

THE EFFECT OF GRAVITY INCLINATION ON HYDROMAGNETIC NON-LINEAR CHEMOTACTIC BIOCONVECTION

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ABSTRACT

This paper deals with the study of the effects of external magnetic field and gravity inclination on the chemotactic bacterial bioconvection by considering a Continuum model. Chemotaxis causes cells to swim out of the plume because the high concentration of the cells constituting the plumes leads to a lower concentration of oxygen in the surrounding fluid. There are cases where the layer is no longer vertical. In such cases, the gravity inclination plays a significant part. A similarity solution is found for the plume in which the cell flux and the volume flux could be matched to those in the boundary layer and also outside the suspension regions. Axisymmetric plumes are formed by applying two scales one with respect to the radial co-ordinate and the other with respect to the similarity variable. The effects of magnetic field and gravity inclination are remarkable, encouraging and the computed results are in excellent agreement with those of hydrodynamic case in the limiting case.

KEYWORDS: Axisymmetric Plumes, Bacterial Bioconvection, Cell Concentration, Chemotactic, Gravity Inclination, Similarity Solution