

Note - Considering above commercial comparison following thing need to highlight which is not include in comparison.

- Cost of Ownership of the installation that should be there for using chlorine.
- Cost of Certified personnel to use chlorine.
- Cost of Hazard during transport of Chlorine.
- Cost of Liability insurance due to risk of using Chlorine (Explosion risk)
- No Depreciation cost of machineries and equipment.
- With Microslay (ClO₂) the Cleaning of the same will help in increasing the discharge rate of the water. Indirect saving the pumping cost.
- Increase the life of distribution pipe as the product is non corrosive.
- Low maintenance cost pipe and other machinery.
- Operational Cost - Loading unloading cost.
- No requirement of additional chemicals.
- No algae & bio film formation.
- Improved Health of the working staff of plant.



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Initiative to save Environment

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ENVOCRYSTAL[®]
Initiative to save Environment

Microslay ClO₂ NSF
Unique Solution for water disinfection



ABOUT ENVOCRYSTAL

Envocrystal an ISO 9001:2015 Company is one of the leading manufacturers of water and waste water treatment chemicals in India. We have committed ourselves to deliver our customer's, good quality products which meet their needs and specifications. We have successfully attained a good position in this industry due to our restless effort to make our valuable clients satisfy with our product range. Our wide range of products includes Water treatment chemicals, Water and Waste water treatment technology, RO AND UF Membrane, Commercial RO Plant, Low Fouling Membrane, Filter Equipment and many more. Our products are extensively demanded amongst our valued customers owing to their impressive features and cost effectiveness. All our product ranges are manufactured keeping in consideration the confined parameters of the industry. Our company follows latest marketing policies and practices transparent business ethics which help us to grow our customer base across the country. We are a client centric organization and every activity taking place in our organization is only and only for our customer benefit.

MICROSLAY (CHLORINE DIOXIDE)

After understanding the advantages and implementation related problem of conventional disinfection system (handling and transportation, dosing application, residual effect, health hazards, safety and infrastructure cost), Envocrystal has evolved a unique disinfection technology Microslay (certified by National Sanitation Foundation under The Public Health and Safety Organization USA). Microslay is a transportable, non-explosive powder kit of two components that, once added to a specific volume of water, reacts fully into a long lasting active Microslay solution with a concentration of 0.6%. It is an oxidizing biocide. Microslay is an advanced delivery system to generate Chlorine, dioxide with a purity of 99.9+%. Microslay does not generate any carcinogenic by products and chlorinated hydrocarbons (THMs, TCMS, CFCsetc). The active biocide Microslay (ClO2) is 10 X more powerful than Chlorine (and Chlorine type disinfectants), works at a board pH range from 4 to 10, with a stable efficiency on variable temperature range.

Microslay (0.6%) solution kills all water-borne micro organisms. These include bacteria, viruses, yeast, fungi, mold, spores, protozoa's, cryptosporidia, actinomycetes, cysts, and other diseases. Microslay also removes phenols, cyanides, and methanogens from water. Microslay is easy to use, simple to apply and contributes positively to all aspects of crop health. Microslay has no harmful environmental impact.

Microslay is delivered as a powder kit of two components. These have a 4 year shelf life. Once added to a specific volume of water, the components react to produce a 99.9+% pure Microslay solution with a full potency shelf-life of up to 30 days.

Explore the website WWW.ENVOCRYSTAL.COM and discover the unique features and benefits of Microslay, the delivery system of the 21st century water disinfectant



CERTIFICATION / ACCREDITATION

1. Toxicology Test - National Sanitation Foundation (NSF ANSI 60)
2. Bacterial Efficacy - Haffkine Institute for Training, Research & Testing
3. LD Oral - India Drug, Resarch association & Laboratory (IDRA)
4. Primary Skin Irritation - India Drug, Resarch association & Laboratory (IDRA)
5. Mucous Membrane - India Drug, Resarch association & Laboratory (IDRA)
6. Sub-Acute Dermal Toxicity 28 Days - India Drug, Resarch association & Laboratory (IDRA)
7. Sub Acute Oral Toxicity 90 Days - India Drug, Resarch association & Laboratory (IDR)
8. Sub-Acute Dermal Toxicity 28 Days - Bee Pharmo Lab
9. Sub Acute Oral Toxicity 90 Days - Bee Pharmo Lab
10. Concentration Test - Haffkine & Geo-Chem Laboratory
11. Chemical Analysis Test - Geo Chem Laboratory



