

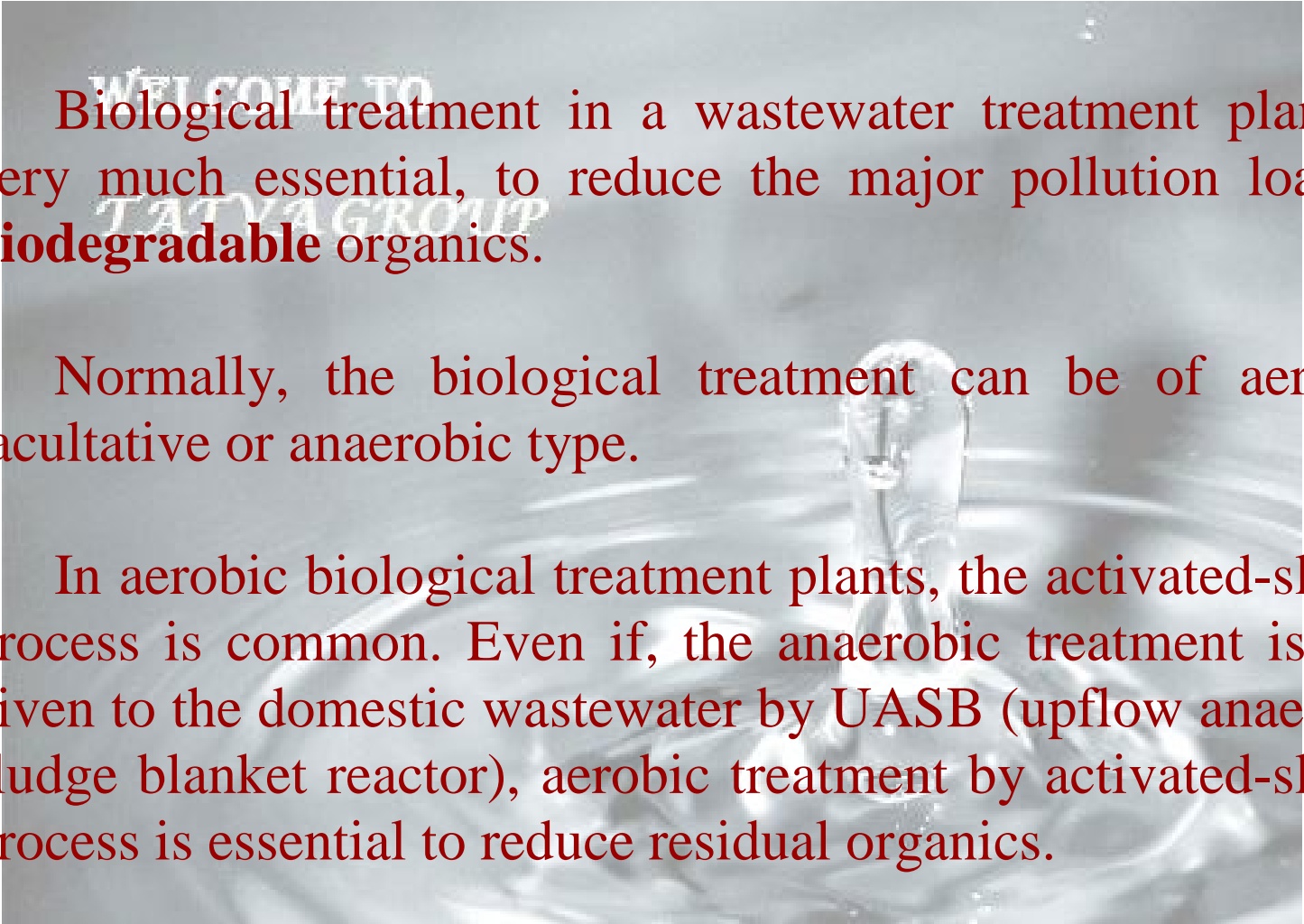
WELCOME TO

TATVAGROUP


**BENEFICIAL USE
OF RESEARCH-BASED CONSORTIUM
OF MICROBIAL CULTURES; *EM*
(BIORGANIC)
FOR BIOLOGICAL TREATMENT
OF EFFLUENT WASTEWATER**

WELCOME TO

- The wastewater (sewage) treatment standards for wastewater are concerned with the removal of biodegradable organics, total suspended solids and pathogens.
- Many of the more stringent standard that have been developed recently deal with the removal of nutrients, heavy metals and priority pollutants.

