

Influence of temperature and ionic conditions on the rheology and droplets characteristics of winged bean protein stabilized oil-in-water emulsion

ABSTRACT

To explore the potential of winged bean seed protein as a food ingredient, an oil-in water emulsion, [25% (w/w), pH 3] stabilized by the protein (5% solution) was prepared by high-pressure homogenizer and subjected to heat (35–75 °C), cold (4–8 °C) and NaCl (1–4%) conditions alone or in combination, and their physicochemical stability to the treatments was assessed by measuring creaming, droplets characteristics and rheology. Result showed a slight increase in mean droplet size at treatment up to 35 °C and 1–2% NaCl. At treatment of ≥ 55 °C and $\geq 3\%$ NaCl, significant increases in mean droplet size were observed, droplet distribution changed from monomodal to bimodal, advanced flocculation and coalescence up to 75 °C, leading to poly-disperse distribution. No flow was observed until a yield value (σ_0) was overcome. At 1% NaCl, the σ was 13 Pa s compared to 21 Pa s at 3–4% NaCl, and above 35 °C treatment, emulsions had high apparent viscosity and exhibited Bingham plastic model resulting from increased droplets sizes.

Keyword: Oil-in-water emulsion; Lipid oxidation; Physicochemical properties; Droplet size; Rheology