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| Abstract |  |

This paper studies the combined effects of viscous dissipation, first and second-order slip and variable transport properties on phase-change hydromagnetic bio-nanofluid convection flow from a stretching sheet. Nanoscale materials possess a much larger surface to volume ratio than bulk materials, significantly modifying their thermodynamic and thermal properties and substantially lowering the melting point. Gyrotactic non-magnetic micro-organisms are present in the nanofluid. The transport properties are assumed to be dependent on concentration and temperature. Via appropriate similarity variables, the governing equation with boundary conditions are converted to nonlinear ordinary differential equations and are solved using the BVP4C subroutine in the symbolic software MATLAB. The non-dimensional boundary value features a melting (phase change) parameter, temperature-dependent thermal conductive parameter, first as well as second-order slip parameters, mass diffusivity parameter, Schmidt number, microorganism diffusivity parameter, bioconvection Schmidt number, magnetic body force parameter, Brownian motion and thermophoresis parameters. Extensive computations are visualized for the influence of these parameters. The present simulation is of relevance in the fabrication of bio-nanomaterials for bio-inspired fuel cells