

# FOAMING PROPERTIES OF WHEY PROTEIN ISOLATE AND $\lambda$ -CARRAGEENAN

## MIXED SYSTEMS

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## ABSTRACT

Heating protein with polysaccharide under a net negative condition can induce the formation of soluble complex with improved functional properties. Studies on foaming properties of whey protein isolate (WPI) with polysaccharide mostly focused on the effects of polysaccharide on native WPI, while little has been done on heated WPI-polysaccharide soluble complex. The objective of our research was to investigate the foaming properties of heated WPI and  $\lambda$ C soluble complex. Three WPI and  $\lambda$ C systems were prepared: 1) heated WPI and  $\lambda$ C soluble complex, (2) heated WPI with added  $\lambda$ C, and (3) unheated WPI with  $\lambda$ C. Foams were generated using a KitchenAid mixer. Foaming ability and foam stability were determined by measuring the overrun and drainage 1/5 life, respectively. Foam rheological properties of foams were determined using a Kinexus Pro Rheometer, while foam microstructures were visualized by confocal laser scanning microscopy. Polysaccharide concentration, pH contributed to the extent of soluble complex, thus influenced the foaming properties. Formation of heated soluble complex with 0.25%  $\lambda$ C at pH 7 led to thicker and more viscoelastic film surrounded air bubble and produce more uniformed smaller air bubble with resulted in the improvement of foaming properties especially foam stability. Results suggest that heated WPI- $\lambda$ C soluble complex significantly enhanced foaming properties. This can be applied to various dairy-based foams as well as new product development.