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1° Trends in grain-based foods

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Poster Communication

NATURAL INGREDIENTS OBTAINED FROM *BRASSICA OLERACEA* L. WASTE

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There is a clear tendency to incorporate natural-based ingredients into food formulations, namely in products from the bakery industry. These type of ingredients have been highlighted as promising alternatives to commonly used artificial ingredients and have been well accepted by consumers due to the associations with beneficial health effects [1]. Natural ingredients, acting simultaneously as preservation and functionalization agents, due to their antioxidant and antimicrobial properties, are particularly valued when obtained from plant species, namely through the use of bio-waste [2]. The aim of this work was to obtain a new bioactive ingredient with functional properties, extracted from *B. oleracea* cultivars (cabbage) waste, to be incorporate in bakery products. For this, two extractions methods (heat assisted extraction, HAE and ultrasound assisted extraction, UAE) were tested. In each method, three independent variables, time (t), temperature or power (T; P) and solvent (S, % of ethanol) were combined in design of using response surface methodology (RSM). The content of total phenolic compounds, quantified through the Folin-Ciocalteu method, was the experimental response used in the optimization procedure. The polynomial models were successfully fitted to the experimental data and used to determine the optimal HAE and UAE conditions. The results obtained for the extraction by HAE showed that the maximum antioxidant activity was optimal by the S/L ratio (S/L = 49.1 g/L) and temperature (77 ºC), but for a short time (15.5 min) and with an ethanol percentage around 26.8 %. The temperature and time seem to be the least determining factors in this optimization, since the ratio and solvent percentage are the factors that most influence the extraction process. This way, it was possible to obtain an extract with total phenols averging of 19.82 mg/g. For UAE, the results showed that power appears to be one of the least important factors in the extraction of total phenols, with solvent percentage and S/L ratio being the most important factors. The optimal point was set at 458.4 W, and ratio S/L (38.36 g/L), but in the lower values of solvent percentage (42.2 %) and extraction time (19.9 min). At the optimal point, higher quantities of total phenols was predicted when compared to the ones achieved in the optimization runs, reaching 19.35 mg/g. In an overall, it was possible to observe that the UAE, using a small amount of solvent, presented a concentration of phenolic compounds similar to HAE, a conventional methodology. The extract rich in phenolic compounds will later have its antimicrobial and antioxidant capacity tested, in order to be incorporated into bakery products as a natural preservative. Thus being the main purpose of this work the replacement of artificial preservatives by natural agents.

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