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COMMERCIAL DETAILS

In 1 Kg (A + B) of Microslay 25 Liter solution can be made at site only by mixing in water. Strength of solution is 6000 PPM Per Liter.
For Calculating the Total Qty required formula as under:-

$$\text{Total Quantity} = \frac{\text{Volume of Water (Ltr)} \times \text{Require Dose (PPM)}}{\text{Strength of Chemical (PPM) 6000 PPM}}$$

$$\text{Strength} = 6000 \text{ PPM}$$

For Example
Water Volume = 100000, Dose @ 0.07 PPM
(Dose can be adjust as per available contamination)

$$\text{Total Quantity} = \frac{100000 \times 0.07}{6000} = 1.17 \text{ Liter}$$

For treating 100000 Liters (1 Lac Ltr) = require 1.17 Liter of Microslay (Chlorine Dioxide).



Microslay (Cl₂) is 21st century chemical technology



APPLICATIONS OF MICROSLAY

Microslay is being used in many applications. Partial list is as under :

HUMAN USE

Drinking water
Municipal water
Ice cube Industry
Swimming pools

HORTICULTURE

Flowers
Irrigation
Ornamental Fish Aquaria



URBAN & LEISURE MARKET

Hotels and resorts
Hospitals
Condominiums
Commercial Building
Air Conditioning systems
Swimming Pools and Hot Tubs
Domestic Sanitize



INDUSTRIAL MARKET:

Cooling Towers
Pulp & Paper
Refineries Pipelines
Irrigation Water
Well Water
Waste Water
Water Parks & Resorts
Merchant Marine, Navy
Cruise Ships
Commercial Aircraft
Car Wash, Train & Truck Wash
Injection Water

BIO INDUSTRY :

Poultry Hatchery
Poultry Growers
Egg Production
Dairy
Swine farms
Swine Processing
Meat and milk farms
Meat Processing
Fish and shrimp hatchery
Fish & shrimp Farming Industry
Fish and Shrimp Processing
Fruit and Vegetable Processing
Canning Industry
Brewing and Milk Industry
Frozen Foods
Cosmetics Industry



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COMPARISON

MICROSLAY COMPARISON WITH BLEACHING POWDER/TCL, CHLORINE GAS

Criteria	Microslay	Chlorine gas	Bleaching Powder / TCL
Application	Easy	Complicated	Complicated and bulky
Residual effect	Very high remains for 48-72 hrs	Decomposes within 4 -5 hrs	Very weak, remains for few hrs only
Algaecide effectiveness	Excellent, effective at low concentration	Effective only when used at very high concentration.	Effective at high concentration.
Microbial effect	Kill bacteria, viruses, cysts, legionella, E.coli, parasite etc.	Deactivate bacteria, not much effective on viruses and other microbial pathogens.	Deactivate bacteria, no effect upon viruses.
pH Range	4 – 10	6 – 7.5	5.5 – 7.
Action upon biofilm	Penetrate through the slime layer of microbes, prevents regeneration by forming acid environment	Not much effective against biofilm, do not penetrate through the cell membrane	Not much effective
Dependency	Temperature independent	Temperature dependent	Temperature dependent
Adaptability	Microbes cannot development resistance	Develop resistance	Develop immunity
Reaction with Ammonia Nitrogen	Not reactive	React with ammonia, requires breakpoint chlorination.	React to form byproducts
Contact time for disinfection	1 – 3 minutes	15 – 30 minutes	30 – 40 minutes
Corrosive effect	Non corrosive	Corrosive	Corrosive
Color and odor	Very effective deodorizer and oxidizer	Effective at high concentration	Not much effective
Reaction with ions	Remove and oxidize iron and manganese ions	Has no effect	Un effective
Requirement of neutralization system	Not required	Required	Required

PREPARATION & DOSING



Take & fill the Tank with exact amount of tap water as shown on the label (1L, 5L, 10L, 50L. etc.)
 First add component A to water in Tank and then add component B. Securely close the tank.
 Wait for 4 hours for reaction to complete. After reaction MICROSLAY (ClO₂)
 Solution is ready for use.

