PRODUCTION OF β-CAROTENE, α-CAROTENE AND LUTEIN NANOCAPSULES BY INTERFACIAL DEPOSITION OF PREFORMED POLYMERS

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Carotenoids are functional lipid substances highly important for human and animal nutrition. However, the high hydrophobicity of carotenoids prevents their solubilization in aqueous systems, making it difficult to homogenize them in a low fat food matrix. In this context, the encapsulation technique emerges as an alternative to optimize the inclusion of lipid active ingredients in foods, improving the solubility of these compounds. In the food sector, the nanotechnology works with the production and the application of particle with diameter shorter than 1000 nm (1). The objective of this study was the production of carotenoids (β-carotene, α-carotene and lutein) nanocapsules and their characterization during a 90 days period of cold storage at 4 °C. A completely randomized experimental design, with 3 replicates, was used. Analysis of variance (F test, $p \leq 0.05$) and comparison of means (Tukey test, $p \leq 0.05$) were performed to evaluate the response variables (average diameter by laser diffraction, zeta potencial by electrophoretic mobility and carotenoids content by high performance liquid chromatography). An ethanolic extract containing carotenoids (26 µg/mL) from Baltimore carrots, was the source of β-carotene, α-carotene and lutein for nanocapsules assembling by interfacial deposition of preformed polymers (2). The average diameter (176 nm ± 2 nm) of the β-carotene, α-carotene and lutein nanocapsules and their zeta potential (– 17.8 mV ± 0.45 mV) were constant during the 90 days period of storage. In contrast, the β-carotene, α-carotene and lutein content decreased during the storage: 0 day (25.96 ± 0.33 µg/mL, 12.67 ± 0.29 µg/mL and 3.29 ± 0.05 µg/mL) and 90 days (13.29 µg/mL ± 0.11, 7.22 ± 0.15 µg/mL and 1.78 ± 0.08 µg/mL), respectively. A significant amount of carotenoids (> 45 %) remained after a 90 days period of storage, therefore demonstrating the feasibility of nanoencapsulation for delivering β-carotene, α-carotene and lutein in the processed food chain.

References:

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