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B R I E F C O M M U N I C A T I O N S

α-TOCOPHEROL FROM ITALIAN HAZELNUT GERMPLASM

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Corylus avellana L. (Betulaceae) is produced mainly in Turkey, Italy, USA, Spain, and Australia (550000, 110000, 25000, 18000, and 50 tonnes, respectively per year) [1]. Italy is the second world leader in hazelnut production. Therefore, hazelnuts have great economic value and, due to their organoleptic characteristics, constitute one of the most important raw materials for the chocolate and cosmetic industry [2]. Hazelnuts are rich in vitamin E, and the most bioactive antioxidant of hazelnut is α-tocopherol. Hazelnuts are very important because they can be used to prevent several diseases caused by oxidative damage. The following hazelnut local genotypes are cultivated in Sardinia, Italy: Coccoredda, Sarda schiacciata, Suconcale, Moro, Moro seme, Sarda tardiva and Sarda grossa. They differ from each other in morphological and genetic traits (unpublished data). The objective of this investigation is to authenticate seven local hazelnut genotypes within the realm of the α-tocopherol fraction of the lipids present in the nut, which can provide an innovative contribution to the agro-industry chain from the orchard to nutraceuticals. So far, there have been no reports on the above said genotypes of *Corylus avellana*.

Hazelnuts were harvested from Sardinia orchards, Italy in two different months (September and December 2004) from Coccoredda, Sarda schiacciata, Suconcale, Moro, Moro seme, Sarda tardiva, and Sarda grossa genotypes. Three representative samples were collected from each genotype and stored at +4°C until use. Nuts of each cultivar (100 g) were removed randomly from refrigerator stored shelled hazelnuts. The separated nuts were frozen in liquid nitrogen and milled to a fine powder by a Waring blender unit for 40 s. Then the fine nut powder samples were dehydrated on lyophilizer (Edwards Pirani 501) shelves to –60°C for two days. The α-tocopherol extraction was performed using accelerated solvent extraction (ASE) 100 (Dionex) according to Sivakumar et al. [3]. The α-tocopherol was quantified by HPLC according to method of Sivakumar et al. [3] and Sivakumar and Bacchetta [4].

To separate the α-tocopherol fraction, the lyophilized hazelnut powder were mixed homogenously with a Hydromatrix in the extraction cell. After placing the cell in the ASE, the selected assay conditions were applied [3]. Figure 1 shows the contents of α-tocopherol (μg/g d.w) in the hazelnut samples. Moro seme nuts extracted in December showed the highest α-tocopherol value (88.29 μg/g d.w), whereas nuts extracted in September (75.37) recorded the lowest. The December α-tocopherol contents of Coccoredda, Moro, Sarda tardiva, Sarda schiacciata, Sarda grossa, and Suconcale nuts (37.71, 61.29, 65.81, 66.0, 67.88 and 77.61 respectively) were less compared to Moro seme but higher than in September. The α-tocopherol of these two months was positively correlated, and there was a clear differentiation into seven genotypes. With respect to different developmental stages, there was a tendency for the α-tocopherol content accumulation to vary. Shigeoka et al. [5] reported the occurrence of α-tocopherol in dark-adapted cells and the light-dependent increase of α-tocopherol in bleached cells which lack chloroplasts. It could be a reason for the higher lipid depositing compartments in nuts of Moro seme containing relatively high accumulations of α-tocopherol in December.

In conclusion, Moro seme nuts extracted in December contained higher amount of α-tocopherol than other genotypes. The higher α-tocopherol accumulation genotype could be the naturally enriched bioactive vitamin E for nutraceuticals. Thus, a higher natural vitamin E content can be achieved by the appropriate selection of hazelnut germplasm for the Sardinia local confectionery and cosmetic industries.

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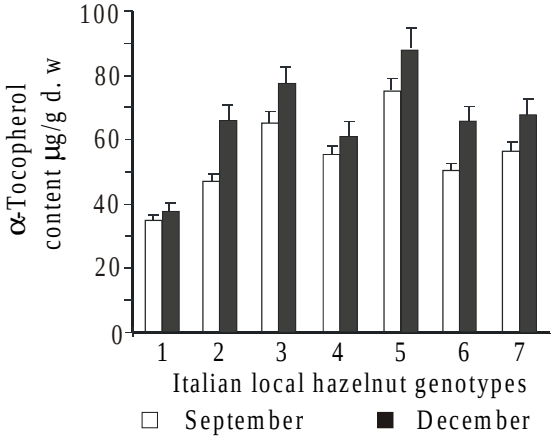

Fig. 1. α-Tocopherol content from Italian local hazelnut genotypes: 1 – Coccoredda, 2 – Sarda schiacciata, 3 – Suconcale, 4 – Moro, 5 – Moro seme, 6 – Sarda tardiva, 7 – Sarda grossa.

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