Chemical Composition, Antioxidant and Antimicrobial Activities of the Essential Oils of Different Pinus Species from Kosovo

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Abstract : Chemical profile, antioxidant and antimicrobial activity of total and fractionated essential oils (EOs) (F1 – hexane, F2 – hexane/diethyl ether, F3 – diethyl ether) derived from five Pinus species (Pinus heldreichii, P. peuce, P. mugo, Pinus nigra, P. sylvestris), were investigated. The hydrodistilled EOs and their chromatographic fractions (direct solid phase extraction, SPE) were analysed by GC-MS and 112 compounds separated and identified. The main constituents were α-pinene, β-pinene, D-limonene, β-caryophyllene, germacrene D, bornyl acetate and 3-carene. The antioxidant activities of total EOs were lower than those of the corresponding fractions, with F2 the strongest in all cases. EOs and fractions showed different degrees of antibacterial efficacy against different microbial pathogens (moderately strong antimicrobial activity against C. albicans and C. krusei ,while low or no activity against E. faecalis and E. coli strains). The detected inhibition zones and MICs for the EOs and fractions were in the range of 14 -35 mm and 0.125 - 1% (v/v), respectively. The components responsible for the antioxidant and antimicrobial activity were oxygenated monoterpenes and sesquiterpenes recovered in the polar EO fractions. These activities seem to be regulated by reciprocal interactions among the different subclasses of phytochemical species present in the EOs.