

World Congress on

Nutrition and Obesity Prevention Source

November 16-18, 2017, Barcelona, Spain

Improved Stability of Food Oil-In-Water Emulsions Using Cacao Pods Husk Pectin-Whey Protein Hydrolysate Complexes

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Nowadays, the production of commercial pectin is limited to a few sources, usually lemon peels and apple pomace, thus, there is an ongoing search for new sources of pectin from regional botanical sources and agroindustrial wastes, like cacao pods husk [1]. Pectin is gradually gaining acceptance as an effective emulsifier in numerous industrial applications, and the emulsifying and emulsion-stabilizing properties of this hydrocolloid are increasingly being assessed [2]. It has been informed that biopolymer soluble complexes formed by oppositely charged protein and polysaccharides exhibit improved emulsifying properties than the individual biopolymers [3].

In this work, the dynamic interfacial adsorption and emulsifying properties of cacao pod husks pectin (CP) were investigated and compared with those of a soluble complex formed between CP and whey protein hydrolysate (WPH). Pectin was extracted from cacao pod husks wastes, and the diffusion (k_{diff}), penetration (k_{pen}) and rearrangement (k_{rea}) rate constants were determined at the canola oil-water interface. Canola oil-in-water emulsions stabilized with CP (E_{CP}) exhibited oil droplets having an initial area-volume mean diameter ($d_{3,2}$) of 113.60 nm, which significantly increased to 162.0 nm during 28 days of storage at 4 °C. The soluble complex (SC_{WPH-CP}) formed by electrostatic interaction between CP and WPH in a weight ratio of 1:5 at pH 3.25, decreased the interfacial tension faster and displayed higher k_{diff} and k_{pen} constants than CP. SC_{WPH-CP} yielded canola oil-in water emulsions with oil droplets presenting a $d_{3,2} < 90$ nm, which did not suffer significant changes during storage. It was concluded that the greater stability of $E_{WPH-CPHP}$ was due mainly to steric repulsion originated by the soluble complex adsorption layers around the oil droplets.

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Biography:

Consuelo Lobato-Calleros is professor of Agro-Food Science and Technology and Chemistry at Universidad Autónoma Chapingo, México, since more than 20 years. She received his PhD in Biological Sciences from Universidad Autónoma Metropolitana, México in 1997. Dr. Lobato-Calleros has more than 15 years of experience in Food Science and Technology research and is author of more than 50 scientific publications. One of its main areas of research is the development and evaluation of colloidal systems for the protection and release of bioactives.