

# CARCASS AND MEAT QUALITY OF DUROC-BOAR OFFSPRING

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**Keywords:** Duroc, carcass characteristic, quality, pork

## Introduction

The swine industry has taken great efforts to produce high quality pork. Various parameters, including genetic, nutrition, management, cooking etc. influence eating quality of pork. Several studies have investigated breed effects on carcass composition and pork quality in pigs (Lo *et al.*, 1992; Lonergan *et al.*, 2001; D'Souza and Mullan, 2001). This study examined the effect of breed on the carcass characteristics and meat quality of offspring pigs from Duroc boars mated with sows of either Landrace (L), Yorkshire (Y) or hybrid (LY).

## Materials and Methods

Two hundred and ninety-one Duroc-boared offspring pigs which came from Duroc (D) boars mated with sows of Landrace (L), Yorkshire (Y) or hybrid (LY), were slaughtered at a live weight of approximately 120 kg, according to standards of commercial procedures, in a Taiwanese abattoir. Carcass characteristics including live weight, carcass weight, carcass length, backfat thickness, loin eye area, dressing percentage, lean percentage, fat percentage, bone percentage, and meat qualities of loin and ham muscles including colour score, marbling score, cooking loss, drip loss, shear force, colour values, pH values, and chemical compositions of loin and shoulder muscles were evaluated (Huang, 2005). Data were analysed using SAS software.

## Results and Discussion

Table 1 shows that the live weights and carcass weights of offspring pigs from Duroc boars mated with LYD sow were significantly ( $P < 0.05$ ) lower than those pigs from Duroc boar mated with LD or YD sow. The offspring pigs from D × LD had significantly longer carcass length than those from D × LYD hybrids. D × YD hybrids had significantly thicker backfat thickness and smaller loin eye areas. D × YD hybrids had significantly lower lean percentage and higher fat percentage. When considering meat quality, the loin muscles from D × YD hybrids had significantly higher NPPC colour scores by sensory evaluation (Table 2). This darker colour could also be illustrated by the significantly higher a values of those samples. D × LYD hybrids had significantly higher shear values which indicated a tougher tissue. No significant difference of NPPC marbling scores, cooking loss, purge, L and b values, and pH of loin muscles and pH values of the ham muscles were observed among the various breeds of pigs. The proximate compositions of loin muscles of the three breeds were not significantly different (Table 3). D × YD hybrids had significantly higher content of tasty amino acids, sweet amino acid, and MSG-line amino acids in loin muscles when compared with pigs of the other two hybrids. D × LYD hybrids had significantly higher total saturated fatty acid percentage and lower total polyunsaturated fatty acid percentage than the others.

**Table 1:** Carcass characteristics of offspring pigs from Duroc boar mated with various sow breeds.

Item	Breed		
	LD (n = 64)	LYD (n = 216)	YD (n = 11)
Live weight, kg	123.05±13.15 <sup>a</sup>	117.88±11.32 <sup>b</sup>	121.65±11.80 <sup>a</sup>
Carcass weight, kg	105.65±11.25 <sup>a</sup>	101.96±9.91 <sup>b</sup>	105.28±10.38 <sup>a</sup>
Carcass length, cm	87.66±3.07 <sup>a</sup>	85.85±3.33 <sup>b</sup>	86.61±2.52 <sup>ab</sup>
Backfat thickness, cm	1.95±0.45 <sup>b</sup>	2.10±0.44 <sup>b</sup>	2.38±0.39 <sup>a</sup>
Loin eye area, cm <sup>2</sup>	60.92±7.59 <sup>a</sup>	59.97±8.26 <sup>ab</sup>	56.98±11.23 <sup>b</sup>
Dressing percentage, %	85.88±1.42 <sup>b</sup>	86.50±1.14 <sup>a</sup>	86.53±0.90 <sup>a</sup>
Lean percentage, %	57.16±2.96 <sup>a</sup>	56.98±2.75 <sup>a</sup>	54.48±3.04 <sup>b</sup>
Fat percentage, %	11.28±3.07 <sup>ab</sup>	10.18±2.69 <sup>b</sup>	12.24±2.70 <sup>a</sup>
Bone percentage, %	15.07±1.25	15.05±1.24	15.32±1.65

