

A study on the reduction of the salt contents on pork sausage using the pre-rigor ham (#468)

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Introduction

The cost for long-term storage of post-rigor muscle and the charge of space could be reduced with the pre-rigor muscle for the processed meat. The improvement of functional properties, such as water-holding capacity, emulsifying ability, and binding ability could be expected during meat processing, if the pre-rigor muscle was used (Fischer *et al.*, 1979; Honikel and Hamm, 1978). The addition of salt into the pre-rigor muscle could maintain higher pH value, resulting in good processing properties and increase the binding force and the cooking yield (Coon *et al.*, 1983). Therefore, the objective of this study was to reduce the salt levels on pork sausage through the pre-rigor ham.

Methods

Sausages using post-rigor ham were manufactured at the regular-salt concentrations (1.5%), and those with pre-rigor ham were processed at different salt concentrations (0.5, 1.0, 1.5%). pH values and temperature were measured to confirm the state of pre-rigor and post-rigor. And pH and color values, protein solubility, cooking loss (CL, %), expressible moisture (EM, %), textural properties, lipid oxidation (TBAR), protein oxidation (VBN), and SDS-PAGE were measured. The experiment design was one-way analysis of variance at a significant level of 0.05.

Results

As shown in Figure 1, pre-rigor ham had higher pH value and temperature, compared to post-rigor ham. Pre-rigor muscle was defined as the meat processing within 1 hour after slaughter (Fischer *et al.*, 1979; Honikel and Hamm, 1978). After processing the pork sausages (data were not shown), pre-rigor meat batter had higher pH values than post-rigor one ($p < 0.05$). In protein solubility, pre-rigor sausages with various salt levels were not different from the post-rigor sausages (1.5% salt level). This result might suggest that pre-rigor muscle has a good protein solubility, and contributes to the desirable textural properties in the final products. Pre-rigor cooked sausages had higher pH values than the post-rigor ones. However, no differences in color values, TBARS, and VBN were observed among pre-rigor (salt level of 0~1.5%) and post-rigor treatment (1.5%) salt (data were not shown). As shown in Table 1, cooking loss was not different among the treatments, and EM values of pre-rigor at 0.5% salt was higher than those at 1.5% salt. However, no differences were between pre-rigor sausages with 0.5 and 1.0% salt observed. Textural properties of pre-rigor sausages were similar to those of post-rigor sausages, regardless of salt levels. These results indicated that the reduced-salt sausages could be manufactured with the pre-rigor sau-

sages. Figure 2 showed the SDS-PAGE of pork sausages with pre-rigor and post-rigor loin cuts. A high intensity of myosin heavy chain band was shown in pre-rigor sausage compared in post-rigor sausage.

Conclusion

Pork sausages with pre-rigor ham at 1.0% salt had similar characteristics to those with post-rigor ham at 1.5% salt. By using the pre-rigor ham, the salt content could be reduced by one third of the regular salt level (1.5%).

Notes

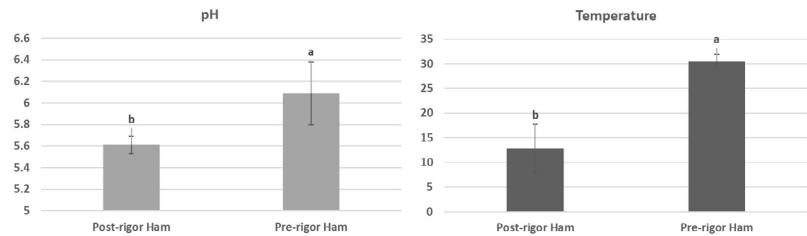


Figure 1. pH values and temperature of pre-rigor and post-rigor ham
^{a,b} Means (n=3) having same superscripts in a same column are not different ($p>0.05$).

Treatments	Cooking loss (CL, %)	Expressible moisture (EM,%)	Hardness (gf)	Springiness (mm)	Gumminess	Chewiness	Cohesiveness
Post-1.5%	9.19±2.98 ^a	31.8±4.31 ^{ab}	5523±1118 ^a	5.45±1.13 ^a	62.4±24.5 ^a	315±66.3 ^a	0.01±0.00 ^a
Pre-0.5%	13.8±7.46 ^a	35.3±1.01 ^a	5411±864 ^a	5.87±1.00 ^a	56.1±15.6 ^a	319±72.4 ^a	0.01±0.00 ^a
Pre-1.0%	10.3±2.00 ^a	31.6±0.76 ^{ab}	6533±893 ^a	6.60±0.83 ^a	66.7±11.5 ^a	442±97.3 ^a	0.01±0.00 ^a
Pre-1.5%	6.57±1.97 ^a	28.3±0.47 ^b	5873±712 ^a	6.69±0.63 ^a	53.2±10.0 ^a	345±32.1 ^a	0.01±0.00 ^a

Table 1. CL, EM and textural properties of cooked pork sausages with pre-rigor(0~1.0%) or post-rigor

^{a,b} Means (n=3) having same superscripts in a same column are not different ($p>0.05$).

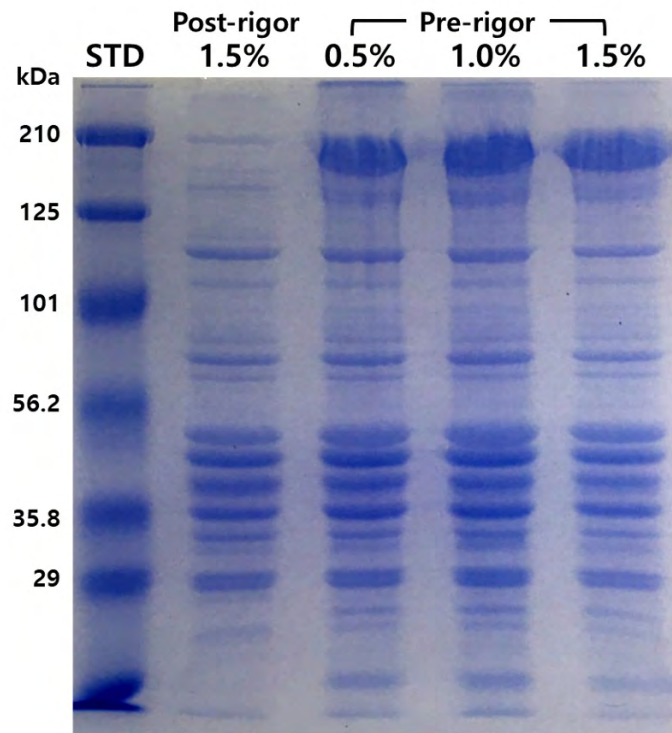


Figure 2. SDS-PAGE of pork sausages with pre-rigor or post-rigor ham

Notes