APPLICATION OF WHEY PROTEIN-POLYSACCHARIDE COMPLEXES IN AERATED DAIRY GELS

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ABSTRACT

Heating whey protein isolate (WPI) and polysaccharides (PS) together to form a complex can stabilize foams and strengthen gels. We applied these complexes in aerated dairy gels, which could be formulated into novel-textured high-protein desserts. Two families of polysaccharides having different degrees of charge density were chosen. WPI-PS complexes were prepared by heating the mixed solutions (8% protein, 0 to 1% PS) at pH 7 and then mixing with heated skim milk powder (8% protein). Aerated gels were formed by whipping the liquid solution with a handheld frother and then setting as a gel by lowering the pH. Aerated gels were evaluated for stability, overrun, and rheological properties.

Rheological results showed no significant difference in gelation time among samples; therefore, stronger interactions between WPI and high charge density polysaccharide were likely responsible for increased stability. In most cases overrun of aerated gels significantly decreased as polysaccharide concentration increased due to increased viscosity which limited air incorporation. However in some cases of high charge carrageenans, overrun increased as concentration increased, related to stronger interfacial films overcoming the effect of viscosity. For both the pectin and carrageenan systems, it was found that yield stress and $G'$, indicators of firmness and mouthfeel, could be predicted using a multiple regression model using gel strength of non-aerated gel and the aerated overrun.

Stable dairy aerated gels can be created from WPI-polysaccharide complexes. High charge density polysaccharides, at concentrations that provide adequate viscosity, are needed to achieve stability while also maintaining solution overrun capabilities. Knowledge gained from this study can be used by food manufacturers to formulate dairy-based aerated gels such as whipped yogurt and mousse.