

Restoration of biological activity in a meat processing industry wastewater treatment plant
Capacity-700 CMD

Background: Food processing industries generate huge quantum of wastewater, arising due to continuous washing and cleaning activities. In particular, meat processing units consume a considerable volume of water for in-house operations, and release a substantial part of the total volume as effluent, into their wastewater treatment plant. Such an industry, located in eastern India, was unable to meet the discharge norms set by the state Pollution Control Board. COD of the effluent was in the range of 20,000-25,000 ppm at inlet and 8000-10,000 ppm at the outlet. This data clearly indicates the inefficiency of cow dung (which they used in their biological system) in solving complex effluent treatment issues. The microflora present in cow dung could achieve only a reduction of 55-60%. The industry approached us for an effective bio-solution. Our technical experts analyzed their biological system and suggested them a bio-augmentation programme.

Major Concerns:

- Persistently high COD
- Odour in the effluent
- High level of ammoniacal nitrogen

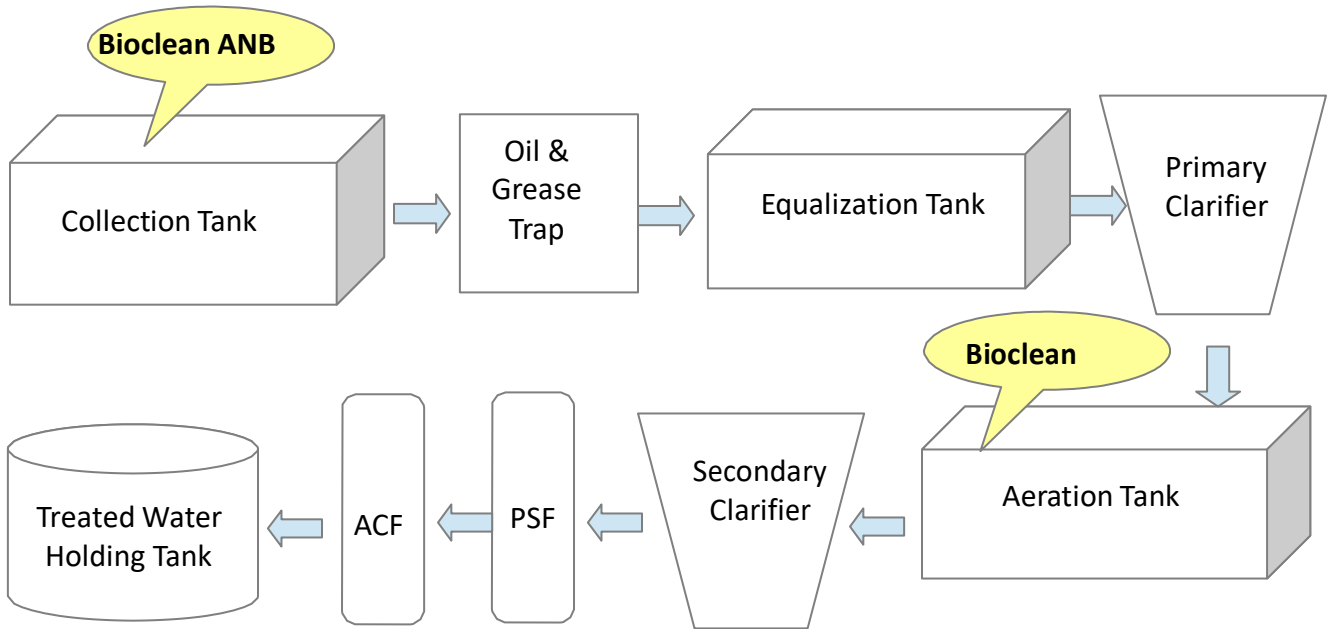
Situation Analysis:

The effluent generated is rich in organic matter like blood, oil and grease, urine, wash water, etc. The quality and quantity of wastewater varies from season to season and also depends on the number of animals slaughtered. This subsequently increases the level of suspended solids in the effluent. As the wastewater comprises of highly putrescible components, it emanated foul odour, which was a nuisance for the personnel working in the facility.

Wastewater Characteristics

Parameters	Range (At inlet)	Range (At outlet)
pH	9 to 10	7 to 7.5
COD (ppm)	20,000-25,000	9000-10,000
Oil & Grease (ppm)	500-550	150-160
Ammoniacal Nitrogen (ppm)	600-650	70-100

Layout of the ETP:



Major Challenges and Approach:

Bioclean TM-the economical biotech solution:

Bioclean TM is a consortium of beneficial, non-genetically engineered microbes, that is proven to handle major challenges in wastewater treatment. The product is a unique blend of microbes and active enzymes, which act synergistically, to lower pollution load in effluent. It effectively reduces undesirable organic load, like COD, BOD, ammoniacal nitrogen, oil and grease from the effluent, thereby improving the wastewater quality.

This advanced microbial formulation was suggested for COD level and ammoniacal nitrogen level reduction in effluent.

