

Abstract Submitted
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Bacterial encountering with oil droplet¹ JIAN SHENG, MEHDI MO-LAEI, Texas Tech University — Encountering of microorganisms with rising oil droplets in aqueous environments is the first and one of the critical steps in the biodegradation of crude oil. Several factors such as droplet sizes, rising velocity, surfactant, and motility of bacteria are expected to affect the encounter rate. We establish well controlled microfluidic devices by applying layer-by-layer technique that allows us to produce horizontal micro droplets with different sizes. The encounter rates of passive particles, motile and non-motile bacteria with these droplets are measured by high speed microscopy. The effects of mobility and motility of these particles on encounter rates are assessed quantitatively. Meanwhile, we visualize re-orientation of the particle due to flow field around the oil droplet. Results show that the motile bacteria have higher probabilities to interact with an oil droplet compare to the passive particles. Ongoing analyses focus on the effect of shear rates, angular dispersion, curvatures of streamlines, and the swimming velocity of bacteria. The ratios of the encounter area to the entire droplet surface at various flow regimes will also be measured.

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