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Bio Nutrient – Saviour for Ecological Waste Water Technology



The issue of waste management in India is a much debated topic which needs no introduction. Large space is dedicated in the media every day to highlight the problems of urban waste. Particularly, pollution of water bodies due to sewage dumping has rendered all the rivers and lakes in urban areas unusable.

The problem is obvious to everyone who has lived in a city in India. While the debate on cleaning our rivers and lakes goes on, there are a very few people coming up with solutions. However, most of these solutions are either exorbitant or too tedious to implement. Thankfully, some interesting ideas have emerged that are not only cost effective, but also provide sustainable solutions for [treating sewage water](#).



Water Hyacinth on Lake

Bio Nutrient is one such process developed to feed Phytoplankton's. Phytoplanktons are a type of single cell Microbes (phytoplankton), which live in all types of natural water bodies. Phytoplankton's use sunlight to produce food through photosynthesis and they become food for other zooplanktons, which in turn are food for fishes. When this cycle is completed, the oxygen level in the water rises and the water body becomes healthy for all living beings.

There have been other technologies innovated in the West to treat sewage water such as Bio Wish, which introduce a type of bacteria into water.

Bio Nutrient for Sewage Water Treatment

“Unlike Bio Wish, Bio Nutrient is like a regular farm fertilizer that causes the native Phytoplankton algae present in water to grow. Bio Nutrient is in a liquid form which is dissolved in fresh water before mixing with contaminated water. The oxygen from Phytoplankton's causes the native bacteria to grow.”

Bio Nutrient mainly treats domestic sewage and not industrial effluents. Industrial effluents contain chemicals that do not allow Phytoplankton's to grow and they also do not have nitrogen and phosphate nutrients that are required for Phytoplankton's to grow. Sewage is undigested food, so it contains all the nutrients needed.

The application of Bio Nutrient on sewage water happened recently, when it was used for treating a large lake in India. Being in the heart of a major residential area, Lake receives domestic sewage, which significantly reduced the oxygen content thereby affecting the aquatic life. Lake encountered a drastic situation, which led to mass fish death.



Lake after using Bio Nutrient

To solve this problem, local fishermen added Bio Nutrient in the lake to solve the problem of fish death in the sewage laden lakes. The powder was used once in 15-20 days or whenever they experienced lower fish harvest. Typically, 1 liter of Bio Nutrient mix is needed for 2 million liters of sewage or 1 liter for 1 hectare sized water body. Apart from preventing algal growth, Bio Nutrient inhibits growth of water hyacinth as well.

Beyond large water bodies, Bio Nutrient can also be used for treating sewage water from a residential apartment complex as well. Typically, sewage from a complex of 50 houses would be about 25,000 liters per day (100 liters per person). If there is space for open water storage, the sewage can be directed to a katcha pond with plastic sheet lining, and without any special construction. The pond/tank can be covered with transparent acrylic sheets for aesthetics and safety. The treated water can be used for gardening, car washing, toilet flushing and other purposes.

'**Bio Nutrient**' contains special and trace nutrients that are deficient in normal waters. Upon application Phytoplankton algae will start blooming within 3 hours that will trigger a large population of zooplankton. '**Bio Nutrient**' produces both live food as well as oxygen (by photosynthesis) in the pond. '**Bio Nutrient**' can be used for

(a) Creating live food

(b) Solving problems in the pond.

Other benefits of using '**Bio Nutrient**'.

1. **Improves** survival.

2. **Helps** breakdown of organic over loads.

3. **Prevents** organic pollution and generation of toxic gases.

4. **Prevents** muddy and moldy smell in prawns.

5. **Improves** color, freshness, strength, and weight gain.

6. **Boosts** immunity and reduces incidence of diseases.

7. **Reduces** requirement of water exchange

Most of the zooplanktons are less than 2 mm in size. This live food is preferable for culture of prawns and fishes for 30 to 40 days till such time that the animals are about 10 gms in size. Later on the pellet feeds can be consumed without wastage and pollution to the pond. The costs of culture under this method can come down substantially by anywhere from 25% to 50%.

For treating sewage, polluted and effluent waters by growing Phytoplankton's and reducing COD and BOD and COLOUR.

