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Effective viscosity of actively swimming algae suspensions RANDY EWOLDT, LUCAS CARETTA, ANWAR CHENGALA, JIAN SHENG, University of Minnesota — Suspensions of actively swimming microorganisms exhibit an effective viscosity which may depend on volume fraction, cell shape, and the nature of locomotion (e.g. "pushers" vs. "pullers"). Here we report experimental measurements of shear viscosity for suspensions of unicellular green algae (*Dunaliella primolecta*, a biflagellated "puller"). We use a cone-and-plate rheometer to measure the dynamic shear viscosity for both motile and non-motile suspensions of *D. primolecta*. Viscosity increases with concentration for both cases, but the active suspensions of "pullers" have a comparatively lower effective viscosity than passive suspensions. This observation contrasts recently proposed theories which predict that "pullers" should instead have a higher viscosity than non-motile suspensions. Additionally, we observe shear-induced migration of active suspensions and consider its impact on the resulting effective shear viscosity.

Randy Ewoldt
University of Minnesota

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