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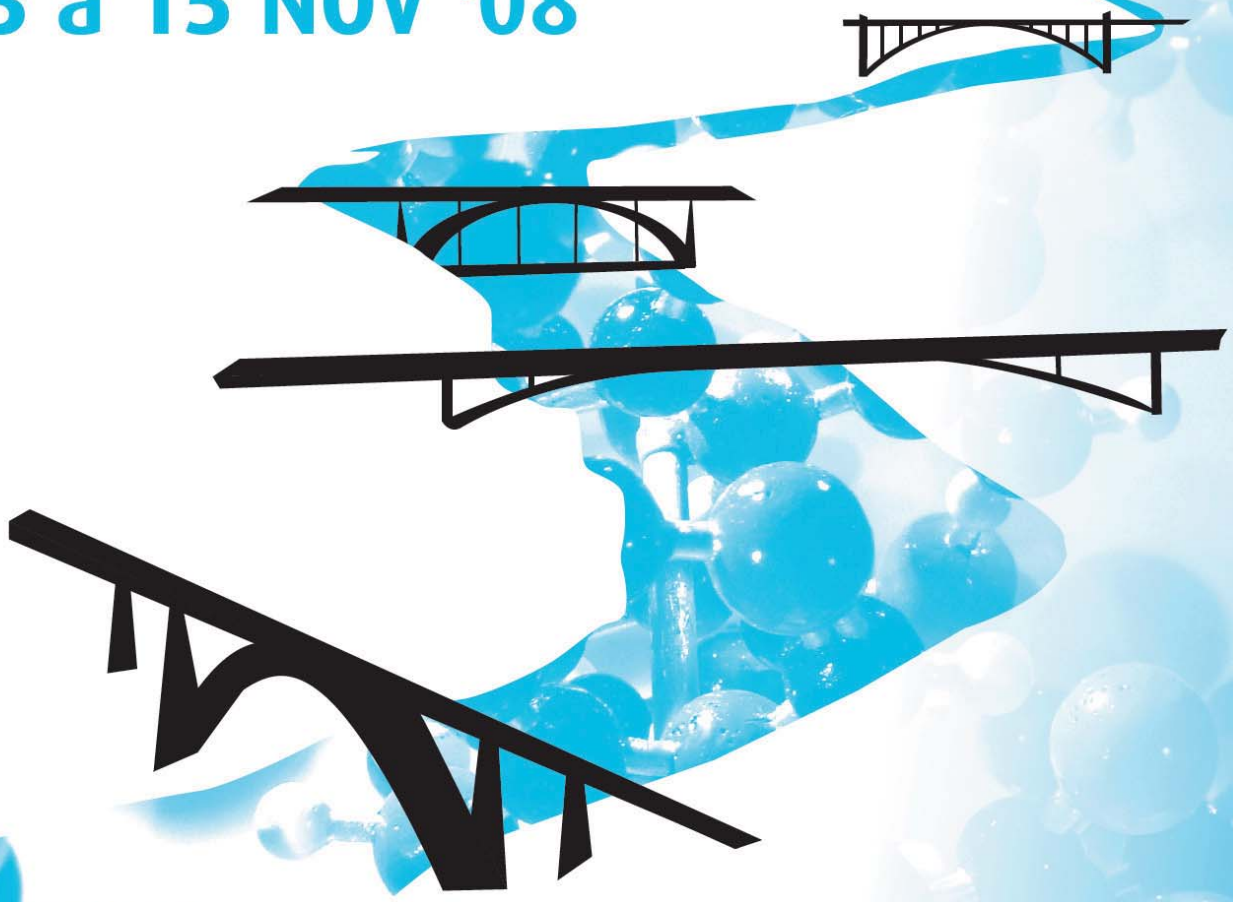

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WALNUT AS A POTENTIAL NATURAL ANTICHOLESTEROLAEMIC AND A SOURCE OF ANTIOXIDANT COMPOUNDS

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Abstract

The frequent nut intake has been associated with lower rates of cardiovascular diseases in several large cohorts observational studies and with a consistent hypocholesterolaemic effect in numerous controlled short-term nut feeding trials [1]. The reduction of total and low-density lipoprotein (LDL) cholesterol observed in those studies, has been attributed both to the high contents of monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids in the diet supplemented with nuts, as well as with the presence of several bioactive compounds in this food [1]. Although walnuts are rich in fat, its fatty acid composition is considered to be healthy due to the predominance of PUFA, presenting one of the highest α-linolenic acid content among the whole food edible plants. It has been suggested that MUFA and ω-3 PUFA consumption are related to total and LDL cholesterol decrease, possibly due to the enhancement of receptordependent hepatic clearance of LDL [1]. Besides, anti-thrombotic, anti-inflammatory and antiarrythmic effects have also been ascribed to ω-3 PUFA intake. Additionally to its fatty acid profile, the presence of other beneficial compounds such as phytosterols and vitamin E isomers (tocopherols and tocotrienols) have also been described in walnuts. Phytosterols, due to their structural similarity with cholesterol, can inhibit its intestinal absorption, thereby lowering total plasma cholesterol and LDL levels [2]. Vitamin E isomers are believed to be involved in a diversity of biochemical functions, mainly due to their action as antioxidants but also by acting as membrane stabilizers [3].

This work aimed to evaluate fatty acid, phytosterol, tocopherol and tocotrienol compositions of different walnut cultivars, including 2 Portuguese, 1 North-American and 6 French cultivars, all collected from the same agricultural field. Fatty acid and phytosterols were analyzed by GC/FID and vitamin E isomers were quantified by NP-HPLC/DAD/FL [3,4]. As expected, the samples presented a high PUFA content (69,0 to 74,8%) and a low SFA content (9,0 to 10,7%). In general, the Portuguese cultivars, Arco and Rego, presented a higher α-linolenic content compared to the remaining cultivars. Total phytosterols content ranged from 131,0 to 178,6 mg/100 g of oil. The highest phytosterol content was found for the Portuguese cultivars, Arco and Rego, which presented 158,0 and 178,8 mg/100 g of oil, respectively. In all samples five vitamin E isomers (α, β, γ, and δ- tocopherols and γ-tocotrienol) were identified, with α-tocopherol being the major compound, followed by α- and δ-tocopherols. Total Vitamin E content ranged from 194,0 to 285,6 mg/kg of walnut, with the French *cv.* Mayette and the Portuguese *cv.* Rego presenting the highest contents.

These results highlight walnut as an important source of potential beneficial compounds which can partially explain the hypocholesterolaemic effect found in several clinical studies.

References

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