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P.35 SELECTED NUTRIENTS IN PORTUGUESE WILD MUSHROOMS ANALYSED BY GAS CHROMATOGRAPHY AND HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Wild edible mushrooms have been used as food and food flavouring material in soups and sauces for centuries, due to their unique and delicate flavour and they have also been traditionally eaten seasonally by specific groups of people (local people, enthusiasts and gourmets) providing a source of minerals and vitamins when fresh vegetables were not available. Wild edible mushrooms are rich in trace minerals, and have high water, protein, fibre, and carbohydrate contents, and low fat/energy levels making them an excellent food for use in low caloric diets¹. Our research group has been interested in the nutritional characterization of wild mushrooms, and in the last years we studied sixteen different mushroom species from the Northeast of Portugal, one of the European regions with higher wild mushrooms diversity^{2,3}. Nevertheless, we intend to go on in the study of this biological matrix, documenting the nutritional composition of all these unique species, and making the information available for a better management and conservation of this natural resource and related habitats.

In this work, we report the chemical composition of ten different Portuguese wild mushrooms, with reference to the contents of moisture, proteins, fat, carbohydrate and ash. On the basis of the samples composition, an estimation of the mushrooms nutritional role was also performed. Among the individual components, fatty acid and sugar profiles were obtained by gas chromatography coupled to a flame ionization detector (GC/FID) and high performance liquid chromatography coupled to a refraction index detector (HPLC/RID), respectively, the latter methodology being then completely validated. The fatty acid profile was analyzed, after a transesterification procedure, with a DANI model GC 1000 instrument equipped with a split/splitless injector, a flame ionization detector (FID) and a Macherey-Nagel column (30m x 0.32mm ID x 0.25µm df)⁴. The oven temperature program was as follows: the initial temperature of the column was 50°C, held for 2min, then a 10°C/min ramp to 240°C and held for 11min. The carrier gas (hydrogen) flow-rate was 4.0mL/min (0.61 bar), measured at 50°C. Split injection (1:40) was carried out at 250°C. For sugars analysis, it was used a solid-liquid extraction procedure and the chromatographic separation was achieved with a Eurospher 100-5 NH₂ column (4.6mm x 250mm, 5mm, Knauer) operating at 35°C (7971R Grace oven), using a Knauer Smartline HPLC equipment with RI detector⁴. The mobile phase used was acetonitrile/deionized water, 7:3 (v/v) at a flow rate of 1mL/min, and the injection volume was 20µl.

The macronutrient profile in general revealed that the wild mushrooms were rich sources of protein (24.32 to 76.63g/100g) and carbohydrates (10.35 to 55.48g/100g), and had low amounts of fat (0.36 to 2.63g/100g). The highest energetic contribution was guaranteed by *Hygrophoropsis aurantiaca*, while *Hypholoma capnoides* gave the lowest energy contribution.

The analysis of fatty acid composition allowed the quantification of twenty five fatty acids. Unsaturated fatty acids and, in particular, oleic (C18:1) and linoleic (C18:2) acids, were predominant (17-61% and 20-54%, respectively). Both linoleic and oleic acids have been related to decreased risk of cardiovascular disease, contributing to the recommendation of mushrooms in the diets of people with high blood cholesterol⁵. Furthermore, linoleic acid is the precursor of 1-octen-3-ol, known as the alcohol of fungi, which is the principal aromatic compound in most fungi and might contribute to mushrooms flavour⁶.

In the analysis of free sugars, all the compounds were separated in a period of time of 10min; the method used proved to be precise (CV% ranged between 0.82 and 1.47), reproducible (CV% ranged from 1.02 to 2.09) and accurate (recovery %) between 91.04% and 92.11%). Arabinose (1.53 to 7.66g/100g), mannitol (0.38 to 18.41g/100g) and trehalose (0.21 to 18.66g/100g) were the most abundant sugars.

Overall, the rich nutritional composition (high contents in protein and carbohydrates, low contents in fat with the precious contribution of unsaturated fatty acids, and absence of trans fatty acids) makes wild mushrooms very special. This study contributes to the documentation of the nutritional composition of wild mushrooms, which are highly consumed and appreciated, but most of the times without a scientific base of support.

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