

Abstract Submitted
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Stability of localized bioconvection patterns of *Euglena* suspensions¹ MAKOTO IIMA, Hiroshima University, TAKAYUKI YAMAGUCHI, Hokkaido University — Suspension of *Euglena gracilis* forms localized convection cells when it is illuminated from below with strong light intensity. Two elementary localized structures are known. One consists of a single region of high number density of the microorganism sandwiched with a pair of convection cells (bioconvection unit) and the other is a localized traveling wave. Measurements of the flux of the number density suggests that the photomovement due to light gradient plays an important role in generating localized convection cells. We proposed a hydrodynamic model incorporating the effect, and succeed in reproducing bioconvection unit, which can be characterized as steady solutions of the proposed model. Bifurcation structure of the solutions are analyzed. The bistable region due to the subcritical bifurcation from trivial state and folding of branch due the saddle-node bifurcation is observed. The stability analysis in the bistable region revealed that the most unstable mode represents a sweep of number density to the central part and reducing the size of the convection cells, which leads the unstable solution to the stable steady solution representing bioconvection unit.

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