

BOOK OF ABSTRACTS

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Nutritional value and fatty acid profile from acorns (*Quercus nigra*): intending new alternative applications

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The development of rural areas depends on sustainability policies to promote agricultural and production systems, in order to increase those populations' income. To attain this purpose, it is important to find new opportunities to valorize the available, but still underexploited, natural resources [1]. Therefore, the aim of this study was to compare the nutritional profile of kernel, shell and the whole fruit of *Quercus nigra*, a Portuguese autochthonous acorn species, intending new alternative applications (functional foods).

Nutritional parameters (ash, fat, protein and moisture) were measured according to AOAC methods [2]. Total carbohydrates were calculated by difference. The fatty acid profile was also evaluated by GC/FID [3].

It was verified that acorn presents a high content of carbohydrates (> 90%) and lower fat and protein contents (< 3% and < 6%, respectively). Some compositional differences were observed in the different parts of the fruit (kernel and shell). Acorn kernel presented the highest values of moisture (43%), ash (1.4%), protein (5.1%) and fat contents (2.5%). The carbohydrate/starch fraction constitutes 91.9% of the kernel. The shell (it by-product) proved to be a good source of carbohydrates/fibre (94.5%), with lower fat and protein contents (0.8% and 3.8%, respectively).

From a nutritional point of view, the results indicate that acorns can be used as a source of dietary energy, starch and fibre, proving to be an attractive low cost food. Moreover, acorns kernel provide essential fatty acids (table 1).

Table 1. Fatty acid profile (relative percentage).

	Whole fruit	Kernel	Shell
Total SFA	18.53	17.89	25.06
Total MUFA	51.92	49.98	54.32
Total PUFA	29.28	32.23	18.86
Total n-3 PUFA	0.55	0.55	0.26
Total n-6 PUFA	28.68	31.61	18.60
n-3/n-6	0.02	0.02	0.01

Acorn flour can be an interesting substitute of wheat flour in bread production, answering to innovation purposes and traditional products valorisation. The edible fruit and its waste (shell) could also be considered added-value ingredients for other purposes, including gluten-free formulations. Further studies are being conducted in order to better characterize these matrices regarding their chemical composition, as well as further potential applications in different industries.

References:

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[3] Alves, R.C., Casal, S. and Oliveira, M.B.P.P. (2009), Determination of vitamin E in coffee beans by HPLC using a macro-extraction method, *Food Science and Technology International*, 15 (1), 57-63.