

CHEMICAL CHARACTERIZATION OF WILLOW BARK EXTRACTS OBTAINED BY ULTRASOUND-ASSISTED EXTRACTION

Gligorić Emilia*, Igić Ružica**, Suvajdžić Ljiljana*, Teofilović Branislava*, Grujić Nevena*

*University of Novi Sad, Faculty of Medicine, Department of Pharmacy, Hajduk Veljkov 3, Novi Sad, Serbia, emilia.gligoric@mf.uns.ac.rs

**University of Novi Sad, Faculty of Sciences, Trg Dositeja Obradovića 3, Novi Sad, Serbia

Willow bark (*Salix* spp., Salicaceae) has been used since ancient times to relieve pain, treat fever and inflammatory conditions. Beside salicin and salicylic derivatives, the major classes of bioactive constituents in willow bark include phenolic acids and flavonoids. As the environmental awareness is rising, focus is set on extraction techniques that are exempt from toxic solvents. Ultrasound-assisted extraction (UAE) is a simple, inexpensive, 'green' extraction technique which could be used effectively for extraction of bioactive compounds from medicinal plants. Therefore, the aim of this study was to compare the chemical profiles of bark extracts of five species of the genus *Salix* (*S. alba*, *S. amplexicaulis*, *S. babylonica*, *S. fragilis* and *S. triandra*) obtained by UAE.

UAE was carried out in ultrasonic bath at 25°C and 40 kHz for 30 min, using water as solvent. Chemical characterization of the obtained extracts was performed by High Performance Liquid Chromatography methods.

In the analyzed bark extracts 11 bioactive compounds were identified and quantified: gallic, chlorogenic, p-hydroxybenzoic, syringic, p-coumaric and *trans*-cinnamic acids, flavonoids epicatechin, rutin, quercetin and naringenin, and the salicylic glycoside salicin. The major compounds in the analyzed extracts were salicin, chlorogenic acid, rutin and epicatechin. *S. amplexicaulis* was the richest in salicin, rutin, p-coumaric and p-hydroxybenzoic acid, *S. alba* in gallic acid, *S. babylonica* in syringic acid and epicatechin, *S. fragilis* in chlorogenic and *trans*-cinnamic acid, while *S. triandra* in quercetin and naringenin.

The obtained results indicate that bark extracts of *Salix* species obtained by UAE contain significant amounts of bioactive compounds and could be further explored for various applications in the pharmaceutical industry.

Keywords: *Salix*, bark, ultrasound-assisted extraction, HPLC