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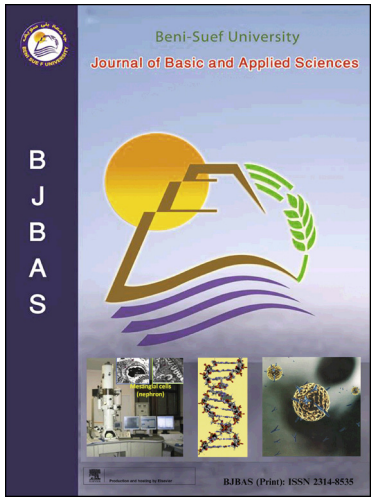

Efficient extraction of antioxidants from *Vernonia cinerea* leaves: Comparing response surface methodology and artificial neural network

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Abstract

Despite response surface methodology (RSM) has been the most preferred statistical tool for optimizing extraction processes, artificial neural network (ANN) has been one of the most effective tools used for optimization and empirical modelling since the last two decades, most especially for non-linear equations. Thus, this study was carried out to compare the performance of RSM and ANN in optimizing the extraction yield and antioxidant capability of extract from *Vernonia cinerea* leaves using microwave-assisted extraction (MAE) techniques. The responses (extraction yield and antioxidant capabilities) were modelled and optimized as functions of four independent MAE parameters (irradiation time, microwave power level, ethanol concentration, and feed-to-solvent ratio) using RSM and ANN. The coefficient of determination (R^2), root mean square error (RMSE) and absolute average deviation (AAD) were employed to compare the performance of both modelling tools. ANN model has a higher predictive potential compared to RSM model with higher correlation coefficients of 0.9912, 0.9928 and 0.9944 for extraction yield, DPPH and ABTS scavenging activities, respectively. Thus, ANN model could be a better alternative in data fitting for the MAE of antioxidants from *Vernonia cinerea* leaves.

Keywords: Extraction yield; *Vernonia cinerea*; Artificial neural network; Antioxidants; Response surface methodology