PetroClean

Title of the Technology: MBBR Based Petrochemical Wastewater Treatment
Intellectual Property associated: Formulation of bacterial consortium for bioremediation of petrochemical wastewater.
Application Number and Date of filing: 202031011766 dated 18th March 2020.
Inventor: Shaon Ray Chaudhuri, Ashoke Ranjan Thakur, Lalit Mohan Gantayet
Categories of this invention: Wastewater conversion to non-potable grade water.
Innovation: This is a microbial process which can replace the conventional activated sludge based treatment of petrochemical wastewater. The desired reduction in COD and BOD is achieved within 18 hours of HRT in the moving bed biofilm reactor with the microbial consortium placed as biofilm on the career. The system remains stable if run as per standard operating procedure for years before requirement for a recharging. It is a sludge free process requiring substantially less amount of energy. All the microbes used in the consortium are from the environmental origin. The process has been scaled up to 12m3/day processing capacity at an Industry.

Problems addressed

The petrochemical effluent is tough to treat using biological means inspite of taking long time and generating sludge that itself needs labour intense treatment. Being CPCB compliant is a major problem for such industries due to the refractory nature of its pollutants. The available solutions are elaborate with enormous sludge generation, yet not satisfying the CPCB norms and hence room for further improvement through development of sludge free efficient systems.

Applications in the field

It could be applied for petrochemical wastewater treatment at the effluent treatment plants. It is meant to replace the biological treatment in the total system leading to a sludge free treatment within 18 hours of HRT with stable and sustained performance.

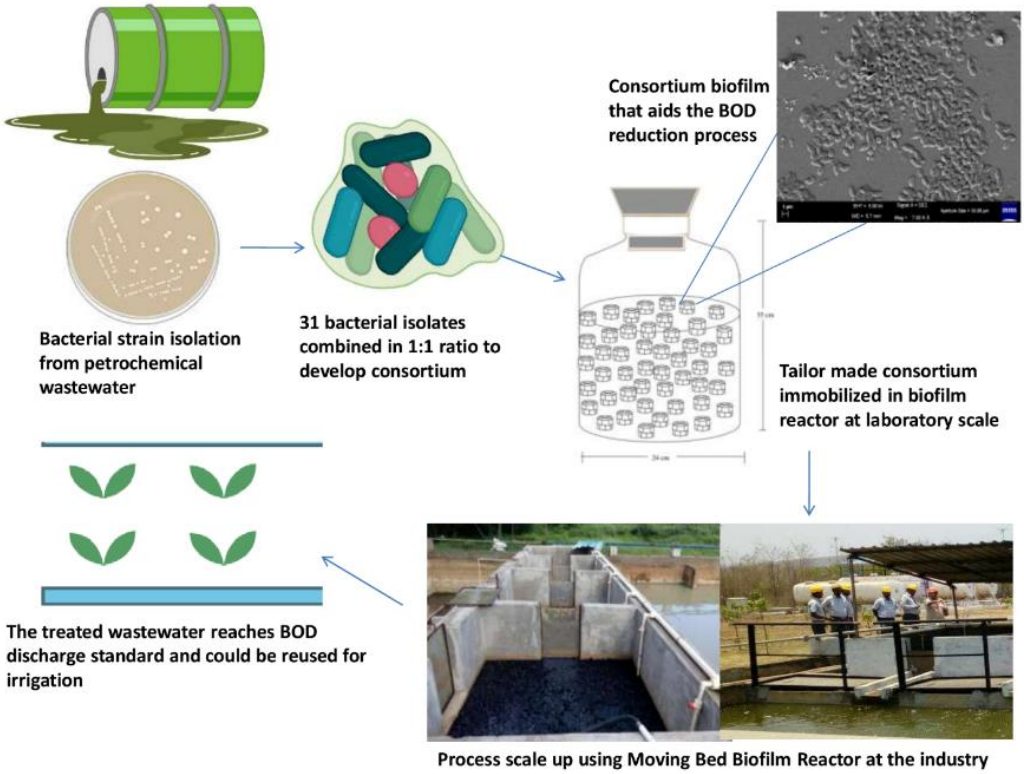
Advantages

Sludge free system
Stable for years if run as per SOP
Needs one-time bacterial inoculation.
Till date the fastest petrochemical wastewater treatment system using microbes from environmental origin.

