

Biodegradation of Hydrocarbons in Untreated Produced Water using Pure and Mixed Microbial Cultures

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Abstract

Biodegradation studies of hydrocarbons in untreated produced water from Escravos tank farm were undertaken over a period of time using Pure and Mixed microbial cultures and the produced water as the sole carbon and energy source. Gas chromatographic analysis showed that untreated produced water with an oil and grease content of 1407 mg/l contained various petroleum hydrocarbon fractions including n-alkanes (608mg/l), NSO compounds (12.68mg/l) and PAHs (0.833mg/l). Upon mechanical treatment, the oil and grease content of produced water was reduced to 44mg/l while n-alkanes, aromatics, NSO compounds and PAHs were reduced to 38.4, 2.65, 1.78, 0.0655 mg/l respectively. An *Achromobacter* sp., used in pure culture and without nutrient supplementation reduced the oil and grease content to 18 mg/l while n-alkanes, aromatics, NSO compounds and PAHs were reduced to 13.68, 1.32, 1.20, and 0.0056 mg/l respectively after 40 days of exposure and this result was better than when mixed microbial culture were used. This is an indication that produced water hydrocarbons are readily biodegradable and pure bacterial cultures can be very effective in degrading its petroleum hydrocarbons.

Keywords: biodegradation, Hydrocarbons, Gas., Petroleum

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