Bioclean ANB-for enhanced odour removal and sludge reduction:

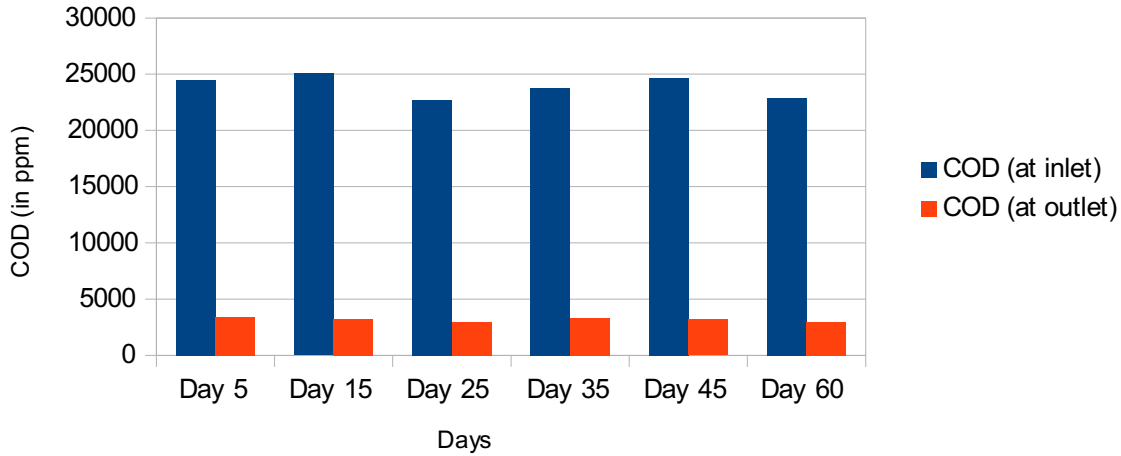
In order to address different wastewater concerns, our research and development team has developed many variants of Bioclean TM. Bioclean STP is a customized formulation, specifically designed for anaerobic treatment systems. It has the potential to maximally reduce odour from effluent, and also helps in sludge reduction.

Results Observed:

- **COD Reduction:**

The microbial consortia present in Bioclean TM, feeds on the organic matter present in effluent, thereby considerably reducing COD. Unlike other microbes, our robust microbes can grow and multiply in all types of shock loads, which makes it easier for them to reduce the organic load. Soon after addition of Bioclean TM, our implementation team observed a drastic reduction in COD level. Initially, using cow dung a COD reduction of 55-60% was achieved. Our advanced microbial formulation helped to fetch a reduction efficiency of 85-87%, which was almost 30% improvement to the initial reduction efficiency. The COD was further reduced as per the discharge limits, by tertiary treatment systems.

COD Reduction

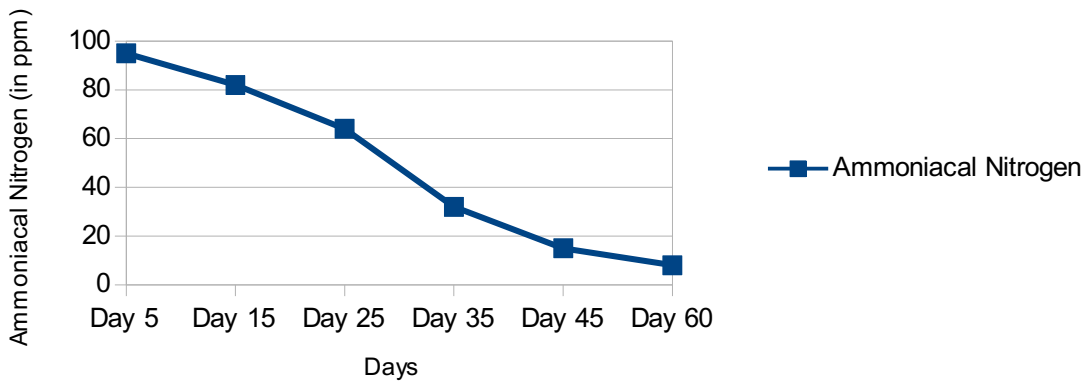


Graph-1: 87% COD Reduction in effluent observed during bioaugmentation

- **Ammoniacal Nitrogen Reduction:**

Blood, urine and faeces are the major sources of ammoniacal nitrogen in meat processing industry effluent. Initially, the ammoniacal nitrogen level at outlet was in the range of 70-100 ppm. During the bio-augmentation programme, Bioclean TM could bring down the level to almost 8-9 ppm. Thus, a 91% reduction in ammoniacal reduction level was attained.

Ammoniacal Nitrogen Reduction



Graph-2:Reduction in Ammoniacal Nitrogen level after Bioclean TM addition

- **Odour Reduction:**

Odour in effluent is majorly due to the formation of H₂S gas during biodegradation process. Bioclean STP comprises of some specialized microbial strains, which have different metabolic pathways, that does not generate odour during degradation process. Odour was gradually removed and completely eliminated by the end of the bio-augmentation programme.

- **Sludge Reduction:**

Sludge generation is due to partially or undegraded organic matter and inactive or dead biomass. The microbial present in Bioclean TM grows and multiplies actively. This reduces sludge reduction to a great extent.

Summary of the results achieved during the bioaugmentation programme:

- 85-87% COD reduction efficiency was achieved
- 91% reduction in ammoniacal nitrogen was achieved
- Odour was completely eliminated

Conclusion:

By adopting our bioaugmentation programme, the industry observed a significant improvement in their wastewater quality. They could meet the discharge limits set by the state Pollution Control Board. Overall plant stabilization was achieved and the plant is now working at its peak efficiency.