

Thermax Bio-Gas Plant, Sangrur (Punjab, India)

90% Reduction in Oxygen Demand at Thermax Bio-Gas Plant Using Nanobubble Technology

Location

Thermax Bio-Gas Plant, Sangrur, Punjab

Unit Type

Nanokriti Virat N500 Nanobubble Generator

Results

- 90% reduction in oxygen demand
- Major operational cost savings
- Enhanced microbial activity
- Increased Process efficiency

Application

Micro-aerobic digestion of rice straw for biogas production

The Thermax Bio-Gas Plant in Sangrur, Punjab, primarily processes rice straw for micro-aerobic digestion. Rice straw is a challenging feedstock due to its high lignocellulosic content, which makes microbial breakdown slow and oxygen-intensive. To maintain microbial activity, the plant relied on traditional air diffusers that consumed a large amount of oxygen, contributing heavily to operational expenses.

The Challenge

1. Excessive oxygen consumption: ~2,000 kg O₂/day
2. High aeration costs account for a major share of operational expenditure
3. Limited microbial efficiency with conventional air diffusers

To address these challenges, the plant replaced its traditional aeration system with Nanokriti's Virat N500 Nanobubble Generator, which delivers highly efficient oxygen transfer at the microbial level.



Image of Thermax Bio-gas plant

Conclusion:

This case demonstrates how Nanokriti's nanobubble technology can transform biogas plants by cutting oxygen demand, enhancing microbial performance, and driving sustainable, cost-effective operations. It sets a benchmark for biogas plants across India, dealing with agricultural residues like rice straw.



Results Summary

The installation of the Nanokriti Virat N500 Nanobubble Generator led to a remarkable 90% reduction in oxygen demand, bringing it down from nearly 2,000 kg per day to just 200 kg per day. This drastic reduction in oxygen use translated into significant cost savings by lowering one of the major operational expenses of the plant. At the same time, the nanobubbles enhanced microbial activity by making oxygen more bioavailable, which improved the efficiency of anaerobic digestion and boosted overall plant performance.

The Outcome

With the installation of Nanokriti Virat N500, Thermax Bio-Gas Plant achieved:

- Enhanced process efficiency
- Sustainable operations with lower energy and resource use
- Improved economic viability for rice straw-based biogas production



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