

Abstract:

Essential oils (Eos) are secondary metabolites, produced in the plant as a consequence of external stimuli or internal stimuli, and biotic or abiotic stress has diverse applications in many fields such as medicine, foods, cosmetics, perfumery, etc. owing to their unique properties. *Coriandrum sativum* L., an annual herbaceous plant, mainly cultivated in Mediterranean countries now almost worldwide used as a culinary, and medicinal aromatic plant. The objective of the study was to choose the best technique for the extraction of essential oil from *C. sativum* L. seeds through preliminary scanning. Different extraction techniques; Enzyme Assisted Hydro-distillation (EAHD) by using (Viscozyme and Cellulase), Ultrasound Assisted Hydro-distillation (UAHD), Microwave Assisted Hydro-distillation (MAHD), Maceration with (Sodium Chloride 1%, Triton X100 1%, Glucose 1%, and Poly Ethylene Glycol) were employed to extract essential oil from coriander seeds. Best yield of essential oil was obtained by Surfactant mediated hydro-distillation (SMHD) which was further optimize to find optimum conditions for the extraction of the maximum possible yield of EO by applying Response Surface Methodology (RSM) by selecting four independent process variables such as the amount of Surfactant (Triton X100) (1-5 ml), Shaking time (2-8 hours), Liquid to sample ratio (10-20 ml/g), and Shaking speed (100-200 rpm). Surfactant-mediated Hydro-distillation using Clevenger type apparatus was the best suitable approach to extract essential oil according to the preliminary scanning data. Analysis of Variance (ANOVA) showed the strong influence of the amount of Triton X100 (A), Shaking speed, and Shaking time (BD), along with the shaking time (B^2) on the yield. Optimum conditions for the extraction of volatile oil from coriander seeds was the amount of Triton X100 3.2807 ml, shaking time 5.790 hours, liquid to sample ratio 13.71 ml/g, and shaking speed 200 rpm, about 7.64 % yield was extracted as predicted by DEO. Coriander Seeds Essential Oil (CSEO) demonstrated various free-radical scavenging activities i.e. Total Phenolic Content (TPC), Trolox Equivalent free-radical scavenging, and DPPH free-radical scavenging activity.