If '**Bio Nutrient**' is applied to effluent waters containing sewage and industrial wastewater (provided there are no toxic chemicals and metals), Phytoplankton algae can be made to grow and absorb carbon load and release oxygen. If we have the nutrient analysis of the wastewater we can tailor make the product to suit individual requirements. The release of oxygen and absorption of the nutrient load will reduce the BOD, **COD**, **COLOUR** and **ODOUR**. In some cases the growing algae could remove the color in the water. This can be proved only by trials. For reclaiming and bringing life to lakes, rivers, and water bodies that are polluted by sewage and other pollutants and those in a state of eutrophication.

Most of the lakes and rivers of the world are severely polluted by sewage and industrial effluents. Due to this there is very little aquatic life and most are in various stages of eutrophication. The heavy load on nutrients like nitrogen and phosphate and the lack of essential trace nutrients for Phytoplankton algal growth are the main reasons for such a state of affairs.

If ' **BIO NUTRIENT** ' is added to the system the Phytoplankton algae starts growing changes anaerobic conditions to aerobic conditions. Stops generation of bad ODOUR in the form of H₂S, very soon the water conditions improve. More oxygen and live food returns to the water and very soon the water body is restored to its normalcy. Dosage may be reduced or increased depending on actual conditions. After recovery of the water body even a tenth of the above dosage could be enough.

For preventing wild growth of waterweeds, water hyacinth, green algae and blue green algae and other waste plants in lakes, rivers, ponds and other water bodies.

The addition of ' **BIO NUTRIENT** ' always removes excess nutrient loads of Nitrogen and Phosphate from the water body by growing Phytoplankton's and converting to live food. In the absence of the nutrient load, other exogenous weeds and plants cannot grow. Further in lakes where the wild plants have already grown, if ' **BIO NUTRIENT** ' is dosed into it, the rapid growth of Phytoplankton's consumes the nutrient chain required for the weeds to grow. Slowly they turn into yellow color and die. Within a few months they disappear from the pond. It is important that systematic dosing of the body of water with ' **BIO NUTRIENT** ' should be carried out.

Avoiding mass fish kill.

Oxygen depletion in water bodies is the major reason for mass fish kill. Sometimes toxins released by algal species like blue green algae and dinoflagellates are also responsible for mass fish mortalities. Using 'Bio Nutrient' can prevent this. Addition of 'BIO NUTRIENT' produces blooms of Phytoplankton algae that help crash out green, blue green and toxic algal species from the water body. The blooming Phytoplankton's produce very large quantities of oxygen by photosynthesis and is soon converted into zooplankton that is live food for fishes. The water body becomes clean and healthy.

Removing and crashing out of Blue green algae.

Blue green algae proliferate in water bodies that have a source of pollution or excess nutrients washed down from agricultural lands. Some species like anabaena produce toxins. In lakes which supply drinking water to towns and cities the growth of Blue green algae is a big nuisance. By using 'Bio Nutrient' the Blue green algae will crash out of the system and float in the water in the form of fibers or like a green paint. This has to be physically removed. The pot ability of the water is not affected and the fishes are not harmed. The water is purified and it is safe for normal use.

Bio Nutrient is a liquid mixture which is diluted in water dosed into the pond once a week. It is effective within hours of dosing. Bio Nutrient contains micronutrients required for multiplication of the ubiquitous and beneficial Phytoplankton's in any water body. Bio Nutrient contains Si, Fe, Mn, Ca, Mg, Zn, Cu, B, S, Mo, P, K and Co.

Bio Nutrient causes a controlled and sustainable growth of beneficial Phytoplankton's. Phytoplankton's are unicellular microscopic aquatic plants that absorb carbon dioxide and release oxygen during photosynthesis. Higher oxygen levels in water enable aerobic bacteria to grow and breakdown the organics in the water. Higher DO level also results in tangible changes like cleaner water, reduction in BOD, lower coli-form levels, elimination of foul odor, reduction in mosquito colonies in water and healthier aquatic life. To some extent even metals get oxidized and precipitate out of water resulting in lower COD levels. Bio Nutrient is therefore a substitute for bacteria and other algae control products.

1 ml of Bio Nutrient is applied to 1000 gallons of water once a week. Shake the bottle well before dosing. Dosing is done early at sunrise when Phytoplankton's are most active. Dose the appropriate dose directly into the filter or skimmer or any area of high flow. The cap holds 5ml.

