Abstract

Enzymatic hydrolysis of cellulose is a complex process because of a number of inhibition and enzyme inactivation reactions which happen during hydrolysis. Artificial Neural Networks (ANNs) are very effective in developing predictive models for processes involving complex reaction kinetics that would otherwise be difficult to be modeled by more traditional deterministic approaches. The present investigation was carried out to study the application of Artificial Neural Network as a tool for predicting glucose production by enzymatic hydrolysis of pure cellulose and comparison with mathematical models and experimental results. A feed forward neural network with one hidden layer was trained and used to predict the glucose production. Comparing the R² (coefficient of determination), MSE (mean square error) and ARD (average relative deviation) values of the neural network model with the mathematical model, it was concluded that the neural network is more accurate than the mathematical models. The obtained results show that the ANN can be a useful method for the design of the enzymatic hydrolysis.
Comparative Study between Neural Network Model and Mathematical Models for Prediction of Glucose Concentration during Enzymatic Hydrolysis

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Index Terms

Computer Science  Artificial Intelligence

Keywords

Cellulose  Enzymatic hydrolysis  Artificial Neural Network  Modeling  Cellulase