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ANTIOXIDANT ACTIVITY AND GC-MS CHARACTERIZATION OF *JUNIPERUS COMMUNIS* L. AND *CISTUS LADANIFER* L. ESSENTIAL OILS

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Juniperus communis L. and *Cistus ladanifer* L. are two abundant shrubs in the mountain areas of the Mediterranean basin, particularly in the Iberian Peninsula. Both species are known for their valuable essential oil that can be used in cosmetic, food and pharmaceutical industries for their bioactive properties [1]. Within the scope of the European Project “BeonNat”, that aims at developing innovative and bio-based products using the biomass of trees and shrubs growing on marginal and underutilised lands as feedstock for the bio-based industry, these two species were selected for evaluation. In this work, the biomass of the two species (branches milled to <20mm particle size) grown in Spain was submitted to steam distillation. The extracted essential oils (EO) were characterized regarding their chemical composition by gas chromatography coupled with mass spectrometry (GC-MS) and their antioxidant activity by the ferric reducing power assay.

An extraction yield of 0.50% and 0.08% (dry basis) was obtained for *J. communis* and *C. ladanifer* biomasses, respectively. The GC-MS analysis enabled the identification of 98.1% of compounds in *J. communis* EO, corresponding to a total of 63 identified compounds, with α -pinene being the major compound (32.3%), followed by limonene (15.8%), sabinene (7.6%), germacrene B (4.9%), cis-thujopsene (4.6%), β -myrcene (3.7%) and β -caryophyllene (3.6%). In general, the chemical composition was in good agreement with that of juniper berries essential oil defined in the European Pharmacopoeia and the ISO 8897 standard, with the exception of limonene (15.8%) that was slightly higher than the defined range (Eur. Ph from 2-12% and ISO standard from 2-8%). For *C. ladanifer* essential oil, a total of 61 compounds were identified corresponding to 92.8% of total compounds, with viridiflorol being the major compound (20.7%), followed by α -pinene (19.8%), ledol (8.1%), camphene (7.2%) and bornyl acetate (5.6%). This result is in good agreement with previous works that also report the sesquiterpene alcohol viridiflorol as the major compound in the EO obtained from *C. ladanifer* leaves and small branches [2]. Regarding the antioxidant activity, both oils showed promising results in the reducing power assay, presenting an EC₅₀ value of 1.35 \pm 0.19 mg/mL and 1.30 \pm 0.07 mg/mL for *J. communis* and *C. ladanifer*, respectively.

References

- [1] Saha, A., & Basak, B. B. (2020). Scope of value addition and utilization of residual biomass from medicinal and aromatic plants. *Industrial Crops and Products*, 145, 11197.
- [2] Gomes, P.B., Mata, V.G., & Rodrigues, A.E. (2004). Characterization of the Portuguese-grown *Cistus ladanifer* essential oil. *Journal of Essential Oil Research*, 17, 160.

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