



## Use of Semi-Refined Carrageenan as a Water Binder in Deli Turkey Breast

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### Objectives

Carrageenan is a high molecular weight linear hydrophilic polysaccharide comprising of repeating galactose units and 3,6-anhydrogalactose units. Kappa and iota carrageenan show most benefits in meat applications as water managers and texture modifiers. Kappa carrageenan forms strong brittle gels while iota carrageenan gels are less strong and more elastic. Carrageenan improves water retention, consistency, sliceability and texture of poultry products with high levels of added brine. The optimum usage level is unique for most processors and depends on the product, raw materials, carrageenan type, composition and concentration and processing conditions. The objective of this study was to evaluate quality characteristics of 42.5% extended turkey breast by utilizing GPI 5038 (a blend of semi-refined kappa and iota carrageenan) versus a commodity semi-refined kappa carrageenan.

### Materials and Methods

Brine was prepared by dissolving sodium phosphate, salt, dextrose, turkey broth and carrageenan in water. Brine temperature was at 0 to 2.2°C. The brine was mixed for approximately 6 min. Carrageenan was used at 0.7% in the finished product. Turkey breast was injected 42.5% of green weight using a 32 needle Gunther injector. The injected turkey breast was macerated then vacuum-tumbled at 6 rpm for 90 min and stored overnight in a cooler at 4°C. An emulsion made from chopped skin and desinewed breast trim was added at 4.13% of the weight of the injected turkey breast and tumbled under vacuum for an additional 60 min. The turkey breast meat

was stuffed in a cook-in bag and cooked in a smokehouse under steam to an internal temperature of 72.2°C. The cooked turkey breast was stabilized using Appendix B USDA guidelines. The product was sliced and vacuum packaged and stored in a cooler at 2.8°C. Cooked turkey breast was evaluated for cook loss (amount of exudate in the cook-in bag after cooking and chilling), sliceability (number of intact slices using a Bizerba high speed tabletop slicer), texture profile analysis using a Texture analyzer equipped with a 1-cm diameter stainless steel probe compressing the surface of the 1.27-cm thick slice to 30% of the height, Interior color (L, a and b values) was measured using a handheld Hunterlab color reflectance meter equipped with a D65 Optical Sensor. Purge was measured over 8 wk of refrigerated storage on sliced, vacuum-packaged product. The study was replicated three times and statistical analysis was performed using ANOVA ( $P < 0.05$ ) with StatView for Windows.

### Results

Cook loss was not significantly ( $P > 0.05$ ) different for GPI 5038 compared to the control. The hardness, gumminess and chewiness values were significantly ( $P < 0.05$ ) higher for GPI 5038 compared to the control. Sliceability values were significantly ( $P < 0.05$ ) higher for GPI 5038 compared to the control. The interior color (L, a, and b) values were not significantly ( $P > 0.05$ ) different for the GPI 5038 compared to the control. Purge after weeks 2 and 4 was significantly ( $P < 0.05$ ) lower for GPI 5038 compared to control.

## Conclusion

The unique, value-added blend of kappa and iota carrageenan (GPI 5038) offers improved finished product quality attributes over commodity semi-refined kappa carrageenan. This study shows that GPI 5038 reduced cook loss while improving sliceability in deli turkey. The GPI 5038 has the potential in modification of existing products or newly developed poultry formulations.