UV needs to be turned off. If the pond has more than its fair share of algae, you can start with double or triple the dose. Since Bio Nutrient is not an algaecide, results can take anywhere from 1 to 8 weeks. So please be patient. Once Bio Nutrient gets a hold, it will maintain excellent water parameters and your maintenance time will reduce by as much as 60%. If your water temperature is below 50 deg F and the pond is algae free, then you can dose half the recommended dose once every other week to maintain a Phytoplankton population in water. This will prevent algae from taking hold in the spring. Once the water temperature rises above 50 deg F, you can revert to normal dosing.

Bio Nutrient has been tested to be non-toxic as per APHA (2012) and OECD (1992) Bio Nutrient has no impact on humans and is even safe if small amounts are consumed accidentally. Overdosing will cause excess Phytoplankton's and water will turn brown. Bio Nutrient has no side effects when dosed in water. Beneficial bacteria, zooplankton and fish grow in a healthy manner in ponds and lakes dosed with Bio Nutrient.

A new way to clean up the rivers, lakes

How would you like the idea of cleaning a dirty lake or a river for a nominal price and in an eco-friendly way?

Bio Nutrient has devised a way to treat sewage and effluents through a patented product, called Bio Nutrient, which not only cleans a polluted water body without affecting its ecology, but also adds nutrients to it, increasing the food content for fish.

Within 15 minutes of dissolving Bio Nutrient in the water, Phytoplankton algae are released. These growing algae absorb nutrients and carbon dioxide from the water and produce oxygen by photosynthesis. The oxygen released helps aerobic bacteria break down the organics and convert the pollutants to base constituents, all this minus the stink that anaerobic decomposition generates. The Phytoplankton's are eaten by zooplanktons that are, in turn, consumed by fish. The ecosystem of the water body is maintained and observed by the presence of healthy fish, which are fit for human consumption.

"With the use of Bio Nutrient, all polluted lakes and rivers can be restored without harming the water life," Besides cleaning water bodies, the product also has several other uses. Bio Nutrient can be used for growing phytoplankton in oceans to absorb carbon dioxide and reduce greenhouse effect, thereby aiding in solving the global warming problem. It can also be used for preventing growth of toxic algae species called red tides in the oceans. It can be used for generating plankton and live food in aquaculture ponds which can boost the growth of prawns and fish.

An Overview of Trials Using Bio Nutrient in Lagoon STPs and dams in Queensland, Australia

This blog post is somewhat more technical than some of the other posts I have done to date. The reason for this is that I am presenting actual data! Yes! The numbers are in and I have graphs, relationships and hypotheses to offer. So if you are interested in the more analytical side of things then I hope you enjoy this post. As we are moving towards summer here in Australia things are warming up so the cyanobacteria are getting more active and the use of Bio Nutrient in these tests is going to get properly tested to see how good it is. I hope you enjoy the report and as always, feel free to contact me if you want to know more.

Bio Nutrient is a nutrient mixture that has all the micronutrients required for growth of Phytoplankton microalgae adsorbed into the amorphous structure. As only Phytoplankton's have a requirement to take up silica, they are the only algae that benefit from the micro-nutrient boost. This means that the Phytoplankton's successfully out-compete the other algae

for nutrients, and reduce blue-green algae growth in a natural way. The process is non-toxic and offers an added benefit in that bacterial activity is enhanced due to the increased dissolved oxygen content from the Phytoplankton bloom. This increase in dissolved oxygen and bacterial activity will assist in bringing down the biochemical oxygen demand (BOD) in the wastewater.



The three trials presented here are each slightly different in regard to the conditions of the STP or the water being treated. Trials 1 and 2 have both shown a strong change in the percentage of the BGA that make up the Total Cell count. A similar pattern may slowly be emerging in Trial 3 which has a lower N concentration.

