

Title: Encapsulation of carotenoid in nanofibers by emulsion electrospinning: termal and oxidative stability

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The canola oil, rich in polyunsaturated fatty acid has been used in emulsions/nano emulsions as carrier for lipophilic compounds encapsulation due to its therapeutic potential and anti-inflammatory effect. Specifically, astaxanthin is a carotenoid of commercial interest due to its potential health benefits. However, the therapeutic benefits of this carotenoid is limited due to its low bioavailability, chemical, thermal and shelf stability. In this work, Bovine Serum Albumine (BSA) was studied as a model protein for the nanofiber production with astaxanthin enriched canola oil by emulsion electrospinning. Significant independent variables: BSA emulsion,Poly Ethylene Oxide (PEO) concentration and solution pH, were selected for the nanofiber optimization based on Methodology Surface Response. Nanofibers were characterized by scanning electron microscopy, thermogravimetric analysis and peroxide value for 7 days at 50°C. Nanofibers without bead defects were produced with 10% w/w BSA emulsion, 5% w/w PEO and pH 3. Astaxanthin loading efficiency of 97.43% was obtained under optimal conditions. Moreover, the encapsulated oil was randomly distributed as droplets inside the fibers. Melting temperature (T_m) of PEO was approximately 400°C and the T_m of loaded BSA emulsion-PEO nanofibers was 440°C. The shift to higher temperatures means that better thermal stability of astaxanthin was found in loaded nanofiber. Finally, BSA protein through the nanoemulsion and nanofiber protect canola oil from oxidative stability. Therefore, emulsion electrospinning results offer an alternative for the development of an astaxanthin encapsulation system with enhanced thermal and oxidative stability compared with electrospinning where the oil is added into the nanofiber without being emulsified.

Biography

Camila Medina is PhD student in the Doctoral program in Sciences of Natural Resources, at Universidad de La Frontera, Temuco, Chile. Camila is a Food Engineer and has a Master's Degree of Engineering Sciences with Specialization in Biotechnology. She has focused her research on the micro/nano encapsulations of bioactive compounds for food and pharmacological applications. She is currently working on “The behavior of the release of a lipophilic drug from protein by O/W-emulsion electrospinning”.

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