

# Bioclean Pond Clarifier

Restores Lake Ecosystems & Water Quality  
Without Dredging or Chemicals

Nature's power against algae & aquatic weed blooms, high  
bottom sludge, fish kills, and water pollution



**Mala**TECH  
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## Benefits of Bioclean Pond Clarifier Bioremediation:

- **Eliminates & prevents algae growth** (non-algaecide, but inhibits the growth of algae by removing N and P sources from the water needed for their metabolism)
- **Eliminates & prevents aquatic weed blooming**
- **Improves water transparency**
- **Improves self-purification processes**
- **Metabolises** natural or artificial, solid and dissolved forms of **organic pollution** in the water column, as a result the **transparency & clarity** of the water significantly **improve**.
- **Bottom sludge reduction:** in the benthic area at the bottom of the lake, microorganisms break down the organic fraction of the sludge in oxidative environment, starting the breakdown from the top of the sediment layer.
- **Eliminates Hydrogen Sulphide, free Ammonia and Mercaptan production** of the sediment layer, as a result it prevents fish kills and odour complaints.
- **Stabilises dissolved Oxygen balance in every layer** of the water column, significantly reduces or eliminates the risk of fish kills due to the lack of DO.
- **Reduces pathogenic count**
- **Restores the disturbed ecological balance**, providing a better environment for fish and other higher aquatic life forms.
- **100% all-natural & biodegradable, non-GMO, non-toxic, non-hazardous product with long shelf life, Works effectively without introducing environmentally hazardous chemicals**



## Product description:

Bioremediation of freshwater lakes means the improvement of the conditions in highly eutrophic & hypertrophic waters (bad ecological state) by the introduction of **all natural, beneficial microorganisms isolated from soil or water**. These microorganisms are capable of leading the total aquatic ecosystem back to the ecological balance needed for a healthy aquatic life.

The essence of bioremediation with Bioclean Pond Clarifier is the **enrichment** of water with **bacterial species** that take a significant part in the freshwater's natural self-purification processes, by highly accelerating them without any harmful side effects.

Technically, if we want to summarize a lake bioremediation with Bioclean Pond Clarifier, we can announce that we do not do other than **we give back those microorganisms to the lake, which should be there**, but due to eutrophication, other species have outgrown them, and resulted the collapse of ecological balance. We **maximize the self-purification capability** of the lake by putting those organisms back in the water body which make a turnaround for the deterioration processes of broken ecological balance, and eutrophication, and we guide the lake back to its healthy ecological state. **Bioclean Pond Clarifier is a real proof** that deterioration of ecological state, **eutrophication is not a one-way street, there is a way back.**



After entering the water these non-pathogenic, and **non-GMO** bacterial cultures can effectively **break down the organic materials** in the water column, **reduce the concentration of inorganic nutrients by removing (Nitrogen), and immobilizing (Phosphorus)** them, **restore the Dissolved Oxygen balance** of the freshwater body, and **break down the organic content of the sediment layer** in oxidative conditions, forming harmless Carbon Dioxide and water as end products of organic removal. By successfully **re-establishing the lake's capability for self-purification**, algae/aquatic weed control, water quality improvement, the height of the sediment layer starts to decrease while the sediment is stabilized by the massive reduction of its organic content. Significantly reduced anaerobic activity in the sediment layer results the **fall of toxic reductive gas production** as well (H<sub>2</sub>S, Mercaptans, NH<sub>3</sub>). The **yearly sediment production also drops** significantly, while the **Dissolved Oxygen balance** in the water column is **restored**, the risk of potential **fish kills is reduced** to minimum. As a result of the treatment, the water body reaches an ecological state, as it would be without the adverse effects of human civilization.