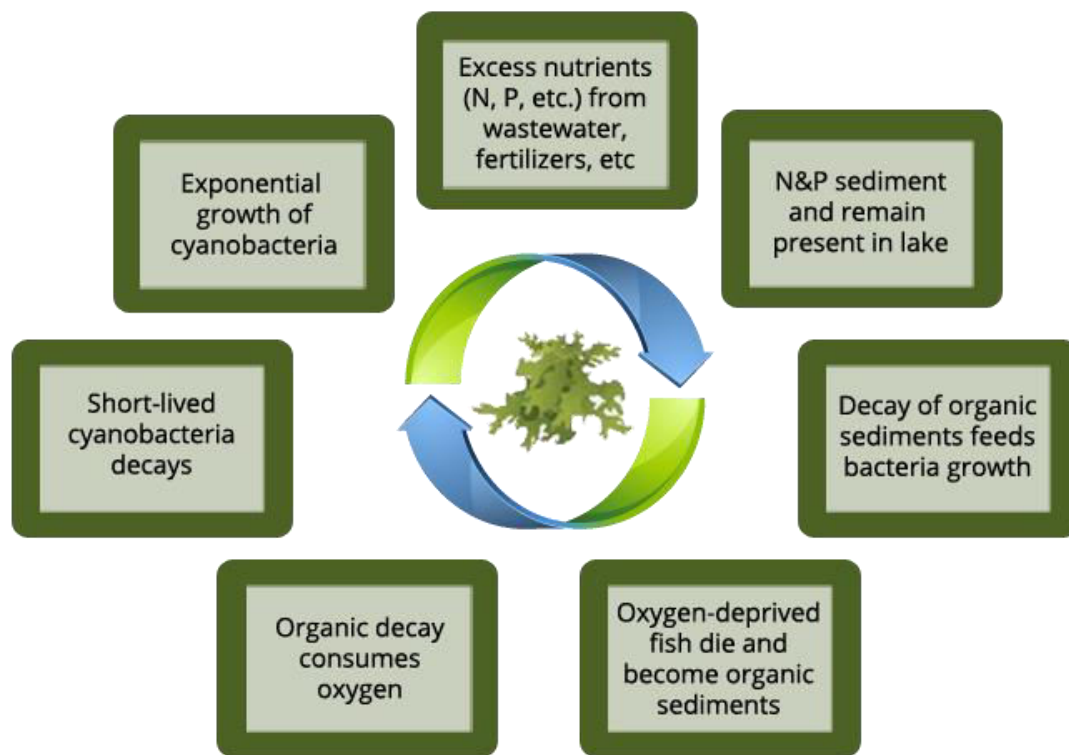
The Total Cell Counts in all trials have been seen to reduce markedly from the starting values. Trial 2 has shown some recovery of non BGA algae, although this stage may be transitory as the lagoon continues to settle toward having a higher DO and lower BGA population.

Because of the increased activity of Phytoplankton's, especially benthic Phytoplankton's, induced by the addition of Bio Nutrient there have been several positive changes to the water quality. In Trial 3, a reduction in the pH and a qualitative assessment that the invertebrate populations in the water have increased suggest that the water is progressively returning to a more stable environment in which algae other than BGAs may proliferate and the nutrients will shift from being retained in algal cycles and may now move up the food chain through the invertebrates and into higher animals such as fish, eels and birds.

Longer trials are needed to assess the long term use of Bio Nutrient in managing nutrients and controlling Blue Green Algae growth, but these three trials are strongly indicative that the use of Bio Nutrient is a simple and effective pathway to achieve this outcome.

**People make a big deal about planting trees, growing
Phytoplankton's in lakes and oceans is more beneficial and easier
too, if Bio Nutrient is used!**

The vicious circle of Eutrophication



Eutrophication is the enrichment of an ecosystem with chemical nutrients, typically compounds containing nitrogen, phosphorus, or both. Eutrophication can be a natural process in lakes, occurring as they age through geological time.

Bio Nutrient is a silica based micronutrient mix packed in 1 litre bottles.

Nano Silica and 10 micro nutrients – Iron, Zinc, Manganese, Boron, Molybdenum, etc.

- It can be used in any natural water body like – Aquariums, Aquaculture Ponds, Lakes, Rivers, Estuaries, Coastal Waters and for Sewage in Sewage / Wastewater treatment plants.
- It causes the Phytoplankton's present in the water to grow rapidly.
- Generally water bodies contain more of nutrients, N and P, and less of micro nutrients, since metals are not stable in water. So by providing the missing micro nutrients, Phytoplankton growth is enhanced.
Phytoplankton's have a silica body, unlike other algae such as Green Algae and Blue Green Algae which have cellulose bodies.
- Phytoplanktons are consumed by zooplankton and these by fishes, unlike Blue Green Algae which are not good food for zooplankton and fish. Lesser quantity of Phytoplankton's die and decompose in the water compared to Blue Green Algae. Decomposition results in release of CO₂ by bacteria.
- Dead Phytoplankton's sink and do not float, so they do not form a layer on top of the water, unlike other algae that form a layer on top of the water and thus cutoff light and reduce photosynthesis.

