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Examining role of composition on the formation of extracellular polymeric substance (EPS) aggregates over a rising oil micro-droplet under shear JIAN SHENG, MUN MUN NAHAR, ANDREW WHITE, MARYAM JALALI, Texas A&M — After Deepwater Horizon spill, it is believed that up to 15% of released oil settled to the sea floor as marine oil snow (MOS), which has been corroborated by field and laboratory observations. Several factors contributed to the production of MOS including particulate concentration and microbial mucous (e.g. EPS). EPS is a complex mixture of polysaccharides, proteins, nucleic acids and lipids, and their composition can vary significantly based on the microbial community and the environment. To examine quantitatively the role of EPS composition, specifically protein to hydrocarbon ratio (PHR), on aggregation, we use a microfluidics, "ecology-on-a-chip", to simulate an rising oil drop through a suspension containing EPS and particulates. Time lapse microscopy lasting several days captures the growth and morphology of EPS aggregates. We demonstrate that EPS in the absence of particles is unable to form aggregates, while the addition of particles induces rapid aggregation. The higher PHR results in more stickiness of the EPS molecule and consequently leads to larger and more rapid formation of MOS. Ongoing work is considering the influence of flow shear and various EPS conformation on aggregate formation in flows. Funded by GoMRI & ARO

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