

Rheological properties of modified starch-whey protein isolate stabilized soursop beverage emulsion systems

ABSTRACT

The rheological properties of soursop beverage emulsions as a function of main emulsion components, namely modified starch (5–12 % w/w), whey protein isolates (WPI) (0–2 % w/w), soursop flavor oil (5–15 % w/w), and deionized water (67.4–86.4 % w/w) were investigated using a fourcomponent with constrained extreme vertices mixture design. The apparent viscosity, flow index, yield stress, viscoelastic behavior (G' and G'') and consistency coefficient were evaluated. In general, analysis of variance (ANOVA) showed high coefficients of determination values (R^2), ranging between 0.795 and 0.999 for the regression models, thus confirming a satisfactory adjustment of the polynomial regression models with the experimental data. Increase in both modified starch and oil phase concentration had increased the apparent viscosity of the emulsions. Contrary, higher concentrations of oil phase had negative effects on flow index and consistency coefficient, resulting in the changes of flow behavior. In addition, modified starch showed solid-like elastic properties at low concentration but behaved as liquid-like viscous as the concentration of modified starch increased. Oil phase concentration had a significant ($p < 0.05$) effect on neither the apparent viscosity nor the flow index at low concentrations but was an important element in providing elastic properties to the emulsion film.

Keyword: Mixture design; Soursop flavour; Modified starch; Whey protein isolate; Rheological properties; Viscoelasticity