidal action using KloSant			
Micro-organisms	ppm of KloSant	Contact Time (seconds)	Inactivation %
<i>Staphylococcus aureus</i>	0.5	60	>99.99
<i>Eschericia coli</i>	0.25	60	>99.99
Streptococcus sp.	0.5	15	>99.99
<i>Lactobacillus brevis</i>	0.15	300	>99.99
<i>Pseudomonas aeruginosa</i>	0.5	60	>99.99
Vibrio sp.	0.5	30	>99.99

Disinfection efficacy of KloSant at various pH

To compare the activity of three disinfectants chlorine dioxide (**KloSant**), chlorine and bromine a study has been undertaken. According to trial reports it is indicated that the wide range of pH from 4 to 10 does not affect the activity of chlorine dioxide, where as the activity of chlorine is reduced as the pH increases above 6.



Biodegradability of KloSant after reaction

Finally, **KloSant** and its primary by-products chlorite and chlorate all break down to sodium chloride. This, together with non-formation of toxic or carcinogenic chlorination by-products and no build-up of toxic organic or inorganic by-products like bromates gives it the least environmental impact of any biocide in use today. These properties make **KloSant** unique among biocides.

Key Benefits

- Potent Chemosterilant – Kills even spore forms
- Strong Bactericide, Virucide and Protozoacide
- Effective in much lower doses
- Highly biodegradable
- Requires less contact time
- 2.5 times more potent than chlorine
- Active over wide range of pH

Comparison of KloSant with other sanitizer

Properties	KloSant (Chlorine dioxide)	Dry Chlorine Compounds
Efficacy	High	Moderate
Microbial range	Broad spectrum effective against all bacteria, viruses, mold, fungi, and algae, including spore-formers.	Relatively ineffective against most viruses, moulds, fungi and spore formers.
Contact time	Few seconds to few minutes	Usually 30 minutes to several hours.
Concentration	0.1 ppm to 100 ppm	Usually % range
pH	Neutral	Moderately to strong alkaline.
Corrosiveness	Negligible at use concentration	Alkaline compounded products are highly corrosive.
Toxicity	Negligible at use concentration.	Alkaline compounded products are highly irritating at use concentration.
Biodegradability	High.	Low to moderate, particularly if chlorinated byproducts are produced.
Other comments	Does not form chlorinated by-products, e.g. chloroform, chlorophenols, or trichloromethane.	Shelf life and stability are poor; odour and bleaching effects can be a problem.

FDA approval of Chlorine Dioxide

Final ruling of FDA indirect food additive petition published August 12, 1987 listing chlorine dioxide 21 CFR 178.1010 as an approved compounds in food processing plants for all food contact surfaces.

Product Specifications

Chlorine dioxide	10 Percent
Specific gravity	1.090 – 1.120
Odour	Slightly ozone like
Solubility	Completely soluble in water
Corrosion (As supplied in concentrated form)	Slightly corrosive in concentrated form
Corrosion (As normal dilution levels)	Non-corrosive to metals at normal use rates.
Efficacy	High
Microbial range	Broad spectrum effective against all bacteria, viruses, mold, fungi, and algae, including spore-formers.

Application Procedure:

KloSant is activated on-site whenever its usage is desirable. This makes it an easy-to-use, safe and versatile disinfectant.

- Dilute 500 ml of **KloSant** in 1.0 liter of clean water and dissolve 75 gm of Activator Chemical in the total volume of diluted **KloSant** in a clean vessel.
- Allow 10 minutes to dissolve and the solution turns dark yellow to yellowish brown in colour.
- Mix required quantity in water outside the pond and then spray uniformly throughout the pond.

Application dosage for Aquaculture farm:

Treatment levels (PPM) *	0.05	0.25	0.5	1.0
KloSant required dosage (Lt.)	5	25	50	100

* Treatment levels (PPM) for 1-hectare pond with 1-meter water depth.

Application dosage for Hatchery:

Treatment levels (PPM) *	5	10	100
KloSant required dosage (ml./1 Ton of water)	50	100	1000

*For Reservoir water treatment in hatcheries to disinfect water.

For effective sanitation of pipelines, tanks and equipment the suggested dosage of **KloSant** is 0.1 %, i.e. 1 lit. /100 lit (i.e. 1000 ppm).