Reaction/Diffusion Equation with Michaelis-Menten Kinetics in Microdisk Biosensor: Homotopy Perturbation Method Approach

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This paper presents the non steady state model of a microdisk enzyme based biosensor where the enzyme reacts directly on the electrode itself. The model is based on diffusion equation containing a non-linear term related to Michaelis-Menten kinetics of enzymatic reaction. We have reported for the first time the utilization of new approaches of the homotopy perturbation method (HPM) to solve nonlinear partial differential equations in microdisk biosensor. Our analytical solution was also compared with numerical solutions and satisfactory agreement was noted. The influence of various parameters on the concentration are also discussed.

Keywords: Biosensors, Mathematical model, Homotopy perturbation method, Nonlinear equation, Chemical sciences.

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