

Abstract Submitted
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The double positive effect of the swimming strategy of *E. coli* bacteria in a flow¹ ADAMA CREPPY, HAROLD AURADOU, ERIC CLEMENT, CNRS, CARINE DOUARCHE, LPS, Universite Paris-sud, VERONICA D'ANGELO, CONICET, Universidad de Buenos Aires, FLUIDE AUTOMATIQUE ET SYSTEMES THERMIQUES (FAST) TEAM, ECOLE SUPRIEURE DE PHYSIQUE ET DE CHIMIE INDUSTRIELLE (ESPCI) TEAM, LABORATOIRE DE PHYSIQUE DU SOLIDE (LPS) TEAM, CONICET COLLABORATION — Active matters have been studied extensively in various regimes (from diluted to dense) in recent decades. More recently, it has been shown that the activity of the bacteria induces a rather significant measurable effect on the reduction of the viscosity of the carrier fluid. This effect is explained by the reorientation of the bacteria under the effect of shearing, the rheotaxis. In diluted regime, studies have shown the accumulation of microorganisms on the walls by an hydrodynamic mechanism. The experimental studies on the subject therefore consisted in putting the microorganisms under flow in tubes of circular or rectangular section. On the other hand, few is known about the effect of this coupling between their swimming and the flow in a more complex flow. In order to do this, we have developed a channel with random obstacles of different sizes in which the *E. coli* strain RP437 has been flowed with different velocities. At the scale of a porous medium, our experiments show that the fluid-bacterial coupling has a double effect (i) the activity of motile (active) bacteria favors trapping between and around the grains which is not the case for non-motile (inactive) bacteria and (ii) as a bonus some motile bacteria progressing more rapidly in the medium.

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