

P 13 Reducing and antioxidant properties of aqueous extracts of manna from *Fraxinus ornus* (Oleaceae)

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Manna is the product obtained by the solidification of the sap coming out during the summer season, from incisions made on the stem and the main branches of some species of the genus *Fraxinus* L. In addition to the traditional use as mild laxative for the high content of mannitol, manna is utilized in dermatological creams for its soothing and anti-aging effects, as well as in syrups as fluidizing and an expectorant and cough suppressant. Its consumption is also recommended to adjust the intestinal and hepatic functionality. Although health benefits of manna are claimed, there is little or no scientific study that has addressed a systematic investigation on the biological potential of the product. We investigated reducing properties of aqueous extracts from manna of *Fraxinus ornus* from Castelbuono (Palermo) cultivars. When measured in comparison with Trolox, an hydrophilic analog of vitamin E, the methanolic manna extracts showed a marked antioxidant activity (6.35 mM Trolox equivalents/g) by ABTS radical cation decolorization assay, while appeared to reduce the perferryl-myoglobin (Mb) radical, generated from reaction of Met-Mb with hydrogen peroxide, with a rate 10-fold faster (15 mM sec⁻¹/g). Total phenols measured by Folin assay, were 0.75 mg gallic acid equivalents/g manna. Finally protective effects of the extract in an inflammatory cell model consisting of a human intestinal epithelial cell line (Caco-2 cells) stimulated by interleukin (IL)-1b, was also investigated. We demonstrated that methanolic manna extracts dose-dependently reduced the cytokines-induced intracellular reactive oxygen species generation (IC₅₀=3mg solid sap). Thus, our work is the first study showing elevated antioxidant properties and protective effects in oxidative-stress biological models of manna from *Fraxinus ornus*.

P 14 Regulating the functional component contents and antioxidant activity of tea leaves by fertilizing with N, P, Se, and Zn

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Fertilizing strategies (with exogenous N: 0.42 g/m², P: 0.21 g/m², Se: 0.83 mg/m² and Zn: 0.03 g/m²) were explored to regulate selected element (Se, Zn, Mn, and Al) and functional component (polyphenol, catechins, free amino acid, polysaccharide and caffeine) contents of new (a bud and two leaves, grown for about 10 days) and old tea leaves (grown for >3 months; Fuding White tea, *Camellia sinensis*) planted in a hilly red soil region of China. Using four different fertilizing strategies (A, Se + Zn; B, Se + Zn + N; C, Se + Zn + P; D, Se + Zn + N + P) for 6 and 12 months, the Al and Mn contents of tea leaves in both new and old leaves were significantly decreased. Meanwhile, the contents of Se and Zn were increased, and the contents of some functional components and the antioxidant activities in tea leaves were improved. In particular, fertilizing strategy C showed the highest Se (0.44 µg/kg), total polyphenol (28.29%), catechins (131.85 mg/g) contents and antioxidant activities (DPPH, 95.06%; FRAP, 3.81 mmol FeSO₄/g; reducing power, 1.26) as well as the lowest Al (222.01 mg/kg) content among these four strategies, whereas fertilizing strategy B showed the highest Zn (34.24 mg/kg), total free amino acid (5.60%), tea polysaccharide (5.79%) and caffeine (56.68 mg/g) contents as well as the lowest Mn content (747.66 mg/kg). It was proven that exogenous elements (N, P, Se and Zn) as fertilizers for 6 and 12 months could produce tea leaves with higher Se, Zn, functional component contents and antioxidant activity as well as lower Al and Mn contents in a red soil region. Longer fertilizing time showed better functional effects. The result could help reducing the potential harm of tea leaves planted in red soil and was benefit to human health.