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Abstract

The stability of foams with whey protein concentrate (WPC) and xanthan gum (XG) were studied. Flow behavior, density, pH and average particle size of aqueous phases were evaluated (10-25 % WPC, 0.05 or 0.15% XG). Flow properties of the aqueous phases were dominated by XG rheology, where a zero shear viscosity was detected before the classic shear-thinning behavior (Carreau model). In general, an increase of either XG or WPC in the mixtures resulted in an increase in zero shear viscosity, characteristic time and foaming capacity. The foam stability, evaluated by the kinetics of drainage and Ostwald ripening, also increased with WPC or XG concentration, reaching very stable milk foams. The functionality of WPC was improved by the presence of XG, likely as a consequence of biopolymer segregative interactions (thermodynamic incompatibility). Rheology of aqueous phase played a decisive role in WPC-XG foam stability.

Key words: whey protein concentrate, xanthan gum, rheology, Carreau model, foam capacity, foam stability.

Introduction

Properties and stability of foams and emulsions depend on many characteristics of the surface-active component in the system and interactions with other foods including food macromolecules like polysaccharides (Dickinson, 1998; Nicurescu et al., 2009). Milk proteins and polysaccharides are known to play an important role in the formation and stabilization of foams and emulsions in food industry. To date, many studies have been conducted with the aim of understanding how these biopolymers adsorb and interact at air-