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Isotopes Used in Comparing Indigenous and International Walnut (Juglans regia L.) Varieties

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Abstract : Walnut production is high in Romania, different varieties being cultivated dependent on high yield, disease resistance or quality of produce. Walnuts have a highly nutritional composition, the kernels containing essential fatty acids, where the unsaturated fraction is higher than in other types of nuts, quinones, tannins, minerals. Walnut consumption can lower the cholesterol, improve the arterial function and reduce inflammation. The purpose of this study is to determine and compare the composition of walnuts of indigenous and international varieties all grown in Romania, in order to identify high-quality indigenous varieties. Oil has been extracted from the nuts of 34 varieties, the fatty acids composition and IV (iodine value) being afterwards measured by NMR. Furthermore, δ13C of the extracted oil had been measured by IRMS to find specific isotopic fingerprints that can be used in authenticating the varieties. Chemometrics had been applied to the data in order to identify similarities and differences between the varieties. The total saturated fatty acids content (SFA) varied between n.d. and 23% molar, oleic acid between 17 and 35%, linoleic acid between 38 and 59%, linolenic acid between 8 and 14%, corresponding to iodine values (IV - total amount of unsaturation) ranging from 100 to 135. The varieties separated in four groups according to the fatty acids composition, each group containing an international variety, making possible the classification of the indigenous ones. At both ends of the unsaturation spectrum, international varieties had been found.

Keywords : δ13C-IRMS, fatty acids composition, 1H-NMR, walnut varieties
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