

Fortification of Concentrated Milk Protein Beverages with Soy Proteins: Impact of Divalent Cations and Heating Treatment on the Physical Stability

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Abstract : This study investigated the effects of adding calcium and magnesium chloride on heat and storage stability of milk protein concentrate-soy protein isolate (8:2 respectively) mixtures containing 10% w/w total protein subjected to the in-container sterilization (115 °C x 15 min). The particle size does not change when emulsions are heated at pH between 6.7 and 7.3 irrespective of the mixed protein ratio. Increasing concentration of divalent cation salts resulted in an increase in protein particle size, dry sediment formation and sediment height and a decrease in pH, heat stability and hydration in milk protein concentrate-soy protein isolate mixtures solutions on sterilization at 115°C. Fortification of divalent cation salts in milk protein concentrate-soy protein isolate mixture solutions resulted in an accelerated protein sedimentation and two unique sediment regions during accelerated storage stability testing. Moreover, the heat stability decreased upon sterilization at 115°C, with addition of MgCl₂ causing a greater increase in sedimentation velocity and compressibility than CaCl₂. Increasing pH value of protein milk concentrate-soy protein isolate mixtures solutions from 6.7 to 7.2 resulted in an increase in viscosity following the heat treatment. The study demonstrated that the type and concentration of divalent cation salts used strongly impact heat and storage stability of milk protein concentrate-soy protein isolate mixture nutritional beverages.

Keywords : divalent cation salts, heat stability, milk protein concentrate, soy protein isolate, storage stability

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