

Encapsulation of mono-,diglycerides obtained from rendering waste oil: Powder, interfacial, rheological and emulsion properties

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Abstract

In the present study, the mono-,diglycerides obtained from rendering waste oil were encapsulated with skim milk powder (MP) and whey protein (WP), and the properties of surfactants obtained were determined. The encapsulation procedure performed in order to achieve ease of use and to determine potential protein-surfactant synergetic effects was performed with dry matter rates of 10% and 20% and surfactant/encapsulation material rates of 1:2 and 1:3 (four different rates for each encapsulation material). The encapsulation efficiency, physiochemical properties, emulsifier stabilities, *SEM* images, steady, dynamic, and interfacial properties of specimens were determined. WP-coated products yielded better results in effective encapsulation efficiency (between 50.38% and 68.44%) and emulsion stability tests (between 23.99% and 37.77% for emulsion stability index), whereas MP-coated mono-,diglycerides yielded better results in viscosity analysis (between 18.04 and 32.13 mPa/s for 25°C) and powder properties such as Carr index (between 50.68% and 55.55%). When using MP and WP in mono-diglyceride encapsulation, new surfactants having different properties were obtained.

Novelty Impact Statement

The powder, emulsion, and rheology properties affected by the coating material and whey protein and skim milk powder are good coating material for mono-diglycerides. Whey protein-coated products have effective encapsulation efficiency and emulsion stability tests. Skim milk powder coated mono-diglycerides yielded better results in viscosity and powder property analysis such as Carr index.

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