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Nutritional and antioxidant characterisation of the peel of 10 species of coloured potatoes

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The use of by-products from the food agro-industry reduces production costs, increases the total use of food and reduces the impact that these by-products may cause when disposed of in the environment. In this way, some potato by-products are used and transformed into food ingredients, such as peelings. Thus, innovative measures are needed to stimulate the full reuse of these foodstuffs, since, whenever possible, the final waste should become raw material for a new process, constituting a second transformation, leading to the reuse of all the raw materials of the potato industry. In this sense, the aim of this work was to carry out a study aimed at peeling ten potato species to which the nutritional parameters were carried out. The samples were from different countries, grown in Greece and obtained under optimal consumption conditions. A total nutritional characterization of the twenty-nine potato peels was performed, as well as of the individual organic acids and soluble sugars. The antioxidant activity was carried out using the thiobarbituric acid reactive substances (TBARS) assay. According to the results obtained, the sample Peru Blue (1.57 ± 0.05 g/100g) obtained the highest value for crude fat, followed by Blaue Hindelbank (1.12 ± 0.13 g/100g); while the sample Blaue Hermans Blaue presented the lowest value (0.33 ± 0.01 g/100g). For protein, Fleuer Bleue (9.5 ± 0.2 g/100g), Blaue Hindelbank (8.9 ± 0.1 g/100g), Pink of Bolivia (9.3 ± 0.5 g/100g), Purple from Congo or Congo (8.9 ± 0.6 g/100g) and Blue from Peru (9.1 ± 0.3 g/100g) were not significantly different from each other and showed the lowest value, while Highland Burgundy Red (12.6 ± 0.1 g/100g) showed the highest value. The ash content showed statistical differences among the results, with the highest content found in Pink of Bolivia (8.0 ± 0.2 g/100g) and the lowest for Fleuer Bleue (1.3 ± 0.1 g/100g). In terms of energy there was also a difference between the results with lower values for Pink of Bolivia (373 ± 1 Kcal) and Purple from Congo (375.8 ± 0.4 Kcal) and higher for Fleuer Bleue (398 ± 1 Kcal). Two soluble sugars were identified and quantified, namely fructose and glucose. For fructose the values were highest for Fleuer Bleue (3.29 ± 0.11 g/100g) and lowest for Highland Burgundy Red (0.04 ± 0.02 g/100g), also, glucose showed lower values compared to fructose, the lowest content being quantified for Purple Fiesta (0.516 ± 0.052 g/100g) and the highest for Blue from Peru (1.07 ± 0.07 g/100g). Three organic acids were quantified, namely oxalic, malic and citric acids. Oxalic acid was highest for Hermans Blaue (2.394 ± 0.015 g/100g) and lowest for Purple Fiesta (0.91 ± 0.02 g/100g). Malic content was found highest for Purple Fiesta (3.12 ± 0.017 g/100g) and lowest for Purple from Congo or Congo (0.213 ± 0.003 g/100g DW). For citric acid, two potato samples showed higher values, namely Purple Fiesta (2.8 ± 0.2 g/100g) and Blaue Hindelbank (2.9 ± 0.1 g/100g) and two other potato samples showed lower values, namely Highland Red Fiesta (1.53 ± 0.03 g/100g) and Blaue Hermans (1.57 ± 0.01 g/100g). The antioxidant activity carried out using TBARS showed similar values for five of the 10 potatoes analysed, Highland Burgundy Red (343.4 ± 8.7 µg/mL), Violet Queen (328.4 ± 11.9 µg/mL), Purple Fiesta (305.7 ± 8.0 µg/mL), Blaue Hindelbank (366. 7 ± 12. 7 µg/mL), Pink of Bolivia (369.5 ± 12.7 µg/mL) and Blue from Peru (323.7 ± 3.5 µg/mL) showed the lowest EC50 concentrations while Blue Star (740.9 ± 33.9 µg/mL) and Fleuer Bleue (692.1 ± 13.3 µg/mL) showed the highest concentrations. This work showed that potato peel has an interesting nutritional profile and can be used to enrich other foods. Furthermore, future work will be carried out on antimicrobial activities, and cytotoxicity.

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