

Optimization of Assay Parameters of L-Glutaminase from *Bacillus cereus* MTCC1305 Using Artificial Neural Network

Authors : P. Singh, R. M. Banik

Abstract : Artificial neural network (ANN) was employed to optimize assay parameters viz., time, temperature, pH of reaction mixture, enzyme volume and substrate concentration of L-glutaminase from *Bacillus cereus* MTCC 1305. ANN model showed high value of coefficient of determination (0.9999), low value of root mean square error (0.6697) and low value of absolute average deviation. A multilayer perceptron neural network trained with an error back-propagation algorithm was incorporated for developing a predictive model and its topology was obtained as 5-3-1 after applying Levenberg Marquardt (LM) training algorithm. The predicted activity of L-glutaminase was obtained as 633.7349 U/l by considering optimum assay parameters, viz., pH of reaction mixture (7.5), reaction time (20 minutes), incubation temperature (35°C), substrate concentration (40mM), and enzyme volume (0.5ml). The predicted data was verified by running experiment at simulated optimum assay condition and activity was obtained as 634.00 U/l. The application of ANN model for optimization of assay conditions improved the activity of L-glutaminase by 1.499 fold.

Keywords : *Bacillus cereus*, L-glutaminase, assay parameters, artificial neural network

Conference Title : ICBB 2014 : International Conference on Biotechnology and Bioengineering

Conference Location : Stockholm, Sweden

Conference Dates : July 14-15, 2014