CFD simulation of a membrane bioreactor for high saline refinery wastewater treatment

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ABSTRACT

In the current research, simulation of chemical oxygen demand (COD) removal process from a high saline refinery wastewater using a membrane bioreactor equipped with a hollow fiber membrane, named as a hollow fiber membrane contactor (HFMC) was investigated using computational fluid dynamics method. A two-dimensional mathematical model was proposed to investigate COD transfer. This model describes the diffusion in the axial and radial directions of the HFMC. The model also examines the momentum transfer toward the tube and the shell. Comparing the model results with the experimental data, a deviation of 7.35% attained which reflects the proper reliability of the proposed model to predict the absorption of COD in the HFMC.

Keywords: Simulation; Hollow fiber membrane contactor; Chemical oxygen demand; Computational fluid dynamics