Rheological Behaviour of Carrageenan/Milk Proteins/Sucrose Mixed Systems

By Ms. YANG Dongying

Abstract

The rheological behaviour of carrageenan/milk proteins/sucrose mixed systems was investigated. Kappa carrageenan (K) and iota carrageenan (I) were added with several mass ratio: 0, 20%K, 40%K, 60%K, 80%K and 100%K at the concentration of 0.1 wt%. Sucrose addition (10 wt%) led to easier gel formation while lower gel strength. Two-step gelation was found only in 60%K mixture without sucrose. Significantly higher β-turn ratio (18.4%) and lower helix ratio (0.53%), large loop ratio (1.39%) and random coil ratio (6.88%) were shown in 60%K mixture by the result of Fourier Transform Infrared Spectroscopy (FTIR). Apparent binding constant was estimated according to the results of differential scanning calorimeter (DSC). In 60%K mixture, milk protein exhibited significantly stronger potential in binding with carrageenan and served more as reinforcement rather than participated in the formation of network. Sucrose promoted the binding between milk protein and carrageenan and accelerated carrageenan-protein network formation.

About the Speaker

Ms. Dongying YANG is a PhD candidate in Food Science and Technology at the National University of Singapore (NUS), under the supervision of Assistant Professor Hongshun YANG. Her research focus is on the rheology of carrageenan in food systems.

Enhancing Myosin Solubility with Glycine and Proline in Low Ionic Strength Solutions

By Ms. ZHOU Yige

Abstract

As the most abundant protein in fish, myosin plays a great role in fishery product overall quality. At high temperature, myosin forms gel through a process called gelation. Myosin gelation usually requires 2 ~ 3% (0.47 ~ 0.68 M) NaCl to ensure adequate solubilisation. However, excessive intake of salt can result in numerous health problems, while insolubilized myosin is detrimental to the final quality. Amino acids, as a universally popular and generally safe food additive, the utilisation can be greatly broadened, thus amino acids were used to improve the solubility. Nineteen amino acids were tested at different concentrations to exam the solubilisation effect of myosin at low ionic strength condition and more than 5 were found to be effective. In this study, glycine and proline were chosen as the target due to its low unit price and high solubility in water. The obtained results showed that myosin treated with 5 mM glycine and proline increased 90.88% and 71.80% solubility in 0.1 M KCl solution, respectively. Smaller protein particle size and stable particles (as proved by zeta potential test) were found comparing with myosin in low ionic strength solution. The hydration capacity, secondary structure and gelling ability of both myosin were found to be quite the same to myosin solubilised in high ionic strength solution, which indicated the feasibility of using amino acid in improving myosin solubility. In future references, this method can be used to further optimise the processing procedure of fishery industry and produce high quality fishery products with low salt content.

About the Speaker

Ms. ZHOU Yige is a Ph.D. candidate under Dr. Yang Hongshun’s group since Aug 2016. Her research interests focus on clarifying structural changes and mechanisms of fish proteins processed with different methods.