

OPTIMIZATION OF ULTRASOUND-ASSISTED EXTRACTION OF ANTIOXIDANT PHENOLICS FROM ALGERIAN *TRIFOLIUM TOMENTOSUM* L. USING RESPONSE SURFACE METHODOLOGY

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Abstract. The current study aims to maximize the recovery of antioxidant phenolics from Algerian *Trifolium tomentosum* L. using an innovative green process: ultrasonic assisted extraction (UAE). Firstly, four different solvents were used: 50% acetone, 50% ethanol, 50% methanol, and 100% ethyl acetate, as well as four different extraction methods: maceration, refluxed extraction, Soxhlet extraction, and UAE. The classification of the best solvent (50% ethanol) and most effective extraction method (UAE) on the basis of quantified total phenolic content (TPC) led to the second part, which focused on optimizing the UAE using response surface methodology (RSM) and a Box Behnken design (BBD). Algerian *Trifolium tomentosum* L. extract demonstrated intriguing total phenolic and flavonoid contents (TPC and TFC) greater than 30 mg GAE/g DW and 6 mg QE/g DW, respectively, and potential total antioxidant capacity (TAC), closer to 20 mg AAE/g DW, under the optimal conditions with 70% ethanol concentration, an extraction time of 30.45 minutes, and an extraction temperature of 75°C. Based on these findings, Algerian *Trifolium tomentosum* L. optimized extract can be used as a green natural ingredient in cosmetic formulations as well as a food preservative.

Keywords: *Trifolium tomentosum* L., antioxidant phenolic, green process, ultrasonic, response surface methodology.

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