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SUPERCRITICAL FLUIDS AND ULTRASOUND ASSISTED EXTRACTIONS APPLIED TO SPRUCE BARK CONVERSION

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Abstract

Supercritical fluid and ultrasound assisted extractions were applied as a first step in a complex processing of spruce bark in order to recover polyphenols compounds. The aim of the study was to compare the efficiency of these "green" processes with a conventional extraction technique (ethanolic extraction). Supercritical fluid extraction was carried out in two steps: (i) static extraction for 15 min at 1000 psi with pure CO₂ and (ii) dynamic extraction for 45 min at 35, 40 and 50 °C, 1200, 2000 and 2500 psi, with CO₂ and 70% ethanol as co-solvent. UAE was carried out in an ultrasonic bath at 45, 50 and 60 °C for 5 to 75 minutes. The ethanolic extraction was performed using ethanol (70%) in a closed oven for 13 days. The extracts were characterized using Folin-Ciocalteu method for total phenolic content and quantified by high liquid performance chromatography (HPLC). The study recommend SFE and UAE instead of traditional ethanolic techniques since these provide high extraction yields, pure extracts, with a large number of polyphenolic compounds extracted and are environmentally friendly.

Key words: ethanol extraction (Eth E) spruce bark, polyphenols, supercritical fluid extraction (SFE), ultrasound assisted extraction (UAE)

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