Development of a Shelf-Stable High-Protein Dairy Beverage

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The purpose of this project was to create a shelf-stable high protein beverage using whole milk and milk protein isolate (MPI) with added coffee flavor and non-caloric natural high-intensity sweeteners. This product fills a gap in the market and improves upon the quality of current dairy protein beverages. Potassium citrate was also added to reduce sedimentation by preventing protein coagulation during heat sterilization. Citrate was added at 0, 0.25, and 0.50% by weight and protein levels were adjusted to 8% (28g protein/12oz serving), 9%, and 10% using MPI. Potassium citrate was also added to beverages with 8% total protein in levels of 0, 0.25, 0.50, and 0.75% and pH was adjusted to 6.8 or 7.0. Beverages were filled into size 300x407 (15oz) cans and sterilized in a still retort at 250°F for 20 minutes. Particle size analysis was performed as an indicator of degree of protein coagulation. Average particle size decreased about 10% with the addition of 0.25% citrate across all protein levels, then increased above 0.25%. Particle size also decreased with 0.25% citrate addition to pH 6.8 and increased at 0.75%. Sensory analysis was performed on chilled samples containing 8% protein using a panel of 80 adults, primarily males age 21-34. Three samples with different sweetener profiles were tested; a combination of stevia and monkfruit was preferred based on overall liking score of 5.9 on a 9-point scale. Added citrate did not diminish creaminess or mouthfeel liking, which scored 6.0. Although sweetness was acceptable at 5.5, data shows that a higher level of sweetness would be preferred. Coffee flavor was liked by panelists with a score of 6.0. These findings show that this beverage containing 28g protein/serving, coffee flavor, and natural sweetener is liked by target consumers and ready for commercialization with minor adjustments to sweetness.