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UNPRECEDENTED STUDY OF THE PROXIMATE AND CHEMICAL COMPOSITION OF NON-CONVENTIONAL SEEDS FOR FURTHER APPLICATION IN BAKERY PRODUCTS

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The use of unconventional food plants (PANC) has been an asset for the food industry, due to its abundance, the non-competing with other vegetable matrices used for human consumption, and their nutritional properties, chemical and bioactive potentiality [1,2]. The present work aimed to study the flour of three PANC seeds, namely *Guizotia abyssinica* (Lf, niger) Cass., *Panicum miliaceum* L. (millet) and *Phalaris canariensis* L. (birdseed), starting with the study of its granulometry and water absorption index. Furthermore, the nutritional value (AOAC methods), free sugars (HPLC-RI), fatty acids (GC-FID), organic acids (UPLC-DAD), tocopherols (HPLC - fluorescence) and phenolic compounds (HPLC-DAD / ESI (MS) composition as also assessed, followed by the antioxidant, hepatotoxic and antimicrobial potential of the hydroethanolic extracts. Finally, bread samples were prepared with partial replacement of the wheat flour (20% of the PANC's flour), and a centroid simplex statistical method was applied to understand the effect of applying PANC flours on the final physical-chemical characteristics of the breads obtained. The flour of the three seeds presented high granulometry, associated with high water absorption index (indicating that their use would have to be complemented with other flours for bakery application). Niger seed was the one that stood out the most, presenting higher contents of total fat, PUFA, sugars, tocopherols and phenolic compounds. The hydroethanolic extracts presented relatively low IC₅₀ and MIC values for inhibition of lipid peroxidation and for antimicrobial activity, respectively. The results obtained for antifungal activity of niger and millet were lower when compared with the positive controls used (E211 and E224). The samples didn't present hepatotoxicity. The partial replacement of 20% wheat flour by millet and birdseed flour allowed to obtain similar breads as the control samples in terms of texture, specific volume and color.

This study allowed to present innovative results in relation to the nutritional, chemical and bioactive properties of seeds that have been little studied and consumed, but with great potential to be applied in the food industry. Considering their composition in bioactive compounds, the use of these seeds is highly advisable in the context of a fortified diet, being sources of compounds of high nutritional value and with beneficial effects for the health of the consumer.

References

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