- 
- ❖ Biological treatment in a wastewater treatment plant, is very much essential, to reduce the major pollution load of **biodegradable** organics.
 - ❖ Normally, the biological treatment can be of aerobic, facultative or anaerobic type.
 - ❖ In aerobic biological treatment plants, the activated-sludge process is common. Even if, the anaerobic treatment is first given to the domestic wastewater by UASB (upflow anaerobic sludge blanket reactor), aerobic treatment by activated-sludge process is essential to reduce residual organics.

WELCOME TO
TATVAGROUP

 The activated-sludge process consists of active biomass. The biomass in the conventional activated sludge process is being getting developed in the domestic wastewater. Naturally grown activated-sludge contains microorganisms like *bacteria, protozoa, nematodes, rotifers and fungi* capable to degrade bio degradable organic matter.

- Most Effluent / Sewage Treatment Plants (ETPs) tend to fail due to one or more of the following factors:
 - a. Inadequate population of micro organisms (commonly measured as MLSS).
 - b. Inadequate aeration (in case of aerobic – activated sludge systems) and
 - c. Heavier loading, beyond designed capacity.

The solution lies in augmenting the treatment with external microorganisms (EM) capable of developing a strong population, using lesser Oxygen and able to withstand shock loads.

RECENT TECHNOLOGIES DEVELOPED IN THE DOMESTIC WASTEWATER TREATMENT PROCESS

- In the conventional activated-sludge process, the naturally grown microorganisms degrade the organic matter but these microorganisms act on the organic matter at a *slow rate and consume more dissolved oxygen*. The oxygen uptake rate is also found to be higher for these microorganisms and the power requirement is high.

- With continuous efforts, **Biotech Services** have developed effective microbial (EM) cultures which is branded as **BIORGANIC** and which contains research-based consortium of (EM) microbial cultures containing all necessary microorganisms (*GENUS: B. licheniformis, B. thurengensis, B. polymyxa, B. sterothemophilus, Penicillium sp., Aspergillus sp., Flavobacterium, Arthrobacter, Pseudomonas, Streptomyces, Saccharomyces, Triphoderma, etc.*).

WELCOME TO

- These effective microorganisms (EM) are aerobic and facultative in nature capable to biodegrade conventional organics including various kinds of complex and harsh pollutants like oil, phenol, chlorinated hydrocarbons, etc. in the wastewater.



WELCOME TO

- On one hand, the degradation capacity of **BIORGANIC** is very high and on the other, being facultative in nature it requires very less oxygen and hence better efficiencies of the treatment plant can be obtained.



Use of specially developed (EM) Biorganic and comparison with conventional activated-sludge process microorganisms

TATVAGROUP

Experimental work has been carried out using specially developed microbial cultures and at the same time using conventional microorganisms brought from the municipal treatment plant. The **Biorganic** (EM) has been used in two stages (firstly without acclimatization and secondly used in acclimatized form) for treatment of domestic wastewater in a bench-scale model to see the degradation capacity and the actual oxygen requirement which has been compared with the conventional activated-sludge process microorganisms.

WELCOME TO

TAT

06-12-06

Parameters	BY CONVENTIONAL CULTURES			IN ACCLIMATIZED MIXED CULTURES WITH BIORGANIC		
	Before treatment	After treatment	% Reduction	Before treatment	After treatment	% Reduction
COD	280	66	76.42%	280	58	79.28%
BOD	141.67	12.5	91.176%	141.67	09	93.64%
Free NH3-N	22.784	1.54	93.24%	22.784	0.2016	99.11%
Org. NH3-N	9.24	9.056	1.99%	9.24	2.86	69.04%
TKN	32.024	10.596	66.91%	32.024	3.0616	90.44%
TP	4.6	4.6	-	4.6	3.1	32.6%
TS	958	826	13.78%	958	816	14.82%
TDS	800	714	10.75%	800	730	8.75%
TSS	158	112	29.11%	158	86	45.56%

It has been found in trials that by reducing the aeration by about 30% there is no significant reduction in the reduction of B.O.D. however there is just a reduction of about 6.25% in the remnant Dissolved Oxygen levels.

To understand the benefits of augmenting a system with **BIORGANIC**, one must understand the requirements of organisms. They require adequate dissolved oxygen (D.O.) levels, a specific pH range and sufficient supply of nutrients in order to proliferate within the system.

The indigenous microbes found in typical wastewater system exposed to harsh conditions, fail miserably. Since microorganisms are the primary decomposers of all organic wastes they are essentially the driving force behind all efficient wastewater treatment facilities.

