

Abstract Submitted  
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**Dissolution and degradation of crude oil droplets by different bacterial species and consortia by microcosm microfluidics** MARYAM JALALI, JIAN SHENG, Texas AM University — Bacteria are involved in cleanup and degradation of crude oil in polluted marine and soil environments. A number of bacterial species have been identified for consuming petroleum hydrocarbons with diverse metabolic capabilities. We conducted laboratory experiments to investigate bacterial consumption by monitoring the volume change to oil droplets as well as effects of oil droplet size on this process. To conduct our study, we developed a micro-bioassay containing an enclosed chamber with bottom substrate printed with stationary oil microdroplets and a digital holographic interferometer (DHI). The morphology of microdroplets was monitored in real time over 100 hours and instantaneous flow field was also measured by digital holographic microscope. The substrates with printed oil droplets were further evaluated with atomic force microscopy (AFM) at the end of each experiment. Three different bacteria species, *Pseudomonas sp*, *Alcanivorax borkumensis*, and *Marinobacter hydrocarbonoclasticus*, as well as six bacterial consortia were used in this study. The results show that droplets smaller than 20m in diameter are not subject to bacterial degradation and the volume of droplet did not change beyond dissolution. Substantial species-specific behaviors have been observed in isolates. The experiments of consortia and various flow shears on biodegradation and dissolution are ongoing and will be reported.

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