

Background

Smruthi Organics is one the famous pharmaceutical company manufacturing active pharmaceutical ingredients located in Solpaur MIDC, Maharashtra.

The company follows a proactive approach to Environmental compliance and boast of a zero discharge ETP in our main manufacturing facility. The company has a dedicated team to take actively manage Environmental, Health & Safety policies to assure excellence in addition to compliance.

Objectives

Objectives of validation program was listed given below,

- 1) Develop biological activity in aeration tank 1st and 2nd.
- 2) Reduce sludge quantity existing aeration tank 1st which was not working existingly.
- 3) Develop MLSS in aeration tank 1st & 2nd with nitrification and denitrification process.
- 4) Develop biomass in aeration tank and activate biological process.

MiCroBial Solution

MiCroBial Aqua is a natural biocatalyst made via novel fermentative process that has been refined by microbiologist in India. MiCroBial Aqua consists of selected consortium of bacteria and enzymes that degrade organic matter as carbs, proteins and fats. These microbes produces different types of enzymes as amylase, protease, lipase, cellulase etc. MiCroBial Aqua works in both aerobic and anaerobic conditions as it contents aerobic and facultative microbes in waste water treatment.



Dosing Program

Recommended Product	MiCroBial Aqua
Volume of wastewater	250 KLD
Product quantity required	1 kg/day
Fresh water required	100 liters/day
Dosing point	Inlet of aeration tank
Mode of application	Application thru dosing tank of 100 liters capacity tank

Existing System of ETP

Existing ETP was having different units of biological treatment process as collection tank, aeration tank 1st & 2nd, clarifier 1st & 2nd along with filtration system including ACF, Sand filter & RO system.

Earlier Scenario - Before Biological Treatment

As per the first meeting observation before starting biological treatment, earlier scenario was given below,

- 1) No biomass and biological activity present in aeration tank 1st & 2nd
- 2) Sludge was floating on the surface of aeration tank 1st & 2nd
- 3) About 40% of sludge was found in aeration tank along with bad odor and organic matter which was observed dead, no aeration and no biological activity
- 4) As observed, there was no MLSS, Nitrification and Denitrification process in aeration tank and clarifier respectively.

Implementation Protocol

On first day effluent from collection tank of optimum PH was taken into aeration tank 1st to fill the aeration tank and started aeration tank continuously for get sufficient DO in aeration tank.

PH & DO of aeration tank was monitored regularly and adjusted both parameters to its optimum PH as PH of 7-7.5 & dissolved oxygen 1-2 mg/l, biological treatment started when optimum conditions received.

Daily flow of effluent was adjusted to specific flow so that biological process wont have shock loading of organic matter.

The activation tank was filled with 100 liters of fresh water and mixed with 800 Gms of MiCroBial Aqua and kept it for 24 hrs. Aeration was provided in activation tank to provide oxygen.

After activated of solution, dosing started into inlet point of aeration tank 1st



Activation Tank

Dosing Tank of 100 liter capacity used during activation of MiCroBial Aqua product. 800 gms of product was mixed with 90-100 liter of fresh water and kept it for 24 hrs activation.

Two tank were used to activate the product. One tank was used for activation of product and second tank was used to dose activated solution directly into inlet point of aeration tank.

Both, activation and dosing tank were washed regularly during application of MiCroBial Aqua product.

Additional aeration was provided to tank to activate the microbes along with optimum temperature

Optimum Conditions

We had provided optimum condition to the aeration tank that will help to bacteria to survive and work efficiently so that there will be good reduction percentage in organic matter and pollutants. Following were the optimum conditions that we provided,

- DO – 2-3 mg/l in aeration tank 1st and 2nd
- PH – In between 7-7.6
- HRT – min 24 hrs [It is more than 24 hrs in this case]
- COD: BOD ratio – 2:1
- MLSS – There was no MLSS in aeration tank
- Aeration was provided 24 hrs to provide O₂ to the microbes for aerobic digestion

Results

After about 8 weeks of addition of MiCroBial Aqua product into aeration tank, implementation team observed significant improvement in biomass (sludge volume) and water quality in aeration tank. Improvement in aeration tank after MiCroBial Technologies treatment were listed below,

- 1) We observed good sludge reduction in aeration tank
- 2) Thick layer of sludge floating on surface of aeration tank was reduced to very good extend and converted to thin layer of sludge that indicated sludge quantity was reduced by biological mechanism.
- 3) Initially color of effluent was dark red wine color which was changed to brownish green color & ultimately to brownish black.
- 4) There was good development of MLSS in aeration tank, MLSS testing was done in lab and it was found as per below
 - a) MLSS in aeration tank - 3700 mg/l
 - b) MLSS in aeration tank - 2200 mg/l

Optimum concentration of MLSS in aeration tank should be 3000-4000 mg/l. so we were maintaining it thru return activated sludge from clarifier 1st and 2nd.

Good sludge settling was observed in clarifier, settling sludge was increased due good biomass development.

Sludge Reduction Photo



Aeration Tank - Before start of biological treatment there was thick layer of sludge floating on the surface of aeration tank 1st.



Aeration Tank 1st - After Biological treatment, there was good reduction in sludge layer after 6 weeks of biological treatment.

Conclusion

The result of validation program demonstrate the effectiveness of MiCroBial Aqua in degradation of sludge in aeration tank. MiCroBial Aqua microbes were able to degrade the sludge and converting it to the biomass, liquifying the dead organic matter. MiCroBial Aqua helps the system to activate the aeration tank and generate biomass. Currently aeration tank is fully activated and having good biological activity helping in reducing different parameters and improving water quality.

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