

Abstract Submitted
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Continuous Microfluidics (Ecology-on-a-Chip) Experiments for Long Term Observation of Bacteria at Liquid-Liquid Interfaces¹ MICHAEL MIRANDA, ANDREW WHITE, MARYAM JALALI, JIAN SHENG, Texas A&M University-Corpus Christi — A microfluidic bioassay incorporating a peristaltic pump and chemostat capable of continuously culturing a bacterial suspension through a microchannel for an extended period of time relevant to ecological processes is presented. A single crude oil droplet is dispensed on-chip and subsequently pinned to the top and bottom surfaces of the microchannel to establish a vertical curved oil-water interface to observe bacteria without boundary interference. The accumulation of extracellular polymeric substances (EPS), microbial film formation, and aggregation is provided by DIC microscopy with an EMCCD camera at an interval of 30 sec. Cell-interface interactions such as cell translational and angular motilities as well as encountering, attachment, detachment to the interface are obtained by a high speed camera at 1000 fps with a sampling interval of 10 min. Experiments on *Pseudomonas* sp. (P62) and isolated EPS suspensions from *Sagittella Stelletta* and *Roseobacter* show rapid formation of bacterial aggregates including EPS streamers stretching tens of drop diameters long. These results provide crucial insights into environmentally relevant processes such as the initiation of marine oil snow, an alternative mode of biodegradation to conventional bioconsumption.

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