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| Title | **SIMULATION OF MAGNETO-NANO-BIOCONVECTIVE COATING FLOW WITH BLOWING AND MULTIPLE SLIP EFFECTS** | | |
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| Abstract |  |
| The phenomenon of bioconvecton due to motile microorganism swimming patterns has been found to be a beneficial mechanism in many biological processes and microdevices. Inducing convective transport in self-propelling microbes has been successfully used to enhance mixing, reaction propensity and concentration transport within a range of engineered devices. Doping materials with microorganisms can also be implemented to manipulate magnetohydrodynamic coating processes with smart functional liquids, in which the substrate may be planar, wedge-shaped, curved etc. Inspired by this application, the current article examines theoretically and numerically the external boundary layer Falkner-Skan flow of an electroconductive nanofluid containing gyrotactic micro-organisms on a two-dimensional wedge with Stefan blowing and different slip effects at the wedge boundary. The physico-mathematical model is formulated using a system of partial differential equations and appropriate boundary conditions which are then transformed to a system of ordinary differential equations with appropriate similarity variables. The non-dimensional boundary value problem is solved numerically with the aid of the Mathematica software solver package named “NDSolve”. The impacts of the Stefan blowing, velocity, thermal, nanoparticle concentration and microorganism slips, magnetic number, Lewis number, bioconvection Lewis number, the Falkner-Skan wedge parameter, bioconvection Péclet number, thermophoresis and Brownian motion on key transport characteristics i.e. dimensionless velocity, temperature, nanoparticle concentration (volume fraction), microorganism concentration, skin friction coefficient, local heat transfer rate (local Nusselt number), local mass transfer rate (local Sherwood number) and the microorganism local density number gradient are computed and visualized graphically. Numerical solutions are validated with previous literature. The outcomes reported in this paper are relevant to the synthesis of functional bio-nanopolymers. | |