

Background

Kayempee Foods Pvt Ltd is India's top quality manufacturers of the finest chocolates. Our products are supplied to chocolate makers and chocolate users across the Nation, from local bakeries to multi - national companies. The combination of Industrial Foods and Consumers foods creates a global powerhouse in wholesale supplier of chocolate products and chocolate confectionary in Andhra Pradesh and throughout the Nation. Currently, Kayempee Foods Pvt Ltd in India operates in three categories viz. Chocolate, Confectionery & Chocolate Products, In the Chocolate Confectionery business has maintained its undisputed leadership over the years. Some of the key products in India are Milk Chocolate, Bitter Chocolate, white Chocolate, Dark Chips, Milk Chips & White Chips, Plain Choco Paste, and Milk Choco Paste & Éclairs.

Objectives

To treat the effluent coming from bakery and confectionary plant by using MiCroBial Technologies product. Current system is treating about 80,000 liters of effluent @ your ETP. It's having food stuff, oil, fats, grease, and other organic and inorganic substances coming from sewage as well.

MiCroBial Solution

The core MiCroBial Aqua is a natural biocatalyst made via a novel fermentative process that has been continually refined by microbiologist in India. MiCroBial Aqua consists of a select consortium of bacteria, enzymes, nutrients and co-factors that degrade organic matter as Carbohydrate, Proteins & Fat (FOG). These microbes produce different types of enzymes as amylase, Protease, Lipase, Cellulase etc. MiCroBial Aqua works in aerobic and anaerobic conditions as it contents aerobic and facultative anaerobic microbes.



Dosing Program

Recommended Product	MiCroBial Aqua
Capacity of AD	1,97,000 liters per day
Product quantity required	1 kg/day (4 ppm)
Fresh water required	200 liters of fresh water
Application point	Inlet Point of anaerobic digester
Mode of application	Application thru dosing tank of 200 liter capacity tank

Wastewater Treatment Process –

Wastewater treated by three different technologies as give below,

- Primary Treatment Process - Treatment with chemicals like coagulant & Flocculants
- Secondary Treatment Process - Biological treatment with MiCroBial bioculture
- Tertiary Treatment Process - Filtration system

Primary Treatment Process –

- Currently PH of influent was about 3.5 – 4
- PH adjustment was carried out by adding of base or acid was done into equalization tank to get the optimum PH 7 – 7.5
- PH of all ETP units was adjusted to 7 -7.5 throughout the process.
- Addition of chemicals like coagulant and flocculants was done in flash mixture to develop coagulation and flocculation process in the flash mixture to reduce the suspended solids from the effluent.

Biological Treatment Process - Unit Description

- Collection tank & Grease separation tank
- Equalization tank
- Flash mixture
- Primary settling tank
- Feeder for anaerobic digester
- Anaerobic digester
- Aeration tank 1st and 2nd
- Secondary clarifier
- Filtration system
- Treated water tank

During process development, MiCroBial Technologies will develop the biomass and sludge bed in anaerobic digester. All the criteria like Sludge bed development, Biomass development, SRT, HRT, anaerobic digestion of organic matter, VFA, total SS, all the parameters will be monitor for anaerobic digestion. It includes four processes as below

- Hydrolysis
- Acidogenesis
- Acetogenesis
- Methanogenesis

Application Method –

Added recommended dose of MiCroBial Aqua into 100 liters of fresh water and kept it for 12-24 hrs. After 24 hrs start dosing of MiCroBial solution at inlet point of anaerobic digester. Maintained the flow rate of 4.1 liter/hr dosing solution so that it will be used in 24 hrs.

Once maintained optimum conditions, microbial growth will start to appear and add effluent to the ETP with good PH with proper flow so that ETP will not get shock when effluent enters.

If effluent was having deficiency of nitrogen and phosphorus, we recommended adding source of nitrogen and phosphorus as these are micronutrients for the biomass development.

Daily flow rate of effluent was optimized as the digester design or 3.3 kl/hr. to avoid shock dosing.

It was essential to added, urea and Jaggary to the anaerobic digester, it will source of nitrogen, phosphorus and carbohydrates



Anaerobic Digester



Collection Tank

Aerobic Digestion –

Aerobic process will be carried out in aeration tank in the presence of oxygen in the tank. Aerobic digestion is one of the most important processes in biological processes.

