STUDY OF MEAT PROPERTIES OF NATIVE BLACK PIGS AND CROSSBRED PIGS

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Introduction

Native Taiwan black pig (TBP, Taoyuan breed) occupied important status among the undertaking of raising pigs in Taiwan. However, with rising of pigs on a large scale and the pursuit of the economic benefits, the production systems of crossbred pigs (LYD) are adopted for the hog industry and TBP declines gradually. Most Taiwanese considers that the pork from black pigs has a kind of sweet taste. The nucleotide related compounds, such as guanosine 5'-monophosphate, 5'-guanylic acid (GMP), inosine 5'-monophosphate, 5'-inosinic acid (IMP) and xanthosine 5'-monophosphate, 5'-xanthylic acid (5'-XMP) might have been resulted for the special sweet taste. IMP and GMP are the representatives in the flavor material of meat, since GMP content in the meat is relatively small, and the content of IMP is higher; therefore, the content of IMP in meat can be used to explain the flavor intensity of meat (Yano *et al.*, 1995). Chen *et al.* (2001) indicated that Taoyuan breed black pig had higher fat content, meat tenderness and juiciness as compared to LYD pork. Cameron and Enser (1991) showed that there were positive correlation between saturated and monounsaturated fatty acids of fat on meat flavor. Furthermore, Wang (2003) also pointed out that the palatability of Japanese Kagoshima black pig was as the result of higher fat content and degree of saturation.

The objective of this study was to investigate the effect of breed and feedstuff on the meat quality of pork loin muscle form LYD, SFB and FFB pigs.

Materials and Methods

Loin muscles were obtained form 24-h post-mortem carcasses of LYD pigs, SFB and FFB. Loin muscle was sliced into 1-cm thick and packed in PS tray with PE over wrapping. Sample were stored in retail display shelf at 2-4℃ under fluorescent lighting to simulate retail condition.

Surface color of LYD, SFB and FFB lion was measured with a CIE colorimeter to determine lightness (L*), redness (a*) and yellowness (b*). Furthermore, proximate analysis of LYD, SFB and FFB loin was determined according to A.O.A.C. (1995). ATP related compounds were determined using the methods of Crescentini and Stocchi (1984) and Seewald *et al.* (1993). Fatty acid content was determined according to Sukhija *et al*. (1988). Sensory evaluation was carried out by a trained panel on loin samples from TBP and LYD (Cardello *et al.*, 1983).

Data from the four replicated trials were analyzed using the General Linear Model procedure and the analysis of variance was performed to determine the significance for breed effects and least-square mean were used for mean separation.

Results and discussion

FFB had the highest ($p<0.05$) moisture, the lowest ($p<0.05$) crude protein and the highest ($p<0.05$) crude fat content in loin and SFB had the lowest ($p<0.05$) moisture, the lowest ($p<0.05$) crude protein and the lowest ($p<0.05$) crude fat content (Table 1). LYD had the lowest ($p<0.05$) IMP content in loin (Table 2), as compared to SFB and FFB. SFB had the highest ($p<0.05$) linoleic, arachidonic acid and total polyunsaturated fatty acid contents, while FFB had the highest ($p<0.05$) palmitic acid and total saturated fatty acid contents. SFB had higher ($p<0.05$) a value. The highest TBA values were observed for SFB loin during storage. In sensory evaluation, LYD had the lowest ($p<0.05$) tenderness and overall acceptability scores as compared to SFB and FFB. No significant difference ($p>0.05$) was found between SFB and FFB samples.

Table 1. Effect of different source of pork on proximate composition (%), and Lab value of loin

Sources	Items						
	Moisture (%)	Crude protein (%)	Crude fat (%)	Ash (%)	L-value	a-value	b-value
LYD	74.193[b]	21.887[b]	2.990[a]	1.953[a]	50.608[a]	4.512[a]	15.388[a]
SFB	73.637[b]	22.327[b]	3.256[a]	1.754[a]	51.356[a]	7.789[b]	17.349[b]
FFB	72.013[b]	20.013[a]	4.193[a]	1.629[a]	57.783[b]	4.052[a]	16.813[b]

[a-c]: Different letters in the same column indicate significant difference ($p<0.05$).

Table 2. Effect of different source of pork on ATP related compounds (mg/g) of lion

	ATP related compounds					
Soruce	ATP	ADP	AMP	IMP	HxR	Hx
LYD	0.04630[a]	0.36091[b]	0.00069[a]	1.98819[a]	0.67705[a]	0.07349[a]
SFB	0.03250[a]	0.38368[b]	0.00157[b]	2.51538[b]	0.77307[a]	0.07212[a]
FFB	0.03072[a]	0.31233[a]	0.00470[b]	2.67617[b]	0.80986[a]	0.14894[b]

[a-c] : Different letters in the same column indicate significant difference ($p<0.05$).

Table 3. Effect of different source of pork on fatty acid composition (%) of loin

	Fatty acid (%)								
Source	C18:0	C18:1	C18:2	C18:3	C20:1	C20:4	SFA [A]	MUFA [B]	PUFA [C]
LYD	12.998[a]	40.242[ab]	14.141[b]	0.572[b]	0.602[a]	0.361[ab]	40.990[a]	43.936[ab]	15.074[b]
SFB	14.409[b]	36.204[a]	15.978[c]	0.897[c]	1.034[b]	0.711[b]	42.409[a]	40.005[a]	17.586[c]
FFB	11.726[a]	42.372[b]	5.650[a]	0.147[a]	0.874[b]	0.167[a]	46.676[b]	47.360[b]	5.964[a]

[A]: SFA: Total saturated fatty acid (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-c] : Different letters in the same column indicate significant difference ($p<0.05$).

Conclusions

In summary, FFB loin had higher fat content, higher saturated fatty acid content, redder lean meat color, higher IMP compounds, higher meat tenderness, and sensory scores than LYD loin. No significant differences were found between FFB and SFB in IMP content and sensory scores. However, higher PUFA content and TBA values were found in SFB loin which meant that loin form swill fed pigs was more prone to oxidation.

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