

Bacterial aggregation assisted by anionic surfactant and calcium ions

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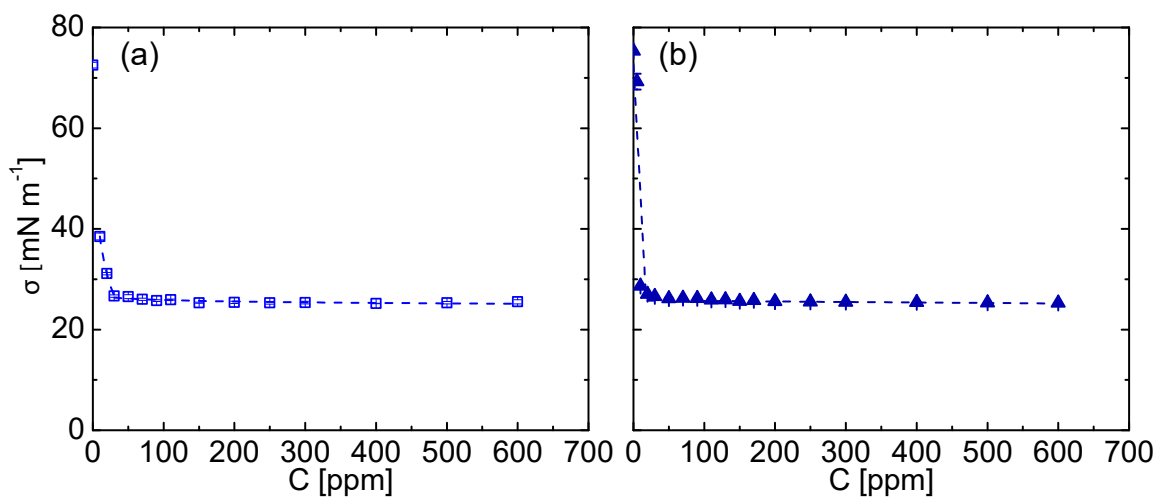


Figure S1: Surface tension of (a) synthetic seawater (SSW) and (b) NaCl solution (58 g L⁻¹) as a function of DOSS concentration. The CMC of DOSS is 30 ppm and 18 ppm in SSW and NaCl solution, respectively, as determined from the intersection of slopes at high and low concentration of DOSS.

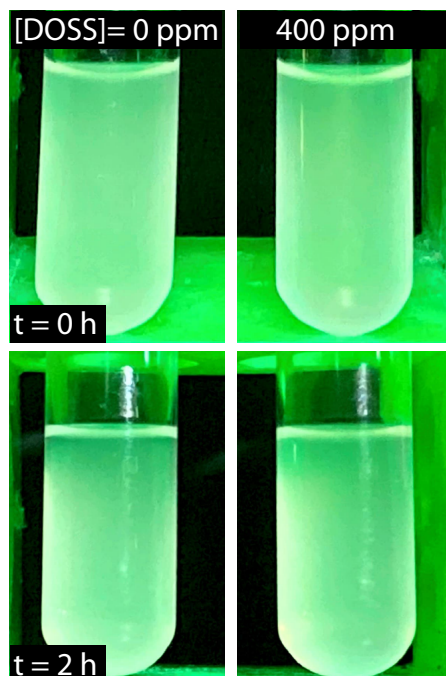


Figure S2: Images of cell suspension at $t = 0$ and 2 h for DOSS concentrations of 0 ppm and 600 ppm. The concentration of bacteria is 10^9 cells mL^{-1} .