WHY WE SHOULD USE MICROSLEY (CHLORINE DIOXIDE)

There are so many benefits with the use of Microsley (Chlorine dioxide) with current water disinfection system, Benefits of continuous Microsley 6000 use in Municipal water supply system can be categorized into two categories

1. Human Benefits
2. Treatment Plant and Pipeline

1. Human Health related benefit

On the basis of available information in US EPA and WHO documents Microsley 6000 can

- a) Improve the quality of water in terms of color, Odor and test of tap water.
- b) Maintain the residual even at the farthest tap, at the consumer end.
- c) Long distance microbiological control.
- d) Remove the Biofilm from the water supply system which chlorine cannot do
- e) Maintain the water quality for longer duration.
- f) No By product (THM, MX, HAA) no side effect
- g) Microsley6000 will resolve lots of other human health related problems that can happen because of chlorine treated water.

2. Internal Cleaning of Potable water Pipelines, Storage tanks –

- a) The cleaning of the same will help in increasing the discharge rate of the water indirect saving of pumping cost.
- b) Increase the life of treatment Plant as the product is non corrosive.
- c) Reduce the corrosion rate in the treatment plant & pipeline
- d) Remove the biofilm from the system and pipeline
- e) Low Maintenance cost for plant & Machinery.
- f) No danger in handling
- g) Reduces the bacteria killing time to provide the best water quality
- h) Maintain the long distance residual

Health hazards	No health hazards	Skin and eye irritation, carcinogenic byproducts	Causes skin irritation, pungent odor and respiratory problems
Solubility	99.9+ %	< 80%	< 60 %
Cleaning and sanitation of supply network	Sanitize by algae removal	Less effective	Not effective
Stability at higher temperature	It remains stable even at higher temperature and does not dissipate as fast as chlorine.	It is temperature dependent and become unstable at high temperature.	Temperature > 30 rapidly disturb chlorine.
Transportation	Very Easy	Very difficult due to gaseous state and bulky cylinders	Very difficult because in liquid form less strength & schemes are in rural areas
Shelf life	3 years of product, 30 days of solution	Depends upon the handling	3 months of product and 3 days of solution
Buildup of carcinogenic Chlorinated Hydrocarbons	No THM, HAA or MX build up in water (Ref- WHO, EPA Manual)	React with organic matter to form chlorinated hydrocarbons (which are Carcinogenic)	Carcinogenic compound formation in presence of organic. Forms THM, HAA or MIX (Ref- WHO Manual)
Capital cost	Low	Very High	High
Operation	Easy	Complicated	Complicated
Infrastructure	Not Required	Fixed and large	Required
Handling	Easy	Difficult	Difficult
Skilled supervision	Not required	Highly skilled labor requirement	Not required
License and approval	Not required	Required	Required
Shelf life of raw material	3 years	Depends upon handling	3 months

Microsley (Cl₂) in Cooling and Energy Industry





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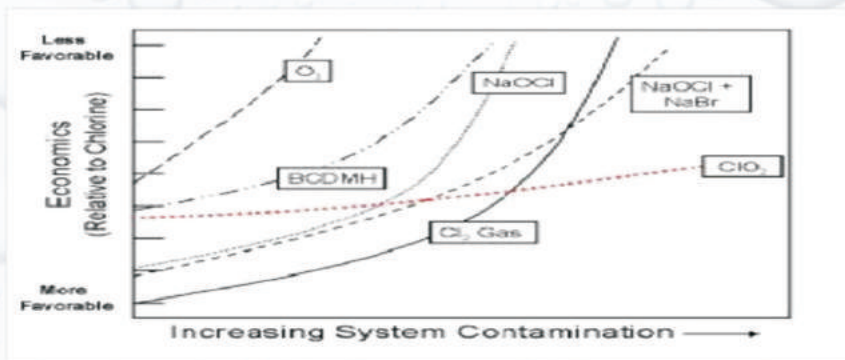


