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Trend in grain-based foods

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Trends in grain-based foods

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1° Trends in grain-based foods

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Poster Communication

VALORIZATION OF APPLE BY-PRODUCTS INTO FLOUR: NUTRITIONAL AND CHEMICAL CHARACTERIZATION AND EVALUATION OF BIOACTIVE PROPERTIES

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The study of fruit and vegetable by-products has aroused great interest, not only in the agri-food industry, for sustainability and economic reasons, but also among the scientific community, which has been highlighting these underutilized and cheap materials as renewable sources of bioactive molecules, including phenolic compounds [1]. In this perspective, the present work aimed to characterize the nutritional and chemical composition of apple by-product flour, as well as to evaluate its bioactive properties in order to assess its potential application in the food industry. The centesimal composition (protein, ash, fat, and carbohydrate contents and energy value) was evaluated following official methodologies (AOAC) and the chemical profile (free sugars and fatty acids) was determined by different chromatographic techniques. The antioxidant activity was evaluated through two *in vitro* assays: the thiobarbituric acid reactive substances (TBARS) formation inhibition assay and the oxidative hemolysis inhibition assay (OxHLIA). The cytotoxic activity was tested in tumor and non-tumor cell lines by the sulforhodamine B method, and the anti-inflammatory potential was evaluated *via* NO production inhibition by lipopolysaccharide-activated RAW 264.7 macrophages. Finally, the antimicrobial capacity against sixteen strains of Gram-negative and Gram positive bacteria and against two fungal strains was evaluated through a microdilution method. The characterized apple by-product contained 84.2 ± 0.1 g/100 g of water. In terms of dry weight, carbohydrates (14.22 ± 0.05 g/100 g) were the macronutrients presented in higher amounts, followed by ash (1.34 ± 0.05 g/100 g). The fat concentration was considerably low. Regarding the sugar profile, two monosaccharides (glucose and fructose) and one disaccharide (sucrose) were detected in the flour sample, and fructose was the main one. Considering the fatty acid profile, fourteen compounds were identified, with oleic (C18:1n9), linoleic (C18:2n6) and palmitic (C16:0) acids in the highest percentage ($38.8 \pm 0.1\%$, $27 \pm 1\%$ and $19 \pm 1\%$, respectively). Regarding the bioactive potential, the apple by-product flour, despite showing cytotoxic potential for only one of the tested cell lines, revealed favorable antioxidant and antimicrobial activities. Based on the results obtained, it can be concluded that apple by-product flour has potential for application in the food industry, namely as an alternative ingredient for food products for celiac people. The valorization of this by-product also contributes to the circular economy and environmental issues.

References

[1] Lima, P.C.C. et al. *Holos*, 2 (2017), 122-136.

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