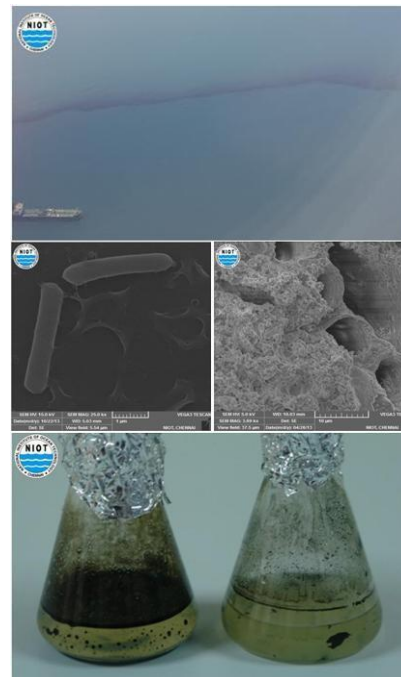


Bioremediation process uses microorganisms or their enzymes to remove/neutralize contaminants within the environment (i.e., within soil and water) to their original condition. The hydrocarbonoclastic bacteria become functionally active in oil contaminated environment. The present indigenous technology of bioremediation is a process of using consortium of hydrocarbonoclastic bacteria from deep-sea to play a key role in the removal of toxic and harmful petroleum hydrocarbons.

1. The present marine microbial consortia were isolated from marine environment of Indian EEZ.
2. The isolated bacterial consortium effectively produces biosurfactant that enhances the bioavailability of contaminants for degradation.
3. Based on the biosurfactant production and capability to utilize wide range of hydrocarbons, 10 bacterial species were mixed in specific proposition to develop a hydrocarbonoclastic bacterial consortium.
4. These consortia were immobilized onto the carrier (natural agro-residues) for effective application on *in-situ* biodegradation of crude oil in marine and coastal environment.
5. A customized growth promoting inorganic mineral salts with optimized carbon: nitrogen: phosphate ratio was developed to support faster rate of multiplication of the bacteria which enhances the degradation process.
6. **Efficiency:** Biodegradation of crude oil by this technology is proven in laboratory. Approximately 90-98% of the total hydrocarbon was degraded into non-toxic end products within a period of 21-28 days which was confirmed by Gas Chromatography Mass Spectrometry.
7. **Storage and shelf life:** The lyophilized consortia can be stored in high barrier plastic bags packed under vacuum for 12 months without a significant decrease in the viability and activity at ambient temperature. The shelf life can be further improved up to 5 years by lyophilizing the cells in 10% sucrose.
8. **Working conditions:** The consortia tolerate wide ranges of salinity, pH, temperature and hydrostatic pressure conditions to adapt all marine environments and to catalyze hydrocarbon degradation reactions in broad physiological conditions.
9. **Application:** The bioremediation package has been demonstrated effective in mitigating Engine oils, Spent engine oil, Crude oil, Diesel, Petrol, Toluene, Xylene, Kerosene, Naphthalene and Phenanthrene etc. This technology has wide application in coastal, coastal and offshore oil spill and sludge treatments in refineries.



Bioremediation of marine oil spill by deep sea bacterial consortia

This technology is developed by **National Institute of Ocean Technology**, Ministry of Earth Sciences, Government of India, seeks to stimulate the use of technology by commercialization under Make in India Initiative and **National Research Development Corporation** will facilitate for smooth transfer of the technology with affordable licensing terms and conditions.

Any company or organization interested in the technical know-how and to get more details about the technology please refer the contact details below.

Contact Details:

Dr. Tata Sudhakar, Scientist - G & Head (Ocean Electronics)
NATIONAL INSTITUTE OF OCEAN TECHNOLOGY
 Velacherry-Tambaram Main Road, Narayanapuram, Pallikaranai,
 Chennai - 600 100, Tamil Nadu, India. Email: tata@niot.res.in; Mobile:
 9444399844 Phone: 044 - 66783525