

Rheology of heated mixed whey protein isolate/cross-linked waxy maize starch dispersions

Abstract

Dynamic and flow rheological characteristics of heated mixed whey protein isolate (WPI) and cross-linked waxy maize starch (CWM) dispersions: 5% solids, pH=7.0, 75 mM NaCl, were examined at starch mass fractions (smf) from 0 (pure WPI) to 1 (pure CWM). The heated mixed dispersions had lower values of G' than the pure WPI dispersion, primarily due to the disruptive effect of CWM granules on the WPI network. The point of phase inversion (minimum G' value) was at about smf=0.65. Based on frequency sweep data, the mixed dispersions were classified as 'structured liquids'. Shear stress–shear rate data on the blends showed three different behaviors: WPI dispersion-like, CWM dispersion-like, or intermediate between the two depending on the composition. Apparent viscosity–shear rate curves followed the power law model with flow behavior index (n) values of $0.09 \leq n \leq 0.16$ at $\text{smf} \leq 0.2$, and $0.47 \leq n \leq 0.53$ at $\text{smf} \geq 0.4$.