




Abstract

# Volatile Organic Profile of *Pinus nigra* Arnold Bark <sup>†</sup>

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**Abstract:** Volatile organic compounds (VOCs) emission from trees and other plants depends on various factors such as species, age, and biochemical characteristics, as well as the interaction with fungi and insects. VOCs derive from the tree native structure and/or are produced via oxidation and hydrolysis from wood components. The aim of this study was to determine VOCs in *Pinus nigra* Arnold bark extracts. *Pinus nigra* Arnold bark was sampled from the mountains Tara and Mokra Gora (Republic of Serbia). Dichloromethane and hexane were used as pure solvents and conventional liquid–liquid extraction (LLE) and ultrasound extraction were applied. Prepared extracts were analysed by gas chromatography coupled with a mass spectrometry detector. The NIST and Wiley libraries were used for the identification of VOCs. After analysis of the VOCs' abundance and peak areas, dichloromethane was chosen as a more efficient solvent in comparison with hexane. The ultrasound technique was more effective for VOC extraction versus the conventional LLE. Additionally, bark extracts from Mokra Gora contained diverse VOCs in contrast to the ones obtained from the Tara locality. The main VOCs were monoterpenes, such as  $\alpha$ - and  $\beta$ -pinene, camphene and limonene. In addition, sesquiterpenes: humulene, germacrene D, longipinene, longifolene and cadinene, as well as oxygenated terpenes such as verbenone and  $\alpha$ -terpineol, were detected in bark extracts. The obtained results showed that location strongly affects the VOC profile in *Pinus nigra*.

**Keywords:** pine bark; monoterpenes; GC-MS



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