



## PO105 - 24968 - CHARACTERIZATION AND BIOACCESSIBILITY OF $\beta$ -CAROTENE ENCAPSULATED ON MICROCAPSULES PRODUCED WITH STARCH AND PROTEIN FROM AMARANTH GRAIN

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### Abstract

$\beta$ -carotene is a carotenoid that, due to its scavenging free radicals property, presents a wide spectrum of biological activities (e.g., anti-cancer, anti-hypertensive, and anti-inflammatory). However, they are quite unstable under certain intrinsic food physicochemical properties and processing conditions, which limit their food application. In this work,  $\beta$ -carotene was encapsulated to improve its stability and bioavailability. Starch and protein extracted from Amaranth seed were used as materials for  $\beta$ -carotene microencapsulation by atomization. The encapsulation efficiency, particle size, ATR-FTIR,  $\beta$ -carotene stability and bioaccessibility were assessed. The total amount of  $\beta$ -carotene encapsulated in starch and protein microcapsules was 10 mg/L. The encapsulation efficiency was  $68.62 \pm 0.22\%$  for starch-based and  $64.09 \pm 0.31\%$  for protein-based microcapsules. The average size of the microcapsule composed of Amaranth protein and starch was  $2.22 \pm 1.84 \mu\text{m}$  and  $1.55 \pm 1.12 \mu\text{m}$ , respectively. The absorption bands in  $\beta$ -carotene are observed, FTIR spectra of the microcapsules exhibited peaks corresponding to  $3,005 \text{ cm}^{-1}$ , confirming the presence of the -OH stretch bond, the microcapsule spectra manifested distinctive peculiar peaks at  $1,455 \text{ cm}^{-1}$ , and stretching CH at the aromatic ring. Starch and protein-based microcapsules with  $\beta$ -carotene were stored under different conditions for 90 d ( $37 \text{ }^\circ\text{C}$  in the dark; at room temperature in the dark; at room temperature under lighting conditions; and at  $8 \text{ }^\circ\text{C}$  in the dark). The stability of  $\beta$ -carotene within the protein microcapsules was better, even at higher temperatures than within the starch microcapsules. This could be due to protein higher retention network that can act as a physical barrier that isolated and protected the compound from external factors. The  $\beta$ -carotene bioaccessibility was  $4.5 \pm 1.2\%$  and  $5.7 \pm 0.8\%$ , for starch and protein, respectively. Results obtained suggest that starch and protein from Amaranth can be considered as potential wall materials for  $\beta$ -carotene encapsulation.



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