

EFFECT OF PORK SOURCES ON MEAT QUALITY CHARACTERISTICS OF RESTRUCTURED HAM

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Abstract—The purpose of this study was to investigate the effects of different pork sources on meat quality characteristics of restructured ham. Pork from Taiwan black pig (TBP) and crossbred white pig (LYD) was used to manufacture of restructured ham. Samples of restructured ham were taken for the proximate composition, yield, purge loss, pH-value, TBA-value, L^* , a^* , b^* -value, shear value, texture profile, fatty acid composition and sensory evaluation analysis. The results showed that TBP had higher crude fat content, a^* -value and lower moisture content and b^* -value than LYD ($p < 0.05$). In sensory evaluation, the treatment of TBP had higher score in tenderness, juiciness ($p < 0.05$) and overall acceptability value ($p < 0.01$) as compared to LYD. Furthermore, TBP group had lower shear force but no significant different was found among treatment in texture profile analysis. In the fatty acid analysis, TBP had the highest percentage of saturated fatty acid (SFA) ($p < 0.05$) and no significant differences were found between TBP and LYD on the content of monounsaturated fatty acid (MUFA) and polyunsaturated fatty acid (PUFA) ($p > 0.05$).

Index Terms—Crossbred white pig, Restructured ham, Taiwan black pig

I. INTRODUCTION

Native Taiwan black pig (TBP) occupied important status among the undertaking of pigs in Taiwan. Meat product of native black pig with a high consumer acceptance due to most Taiwanese consider that pork from native black pigs has a kind of sweet taste and was more palatable than pork from crossbred white pigs. Cheng *et al.* (2001) indicated that black pig had higher fat content, meat tenderness and juiciness as compared to LYD pork. Chen *et al.* (2007) also pointed out that the commercial black pigs had lower moisture content and higher crude fat, L^* -value, a^* -value and desirable tenderness and juiciness than crossbred LYD. Pan (2009) showed that TBP had lower shear value and higher overall acceptability when compared with LYD. Furthermore, Cameron and Enser (1991) indicated that there was positive correlation between saturated and monounsaturated fatty acids of fat on meat flavor, moreover, Wang (2003) also pointed out that the palatability of Japanese Kagoshima black pig was as the result of its higher fat content and degree of saturation. The objective of this study was to investigate the effect of pork source on meat quality characteristics of restructured ham.

II. MATERIALS AND METHODS

Ham from TBP and LYD pig were used to manufacture of restructured ham. Samples of restructured ham were taken for quality analysis test. Proximate analysis was determined according to A.O.A.C. (1995). Surface color of LYD and TBP was measured with a CIE colorimeter to determine lightness (L^*), redness (a^*) and yellowness (b^*). TBA value was determined according to Ockerman (1985). Texture profile analysis was measured with Texture analyzer (Szczesniak, 1975). Sensory evaluation was carried out by a trained panel on meat samples from TBP and LYD (Cardello *et al.*, 1983). Fatty acid content was determined according to Sukhija *et al.* (1988). The significance of different between means was calculated using Student's t-test. An alpha level $p < 0.05$ was used to determine significance.

III. RESULTS AND DISCUSSION

The results showed that the different sources of pork had no significant effects on crude protein, ash, yield, purge loss, pH-value and TBA-value in restructured ham ($p > 0.05$). Restructured ham made from TBP had higher crude fat content, a^* -value and lower moisture content, b^* -value than LYD ($p < 0.05$). In sensory evaluation, the treatment of TBP had higher score in tenderness, juiciness ($p < 0.05$) and total acceptability ($p < 0.01$) when compared with LYD. Moreover, these sensory traits seem to have an important and positive role in consumer preference. Furthermore, TBP had lower value in shear force but no significant different was found among treatment in texture profile analysis. In the fatty acid analysis, TBP had the higher percentage of saturated fatty acid (SFA) ($p < 0.05$); however, the content of monounsaturated fatty acid (MUFA) and polyunsaturated fatty acid (PUFA) had no significant differences between TBP and LYD ($p > 0.05$). A close relationship has been described between the SFA content and tenderness, juiciness, total acceptability on the meat products, contributing to consumer preference.

Table 1. Effect of pork sources on proximate composition (%) of restructured ham

Sources	Items					
	Moisture (%)	Crude fat (%)	Ash (%)	Crude protein (%)	Purge loss (%)	Yield (%)
TBP	73.84 ^a	3.67 ^a	2.37	16.32	0.73	88.75
LYD	74.68 ^b	2.82 ^b	2.33	16.43	0.66	88.25

^{a-b}: Different letters in the same column indicate significant difference ($p < 0.05$).

Table 2. Effect of pork sources on shear value and texture profile analysis of restructured ham

Sources	Items				
	Shear value (kg / cm ²)	Hardness (kg)	Springiness	Cohesiveness	Chewiness (kg)
TBP	1.433	1.167	0.822	0.478	0.466
LYD	1.504	1.167	0.812	0.418	0.401

^{a-b}: Different letters in the same column indicate significant difference ($p < 0.05$).

Table 3. Effect of pork sources on the sensory evaluation of restructured ham

Source	Items ^A					Overall acceptability
	Color	Odor	Tenderness	Juiciness	Flavor	
TBP	4.4	4.4	6.5 ^a	5.4 ^a	6.2	6.6 ^a
LYD	4.6	4.4	5.6 ^b	4.6 ^b	5.5	4.8 ^b

^A Color: 1=extremely light, 9= extremely dark; Odor: 1=extremely bland, 9= extremely intense; Tenderness: 1=extremely tough, 9=extremely tender; Juiciness: 1=extremely dry, 9= extremely juicy; Flavor: 1=extremely bland, 9= extremely intense; Overall acceptability: 1=extremely dislike, 9= extremely like.

^{a-b}: Different letters in the same column indicate significant difference ($p<0.05$).

Table 4. Effect of pork sources on fatty acid composition (%) of restructured ham

Fatty acid (%)									
Source	C12:0	C14:0	C16:0	C18:0	C18:1	C18:2	SFA ^A	MUFA ^B	PUFA ^C
TBP	2.74	1.18	30.13	13.10	38.88	13.63	49.78 ^a	40.95	14.43
LYD	2.51	1.39	27.16	11.72	37.03	16.32	44.70 ^b	38.82	17.48

^A: SFA: Total saturated fatty acid (C8:0 + C10:0 + C12:0 + C14:0 + C16:0 + C18:0).

^B: MUFA: Total monounsaturated fatty acid (C16:1 + C18:1 + C20:1).

^C: PUFA: Total polyunsaturated fatty acid (C18:2 + C18:3 + C20:4).

^{a-b}: Different letters in the same column indicate significant difference ($p<0.05$).

IV. CONCLUSION

The results indicated that restructured ham made from TBP had higher crude fat content, a^* -value, tenderness, juiciness, overall acceptability, saturated fatty acid content ($p < 0.05$) and lower shear force value than LYD. Thus, restructured ham made from TBP demonstrated better eating quality and consequently higher consumer preference.

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