There are literally millions of different naturally occurring microbes in our world. We have found a way to isolate and create a unique product from certain microbes to perform highly specific, beneficial tasks. The microbes in **Bioclean Pond Clarifier** help to **restore natural dynamic ecological balance** in situations where environmental factors have led to unstable and unhealthy water quality conditions. We have encapsulated the microbes, and inactivated them in a powder form to provide a multiple year shelf life for Bioclean Pond Clarifier. Moreover, we attached a part of the microbe content on extremely low size carriers. Whenever Bioclean Pond Clarifier is mixed with water, part of the microbes get in aqueous solution, and start bioremediation processes in the water column, while those microbes which are attached to the carriers sink to the bottom of the lake, and start their action in the benthic area to **reduce and stabilize sludge layer.**



## The operating mechanism of Bioclean Pond Clarifier:

### Algae, aquatic weed control, nutrient removal (NH<sub>4</sub><sup>+</sup>, NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>)

With Bioclean Pond Clarifier **Nitrogen removal** is processed through multiple steps of reactions, which is practically a **combined heterotrophic nitrification-denitrification** procedure. The bigger portion of Ammonium ions are oxidized by our bacteria to Nitrate in 2 steps, then Nitrate is reduced to Nitrogen gas inside the cells, and released into the atmosphere. The rest of Ammonium and Nitrate ions are consumed by the bacteria as nutrient supply to create cell mass.

By the application of Bioclean Pond Clarifier, bio-polymers secreted by certain strains of microbes coagulate the suspended particulate matter and soluble Phosphate ions from the water. The organic matter is degraded by action of enzymes secreted by the microbes. Bioclean Pond Clarifier contains a very high concentration of specially selected bacteria, which ensure a proper biodegradation process. Bio-polymers secreted by Bioclean Pond Clarifier bacteria are also for **immobilizing ortho-Phosphate ions, and make them inaccessible for algae & vegetation**. The process of Phosphorus removal in lakes by Bioclean Pond Clarifier is as follows:

#### 1. Degradation of Organic Phosphorus

Organic Phosphorus -----> CO<sub>2</sub> + H<sub>2</sub>O + PO<sub>4</sub><sup>3-</sup>

#### 2. Immobilization of Phosphorus

Soluble Phosphate -----> Insoluble Phosphate



Since algae, and aquatic weed species are autotrophic organisms, which require inorganic Carbon as Carbon source, and macronutrients (mainly Ammonium, Nitrate, and ortho-Phosphate), Bioclean Pond Clarifier bioremediation starves out the algae, and aquatic weed, since our bacteria act as microbial competitors for food source for algae, and aquatic weed species. That is how Bioclean Pond Clarifier **controls algae count, knock down, and prevent algal blooms, and aquatic weed blooms** without any risks, unlike chemical treatment. Whenever the natural dynamic ecological balance is restored in the aquatic ecosystem, the bacteria start self-controlling their count. **You cannot overdose the product, because it is self-controlling, which means you are unable to harm your lake with Bioclean Pond Clarifier.**

### Restoring the Dissolved Oxygen balance of the lake

The deterioration of the Dissolved Oxygen (DO) balance in a lake is usually the first symptom of eutrophication, and disturbed ecological balance. High load of nutrients results algae or aquatic weed blooms. Overgrowth of algae and vegetation results sunlight reaches only the top layer, and photosynthesis does not happen at the rate it should in the lower parts of the water column. Algae become Oxygen consumers at night, or when sunlight is not present, so they lower the DO concentration. Aquatic weeds are shading the water, which depresses photosynthetic activity of the Phytoplankton. Abundance of organic substances in the water body result that microbial populations consume DO for degrading organic materials.

As Bioclean Pond Clarifier microbes are competitors for food for algae, and aquatic weed, depressing their activity at night result more DO residual for the dawn, while at daytime photosynthesis is still able to saturate the water with DO. Transparency improves, sunlight reaches deeper layers of the water body, increasing the height of the DO saturated zone. In the meantime, organic pollution is consumed, meaning the phenomenon of extra DO consumption due to organic breakdown will disappear.

