

Antioxidant capacity and phenol content of *Fraxinus angustifolia* leaf and bark extracts



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Keywords

Fraxinus angustifolia Vahl.

Bioactive compounds

Antioxidant activities

Mediterranean species

wild harvested plants

natural remedies

NWFP

Aromatic & Medicinal Plants

Scale

National

Context

Among the various medicinal and culinary tree, some native species are of particular interest because they may be used for the production of raw materials or preparations containing molecules with significant antioxidant capacities and health benefits. Among these species, we listed *Fraxinus angustifolia* Vahl. subsp. *angustifolia* (Oleaceae) as a Tunisian native tree.

Objective

The ultimate objectives of this work were to find new potential sources of natural antioxidants agents in the food industry. This study is the first to investigate secondary metabolites and biological activities of barks and leaves of *Fraxinus angustifolia* Vahl. subsp. *angustifolia* (Oleaceae), Tunisian native tree, from two provenances (Béja and Nefza) were investigated using two solvents extracts (ethanol and distilled water).

Results

The obtained results showed that *Fraxinus angustifolia* is a very rich plant in secondary metabolites. High contents in polyphenols, flavonoids, and tannins were observed in both extracts of all studied organs. Significant differences were found between both provenances of the two organs. The highest amounts of polyphenols ($24,84 \pm 0,57$ mg GAE/g DW), flavonoids ($2,71 \pm 0,15$ mg CE/g DW), total tannins ($138,07 \pm 5,77$ mg CE/g DW) and condensed tannins ($68,43 \pm 5,76$ mg CE/g DW) were shown for Béja bark ethanolic extracts. The level of antioxidant activity estimated by DPPH test systems was high for Nefza bark ($IC_{50} = 7,12 \pm 0,07$ μ g/ml) and Nefza ethanolic extracts leaves ($IC_{50} = 8,81 \pm 0,20$ μ g/ml).



Recommendations

These results are preliminary; it would be interesting to do additional studies to understand the molecular and cellular mechanisms of these effects. These studies should also be directed towards the purification of extracts and the evaluation of purified compounds for their effects on the indications involved in biological activities.



Impacts and weaknesses

Our result exhibited significant differences in the content of polyphenols, flavonoids, total, and condensed tannins according to the solvent extracting. The significant variability between the fractions, in the phenolic compounds, may be attributed to the extracting power of the solvent used and its chemical nature, structure, degree of polymerization, and the interaction of these compounds with each other.



Future developments

This study was the first report of the antioxidant activity of extracts from leave and bark extracts of *F. angustifolia* in Tunisia. These promising results open the way for further investigations to purify and identify active molecules. Our results showed that the barks were the organ that gives the highest level in polyphenol, flavonoid, total and condensed tannins contents which favor them in industrial use for extraction.



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Further information

Dewanto V, Wu X, Adom KK, Liu RH (2002) Thermal processing enhances the nutritional value of tomatoes by increasing total antioxidant activity. *J Agric Food Chem* 50:3010-3014.

Hanato T, Kagawa H, Yasuhara T, Okuda, T (1988) Two new flavonoids and other constituents in licorice root: their relative astringency and radical scavenging effect. *Chem Pharm Bull* 36, 1090-1097.

Lister E, Wilson P (2001) Measurement of total phenolics and ABTS assay for antioxidant activity (personal communication). Lincoln, New Zealand: Crop Research Institute.

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About INCREDIBLE Project

INCREDIBLE project aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region.



Funding

'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) project receives funding from the European Commission's Horizon 2020 programme under grant agreement N° 774632.