

Recovery of Phenolic Compounds from Pomegranate (*Punica Granatum L.*) Agroindustrial Waste using Pressurized Liquid Extraction

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This study aimed to extract phenolic compounds from Wonderful pomegranate (*Punica granatum L.*) agroindustrial waste specifically from its peel and carpelar membranes applying Pressurized Liquid Extraction (PLE). Four preliminary treatments were considered applying Supercritical Fluid Extraction (SFE) and PLE with different concentrations of pure CO₂ and ethanol, and mixtures of both solvents in different proportions of CO₂/ethanol (90/10, 50/50). From these preliminary studies, it was concluded that the extraction through pressurized liquids using just ethanol is the best extraction method in order to obtain an important extraction yield. Then, a 2x5 factorial statistical design was applied where the influence of the temperature (40 and 60°C) and pressure (20,40,60,80 and 100 bar) were evaluated on i) the global extraction yield and qualitative and ii) quantitative composition of the phenolic compounds. Two extracts with the highest extraction yield were selected and subjected to chromatographic techniques such as Thin Layer Chromatography (TLC) and High Performance Liquid Chromatography with photodiode array detector (HPLC-DAD) in order to identify and quantify the most representative phenolic compounds. The highest extraction yields were presented by applying the temperature of 60°C at both 40 bar (E1, X₀ =37.28% DW) and 80 bar (E2, X₀ =44.99% DW) pressure. Nevertheless, E1 contained higher amount of phenolic compounds identified as α-punicalagin, β-punicalagin and ellagic acid (1.26±0.05, 3.84±0.01 and 0.67±0.08 mg/g extract respectively) than the E2 (0.94±0.04, 2.92±0.09 and 0.53±0.01 mg/g extract). Pomegranate agroindustrial waste is an important source of α, β-punicalagins and ellagic acid; PLE has demonstrated to be a promising and efficient extraction method for the recovery of those phenolic compounds using GRAS solvents such as ethanol. The application of biocompound extraction techniques represents a sustainable alternative for the valorization of agroindustrial waste from the pomegranate industry.