Published February 1, 2019

2017 Reciprocal Meat Conference – Animal Welfare

Meat and Muscle Biology™

Evaluation of Pork Skin Gelatin on Rheological Properties of Pork Myofibrillar Protein Gel at Different Salt Concentrations

C. Lee* and K. B. Chin

Department of Animal Science, Chonnam national university, Gwangju, Republic Of Korea

Keywords: FTIR, gelatin, myofibrillar protein, salt concentration
Meat and Muscle Biology 1(3):39 **doi:10.221751/rmc2017.036**

Objectives

The aim of this study was to evaluate the pork skin gelatin on rheological properties of myofibrillar protein gel as affected by different salt concentrations.

Materials and Methods

Myofibrillar protein (MP) mixtures were prepared with or without 1.0% of gelatin powder at different salt concentrations (0.15, 0.30, 0.45 M). Gelatin powder was provided by Gel-Tech (Model #Gelatin-G, Busan, Korea). This gelatin powder had 209 bloom of jelly strength and 8 mesh of particle size. Cooking yield (%), gel strength (gf), shear stress (Pa), sodium dodecyl sulfate-poly acrylamide gel electrophoresis (SDS-PAGE), scanning electron microscopy (SEM), fourier transform infrared spectroscopy (%T), sulfhydryl group (A415), and surface hydrophobicity (μg) were measured. The experimental design was 2-way (2x3) analysis of variance and each experiment were performed in triplicate (Table 1).

Results

The addition of gelatin powder increased cooking yield and shear stress, and MP at salt concentration of 0.45 M had higher values of cooking yield and shear stress than the other lower salt concentrations (0.15, 0.30 M). Although gel strength was not affected by adding gelatin ($p > 0.05$), MP gel at the salt concentration of 0.45 M increased gel strength as compared to those at 0.15 and 0.30 M ($p < 0.05$). Protein bands of SDS-PAGE did not differ among the treatments, regardless of addition of gelatin. In microstructure, MP gels with increasing salt concentration showed compact and wet structures. The quantitative analysis of the changes in band at 1650 cm-1, 1624 cm-1, and 1680 cm-1 (α-helix/unordered structures and β sheet) were decreased with increased salt concentrations. Increasing salt concentration showed low content of sulfhydryl groups. Myofibrillar protein mixtures with gelatin at 0.45 M was lower content of sulfhydryl groups than those without gelatin ($p < 0.05$). Surface hydrophobicity of MP at 0.45 M were higher than those of low salt concentrations ($p < 0.05$). At 0.15 M and 0.45 M, MP mixtures with gelatin was higher than those without gelatin ($p < 0.05$).

Conclusion

These results suggested that MP gel at the salt concentration of 0.45 M was optimum condition for the application of the gelatin in MP systems.

Table 1. Experimental design of this study

	mg/ml					
	Control			Gelatin		
Ingredients	0.15 M	0.30 M	0.45 M	0.15 M	0.30 M	0.45 M
Myofibrillar protein	40.0	40.0	40.0	40.0	40.0	40.0
Buffer solution	10.0	10.0	10.0	9.50	9.50	9.50
Gelatin	0.00	0.00	0.00	0.50	0.50	0.50
Total	50.0	50.0	50.0	50.0	50.0	50.0