

Title: Development of oil-in-water multilayer emulsion as an effective encapsulation systems of astaxanthin.

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Interfacial deposition of biopolymer layers on oil droplets may be a suitable strategy for increasing the emulsion stability and protection of functional ingredients. The aim of this study was to design oil-in-water multilayer emulsions stabilized by ionic biopolymers as encapsulation systems of astaxanthin. The emulsions were produced by sequential adsorption of biopolymers with opposite charges at pH 3.0: Lupin protein isolate (LPI), ι-carrageenan and chitosan. The primary emulsion (PE) obtained by homogenization pressures from 100 to 500 Bar and cycles from 1 to 5 was investigated. Then, the secondary (SE) and tertiary (TE) emulsions were homogenized at 5.000 rpm for 2 min. The physical stability of emulsions under different environmental stresses (pH: 3 to 7, temperature: 25 to 85 °C and NaCl concentration: 25 to 300 mM) was evaluated. The results showed that PE was stabilized with 0.50% w/w of LPI at 300 bar and 5 cycles. It was stable to a phase separation after 24 h of storage at 25°C. Then, the saturation concentration of ι-carrageenan and chitosan were 0.11 and 0.09% w/w on the droplets of SE and TE, respectively. The PE was unstable to droplet aggregation at pH values between 4 and 5. The SE was stable at all pH range and TE was unstable at pH between 6 and 7. The emulsions were stable from 25 to 65°C and at all the NaCl concentration evaluated. Therefore, SE and TE presented greater physical stability than PE providing an stable system of astaxanthin encapsulation for food applications.

Biography

Eduardo Morales Antonio is Food Engineer and Master in Engineering Sciences with Specialization in Biotechnology. Currently, he is student in the Doctoral Program in Engineering Sciences with Specialization in Bioprocesses at Universidad de La Frontera, Temuco, Chile. His research is focused on "Multilayer emulsion as an effective encapsulation systems of astaxanthin to develop a powdered beverage".

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