Dosing Program –

Recommended Product	– MiCroBial Aqua
Capacity of aeration tank	– 2,52,000 liters/day
Quantity of Product	– 1 kg/day
Fresh water required	– 100 liters of fresh water.
Application Point	– Inlet Point of aeration tank
Mode of Application	- Application thru dosing tank of 100 liter capacity tank

Application Method –

Added recommended dose of MiCroBial Aqua into 100 liters of fresh water and kept it for 12-24 hrs. After 24 hrs start dosing of MiCroBial solution at inlet point of aerobic digester. Maintained the flow rate of 4.1 liter/hr dosing solution so that it will be used in 24 hrs.

Once maintained optimum conditions, microbial growth will start to appear and add effluent to the ETP with good PH with proper flow so that ETP will not get shock when effluent enters.

If effluent having deficiency of nitrogen and phosphorus, we are recommending adding source of nitrogen and phosphorus as these are micronutrients for the biomass development.

Daily flow rate of effluent will be optimized as the digester design or 3.3 kl/hr. to avoid shock dosing.

If required, it was essential to add urea and Jaggary to the aerobic digester, it will source of nitrogen, phosphorus and carbohydrates.

Benefits of MiCroBial Aqua –

- Reduce in sludge production
- Reduce BOD, COD, TSS, Biological nutrients
- Improve MLSS, Biomass in the system
- Reduce odors
- Reduce need for chemical additives
- Reduce hydrogen sulfide, ammonia and nitrates
- Enhance nitrogen and phosphorus removal
- 100% natural and non-toxic

Equipments required –

- List of equipments are given below
- Four 100 liter capacity tank with tote at the bottom
- 400 liters of fresh water
- MiCroBial Aqua product

Notes: No special training is required to mix and dose MiCroBial product is non-hazardous and no special personal protection equipment is required in regards to activation or dosing



Aerobic Digester



Aerobic Digester

Results & Observation -

After providing optimum conditions for the application of MiCroBial Aqua, dosing of culture and nutrients started in anaerobic digester on daily basis as per the biomass provided to the client. With the continues application for min 4 weeks our team were observing different parameters and changes in anaerobic digester. After 4 weeks, sample of effluent removed from bottom of anaerobic digester to see the sludge development and TSS in the bottom. A thick sludge was observed in a bucket which was came out from the sludge bed or biomass developed in the bottom of anaerobic digester.

At the same time COD was tested at in house lab for reduction, after testing, it was observed that COD was reduced from 25,000 mg/L to 5000 mg/L. Odor of treated effluent was reduced coming from the anaerobic digester.

Same effluent treated from anaerobic digester was transferred to 1st aeration tank to 2nd aeration tank and 3rd aeration tank respectively for aerobic digester. with provided optimum conditions in aerobic digestion, we observed good biomass or MLSS development in aeration tank when we tested Sv30. Tested Sv30 was 300-400 ml/L.

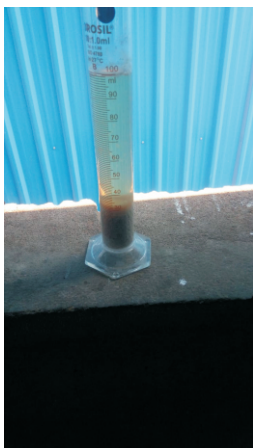
ETP is now getting good performance with the help of MiCroBial Aqua and biomass development program provided to the client. Initially MiCroBial Technologies analysed every aspect of ETP like optimum conditions, done trouble shooting and provided biomass development program mentioning PH, HRT, Flow rate, Dosing concentration, Feeding concentration, nutrient addition, DO etc.

MiCroBial Technologies provided A to Z complete solution to the food ETP to get the plant stability along with the microbial culture.

Conclusion -

MiCroBial Technologies provided a well balanced microbial consortium for the treatment of food effluent with high COD and BOD concentration in suspended and dissolved form. MiCroBial Aqua was able to develop sludge blanket and biomass in the anaerobic digester to carry out all the steps of anaerobic digestion like hydrolysis, acidogenesis, acetogenesis and methanogenesis. It was also observed that it has ability to control the odor from effluent.

MiCroBial Aqua is also able to develop biomass/MLSS in aeration tank (Image 1st). Aerobic process was developed with the nitrification and denitrification process to reduce BOD. Briefly, MiCroBial Aqua is having ability to perform nitrification/ denitrification process in aerobic digestion and anaerobic digestion in food effluent treatment plant.



Sv30 - Biomass



Biomass in Anaerobic Digester

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