OXIDATION POTENTIALS OF VARIOUS OXIDANTS

Oxidant	Oxidation strength	Oxidation Capacity
Ozone(O ₃)	2,07	2 e ⁻
Hydrogen peroxide (H ₂ O ₂)	1,78	2 e ⁻
Hypochlorous acid (HOCl)	1,49	2 e ⁻
Hypobromous acid(HOBr)	1,33	2e ⁻
Chlorine dioxide (ClO ₂)	0,95	5e ⁻

ECONOMIC COMPARISON WITH OTHER BIOCIDES

A comparison of chlorine dioxide and other oxidizing biocides should be conducted from the perspective of performance rather than on a cost per pound of chemical basis. When chlorine dioxide is evaluated in this way, it becomes more cost competitive with alternative biocide programs, especially in systems, which operate at high pH or are contaminated with organics. The higher the contamination level the more economically viable chlorine dioxide becomes. For a clean system, the amount of chlorine dioxide required to treat a system would commonly be 1/4 to 1/5 of that of chlorine. For a contaminated system, the amount required may be as low as 1/20. Figure gives an indication of chlorine dioxide economics versus the economics of other common oxidants based on system contamination.



Microslay (ClO₂) in Agriculture and Horticulture



WHY IS MICROSLAY SO GOOD?

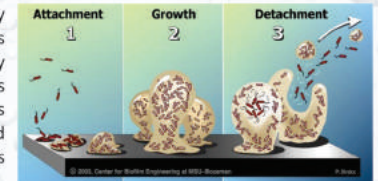
Microslay has been called the “ideal” biocide because of its unique combination of properties.

Potency – It is extremely effective at low dosages. Maintaining a continuous free residual of just 0.05 – 0.02 mg/l of ClO₂ in a water supply has been shown to be effective in controlling a wide range of harmful bacteria and problematic microbes.

Rapid kill – Chlorine dioxide disinfects and sanitizes in seconds, where other micro biocides can take many hours or even days to work.

Not pH sensitive – Unlike chlorine and bromine, which both become less effective as the pH of water rises, ClO₂ remains an extremely effective biocide between pH 4 and 10.

Effective biocide against biofilms – Because chlorine dioxide is a readily soluble gas which dissolves in water without forming ionic species, it is able to permeate and penetrate biofilms which are often relatively resistant to other disinfectants and biocides, such as chlorine. It oxidizes the polysaccharide matrix that keeps the bio film together. This makes ClO₂ particularly effective in controlling and removing pseudomonas and other slime-forming bacteria which can cause major problems in systems such as cooling towers, heat exchangers, spa pools/baths and hot tubs.



Potency against legionella – Chlorine dioxide is extremely effective disinfectant used for legionella control and inhibiting the microbial biofilms in which they tend to grow. It is recognized as an effective biocide and disinfectant to control the risk of Legionnaires' disease associated with hot and cold domestic water systems, cooling water systems, spa baths, hot tubs and leisure pools.

No Disinfection By-Products (DBPs) -When chlorine dosing systems are used in the purification of drinking water that contains natural organic compounds such as humic and fulvic acids, it tends to form halogenated disinfection by-products such as tri-halo-methane (THMs). Drinking water containing such DBPs has been shown to increase the risk of cancer. ClO₂ works differently to chlorine; its action is one of pure oxidation rather than halogenation, so these halogenated DBPs are not formed.

High Selectivity – While Chlorine Dioxide is an extremely powerful oxidant, it has a lower reduction potential than most other commonly used oxidizing biocides and disinfectants. This lower redox potential means that it is able to kill the microbes without reacting with other contaminants, often resulting in much lower dosage rates which can make it the cheaper alternative.

No Taste, Odor and Taint Problems – Ordinary chlorine reacts with ammonium compounds to form environmentally damaging chloramines, which give the water an unpleasant taste and odor. Because chlorine dioxide doesn't form chloramines and other halogenated DBPs, it does not cause taste and odor problems in drinking water, and in process water there is less risk of tainted product. This means ClO₂ is often used in drinking water purification and is the disinfectant and sanitizer of choice for water used in food and beverage production.



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