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Effects of physical factors on the swarming motility of text itPseudomonas aeruginosa TIEYAN SI, Harbin Institute of Technology, ZIDONG MA, Brown University, WAI SHING TANG, Chinese University of Hong Kong, ALEXANDER YANG, JAY TANG, Brown University — Many species of bacteria can spread over a semi-solid surface via a particular form of collective motion known as surface swarming. Using *Pseudomonas aeruginosa* as a model organism, we investigate physical factors that either facilitate or restrict the swarming motility. The semi-solid surface is typically formed by 0.5-1% agar containing essential nutrients for the bacterial growth and proliferation. Most bacterial species, including *P. aeruginosa*, synthesize bio-surfactants to aid in swarming. We found addition of exogenous surfactants such as triton into the agar matrix enhances the swarming. In contrast, increasing agar percentage, infusing osmolites, and adding viscous agents all decrease swarming. We propose that the swarming speed is restricted by the rate of water supply from within the agar gel and by the line tension at the swarm front involving three materials in contact: the air, the bacteria propelled liquid film, and the agar substrate.

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