FATTY ACIDS COMPOSITION OF KERNEL OIL FROM SIX DIFFERENT HAZEL (*CORYLUS AVELLANA* L.) POPULATIONS IN ITALY

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Hazelnut kernels are rich in fats, proteins, and vitamins and play a relevant role in the agricultural market, mainly because of their use to provide flavor in dairy, bakery, candy, confectionery, and chocolate products. Hazelnut have functional properties due to their content in fatty acids and phenolic compounds that could positively affect human health. Italian hazelnut production is 85,232 10^3kg year^{-1} for in-shell product (1). Particularly, Campania, Lazio, Piemonte, and Sicilia account for 98% of the national production. About 90% of the world crop is sold as kernels and processed in the food industry (i.e. chocolates, bakery, dairy), and the remaining 10% is sold as in-shell product and consumed fresh, blanched, or roasted (2). The food industry requires uniform high-quality nuts and precise morphological, chemical, and physical kernel characteristics, as well as absence of defects (3,4).

In this study, the fatty acid content of kernel is investigated in six hazel populations from different sites of Italy. The 3 sites of Northern Italy are: Natural Reserve Bosco Siro Negri (BN - Lombardy, natural broadleaved Oak forest of Ticino alluvial plain), Lequio (L - Piedmont, hazel plantation, 650 m a.s.l., Langhe hills) and Alba (A - Piedmont, hazel plantation, 250 m a.s.l., Tanaro alluvial plain). In site BN wild type *Corylus avellana* is present while in sites L and A the hazel cultivar is 'Tonda Gentile Trilobata' (previously 'Tonda Gentile delle Langhe'). The 3 sites in Central Italy (Lazio, Tuscia hills) are: Nepi (N1 – hazel plantation with surface drip irrigation, 250 m a.s.l.), Nepi (N2 – hazel plantation with sub-surface drip irrigation, 250 m a.s.l.), Capranica (C unmanaged hazel cultivation, 350 m a.s.l.). The hazel cultivar 'Tonda Gentile Romana' is grown in sites N1, N2 and C.

In each site fully ripe hazelnuts were collected. Crude oil was obtained from finely chopped nuts, using the Soxtherm automatic extraction instrument (Gerhardt Analytical system, Germany).

The fatty acid composition of hazelnut oil samples was determined from total lipid extracts as methyl esters (FAMEs) by gas chromatography (GC) coupled to mass spectrophotometry, according to methods described in regulation of EEC 2568/91 (5-6). The GC reference standard FAME mix GLC-10 was used to identify and quantify the FAMEs.

Three extracts have been prepared from each site sample and 2 injections for each extract were performed. Kruskal-Wallis Analysis was used to test the significance of the differences among concentrations and Tukey's HSD to perform post-hoc pairwise tests. The results are reported in Tab. 1.

	N1	N2	C	BN	L	A		N-C	BN	L-A
Palmitic Acid PA	7.5	5.9	6.6	9.4	5.9	7.0		6.6	9.4	6.2
Linoleic Acid LA	4.5	4.7	5.4	16.4	3.6	3.7		4.7	16.4	3.6
Oleic Acid OA	81.3	68.2	68.0	126.1	70.3	71.5		68.3	126.1	70.8
Stearic Acid SA	2.3	2.1	2.0	2.4	2.6	2.9		2.1	2.4	2.6
Total Fatty Ac. TFA	96.6	81.1	81.3	159.1	83.6	85.2		82.9	159.1	83.8

Tab. 1 - Content of fatty acids (mg g^{-1}) in the 6 populations (see text) and in the 3 varieties of Hazel (N-C: 'Tonda Gentile Romana', BN: wild type. L-A: 'Tonda Gentile Trilobata')

The median concentrations of PA, LA, OA and TFA are always significantly different among BN and all the other populations and among BN and the two cultivars (N-C, L-A). The results of the analysis agree with the literature data about the content of fatty acids in hazelnut oil of hazel cultivars (4) but wild type hazel form Natural Reserve Bosco Siro Negri proves to have the highest fatty acid content.

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