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Abstract

An Experimental Study Exploring Box–Behnken Design for Optimal Extraction of Phenolics from *Olea europaea* Leaves †

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Abstract: *Olea europea* is among the most important potential plants of the Arabian Peninsula. It is commonly known as Zaytoun in Arabic. Olive leaves possess a wide array of pharmacological and medicinal attributes. Currently, process optimization for extraction parameters in herbal infusions to maximize antioxidant phenolic compounds has attracted consideration. This study examines the optimum microwave-assisted extraction conditions by using response surface methodology (RSM) with Box–Behnken design (BBD) for the better extraction output of total phenolic content from olive leaves taking water as a green solvent. The effect of three independent variables—time (5–15 min) X1, microwave power (40, 60, 80) X2 and solid-solvent ratio (0.5 to 1.5 g/40 mL) X3—on the determination of biomass yield and total phenolic were studied. The influence of process parameters, i.e., X1, X2 and X3, were investigated using Design-Expert software to establish mathematical models and to obtain the optimal conditions of TPC extraction. Results showed that the obtained % yield ranges from 16 to 48%, while the range of TPC was found to be from 28.76 to 221.43 mg GAE/g DW. The significance of regression coefficients was statistically examined by analysis of variance (ANOVA). It was found that the lack of fit value of the quadratic model was insignificant, but the model was significantly fitted. So, the second-order polynomial model could be used to optimize the extraction of phenolic compounds from olive leaves. This study provides ideas with the scientific basis of utilization of olive leaves as a rich source of phenolic compounds to be extracted using Microwave-assisted extraction (MAE).

Keywords: *Olea europea*; res ponse surface methodology; Box–Behnken design; microwave-assisted extraction; total phenolic compounds

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