

PP54. Juniper essential-oil composition and bioactivity as a function of species and sex

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There are 10 species of juniper (*Juniperus* L., Cupressaceae) in the European flora, six of which (*J. communis*, *J. oxycedrus*, *J. pygmaea*, *J. sabina*, *J. sibirica*, and *J. excelsa*) are found in the Flora of Bulgaria. Of these, *J. excelsa* is monoecious and the other five species are dioecious. The objective of this study was to compare the essential oil (EO) composition, antioxidant, antimicrobial, and insecticidal activities of the male (M) and female (F) plants from the five dioecious species. A secondary objective was to compare extraction methods; Clevenger vs semi-commercial steam distillation on the EO yield, profile, and bioactivity of the juniper species. The concentration of α -pinene, β -caryophyllene, δ -cadinene, and δ -cadinol was different between the oils of M and F plants within all five species. Male and F plants of *J. pygmaea*, *J. sabina*, and *J. sibirica* had significantly different concentrations of sabinene within the respective species. In some cases, the EO of M and F plants had different antioxidant and antimicrobial activities. The extraction method, Clevenger vs semi-commercial steam distillation was also significant on the antioxidant capacity of the EOs within most juniper species. Overall, the EO obtained from the semi-commercial extraction was more consistent within a species with respect to antioxidant capacity compared with the oils obtained using the Clevenger-type extraction. However, the oils obtained via Clevenger extraction showed greater antioxidant capacity within a species compared with those from semi-commercial extraction. In two separate experiments, seven of the juniper oils (*J. communis*-F, *J. communis*-M, *J. oxycedrus*-M, *J. pygmaea*-F, *J. pygmaea*-M, *J. sibirica*-F, and *J. sibirica*-M) were tested for repellent and insecticidal activities against *Rhopalosiphum padi* (bird cherry-oat aphid) and *Sitobion avenae* (English grain aphid). All of the tested oils had significant repellent and insecticidal activities against the two aphid species at concentrations of the EO in the solution at 1%, 2.5%, and 5%. The results suggest that when reporting EO composition, antioxidant, antimicrobial, and insecticidal activity of juniper EO, the sex of the tree and the extraction method needs to be indicated along with the species. The results may benefit industry utilizing juniper leaf oil for new product development.

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