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Sugar composition, phenolic content and antioxidant activity of *P. tridentatum* aqueous extracts: micropropagated shoots *vs* wild plants

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P. tridentatum (L.) Willk (common name *Carqueija*) is a shrub whose aerial parts are highly used in Portugal, in traditional medicine and gastronomy. This work aimed to evaluate and compare the phenolic content, reducing sugar composition and antioxidant activity of aqueous extracts of micropropagated shoots at multiplication phase and wild plants. The plant material was collected in two areas of Portugal (Gardunha and Malcata) at different vegetative stages.

Aerial parts of wild plants and micropropagated shoots were subjected to an aqueous extraction by Clevenger apparatus. The aqueous phase was freeze-dried and the solid extracts were analyzed in terms of sugar composition, total phenolic content and antioxidant activity.

The acid hydrolysis followed by HPLC analysis of the solid extract of micropropagated shoots and wild plants revealed that rhamnose, arabinose, xylose, mannose, galactose, glucose and uronic acids are the main reducing sugar constituents. Glucose and uronic acids are present in higher amounts, being glucose predominant in the wild plants extracts, independently of the location and vegetative stage (162-213 mg/g d.m.), while uronic acids predominated in the micropropagated shoots (131-135 mg/g d.m.).

The total phenolic content (TPC) was quantified by Ribéreau-Gayon method (1970). The micropropagated shoots presented lower TPC values (159.5 mg gallic acid eq. /g d.m.) than wild plants (341.4 mg gallic acid eq./g d.m). Still, all extracts have shown high levels of phenolic compounds.

The antioxidant activity was determined by the radical scavenging activity method using DPPH radical and also evaluated by FRAP (Ferric Reducing Antioxidant Power). The extracts showed a good antioxidant activity. However, there was no significant difference between the micropropagated shoots and wild plants (925 and 942 mMTrolox/100g d.m. respectively), even though the dissimilar chemical composition observed in terms of TPC and reducing sugar composition.

The results foresee a high potential for the utilization of this species or its extracts as a new source of safe natural antioxidants and preservatives for the food industry with consequent health benefits for consumers. Furthermore, the aqueous extracts from the micropropagated shoots showed a similar antioxidant activity potential to that of the wild plants, which may allow the preservation of wild plants and consequently the natural ecosystems.