**The restoration of DO balance is usually the first symptom of Bioclean Pond Clarifier bioremediation, it happens in a few weeks after the first treatment. The risk of fish kills caused by the lack of DO diminishes significantly due to Bioclean Pond Clarifier treatments.**

### Reduction of sediment layer at the bottom of the lake

Like those bacteria in Bioclean Pond Clarifier which goes to aqueous solution, and break down dissolved, and particulate organic pollution to Carbon Dioxide and water in the water column, the bacteria which remain attached to the Silicate-based carriers sink to the bottom of the lake, and start their activity there. The aerobic and facultative bacteria in Bioclean Pond Clarifier begin degrading and breaking up the organic content of the sludge at the bottom of the lake. Bioclean Pond Clarifier has been formulated with carefully selected microbes that can break down and utilize materials that are undesirable in the lakebed. The bacteria use up the accumulated undesirable waste as a ready food source.



As the organic content of the sediment layer is being consumed, and starts to decrease, the structure of the sediment changes. The decrease in organic content results the collapse of the sediment, so the layer height of the sediment decreases significantly. The anaerobic activity drops due to less organic content, and oxidative environment provided at the top of the sediment layer. The color of the sediment changes from black to dark grey first, then to lighter grey, brownish-grey, then brown, as anaerobic activity lowers inside, and organic content decreases, and gets stabilized. The production of anaerobic reductive gases like H<sub>2</sub>S, free Ammonia, and Mercaptans decrease, then stops, odor problems disappear. Finally, the sediment becomes a home again for higher life forms, and a healthy benthic area, which is a very important part of the aquatic ecosystem.

**The risk of fish kills caused by H<sub>2</sub>S, and free Ammonia diminishes significantly due to Bioclean Pond Clarifier, and you can forget about dredging your lake ever!**

### Reduction pathogenic count in the lake

As beneficial bacteria in Bioclean Pond Clarifier are natural competitors for food for many organisms boosted by eutrophication, we also placed bacteria in the product which act as competitors for food for pathogenic organisms. Bioclean Pond Clarifier treatments usually result a rapid & significant drop in pathogenic bacteria count, since they are outgrown by our bacteria plus the bioremediated water environment with high Dissolved Oxygen concentrations throughout the entire water column generally do not favour their growth.



For a complete solution in fighting against, and preventing fish kills resulted by bacterial or viral infections, please also check Bioclean Aqua, which is our supplementary product for Bioclean Pond Clarifier bioremediation.

## Fields of application:

- Freshwater Lakes
- Water reservoirs
- Oxbows
- Decoration ponds
- Slow-moving rivers, and canals
- Wastewater treatment ponds
- Tertiary treatment / polishing / stabilization ponds



## Application of Bioclean Pond Clarifier:

### IMPORTANT INFORMATION:

Recommended daily dosages are guidelines only, given in ppm for the solid product, based on lake net volume.

For determining exact dosages for your lake, reservoir, pond, basin or hatchery, please provide us information by sending us our questionnaire filled with information.

Whenever you have any questions, do not hesitate to contact us!

### 1) Freshwater lakes:

**Dosage for one treatment:** 0.15-3 ppm per treatment based on lake's water volume. Exact dosage rate depends on water quality, ecological state of the lake, and the load of pollution/nutrients.

**Number of treatments per year:** 4-8 treatments per year depending on water quality, ecological state, the load of pollution/nutrients, and geographic location of the lake.

