

عنوان مقاله:

Model Based Evaluation of Ferrous Iron Oxidation by Acidophilic Bacteria in Chemostat and Biofilm Airlift Reactors

محل انتشار:

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خلاصه مقاله:

This article presents a model based evaluation of ferrous iron oxidation in chemostat and biofilm airlift reactor, inoculated with a mixed culture of *T. ferrooxidans* and *L. ferrooxidans* bacteria. The competition between the two types of bacteria in the chemostat and in the biofilm airlift reactors alongside the distribution of both bacteria along the biofilm thickness at different time sections have been studied. The model results demonstrate times when very low dilution rates applied in chemostat reactor; *L. ferrooxidans* outcompete *T. ferrooxidans* due to higher affinity of *L. ferrooxidans* for the substrate than that of *T. ferrooxidans*. The bacterial distribution profiles along the biofilm in the airlift reactor at different time scales show that in the beginning, *T. ferrooxidans* bacteria are dominant but when the reactor operates for long time the desirable *L. ferrooxidans* species outcompete *T. ferrooxidans* as a result of the low Fe^{2+} and high Fe^{3+} concentrations. The optimal treatment performance in airlift reactor is achieved at the loading rates below $140 \text{ mol } Fe^{2+}/m^3.hr$ and a conversion efficiency of $>98\%$. This model results are in good agreement with [the experimental results in the literature [1].

کلمات کلیدی:

L. ferrooxidans, *T. ferrooxidans*, AQUASIM software, H_2S removal, Ferrous iron, biofilm airlift reactor, chemostat reactor

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