

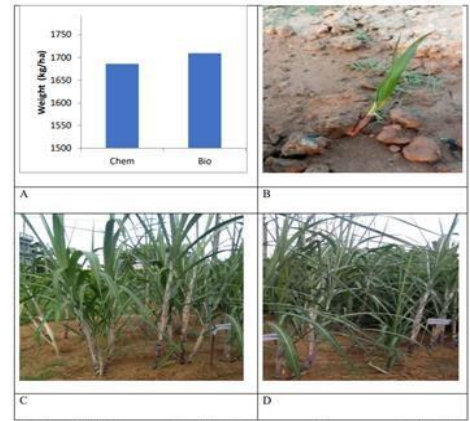
Dairy Wastewater Conversion into Liquid Biofertilizer

Applications

The present invention describes a microbial biofertilizer production plant with sustained performance and little maintenance that converts the entire milk processing plant wastewater into liquid biofertilizer which in turn replaces the use of fresh water and chemical fertilizers. The process can replace the existing labor intense wastewater treatment process for milk processing plant and has applications in

- Dairy Industry
- Waste Management
- Organic dairy farms
- Hydroponic farms
- Effluent Treatment Plants
- Milk Cooperative Societies

Fig. Field Trials of Biofertilizer Treatment – Sugarcane: **A)**Yield of sugarcane from biofertilizer treatment as compared to Chemical Treatment, **B)**Two leaves stage of Sugarcane plant after sprouting, **C)**Image of field trial of sugarcane plant from chemical fertilizer application, **D)**Image of field trial of sugarcane from biofertilizer application. (P value – 0.653)



Intellectual Property

Bio-fertilizer production from bacterial consortium

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NBA Approval

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Categories of this invention

- ▶ Water Treatment
- ▶ Lifesciences
 - Biotechnology
 - Environment
 - Bioremediation
 - Dairy Effluent

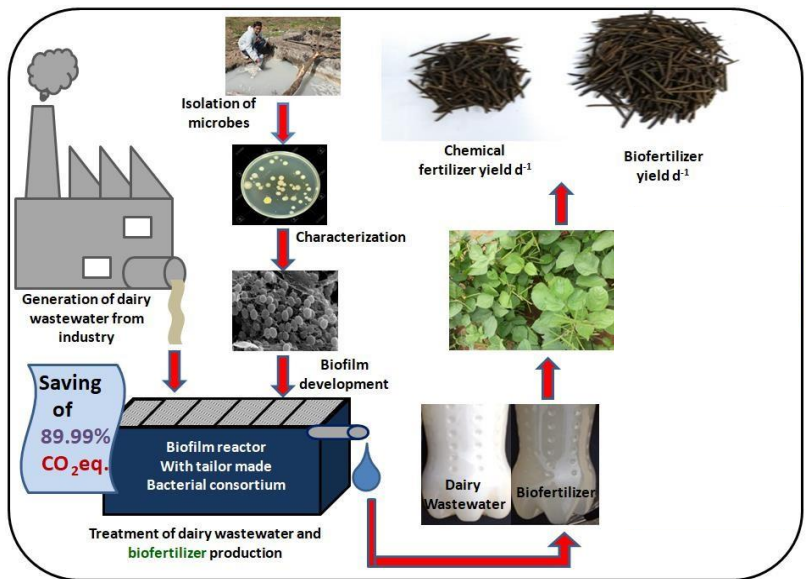
Technology

Dairy wastewater (DWW) is nutritionally rich and extremely hazardous to the environment if discharged untreated. The conventional treatment is time- labor-, and energy-intensive. The current technology provides a solution using a tailor-made microbial consortium which at particular combinations and weight ratios have the ability to convert DWW into a liquid bio-fertilizer. The consortium is developed using bacterial strains from different environmental origins that could reduce 93% nitrate with simultaneous production of ammonia (626 µg/100 ml) within 20 h in non-aerated, immobilized conditions as compared to 82% nitrate reduction producing 2.4 µg/100 ml ammonia in 96 h with extensive aeration in a conventional ETP setup.

This DWW treatment reduces space (by 75%) and energy (90%) requirement resulting in 89.9% reduction in CO₂ equivalent gas emission. Furthermore, it provides a synergistic, scalable, cost-effective solution for effluent management, while at the same time provides an effective biofertilizer which enhances plant biomass, yield, agronomic characteristics and plant protection against infestation, and has been tested for 16 types of crops.

During the field trials, this biofertilizer enhanced yield in the crops of Mung bean, Maize, Black Gram, Sorghum Sudan grass, Aloe vera, Elephant Foot Yam, and Lemongrass as compared to the conventional practice while maintaining the nutritional quality.

Process Workflow



Advantages

| Properties | Current Technology | Conventional Technology |
|---|--------------------|-------------------------|
| Simple one/two step operation | √ | X (7 steps) |
| Retention time only 4-16 hrs | √ | X (120hrs) |
| Energy consumption 3-6kW for 500m ³ /day treatment | √ | X (70kW) |
| Water Discharge | X | √ |
| Scum to be processes | X | √ |
| Value added product | √ | X |
| Zero Discharge Technology | √ | X |
| Agricultural Sustainance | √ | X |
| Yield Increase | √ (1.04 - 4.38) | X |

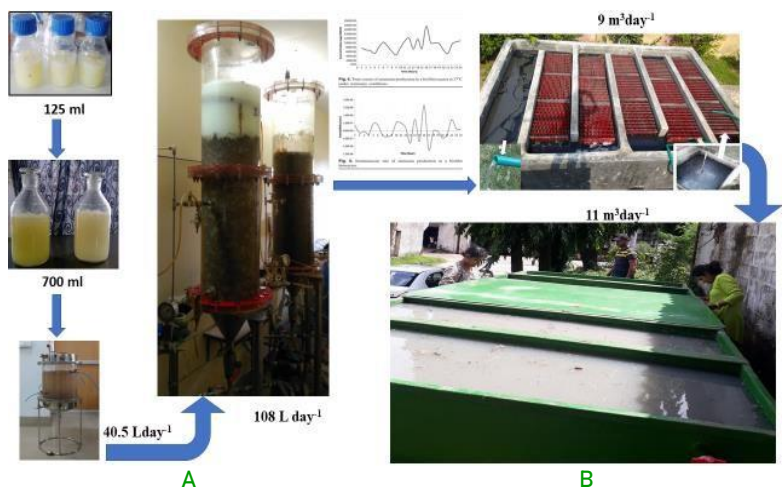


Fig. DWW Treatment **A)** In Bench Scale Reactors upto 108 litres /day, **B)** Pilot Scale in Dairy Farms upto 11m³ /day