

Abstract

Evaluating the Preservation of Bioactive Compounds in Encapsulated Powder of *Allium ursinum* †

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Abstract: Incorporating natural plant extracts as food additives offers promising benefits for improving food quality, nutrition, and safety. Therefore, the aim of this study was to develop an environmentally friendly process for obtaining solid powder from *Allium ursinum* liquid extract, which could be used as a natural food additive. The spray drying process was applied to overcome the instability and increase the solubility of bioactive compounds in *A. ursinum* extracts obtained by subcritical water extraction. The chemical and physical stability of the extracts are crucial for determining the shelf life not only of the extract itself, but also of products containing natural extracts. Therefore, it is important to determine whether the quality of the powder (its content of bioactive compounds and its physical characteristics) is affected during storage by environmental factors, such as temperature, oxygen, and relative humidity, in order to determine the best conditions for the storage of the powder. The powders obtained from aqueous *A. ursinum* extract were stored for three months, and the most important parameters were evaluated. The colour of the powders remained the same, and the powder kept loose, without sticking and forming lumps during the entire storage period. Physical analyses of the stored powders were compared with the results conducted on freshly prepared powders. No statistical changes were detected, proving that the powders remained stable regarding physical characteristics. The changes in the chemical composition, specifically total phenolics and total flavonoids, as well as the antioxidant activity, were monitored during the storage period at two-week intervals. The encapsulated powders showed excellent stability, with minimal loss of total phenolics (12.64%) and total flavonoids (10.52%) after three months of storage. Physicochemical analysis confirmed the successful preservation of bioactive compounds through microencapsulation using maltodextrin, suggesting its potential for application in new food products.

Keywords: spray drying; *Allium ursinum*; extract stability; natural additives



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