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A viscoelastic two fluid model for the self-propulsion of Helicobacter pylori in a mucus layer CHAITHANYA K. V. S., SUMESH P. THAMPI, Department of Chemical Engineering, Indian Institute of Technology Madras, Chennai - 36, India. — Experiments revealed that the bacterium *Helicobacter pylori* (*H. pylori*) invades the mucus layer protecting the epithelial cells, and causes ulcers in the stomach. It does that by modifying the rheological properties of the mucus layer from a high-viscosity gel to a low-viscosity gel, in which the *H. pylori* propels. However, the propulsion mechanism of *H. Pylori* is poorly understood. S. Y. Reigh, and E. Lauga (Phys. Rev. Fluids 2, 093101) modeled the *H. pylori* using squirmer model developed by Lighthill (1952), and analyzed its propulsion in a mucus layer using a two-fluid model (swimmer confined in a low viscous drop suspended in a high viscous fluid), assuming that the two fluids are Newtonian. However, the mucus layer that coats the stomach wall is viscoelastic in nature. So, in this work, using asymptotic theory with Deborah (De) number (ratio of the material relaxation time scale to the flow time scale) as a small parameter, we solve for the O(De) velocity field, the swimming speed, the power dissipated by the swimmer, and the swimming efficiency. Our analysis may explain the experimental observations related to the swimming strategy of *H. pylori*.

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