Abstract

The mathematical model of immobilized enzyme system in porous spherical particle is presented. The model is based on non-stationary diffusion equation containing a nonlinear term related to Michaelis-Menten kinetics of the enzymatic reaction. A general and closed form of an analytical expression pertaining to the substrate concentration profile and effectiveness factor
are reported for all possible values of dimensionless modules \( P \) and \( Q \). Moreover, herein we have employed “Homotopy Perturbation Method” (HPM) to solve the non-linear reaction/diffusion equation in immobilized enzymes system. These analytical results were found to be in good agreement with simulation result.

Reference

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**Index Terms**

Computer Science  
Applied Sciences

**Key words**

Diffusion-Reaction  
Immobilised Enzymes  
Modelling

Homotopy perturbation method

Biosensors

Michaelis-Menten kinetics

Effectiveness factor