

## Evaluation of product quality of pre-rigor pork sausages with reduce salt as compared to post-rigor ones (#476)

HaEun Kim, Koobok Chin

Chonnam, Animal science, Guwangju, South Korea

### Introduction

Excessive sodium intake increases the risk of chronic diseases, such as hypertension, stroke and cardiovascular disease. Therefore, many studies for reduced-salt meat products have been progressed with improved processing technologies. Pre-rigor muscle had high functional properties such as water-holding capacity, cooking loss, and juiciness compared to post-rigor muscle, since it had higher pH value than post-rigor muscle [1]. In addition, the lipid oxidation of meat products with pre-rigor muscle was retarded as compared to the post-rigor muscle [2]. The objective of this research was to assess the potential possibility to produce low-salt (<1.0%) pork loin using the pre-rigor muscle as compared to those with post-rigor ones.

### Methods

Pre-rigor cured pork loin (< 1 hr after slaughter) with various salt levels (0~1.5%) were prepared with 3 cm thickness and compared to post-rigor muscle at the salt levels of 1.5%. pH values and temperature were measured to check if they were pre-rigor pork loins as compared with the post-rigor ones. Before and after cooking, pH values, temperature and color values (L\*, a\*, b\*) of the loin cuts were measured. After cooking in the water-bath, salinity, lipid oxidation (TBARS), volatile basic nitrogen (VBN), cooking loss (CL, %), expressible moisture (EM, %) and shear values of cooked pork loin were measured during frozen storage (-70°C). Data were analyzed by two-way (treatment \*storage time) analysis of variance at significant level of 0.05.

### Results

Since no interaction between treatment and storage time were observed ( $p > 0.05$ ), data were pooled by treatment and storage time. The pre-rigor pork loins had higher pH and temperature than post-rigor ones. Before cooking, pre-rigor pork loins had lower a\* values than the post-rigor ones (Table 1). As storage time increased, a\* values decreased, but no differences in pH, and L\* and b\* values were observed.

pH values, and L\* and a\* values did not show any differences, but b\* values of the pre-rigor pork loins at 0.5% salt were higher than those of post-rigor loins (Table 2). During 28 days of storage, pH values increased at 14 days of storage, but decreased thereafter. No differences in TBARS, VBN and EM values of hams between the pre- and post-rigor pork loins were observed (Table 2). However, the shear force values (kgf) of the pre-rigor loin were higher than those of the post-rigor loin. This result indicated that the pre-rigor muscle improved the textural characteristics as compared to the post-rigor muscle.

CL (%) of pre-rigor at 1.0% salt was similar to those with post-rigor with 1.5% salt (Fig 1). This result was partially due to higher pH of the pre-rigor muscle, resulting in similar values with post-rigor [3].

### Conclusion

Pre-rigor pork loins with 1.0% salt showed similar characteristics to post-rigor pork loins with 1.5% salt level, which could be reduced the salt level by 1/3 of the original salt levels and could be produced the pork loin with reduced salt levels without detrimental effects. In addition, the frozen storage affected pH, b\* values, TBARS, VBN and shear values.

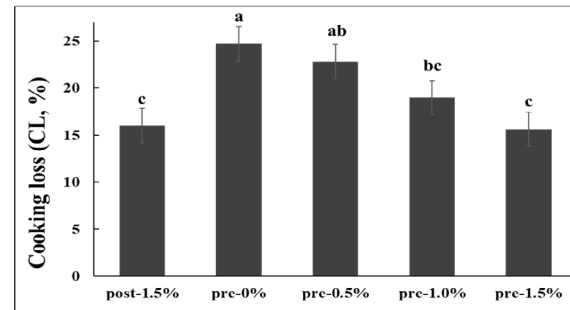


Fig 1. Cooking loss (CL, %) of pork loins with pre-rigor at various salt levels (0~1.5%) and compared to the post-rigor (1.5%).

**Fig 1. Cooking loss (CL, %) of pork loins with pre-rigor at various salt levels (0~1.5%) and compare a, c Means with having different super-scripts within same column are different ( $P < 0.05$ ).**

