

Microbial Biofilm Reactors based technology for liquid sewage conversion to non-potable grade reusable water

Applications

This technology can be implemented in existing process for waste water treatment in the areas of:

- Industrial Effluent Treatment
- Community Sewage Treatment
- Treatment of Agricultural Run-off

It could also be integrated into existing effluent treatment plants with minor modifications, which in turn enhances its performance capacity almost 120 times (assuming a 240Hrs of HRT in conventional system). The immobilized bacteria within the reactor (which can be designed based on water quality, space and climate of the region of installation) can perform the function without sludge generation.



Water Sampling (Keshtopur canal, Kolkata)

Inventors

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Categories of this invention

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

Intellectual Property

Microbial Consortium for nitrate and phosphate sequestration for environmental sustenance
Applicant Dr. Shaon Ray Chaudhuri,
Indian Patent Granted -351564; NBA Approval
Bangladesh Patent Granted -1005753
PCT Published - WO2015075607A2

Problem Addressed

Currently, there is a huge gap between the amount of the waste water/ sewage generated and the available treatment capacity. The main reason behind this gap is the expenditure and land requirement for installation and maintenance of the existing treatment technology. The requirement of land, energy, labour and sludge handling facility make the adoption of the conventional technology crippling for the middle and small scale installation. Hence, they often discard untreated or improperly treated wastewater into the natural waterbodies which further pollutes the fresh water resources.

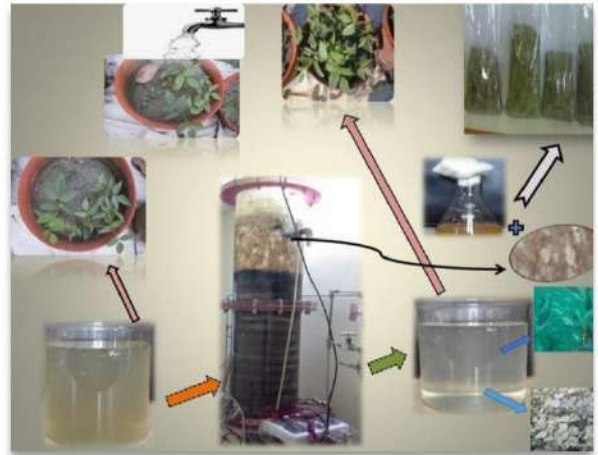
Technology

A stable single or two-unit operation with microbial biofilm consisting of three *Bacillus* sp. consortia which **within 2 hours** could treat 2600 liters of waste water with adequate BOD (~97%) and COD (~92%) reduction requiring **80% less energy** and **55% less space** than a conventional system. This process sequesters 62 to 66% phosphate and also sequesters and removes 94.6 to 98.98% nitrate from waste water effluent. In addition, the treated water could be reused safely for **agriculture** and **aquaculture**, thus preserving fresh water wastage for non-potable applications. Furthermore, being a sludge free system it could make the wastewater treatment less labor intense.

GenBank Reference Id

- Draft Genome of a phosphate accumulating *Bacillus* sp. WBUNB004
- Draft Genome of a nitrate and phosphate removing *Bacillus* sp. WBUNB009
- Draft Genome of a nitrate and phosphate accumulating *Bacillus* sp. MCC0008

Process Workflow



Advantages

- Fastest conversion time of 2 hours
- Provides greater stability in high volume reactors.
- The method prevents eutrophication of water bodies.
- The consortium fastens initiation of flowering in plants



Field Trials on
Vigna radiata



Paddy (Control)



Paddy (On Biofertilizer
Application)

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