Trapping of betanin in alginate microcapsules: Stability studies under accelerated conditions

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Abstract

Microcapsules including red beet extract rich in betanin was produced by ionic gelation. Sodium alginate was used as wall material. Impacts of coating amount and active material were assessed with respect to encapsulation efficiency (EE) of the capsules in terms of total phenolic content (TPC). Encapsulation of the red beet extract in alginate microbeads was satisfying with >80% under the best conditions of ionic gelation (15% calcium chloride concentration and 2% sodium alginate for 15 min of hardening time). The interaction between the active material and the alginate beads were also investigated by diffuse reflectance fourier transform (DRIFT) spectroscopy. Accelerated oxidation test was employed to measure the stability of the microcapsules against oxidation by means of Rancimat method. Stability of the produced microbeads were evaluated in terms of kinetic and thermodynamic analyzes. After the induction times were determined under different temperature conditions (110, 120, 130 and 140 ^{o}C) by Rancimat test, kinetic and thermodynamic parameters of the product were analyzed. The findings ([?]H $^{++}$>0, [?]S $^{++}$<0, and [?]G $^{++}$ >0) indicates that low entropy value is attributed to more stable microbeads with less energy (<40 kJ mol $^{-1}$).

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