PE1.15 Effect of terminal sire and slaughter weight on meat quality of pigs 131.00

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A total of 128 pigs (50% castrated males and 50% females) was used to study the effect of two terminal sire breeds (DU: Duroc *vs* PI: Pietrain) mated to Sino-European dams and two slaughter weights (LOW: 105 kg *vs* HIGH: 115 kg) on meat quality destined to dry cured product industry. A 2 x 2 factorial design was used, and each treatment was replicated 32 times. Meat quality parameters of meat composition, drip losses, marbling and color were analyzed on *longissimus dorsi*. DU pigs showed a higher intramuscular fat content (P = 0.003) and higher marbling scores on streak surface (P=0.001), number of streaks per cm^2 (P=0.002) and percentage of marbling surface (P<0.001) than PI. Moreover, DU loins had lower drip losses at 48 h (P=0.002) and at 96 h (P=0.001) than PI. Finally, DU loins had lower yellowness than PI (P=0.011), but no differences were observed on lightness and redness. Slaughter weight did not affect neither meat composition nor marbling scores, but LOW loins had lower drip losses at 48 h (P=0.034) and at 96 h (P=0.025), and lower yellowness (P=0.048) than HIGH ones. It was concluded that the use of DU as the terminal sire breed instead of PI produced meat optimal for the dry cured product industry, whereas the slaughter weights studied did not influence on the main meat quality parameters analyzed.

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I.INTRODUCTION

REED is the main factor which affects meat Bsensory properties [5]. Therefore, the definition of the terminal sire and dam used to obtain the fattening pigs is very important, as it has a huge influence on the meat quality parameters of its progeny.

In this sense, the intensive commercial breeding of pigs has turned into leaner carcasses [7]. This strategy has been very useful to obtain commercial meat cuts. However, for the dry cured producers intramuscular and subcutaneous fat content are also very important [1]. Therefore, Duroc boar, which has intermediate carcass quality characteristics and high intramuscular fat, is suitable for high quality dry cured products [3]. Also, the use of Sino-European sows in dam line could improve meat quality [2][8]. Moreover, slaughter weight could also affect meat quality, as higher slaughter weights increase intramuscular fat [6].

The objective of this trial is to study the effect of terminal sire and slaughter weight on meat quality of fattening pigs.

II.MATERIALS AND METHODS

A. Experimental design

A factorial 2 x 2 design with two terminal sire breeds (DU: Duroc *vs* PI: Pietrain) and two slaughter weights (LOW:105 kg *vs* HIGH: 115 kg) was used. A total of 128 pigs was used (50% castrated males and 50% females), and each treatment was replicated 32 times. A meat sample of *longissimus dorsi* from each animal formed the experimental unit. Pigs were reared according to experimental design. At slaughter, pigs were electrically stunned, exanguinated, scalded, skinned and eviscerated according to standard commercial procedures. Afterwards, a section of 300 g was taken from the left loin of each carcass at the level of the third and fourth last ribs. The samples were immediately identified and refrigerated until required.

B. Meat quality analyses

Meat composition, color, drip losses and marbling were analyzed. Humidity, protein and intramuscular fat were analyzed following the ISO protocols R-1442, 937-1978 y 1443-1973, respectively. Drip losses were analyzed according to the method described in [4] at 48 and 96 hours *post-mortem*. Finally, fresh meat marbling was analyzed by an image analysis method using Optimas 6.5 software. There were measured the following parameters: streak surface (SS, cm^2), number of streaks per cm^2 (SN), percentage of marbling surface (MS) and percentage of the three biggest streaks (BS). Meat color was measured on a loin slice of 1 cm of thickness. The slice was left 30 min exposed to the atmosphere to allow hemo-

pigment oxygenation. Color was analyzed using a spectrophotometer Minolta CM 2002, measuring the parameters of L* (lightness), a* (redness) and b* (yellowness). Each sample was measured five times.

C. Statistical analyses

The data were analyzed using the GLM procedure of SAS. The model included terminal sire breed and slaughter weight as main effects, and sex as fixed effect. Results are shown as least square means.

III. RESULTS AND DISCUSSION

DU pigs had a higher content of intramuscular fat than PI (Table 1), and consequently lower humidity content. However, protein content of loin was not different among breeds. On the other hand, slaughter weight did not affect the composition of loin.

Drip losses were significantly lower in DU and LOW loins at 48 and 96 hours (Table 2) than PI and HIGH loins, respectively.

As it was expected, marbling was significantly higher in DU than PI in SS, SN and MS measures (Table 3), but PI hand higher BS than DU. These results suggest that DU has higher marbling score than PI, whereas PI has less but bigger streaks than DU. On the contrary, marbling scores were not affected by slaughter weight.

Finally, terminal sire breed did not affect lightness and redness, but PI loins had higher yellowness score than DU (Table 4). Besides, HIGH loins had higher lightness and yellowness scores than LOW ones.

Table 1. Effect of terminal sire breed and slaughter weight on humidity (H, %), protein (P, %) and intramuscular fat (IMF, %) of loin.

	H, %	P, %	IMF, %
Terminal sire breed			
Duroc	71.51	22.92	3.21
Pietrain	72.30	23.02	2.58
Slaughter weight			
105 kg	72.07	23.00	2.80
115 kg	71.74	22.94	2.99
SEM[1] (n=64)	0.14	0.13	0.15
Probability[2]			
Terminal sire breed	<0.001	NS	0.003
Slaughter weight	NS	NS	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.05).

Table 2. Effect of terminal sire breed and slaughter weight on meat drip losses at 48 and 96 hours post-mortem.

	Drip losses, %	
	48 h	96 h
Terminal sire breed		
Duroc	6.93	10.49
Pietrain	8.01	11.96
Slaughter weight		
105 kg	7.10	10.76
115 kg	7.84	11.69
SEM[1] (n=64)	0.24	0.29
Probability[2]		
Terminal sire breed	0.002	0.001
Slaughter weight	0.034	0.025

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.05).

Table 3. Effect of terminal sire breed and slaughter weight on marbling parameters of streak surface (SS, cm^2), number of streaks per cm^2 (SN), percentage of marbling surface (MS) and percentage of three biggest streaks (BS).

	SS, cm^2	SN	MS, %	BS, %
Terminal sire breed				
Duroc	1.65	4.58	7.39	35.81
Pietrain	1.38	3.90	5.28	40.16
Slaughter weight				
105 kg	1.54	4.26	6.42	38.06
115 kg	1.49	4.22	6.24	37.91
SEM[1] (n=64)	0.05	0.15	0.24	1.44
Probability[2]				
Terminal sire breed	0.001	0.002	<0.001	0.035
Slaughter weight	NS	NS	NS	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.05).

Table 4. Effect of terminal sire breed and slaughter weight on loin color parameters: L=lightness; a*=redness and b*=yellowness.*

	L*	a*	b*
Terminal sire breed			
Duroc	47.38	3.15	7.68
Pietrain	47.81	3.40	8.12
Slaughter weight			
105 kg	47.17	3.23	7.73
115 kg	48.02	3.33	8.07
SEM[1] (n=64)	0.31	0.11	0.12
Probability[2]			
Terminal sire breed	NS	NS	0.011
Slaughter weight	NS	NS	0.048

[1] SEM: standard error of the mean.
2 Probability: NS = non significant (P > 0.05).

IV CONCLUSION

The use of Duroc as the terminal sire breed instead of Pietrain produced meat with a higher content of intramuscular fat and marbling, optimal for the dry cured product industry. However, the increase of the slaughter weight from 105 up to 115 kg, did not influence on intramuscular fat or marbling measures.

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