



## Optimization of ultrasound-assisted extraction from *Moringa oleifera* leaves using response surface methodology

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### **A b s t r a c t**

The present study optimized ultrasound-assisted extraction conditions to maximize extraction yields of from moringa oleifra the optimal extraction time (X1), extraction temperature (X2), and ethanol concentration (X3) were identified using response surface methodology (RSM). A central composite design was used for experimental design and analysis of the results to obtain the optimal processing parameters, Statistical analyses revealed that three variables and the quadratic of X1, X2, and X3 had significant effects on the yields and were followed by significant interaction effects between the variables of X2 and X3 ( $p < 0.01$ ). A three-dimensional response surface plot and contour plots derived from the mathematical models were applied to determine the optimal conditions. The optimum ultrasound-assisted extraction conditions were as follows: extraction time, 45 minutes; temperature, 30°C; extraction and ethanol concentration, 70%. Under these conditions, the experimental yield was 3.414%, which agreed closely with the predicted value (3.406%), the experimental values agreed with those predicted by RSM models, thus indicating the suitability of the model used and the success of RSM in optimizing the extraction conditions.