Modeling of antibiotics production in magneto three-phase airlift fermenter

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Abstract

A mathematical model is developed to describe the performance of a three-phase airlift reactor utilizing a transverse magnetic field. The model is based on the complete mixing model for the bulk of liquid phase and on the Michaelis–Menten kinetics. The model equations are solved by the explicit finite difference method from transient to steady state conditions. The results of the numerical simulation indicate that the magnetic field increases the degree of bioconversion. The mathematical model is experimentally verified in a three-phase airlift reactor with *P. chrysogenum* immobilized on magnetic beads. The experimental results are well described by the developed model when the reactor operates in the stabilized regime. At relatively high magnetic field intensities a certain discrepancy in the model solution was observed when the model over estimates the product concentration.

Keywords Mathematical modeling; Magnetic stabilization; Magneto airlift eactors; Penicillin production; *P. chrysogenum*