

## Optimization of supercritical carbon dioxide extraction of *Quercus infectoria* oil

### ABSTRACT

This current study focuses on the modelling and optimization of supercritical fluid extraction of *Quercus infectoria* galls oil. In this case, response surface methodology (RSM) and artificial neural network (ANN) were applied for the modelling and prediction of extraction yield of galls oil. A 17-run Box-Behnken Design (BBD) was employed to statistically optimize the process parameters of SC-CO<sub>2</sub> extraction of *Quercus infectoria* galls at a condition as follows: pressure (5000, 6000, 7000 Psi), temperature (40, 50, 60°C) and extraction time (30, 45, 60 min). The maximum yield of the extracted oil is 1.12 % and the optimum conditions are at an extraction pressure of 5574 Psi; extraction temperature of 75°C and extraction time of 54 min. Under the optimal conditions, the experimental results agree with the predicted values obtained through analysis of variance (ANOVA). This indicates a successful response surface methodology and highly satisfactory goodness of fit of the model used. The analysis of experimental design for process optimization results demonstrates that temperature and extraction time are the main parameters that influence the oil extraction of *Quercus infectoria*.

**Keyword:** *Quercus infectoria* (Manjakani); Supercritical CO<sub>2</sub> extraction; Optimization; Response surface methodology (RSM); Artificial neural network