 DOI: https://doi.org/10.15414/2021.9788055224015

WALNUT KERNELS PELLICLE (*JUGLANS REGIA* L.) – A GOOD SOURCE OF GALLIC, ELLAGIC ACIDS, CATECHIN AND THEIR DERIVATIVES FOR FUNCTIONAL FOODS

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The pellicles, which cover the walnut kernels, protect the lipids from the kernel's endosperm against the oxidative degradation. In previous studies, we showed that for the formation of the bad brown colour and bitter taste of walnut kernels, the oxidized polyphenols (naphthoquinones) are responsible. It is necessary to mention that the ratio between the average content of total polyphenols in pellicles and in kernels can reach 12.7, and this excellently correlated with mass fraction of pellicle in the kernels (10–11 %). The majority (more than 90 %) of phenolic compounds are concentrated in the pellicle.

The purpose of this research was to found the optimal extraction's conditions of phenolic compounds from kernel pellicles and to evaluate the antioxidant capacity of these. The yield of extractive components was determined in function of the concentration of food-grade ethanol as solvent, temperature of extraction and previous defatting procedure. Defatting was realized by hydraulic pressing at 20MPa. Results showed that the maximum amounts of phenolic compounds were extracted with 50 % aqueous ethanol at 22–24 °C from the pellicles, obtained from native not-defatted kernels. The total polyphenol content in extract from defatted kernels was of 1.2–1.4 times higher than from the native kernels. But we observed, that the contamination of kernel's pellicle with the lipids, extracted from endosperm during pressing, make much more difficult extraction of phenolic compounds from the pellicle with aqueous ethanol solutions. The optimization of extraction conditions gives the opportunity to obtain the extracts with total phenolic content increased by 1.5–2.0 times. Due to a rich phenolic content, in dry residue consisted approximately 55–60 %, these extracts exhibited pronounced biological activity. HPLC analysis of polyphenols was performed at "Shimadzu LC-2030C 3D-Plus" with PDA detector, by gradient elution with water: acetic acid (polar phase A) and acetonitrile: acetic acid (non-polar phase B), using reversed-phased **C_{18}** column "Phenomenex" (150mm*4.6mm*5µm*80nm). HPLC show the presence in extracts of a high quantitates of biologically active compounds: gallic acid and its derivatives, ellagic acid, casuarictin, catechin, epicatechin and partially identified derivatives of rutin. Antioxidative activities of the extracts, obtained from kernel's pellicle, were determined *in vitro* by evaluation of peroxyl radical scavenging capacity. Antioxidant activities were calculated in gallic acid equivalent (GAE) in mM per gram of the dry residue. Antioxidant activities varied from 2.10 to 3.17 mM GAE/g, in function of harvesting year and defatting pre-treatment.

To conclude, the pellicle of walnut kernels is a valuable source of the biologic active phenolic compounds with antioxidative properties, which could be used for development of the food compositions with functional properties. Notable fact: extraction of phenolic compounds from the pellicle prevent a kernel's browning and bittering. Use of so-called dephenolised walnuts seems to be a promisingly way for the development of smart food technologies.

Keywords: antioxidant activity, functional foods, gradient elution, HPLC, kernel's pellicle, polyphenols.

Acknowledgments:
We express our gratitude to the "*Erasmus Plus*" University Staff Mobilities, funded by the European Union, and to the Postdoctoral Project 20.00208.1908.02, founded by the Government of Moldova.