World Academy of Science, Engineering and Technology
International Journal of Biotechnology and Bioengineering
Vol:9, No:01, 2015

Two-Dimensional CFD Simulation of the Behaviors of Ferromagnetic Nanoparticles in Channel

Authors : Farhad Aalizadeh, Ali Moosavi

Abstract : This paper presents a two-dimensional Computational Fluid Dynamics (CFDs) simulation for the steady, particle tracking. The purpose of this paper is applied magnetic field effect on Magnetic Nanoparticles velocities distribution. It is shown that the permeability of the particles determines the effect of the magnetic field on the deposition of the particles and the deposition of the particles is inversely proportional to the Reynolds number. Using MHD and its property it is possible to control the flow velocity, remove the fouling on the walls and return the system to its original form. we consider a channel 2D geometry and solve for the resulting spatial distribution of particles. According to obtained results when only magnetic fields are applied perpendicular to the flow, local particles velocity is decreased due to the direct effect of the magnetic field return the system to its original fom. In the method first, in order to avoid mixing with blood, the ferromagnetic particles are covered with a gel-like chemical composition and are injected into the blood vessels. Then, a magnetic field source with a specified distance from the vessel is used and the particles are guided to the affected area. This paper presents a two-dimensional Computational Fluid Dynamics (CFDs) simulation for the steady, laminar flow of an incompressible magnetorheological (MR) fluid between two fixed parallel plates in the presence of a uniform magnetic field. The purpose of this study is to develop a numerical tool that is able to simulate MR fluids flow in valve mode and determineB0, applied magnetic field effect on flow velocities and pressure distributions.

Keywords : MHD, channel clots, magnetic nanoparticles, simulations
Conference Title : ICABB 2015 : International Conference on Applied Bioscience and Biotechnology
Conference Location : Singapore, Singapore
Conference Dates : January 08-09, 2015