### Entire length of the bioremediation process:

As a thumb rule we can announce that **10-15 years of harm** caused by the deterioration of ecological state, and water quality of a lake **can be eliminated with a one-season Bioclean Pond Clarifier treatment**. It is 100% upon the customer's decision where to stop the process, however the ecological state of the lake is going to start falling if the treatments are stopped early, and the lake has not reached its dynamic equilibrium yet. The state of the dynamic equilibrium of a healthy ecological state can usually be achieved within 3-5 years depending on initial water quality, the rate of ongoing load of pollution/nutrients, and the ecological state of the lake at the start of bioremediation. If the load/penetration of pollution is continuous, and cannot be controlled, a low amount of maintenance dosage of Bioclean Pond Clarifier is recommended after the bioremediation is complete to maintain the dynamic equilibrium of the lake in a good, and healthy state, to ensure that the lake's microbiology is able to cope with the pollution it receives, and maintain self-purification capacity at maximum level.

### Timeframe of result expectations:

Restoration of Dissolved Oxygen balance:	After 1st or 2nd treatment
Algae control, improved transparency:	In year 1
Aquatic weed control:	From year 2
Sludge/sediment level reduction:	8-25 cm per year depending on organic content of sediment (the reduction rate of the sediment decreases from year to year, as organic content of the sediment decreases)
Pathogenic control:	In year 1
Reduced risk of fish kills:	In year 1
Water quality improvement:	After the 1st treatment
H <sub>2</sub> S, free Ammonia, smell reduction:	In year 1 or from year 2

### Method for the proper execution of a treatment:

Bioclean Pond Clarifier needs to be premixed with water before application! Pure water, or preferably the lake's own water should be used! After stirred and mixed well, the suspension of Bioclean Pond Clarifier must be sprayed onto the water surface by **EVENLY COVERING THE ENTIRE WATER SURFACE OF THE LAKE WITH THE SUSPENSION OF BIOCLEAN POND CLARIFIER!**

For smaller lakes, treatments can be done from the shore from multiple locations by using a container for the suspension, and a pump with a sprayer. For bigger lakes treatments are done from a boat.

### 2) Smaller freshwater (decoration/garden) ponds:

**Dosage for one treatment:** 3-8 ppm per treatment based on pond's water volume. Exact dosage rate depends on water quality, ecological state of the pond, and the load of pollution/nutrients.

**Number of treatments per year:** Once per month in season.

Rest is like described in section "1) Freshwater lakes" above.



### 3) Wastewater Treatment, Tertiary treatment / polishing / stabilization ponds:

Bioclean Pond Clarifier is also used at wastewater treatment or secondary effluent treatment ponds for effluent polishing (reduced COD, BOD, TSS, NH<sub>4</sub>-N, TN, TP concentration in tertiary treated effluent) algae, aquatic weed, pH control, and sludge reduction.

**Dosage for one treatment:**

Shock dose (1st treatment): 1-2 ppm per treatment based on pond's water volume. Exact dosage rate depends on water quality.

Onwards: 0.6-1.5 ppm in season, once per month.

**If Nitrogen & Phosphorus macronutrient concentrations are high (compared to freshwater standards) in the influent, Pond Pure is needed as an add-on for algae, aquatic weed, and pH control.**

### Timeframe of result expectations:

Algae control, improved transparency:	In year 1
pH control:	In year 1
Aquatic weed control:	<b>In year 1</b>
Sludge/sediment level reduction:	4-25 cm per year depending on organic content, and influent TSS, Salinity, inhibitor/toxic substances' concentrations etc.
Water quality improvement:	After the 1st treatment
H <sub>2</sub> S, free Ammonia, smell reduction:	In year 1

### Method for the proper execution of a treatment:

Usually municipal & industrial WWTP operators dose the soluble version of Bioclean Pond Clarifier by a metering pump to the inlet of the pond, on a continuous basis. Boat treatments every 2-4 weeks with the suspension-forming version can also be done upon customer's preference.



### Packaging information:

The product is available in:

- 25 kg net carton box in bulk for larger lakes
- 15 kg net carton box (60X250 g metal pouches) for small ponds which are the lowest units for ordering.

### Storage information & shelf life:

Keep the product in a cool and dry place below 30 Celsius. Avoid exposure to direct sunlight. Shelf life is 5 years from manufacturing date.