

Abstract Submitted  
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**Biodegradation of crude oil dispersions by marine bacteria**  
GABRIEL JUAREZ, UIUC, VICENTE FERNANDEZ, ROMAN STOCKER, ETH Zurich — Dispersants are used to break up marine oil slicks and increase the available surface area for bacteria to degrade oil hydrocarbons. However, this common view neglects key elements of the microscale interactions between bacteria and oil droplets, namely encounters and growth. Utilizing experimental observations of bacteria colonizing oil droplets, we model the interactions affecting hydrocarbon consumption between a collection of oil droplets with varying sizes and a single bacterial pool. The results show that degradation time is minimized for intermediate droplet sizes and that reducing droplet size too much can lead to years in increased degradation time. This mechanical model provides a baseline for understanding oil biodegradation and mitigation strategies in open marine systems.

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