### Notes

	pH	L*	a*	b*	TBARS (mg MDA/kg)	VBN (meq/kg)	Shear value (kgf)	Expressible moisture (EM, %)	Salinity (%)
Treatment									
Post-1.5%	5.92±0.09 <sup>a</sup>	73.2±2.28 <sup>a</sup>	9.41±1.34 <sup>a</sup>	4.30±0.66 <sup>b</sup>	0.31±0.05 <sup>a</sup>	2.87±1.40 <sup>a</sup>	2.29±1.04 <sup>b</sup>	28.0±3.82 <sup>a</sup>	1.29±0.23 <sup>a</sup>
Pre-0%	5.98±0.13 <sup>a</sup>	75.3±2.01 <sup>a</sup>	8.67±1.30 <sup>a</sup>	4.92±1.03 <sup>bc</sup>	0.32±0.05 <sup>a</sup>	2.74±1.49 <sup>a</sup>	3.36±0.59 <sup>a</sup>	26.4±4.34 <sup>a</sup>	0.15±0.10 <sup>d</sup>
Pre-0.5%	5.97±0.10 <sup>a</sup>	74.2±2.27 <sup>a</sup>	8.73±1.67 <sup>a</sup>	5.04±0.50 <sup>a</sup>	0.31±0.05 <sup>a</sup>	3.19±1.74 <sup>a</sup>	3.80±0.97 <sup>a</sup>	27.4±3.37 <sup>a</sup>	0.40±0.05 <sup>c</sup>
Pre-1.0%	5.93±0.10 <sup>a</sup>	74.7±3.63 <sup>a</sup>	8.68±1.58 <sup>a</sup>	4.68±0.68 <sup>bc</sup>	0.31±0.05 <sup>a</sup>	2.86±1.76 <sup>a</sup>	3.37±0.84 <sup>a</sup>	26.1±3.56 <sup>a</sup>	0.80±0.13 <sup>b</sup>
Pre-1.5%	5.92±0.06 <sup>a</sup>	73.3±1.24 <sup>a</sup>	8.86±1.21 <sup>a</sup>	4.52±0.82 <sup>bc</sup>	0.31±0.06 <sup>a</sup>	2.82±1.60 <sup>a</sup>	3.14±1.07 <sup>a</sup>	27.7±3.46 <sup>a</sup>	1.31±0.20 <sup>a</sup>
Storage days									
0	5.95±0.06 <sup>b</sup>	74.3±1.97 <sup>a</sup>	9.12±1.64 <sup>a</sup>	4.53±0.61 <sup>b</sup>	0.32±0.06 <sup>bc</sup>	1.94±0.24 <sup>b</sup>	3.00±1.10 <sup>b</sup>	27.9±4.68 <sup>a</sup>	0.75±0.49 <sup>a</sup>
14	6.03±0.08 <sup>a</sup>	73.4±2.80 <sup>a</sup>	9.21±0.73 <sup>a</sup>	5.24±0.94 <sup>a</sup>	0.28±0.02 <sup>b</sup>	2.40±1.10 <sup>b</sup>	4.10±0.48 <sup>a</sup>	26.5±1.71 <sup>a</sup>	0.84±0.46 <sup>a</sup>
28	5.84±0.09 <sup>a</sup>	74.5±2.97 <sup>a</sup>	8.02±1.04 <sup>a</sup>	4.47±0.66 <sup>b</sup>	0.34±0.02 <sup>a</sup>	5.28±0.39 <sup>a</sup>	2.67±0.56 <sup>b</sup>	26.1±2.08 <sup>a</sup>	0.82±0.58 <sup>a</sup>

**Table 2. pH, color values, TBARS, VBN, shear values and EM values and salinity of cooked pork loins**

a-c Means with having different superscripts within same row are different (P<0.05).

Treatments	pH	L*	a*	b*
Post-1.5%	5.65±0.07 <sup>a</sup>	49.7±1.94 <sup>a</sup>	4.58±1.06 <sup>a</sup>	4.28±1.10 <sup>a</sup>
Pre-0%	5.76±0.21 <sup>a</sup>	49.5±2.51 <sup>a</sup>	2.72±1.14 <sup>b</sup>	3.37±0.89 <sup>a</sup>
Pre-0.5%	5.75±0.17 <sup>a</sup>	48.9±1.57 <sup>a</sup>	3.00±1.29 <sup>b</sup>	3.43±0.89 <sup>a</sup>
Pre-1.0%	5.72±0.15 <sup>a</sup>	48.6±2.90 <sup>a</sup>	3.15±0.61 <sup>b</sup>	3.20±0.93 <sup>a</sup>
Pre-1.5%	5.64±0.11 <sup>a</sup>	49.4±2.61 <sup>a</sup>	2.93±1.14 <sup>b</sup>	3.46±1.13 <sup>a</sup>
Storage days				
0	5.72±0.19 <sup>a</sup>	49.8±2.39 <sup>a</sup>	3.77±1.29 <sup>b</sup>	3.59±1.15 <sup>a</sup>
14	5.74±0.09 <sup>a</sup>	48.0±1.71 <sup>a</sup>	2.82±0.63 <sup>b</sup>	3.07±0.69 <sup>a</sup>
28	5.63±0.04 <sup>a</sup>	49.2±2.23 <sup>a</sup>	2.72±1.20 <sup>b</sup>	3.96±0.88 <sup>a</sup>

**Table 1. pH and color values of raw pork loins post- and pre-rigor with various salt levels**

a, b Means with different superscripts within a same row are different (P<0.05).

## Notes