

#301: Use of food grade hops extracts for the development of innovative food additives

Santarelli VERONICA¹, Lilia NERI², Rodrigo GONZALEZ ORTEGA², Faieta MARCO², Simona TATASCIORRE², Carla DI MATTIA², Paola PITTIA²

¹University of Teramo, Teramo, Italy

²Faculty of Bioscience and Technology for Food, Agriculture and Environment, University of Teramo, Teramo, Italy

In food productions, the use of plant extracts represents a useful strategy to replace the use of additives with technological functionalities and to satisfy the consumers' demand for innovative, functional, and clean label products. In this frame hop (*Humulus Lupulus L.*), is an undervalued plant. Hop, in fact, represents a very rich source of secondary metabolites (resins, pigments, polyphenols, essential oils) with antimicrobial, antioxidant, and biological activities, however, besides brewing and herbal applications, its use in food applications is very limited. Thus, the development of hop-based additives could promote and facilitate the use of hop extracts in food formulations and products.

This study is aimed to develop powdered hops extract with functional and technological properties for food applications. To this purpose, freeze-drying was used as both desolvation and encapsulation technology, and the effect of two different carriers, i.e. maltodextrin (MD) and arabic gum (AG), on the functional properties and technological functionality of the resulting powders was tested.

Hop (cv. Herkules) extracts were obtained using preliminarily optimized solvent (50 % v/v ethanol) and process extraction conditions (ultrasounds: 100 Watt, 50 kHz; time 30 min; T: 25 °C). After ethanol removal, hop extracts were suspended in Tween 20 solution (0.02 % w/w) and freeze-dried with the addition (+12 %) of MD, AG, or MD in combination (ratio 1:1) with AG.

Hop powders were evaluated for the moisture content (Mc), water activity (aw), solubility, moisture sorption isotherms (WSI), colour and colouring power, bitter acids and total polyphenol content (TPC), and polyphenol encapsulation efficiency. The stability over time at different temperatures was also tested.

Results showed that the coating materials influenced the Mc, the aw, the colour and the colouring power of the powders while did not affect their solubility. All the powdered extracts showed sigmoidal WSI, however, those containing AG showed higher equilibrium moisture content than that formulated only with MD. The encapsulating agent differently affected the TPC, the polyphenol EE, the content of bitter acids, and the antioxidant properties after freeze-drying as well as the chemical stability of hops powder over storage.

Keywords

hops extracts, food additive, bioactives, antioxidant activity, encapsulation