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**ANTIOXIDANT AND ANTIHEMOLYTIC ACTIVITY OF PUMPKIN BY-PRODUCTS:
A CONTRIBUTION TOWARDS RESOURCE-USE EFFICIENCY**

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The current need to obtain nutritious and healthy foods from alternative and more sustainable sources and to reduce waste in the agri-food sector has led to a great interest in the valorisation of plant parts currently treated as by-product, but which have nutritional value and food-grade potential for inclusion in the human diet. The pumpkin processing industry is a good example because it generates a large amount of biowaste in the form of seeds and peels [1], which can be recycled inside the food chain as bioactive or functional ingredients, since these matrices contain significant amounts of carotenoids, protein, fibre, and tocopherols, among other antioxidants [2]. This study aimed to measure the antioxidant activity of pumpkin by-products, in order to assess their potential for use in novel food formulations. Pumpkin seeds and peels provided by local producers in the northeast of Portugal were lyophilized, ground to a fine powder, and submitted to a solid-liquid extraction using an hydroethanolic mixture as solvent [3]. The obtained liquid extracts were lyophilized, redissolved in distilled water, and successively diluted to different concentrations to evaluate the antioxidant activity. The thiobarbituric acid reactive substances (TBARS) formation inhibition and the oxidative haemolysis inhibition assays were performed *in vitro* using porcine brain cell homogenates and sheep red blood cells as oxidizable biological substrates, respectively [3]. A Student's *t*-test was applied to assess the existence of statistical differences between both samples. Based on the results obtained with the performed cell-based assays, it was possible to conclude that both seed and peel extracts display antioxidant effects. The seed extract was more effective in inhibiting the formation of TBARS, such as the highly reactive malondialdehyde, which results from the peroxidation of polyunsaturated fatty acids that constitute the porcine brain cell membranes. In turn, the peel extract had a better performance in protecting the red blood cells from the haemolytic action of free radicals initially generated in the system by the oxidant 2,2'-azobis (2-methylpropionamide) dihydrochloride, which is thermally activated during incubation at 37 °C. Overall, these results demonstrate that the preservation and/or functionalization of food products could be achieved with the addition of bio-based antioxidant ingredients resulting from pumpkin by-products.

References

- [1] X. Rico, B. Gullón, J.L. Alonso, R. Yáñez, *Food Research International*, 132 (2020) 109086.
- [2] M.N. Norfezah, A. Hardacre, C.S. Brennan, *Food Science and Technology International*, 17 (2011) 367.
- [3] A.L. Vara, J. Pinela, M.I. Dias, J. Petrović, A. Nogueira, M. Soković, I.C.F.R. Ferreira, L. Barros, *Foods*, 9 (2020) 1522.

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