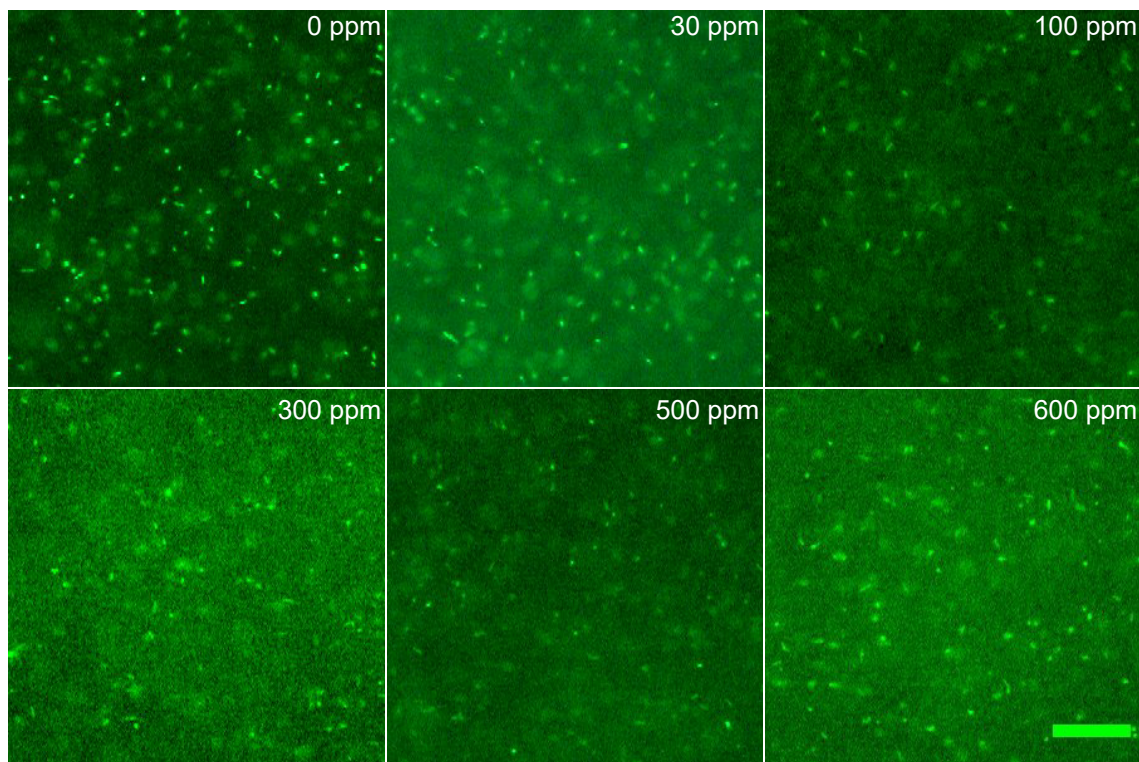


Figure S3: Fluorescence images of *M. hydrocarbonoclasticus* in NaCl (58 g L^{-1}) at various DOSS concentrations, indicated on the panels. The concentration of bacteria is 10^9 cells mL^{-1} . The scale bar is $20 \mu\text{m}$.

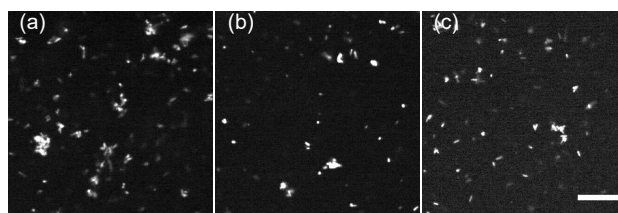


Figure S4: Confocal micrographs of aggregates of (a) *M. hydrocarbonoclasticus*, (b) sheared *H. titanicae*, and (c) motile *H. titanicae* at a DOSS concentration of 400 ppm. Optical density is 0.6. The scale bar is 20 μm .

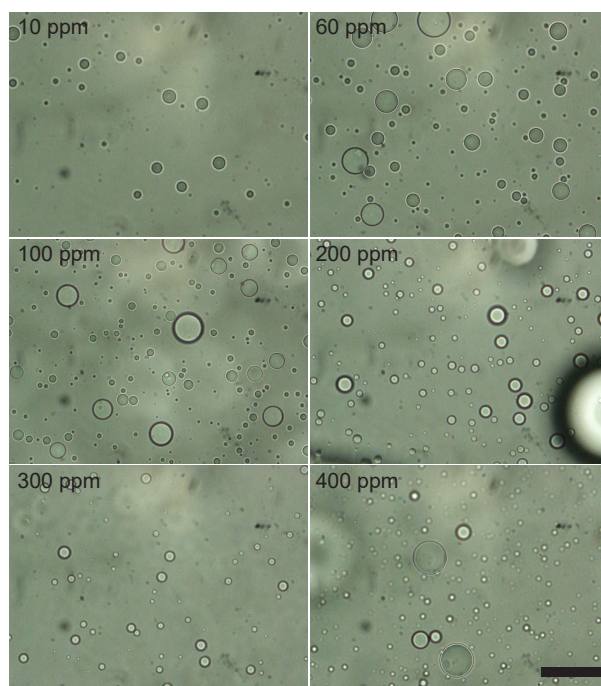


Figure S5: Brightfield micrographs of hexadecane emulsion droplets in SSW at various DOSS concentrations in absence of bacteria. The scale bar is 50 μm .

Aggregation of bacteria promotes flocculation of dispersed hydrocarbons

We examined the implications of DOSS-driven aggregation of bacteria for the dispersion of hydrocarbon droplets in synthetic sea water. This scenario is a simplified version of conditions encountered in marine oil remediation, as DOSS is a component of the Corexit dispersant employed in oil spill recovery. When the concentration of DOSS is low (10 ppm), *M. hydrocarbonoclasticus* bacteria do not aggregate (Fig. S6). Increasing the concentration of DOSS promotes aggregation of bacteria in bulk and at the oil-water interface. For DOSS concentrations of 100 ppm or greater, aggregates of bacteria appear to bridge between neighboring oil droplets, whereas no such bridging was observed in absence of bacteria (Fig. S6). This preliminary result suggests that DOSS-driven bacteria aggregation may contribute to the flocculation of oil droplets.

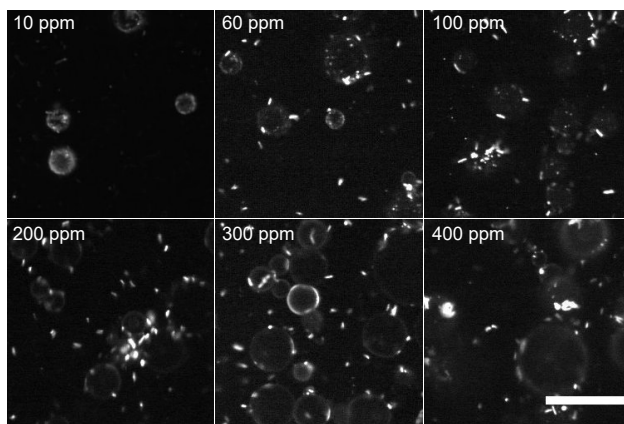


Figure S6: Hexadecane droplets in *M. hydrocarbonoclasticus* as a function of DOSS concentration. The optical density of suspensions is 0.6, corresponding to a concentration of 10^9 cells mL^{-1} . The scale bar is 30 μm .