- The Silica shells of the Phytoplankton's too do not decompose; millions of tons of fossilized Phytoplankton aqueous Earth from various points of time is available all over Earth and is used in many products like toothpaste, water filters, pet food, as a pesticide in granaries, cosmetics like Multani Mitti, Dynamite, etc.
- "Because of their abundance in marine plankton, especially in nutrient-rich areas of the world's oceans, Phytoplankton's probably account for as much as 20% of global photosynthetic fixation of carbon (~ 20 Pg carbon fixed per year: Mann 1999), which is more than all the world's tropical rainforests.
- Sewage Treatment – removed nutrients, N and P, and provides Oxygen.
- Lake, River, estuary and coastal water remediation – removes nutrients – N and P, increases dissolved oxygen level, reduces harmful bacteria, reduces mosquitoes in polluted lakes, reduces harmful algal blooms, red tides, mass fish kills, dead zones in coastal waters,
- Increases fish catch in lakes,
- Helps keep aquaculture ponds clean and well oxygenated, prevents harmful algal blooms, reduces ammonia accumulation, provides natural live feed to fish.
- Phytoplankton Algae are a source of bio-fuel.
- Production of Omega-3 dietary health supplements

People make a big deal about planting trees, growing Phytoplankton's in lakes and oceans is more beneficial and easier too, if Bio Nutrient is used!

- 1 liter of Bio Nutrient causes growth of at least 200 kgs of Phytoplankton's.
- 1 liter of Bio Nutrient results in release of at least 200 kgs of Oxygen.
- 1 liter of Bio Nutrient results in consumption of at least 275 kgs of Carbon dioxide.
- 1 liter of Bio Nutrient results in consumption of at least 80 kgs of Nitrogen.
- 1 liter of Bio Nutrient results in consumption of at least 10 kgs of Phosphate.

Hydrogen Sulfide is emitted by anaerobic bacteria in sewage treatment plants, septic tanks, polluted lakes, etc. Bio Nutrient and Phytoplankton's create aerobic conditions and this stops the emission of Hydrogen Sulfide.

Methane is emitted by methanogen bacteria in Sewage Treatment Plants, Septic Tanks, polluted lakes, flooded paddy fields, etc. Phytoplankton's increase the Dissolved Oxygen level of water in every nook and corner of the tanks and thereby convert Anaerobic conditions to Aerobic conditions. This will reduce Methane emissions. Methane is consumed by methanotroph bacteria, aerobic conditions promote growth of methanotrophs.

In nature Phytoplankton's and Zooplankton provide 50 to 75% of the food for finfish and crustaceans in aquaculture ponds, lakes, rivers and oceans.

1 litre of Bio Nutrient is to be used in about 1-2 million liters of raw sewage everyday and in 2 to 10 acre of lakes once a week.

- Using Bio Nutrient as micronutrient mixture we are able to increase the growth rate of Phytoplankton strains tested (n=10) in comparison with other reported mediums.
- Bio Nutrient also increased the EPA content in Phytoplankton *Cylindrotheca fusiformis*.
- Bio Nutrient in combination with urea as N source increased the lipid content in *Cylindrotheca fusiformis* and *Cylindrotheca clostridium*.

The normal dosage is 1 liter Everyday per 1 to 2 million liters of sewage.

The deciding factor is the Nitrogen and Phosphate content of sewage:

- 1 person excretes 4.5 grams of N and 0.8 grams of P per day (EU Avg), in urine.
- 1 person uses 100 to 200 liters of water per day – toilet, bathing, kitchen, etc.
- So 10,000 people produce 1 to 2 million liters of sewage per day, with about 45 kgs of N and 8 kgs of P.

Hence, 1 liter of Bio Nutrient is required to remove 80 kgs of N and 11 kgs of P, so perhaps 500 or 750 ml would be adequate, but 1 liter is a better estimate.

Dosage in flowing water would be based on the N and P level of the water, in the ratio mentioned above – 1 litre for 80 kgs of N and 11 kgs of P. Water flow does not really impact Phytoplankton growth but the result would be seen downstream, far from the spot where Bio Nutrient is dosed.

Not really. Depth is not an issue. Phytoplankton's move up and down the water column. They come up in the morning and take in sunlight and nutrients and start photosynthesis and then they sink up to 100 meters and float up the next day. The lipids / oil in the Phytoplankton is used to regulate buoyancy. So Bio Nutrient will be available to the Phytoplankton's in the top few meters of the water.

For More Details Or Supply of Bio Nutrient Contact:-

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