Physical properties of Sacha Inchi seed oil microcapsules obtained by spray drying.

Rodríguez-Cortina, A.[1], Hernández-Carrión, M.[1]*

[1]Chemical and Food Engineering Department, Grupo de Diseño de Productos y Procesos (GDPP), Universidad de los Andes, Bogotá, Colombia.

*Presenting author: m.hernandez1@uniandes.edu.co

Abstract

Sacha Inchi seed oil (SIO) is rich in omega 3, 6, and 9 fatty acids with important health benefits, but temperature sensitive [1]. Spray drying is an emerging technology that improves the long-term stability of bioactive compounds [2, 3]. This work aimed to study the effect of three different homogenization techniques on some physical properties and bioavailability of microcapsules of Sacha Inchi seed oil (SIO) emulsions obtained by spray drying. Emulsions were formulated with SIO (5%, w/w), maltodextrin:sodium caseinate as wall material (10%, w/w; 85:15), Tween 20 (1%, w/w) and Span 80 (0.5%, w/w) as surfactants and water up to 100% (w/w). Emulsions were prepared using high-speed (Dispermat D-51580, 18,000 rpm, 10 min), conventional (Mixer K-MLIM50N01, Turbo speed, 5 min), and ultrasound probe (Sonics Materials VCX 750, 35% amplitude, 750W, 30 min) homogenization. SIO microcapsules were obtained in a Mini Spray B-290 (Büchi) using two inlet temperatures of the drying air (150 and 170°C). Moisture, density, dissolution rate, hygroscopicity, drying efficiency (EY), encapsulation efficiency (EE), loading capacity, and oil release in digestive fluids *in vitro* were studied. Results showed that the microcapsules obtained by spray-drying had low moisture values and high encapsulation yield and efficiency values (greater than 50% and 70%, respectively). The thermogravimetric analysis indicates that heat protection was assured, enhancing the shelf life and the ability to withstand thermal food processing. Results suggest that spray-drying encapsulation could be a suitable technology to successfully microencapsulate SIO and enhance the absorption of bioactive compounds in the intestine. This work highlights the use of Latin American biodiversity and spray drying technology to ensure the encapsulation of bioactive compounds. This technology represents an opportunity for the development of new functional foods, improving the safety and quality of conventional foods.

Keywords: Spray drying, Sacha Inchi, In vitro, Shelf life, Oil release.

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