When indigenous microbial populations within the system are out of balance the end result is an inefficient system. Wastewater treatment systems devoid of this natural biological process are typically plagued by sludge buildups, tank deposits, fouled drain fields, backups and anaerobic odor problems.

A look at what Biorganic (EM – Effective microorganisms) can do in terms of increase in MLSS would help to understand the treatment further.

One liter of Biorganic (EM) contains 10^{12} counts of micro organisms. It has been estimated that the weight of each cell is about 5.0×10^{-13} gms.

The total weight of micro organisms in 1 liter of Biorganic is about 0.5 gms.

Micro organisms generally reproduce by binary fission in which the original cell becomes two new organisms. The time required for each such reproduction is about 20 to 30 minutes. Assuming 30 minutes as the time for reproduction, one bacterium would multiply to 2^{20} (approximately 1.0×10^6) in 10 hours. This presumes sufficient food and nutrients for growth.

The weight of this growth would be about 0.5×10^6 gms.

OR 500 Kilograms

The availability of this extra quantity of micro organisms (which need lesser oxygen and are more adapted to variations in pH, Temperature and shock loads) is what enables the plant (STP) to take up more loads.

We propose to dose any Sewage Treatment Plant at not less than 3 ppm (3 liters of Biorganic (EM) for every million liter of sewage flow).

This would generate about 1000 Kgs. of micro organisms over 10 hours.

Assuming a retention of 10 hours for a million liter system, the water quantity should be about 416 cu. Meters in the Bioreactor.

WELCOME TO

This would mean an additional micro organism quantity of around 2400 mg/liter by which value it is likely to push up the MLSS.

CONCLUSION

In a 100 MLD plant with 12 hours retention time and a design D.O. of 2.5 ppm, a load increase of 20% (ie 120 MLD) can be treated with 2 to 2.5 ppm Biorganic dosing once the system is regularised. The overload would cause a reduction in remnant D.O.. Initial shock dosing to be at 4.0 ppm

CHARACTERISTICS OF BIORGANIC

- Active Ingredients : Blend of Natural and Effective Microbes , Enzymes , Nutrients and Growth Stimulants.
- Bacterial Count : > 1 Trillion CFU/Liter.
- Product Type : Liquid Formulation.
- Type Of Bacteria : Aerobic and Facultative Microbes with the ability to degrade organic pollutants.
- Application Temp: 13 – 55 Deg. Celsius.
- Specific Gravity : 1.1
- Application pH: 5.0 – 10.0
- Storage : Store in cool , dry places. Shelf Life 9 months.
- Handling : Avoid eye contact , do not ingest , wash hands with soap after use.

FEATURES: Biorganic is available in wet normal or concentrated bacterial formulations , containing up to 76 strains of micro organisms.

ADVANTAGES OF BIORGANIC

WELCOME TO

- Digest difficult to degrade compounds that are typically toxic to naturally occurring bacteria or existing generic bacteria.
- Bio-organic is the only Bio-product that can perform efficiently in effluents having high Total Dissolved Solids.
- The treatment is eco-friendly and conducive to ISO:14000.
- Odor control due to the complete biodegradation of organic compounds.
- Reduces dependence on chemicals.
- Reduces Hazardous waste.
- Reduces the overall treatment cost.
- Improves the quality of treated water.
- Non- Corrosive , non-pathogenic and low quantities of use , make it safe and easy to handle and store.

COST EFFECTIVE

WELCOME TO

- Bacterial culture (EM) not only helps in achieving norms in case of shocks and peak loads and improving the quality of treated water but it is cost effective also.
- Aeration cost can be reduced.
- No need to dose Urea or other nutrients.
- No sludge return is reduced / stopped.
- Cost of coagulant is reduced.
- In case of increased loads, most of the time simple bioaugmentation by Biorganic is effective to enable organic load reduction (without addition of capital and power consumption)

In cases where Clarifiers may not have the effective retention; this problem can be overcome by addition of flocculant

Contact Coordinates:

TATVAGROUP

 **Biotech Services**

B-72, Sec-55, Noida 201303, India

e mail : biotechservices@airtelmail.in : aagarwal@biotechservices.biz

Phones: +91(120)4336461, 4324613, 6561355

Mob: +91 9871138704 Tfx +91 120 4336461

URLs: www.biotechservices.in
www.biotechservices.biz
www.biotechservices.net.in
www.septic-tank-treatment.org
www.biopac.co.in