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2014 Gulf of Mexico Oil Spill & Ecosystem Science Conference

Presentation Abstract

Session:	P-005-Fate and Transport of Oil Spill Residues and their Impacts on Nearshore Coastal Environments Tuesday, Jan 28, 2014, 6:00 PM - 8:00 PM
Presentation:	**Biodegradation Of Long Chain Alkanes And Alkenes By Enrichment Cultures Under Methanogenic, Sulfate-Reducing And Iron-Reducing Conditions**
Location:	Main Ballroom (Convention Center), Poster Board: 5-213
Pres. Time:	Tuesday, Jan 28, 2014, 6:00 PM - 8:00 PM
Keywords:	biodegradation; anoxic; microbial characterization
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Abstract:	Hydrocarbon degradation in oxygen-limited environments occurs in deep water and sediments after oil spills. This relates to the objective of this study; to understand and enhance the biodegradation of oil. To study the ability of non-adapted microbial communities to degrade aliphatic hydrocarbons, six enrichment cultures were obtained. Non-adapted anaerobic granular sludge was used as inoculum, and cultures were grown with 1 mM hexadecane or hexadecene under sulfate reducing, iron reducing or methanogenic conditions. Degradation of the hydrocarbons was determined by the reduction of the electron acceptor or methane production, and compared with cultures without the hydrocarbons. After 3 successive transfers, hexadecene biodegradation was observed in all the enrichments, whereas hexadecane utilization only occurred under iron reducing conditions. In hexadecane and hexadecene cultures, 51% and 41% of the available Fe3+ was reduced after 52 days of incubation. In the hexadecane enrichments, 44% of the sulfate was reduced after 300 days of incubation, and 8 mM methane was produced in the methanogenic enrichments, which corresponds to 65% of the stoichiometric value. The microbial communities are characterized by 454 pyrosequencing of the 16S rRNA genes and will be presented as well. This work shows that the biodegradation of long chain alkanes and alkenes is more widespread in nature than previously thought, and can be used for the removal of oil after an oil spill.