Mean±SE; <sup>a,b</sup> Values in the same row with different superscripts are significantly different (  $P < 0.05$  )

**Table 2:** Meat quality of loin and ham muscles of offspring pigs from Duroc boar mated with various sow breeds.

Item	Breed		
	LD (n = 64)	LYD (n = 216)	YD (n = 11)
Loin muscle			
Colour score	2.57±0.84 <sup>b</sup>	2.92±0.79 <sup>ab</sup>	3.14±0.55 <sup>a</sup>
Marbling score	1.60±0.65	1.81±0.71	1.82±0.64
Cooking loss, %	26.46±2.69	28.08±3.48	28.08±1.92
Dripping loss, %	4.05±1.99	4.68±2.60	5.24±2.60
Shear force, kg	4.65±0.90 <sup>b</sup>	6.08±1.77 <sup>a</sup>	4.01±0.85 <sup>b</sup>
L-value	40.78±5.15	41.92±3.47	40.15±2.24
a-value	8.09±0.98 <sup>b</sup>	7.95±0.99 <sup>b</sup>	9.04±0.95 <sup>a</sup>
b-value	6.86±0.86	6.95±0.89	6.80±0.54
pH <sub>1</sub>	5.89±0.32	5.78±0.27	5.89±0.24
pH <sub>24</sub>	5.67±0.25	5.61±0.15	5.65±0.10
Ham muscle			
pH <sub>1</sub>	6.15±0.28	6.07±0.27	6.08±0.20
pH <sub>24</sub>	5.86±0.31	5.78±0.26	5.78±0.25

Mean±SE; <sup>a,b</sup> Values in the same row with different superscripts are significantly different ( P<0.05 )

**Table 3:** Chemical composition of loin and shoulder muscles of offspring pigs from Duroc boar mated with various sow breeds.

Item	Breed		
	LD (n = 64)	LYD (n = 216)	YD (n = 11)
Loin muscle			
Crude protein, %	24.06±1.45	24.35±1.25	24.23±1.37
Crude fat, %	2.97±1.66	2.84±1.36	3.51±1.70
Moisture, %	72.06±1.69	72.06±1.93	71.07±1.32
Ash, %	1.07±0.25	1.05±0.25	1.01±0.23
Tasty amino acid, mg/100g	8993±1927 <sup>b</sup>	9373±2547 <sup>b</sup>	10512±2243 <sup>a</sup>
Sweet amino acid, mg/100g	5109±1521 <sup>b</sup>	5876±2027 <sup>ab</sup>	6187±2052 <sup>a</sup>
MSG-like amino acid, mg/100g	7194±1255 <sup>b</sup>	7148±1991 <sup>b</sup>	8146±1243 <sup>a</sup>
Glycogen, mg/g	1.74±0.76	1.59±0.66	1.88±0.67
Shoulder muscle			
Total saturated fatty acid, %	37.20±2.75 <sup>b</sup>	39.17±2.86 <sup>a</sup>	36.72±3.43 <sup>b</sup>
Total monounsaturated fatty acid, %	37.91±2.55	39.40±2.45	39.19±3.49
Total polyunsaturated fatty acid, %	23.41±4.16 <sup>a</sup>	19.96±3.77 <sup>b</sup>	22.86±6.55 <sup>a</sup>

Mean±SE; <sup>a,b</sup> Values in the same row with different superscripts are significantly different ( P < 0.05 )

Tasty amino acid = Asp + Gly + Glu + Ser + Thr; Sweet amino acid = Ala + Gly + Pro + Ser + Thr; MSG-like amino acid = Asp + Glu + Met + Ser (Huang, 2005).

### Conclusions

Carcass characteristics and meat quality traits from the offspring pigs which came from a Duroc boar mated with sows of either Landrace, Yorkshire or hybrid were varied. Among the breeds, the results showed that D × LYD hybrids had significantly lighter live and carcass weights; D × YD hybrids had significantly thicker backfat thickness and smaller loin eye areas, thus leading to a significantly lower lean percentage and higher fat percentage. The loin muscles from D × YD hybrids had significantly higher NPPC colour scores. D × LYD hybrids had significantly higher shear values. D × LYD hybrids had significantly higher total saturated fatty acid percentage.

### References

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