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Active viscosity of E-Coli suspensions[1] ERIC CLEMENT, JEREMIE GACHELIN, GASTON MINO, HELENE BERTHET, ANKE LINDNER, ANNIE ROUSSELET, PMMH-ESPCI - University Pierre et Marie Curie — Active suspension is the name borne by fluids laden with self-swimming entities such as bacteria, algae or artificial swimmers. Such fluids display emergent constitutive properties differing strongly from those of passive suspensions. Here, we present a recent work, were we measure the viscosity of a wild type E-Coli suspension in the dilute and semi-dilute limits. To this purpose, we use micro-fluidic device build as a Y shape micro-fluidic channel. On one side of the arm, the active suspension is injected and on the other arm, the suspending fluid in injected at the same flow rate. From the position of the interface between the pure fluid and the suspension, we extract the suspension relative viscosity. Varying bacteria density and flow rate, we show a regime specific to active fluids, where the relative viscosity is lower than the viscosity of the suspending viscous fluid. We discuss our results in the perspective of recent theoretical and experimental works.

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