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**Nutrient uptake in a suspension of squirmers** SHUNSUKE KAJIKI, YOHSUKE IMAI, TAKAMI YAMAGUCHI, TAKUJI ISHIKAWA, Tohoku University — Although microorganisms exist everywhere and significantly influence our life, little is known about the mass transport in suspensions of microorganisms. The aim of this study is to analyze the effect of the swimming motion on the nutrient uptake. In this study, we propose a discrete model of concentration field of nutrients in a microbial suspension, and simulate the nutrient uptake by model microorganisms. We modeled a microorganism as a squirmer, which swims by generating the tangential velocity on its surface. The hydrodynamic interactions between squirmers were calculated by Stokesian dynamics method. We first analyzed the uptake ratio of a squirmer in an infinite domain without any background flow, which agreed well with former study by Magar et al.(2003). Then, we investigated nutrient uptake process in an infinite suspension of squirmers with the volume ratio of 0.01-0.35. The results showed that the suspension uptake rate was strongly dependent on the volume ratio of squirmers, the swimming mode of squirmers and Peclet number. These results are important in understanding the transport phenomena in a microbial suspension.

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