Publications to the Tech if any

1. Tethi Biswas, Srimoyee Banerjee, Amrita Saha, Abhishek Bhattacharya, Chaitali Chanda, Lalit Mohan Gantayet, Punyasloke Bhadury, **Shaon Ray Chaudhuri**. 2022. Bacterial consortium based petrochemical wastewater treatment: from strain isolation to industrial effluent treatment Bacterial consortium based petrochemical wastewater treatment: from strain isolation to industrial effluent treatment. Environmental Advances.7: 100132.
2. Microbial Biofilm Reactor for Sustained Waste Water Treatment and Reuse. **Shaon Ray Chaudhuri** (2022). In: Karchiyappan, T., Karri, R.R., Dehghani, M.H. (eds) Industrial Wastewater Treatment. Water Science and Technology Library, vol 106. Springer, Cham. https://doi.org/10.1007/978-3-030-98202-7_14
3. Shashi Bhushan, Jayakrishnan U., Shaon Raychaudhuri and Halis Simesk. Extremophile Biofilm Behavior, Characterization and Economical Applications. In Extremophiles: Wastewater and Algal Biorefinery. Pratibha Dheeran and Sachin Kumar (Eds). Catalogue Number: 543779, Chapter 11, pp 243-276. Accepted

Provide Images/Flowchart



Process scale up using Moving Bed Biofilm Reactor at the industry

Recognition/Award

This technology has been working at East India Petroleum Limited, Vishakhapatnam from 2016 onwards and is the 1st technology transferred from Tripura University to an Industry.

This technology won the NASI - Reliance Industries Platinum Jubilee Award for Application Oriented Innovations covering Biological Sciences, 2020

EAST INDIA PETROLEUM PVT. LTD.

Regd. Office & Terminal

Ref : EIPL/Gen/2019-20/205
Visakhapatnam.

To

Dr Shaon Ray Chaudhuri
Microbial Technology Group
Tripura University
TRIPURA
INDIA

Dear Dr Ray Chaudhuri,

Sub ; Acknowledgement for the microbial facility provided for our effluent treatment at EIPL terminal, Visakhapatnam, Andhra Pradesh.

We wish to place on record our acknowledgement for providing us specially developed microbial consortium for multipollutants (mainly of petroleum and petrochemical products) control in the wastewater. The microbial technology developed by your group for treatment of our effluent is in operation continuously in full scale MBBR system (approximately 12m³/day) in our Effluent treatment plant at the EIPL Liquid Cargo Terminal at Visakhapatnam, India since September 2016.

The system has shown promising result in treating variety/mix of pollutant that our plant has been receiving. It produces water which is suitable for discharge as per Central Pollution Control Board Norms. This process has helped us recover about 3 Kilo liter of water per day (KLD). For our organization we require about 21KLD water which is purchased. Adoption of this process has helped us recover 3 KLD water which is suitable for land application (gardening) as well as fire fighting. This process has helped us recover the cost of installation within 4 years of operation.

We also acknowledge your ready support in orienting and training our manpower on use of microbial systems and made special focus on our ETP functioning, and in helping set up our laboratory for effluent testing. We also look forward to continued collaboration between our organization and yours in particular and the academia and industry in general.

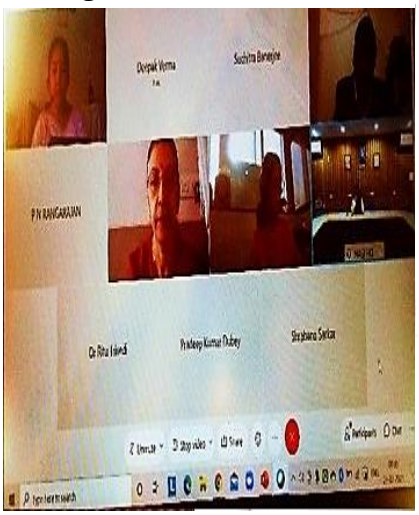
Thanking you

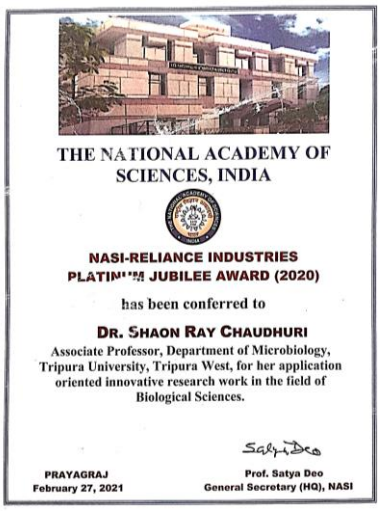
Yours Sincerely

For East India Petroleum Pvt. Limited

KVK Subba Raju
General Manager

Corporate Office :





THE NATIONAL ACADEMY OF SCIENCES, INDIA

NASI-RELIANCE INDUSTRIES PLATINUM JUBILEE AWARD (2020)

has been conferred to

DR. SHAON RAY CHAUDHURI

Associate Professor, Department of Microbiology, Tripura University, Tripura West, for her application oriented innovative research work in the field of Biological Sciences.

PRAYAGRAJ
February 27, 2021

Prof. Satya Deo
General Secretary (HQ), NASI

Technology Commercialization Contact: Prof Shaon Ray Chaudhuri