PE1.14 Meat quality of crossbreeds of different Duroc boars and Iberian sows 130.00

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***Abstract*— A total of 180 pigs (50% males and 50% females) was used to study the effect of three terminal sire breeds (DU1 *vs* DU2 *vs* DU3) on meat quality destined to Iberian dry cured industry. Twelve carcasses randomly selected per treatment were used to analyze composition and color of meat and fatty acid profile of intramuscular fat (IMF) and subcutaneous fat (SF). DU3 animals had higher IMF content than DU1 and DU2 pigs (P = 0.009), but no differences were observed between breeds for humidity or protein content. DU3 pigs had also higher lightness score (P = 0.020) than DU1 and DU2 pigs. DU1 loins had a higher redness score than DU2 loins, while DU3 samples showed an intermediate value (P = 0.045), and no differences were observed for yellowness. DU3 pigs showed significantly more SF content on C18:0 than DU2 pigs (P = 0.003), and DU1 pigs showed an intermediate value. No differences were observed among treatments in C16:0, C18:1 and C18:2 SF contents. IMF profile of fatty acids of DU3 samples was significant higher in C16:0 (P = 0.013) and C18:0 (P = 0.046) than DU1 samples, showing DU2 pigs an intermediate value. Consequently, DU3 and DU2 pigs had a significant lower content of C18:2 than DU1 pigs (P = 0.003). It is concluded that DU1 strain is the most adequate for the crossbred with Iberian sows destined to dry cured products industry.**

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***Index Terms*— Duroc, fatty acids profile, Iberian pig, meat quality.**

I.INTRODUCTION

THE Spanish regulation for the production of Iberian pigs, allows the use of Duroc as terminal sire. However, there are many commercial strains of Duroc, which could provide different characteristics on performance, conformation or intramuscular fat, which implies important differences on meat quality and its suitability for the dry cured ham manufacture.

Intramuscular fat content and fatty acid profile play an important role in the quality of dry-cured products [9][1], as it play a key role in the flavor compound formation during the ripening process and the oily appearance of Iberian dry cured-products [8]. Further, an insufficient fat content enhances dehydration and the products would ripen too quickly, impairing the appropriate development of quality [6].

The objective of this trial is to study de the effect of three different strains of Duroc sires mated with Iberian dams on the meat quality of its progeny destined for the Iberian dry cured ham industry.

II. MATERIALS AND METHODS

A total of 180 crossbreed Iberian x Duroc pigs (50% males and 50% females, both castrated) was used. There were three experimental groups according with the strain of the Duroc boar used (DU1 *vs* DU2 *vs* DU3), and all pigs were reared together and received the same feed. At the preplanned slaughter age of 289 d (with an average weight of 150.38 ± 14.62 kg BW) twelve animals from each treatment were randomly selected and subcutaneous fat (SF) biopsy samples were taken. Later, all pigs were stunned with carbon dioxide, exanguinated and eviscerated, and a cranial part of *longissimus dorsi* muscle (LM) samples were taken at the level of the last rib from the same animals selected for SF. All samples were vacuum-packed and kept at –20ºC for subsequent analyses. Removed *longissimus dorsi* were analyzed for chemical composition, color and intramuscular fat (IMF). Moisture was determined using the official method [2]. Total lipids were extracted with chloroform:methanol (2:1 vol/vol) according to the method of [4]. Total protein content was analyzed following the procedure described by [7]. Instrumental color of the meat (CIE L^* a^* b^*) was measured in triplicate using a spectrophotometer Minolta CR-300 (Minolta Camera Corp., Meter Division, Ramsey, NJ). Lipids from SF, as well as IMF were extracted independently by method described by [3]. Only results on main lipids (C16:0, C18:0, C18:1 and C18:2) are shown.

The data were statistically analyzed using the GLM procedure of SAS. The model included Duroc strain as main effect and sex as fixed effect. Results

are shown as least square means.

III. RESULTS AND DISCUSSION

DU3 animals tended to have higher IMF content than DU1 and DU2 ones (Table 1), but no differences were observed on humidity or protein content. DU3 animals had also higher lightness score (Table 2) than DU1 and DU2 ones. However, DU1 loins had a higher redness score than DU2, while DU3 showed an intermediate value, and no differences were observed in yellowness. The results obtained in meat color are consistent with IMF content, as [5] reported that a large amount of intramuscular fat can increase lightness.

Regarding to the SF profile of fatty acids, DU3 showed significantly more content on C18:0 than DU2 (Table 3), and DU1 showed an intermediate value. No differences were observed among treatments in C16:0, C18:1 and C18:2 SF contents. Furthermore, IMF profile of fatty acids of DU3 was significant higher in C16:0 and C18:0 than DU1 (Table 4), showing DU2 had an intermediate value. Consequently, DU3 and DU2 had a significant lower content of C18:2 than DU1.

Table 1. Effect of Duroc sire strain on meat content on humidity (H, %), protein (P, %) and intramuscular fat (IMF, %).

	H, %	IMF, %	P, %
Duroc strain			
DU 1	70.5	8.0^{y}	18.5
DU 2	69.9	7.8^{y}	18.7
DU 3	69.6	10.5^{x}	16.4
SEM[1] (n=12)	0.50	0.77	0.91
Probability[2]			
Duroc strain	NS	0.059	NS
Sex	NS	NS	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.10). Values in a column with different superscripts (x, y) tended to be significant (0.05 < P < 0.10).

Table 2. Effect of Duroc sire strain on loin color parameters: L=lightness; a*=redness and b*=yellowness.*

	L*	a*	b*
Duroc strain			
DU 1	43.1^{b}	10.7^{a}	3.7
DU 2	44.0^{b}	9.1^{b}	3.2
DU 3	47.1^{a}	9.4^{ab}	4.2
SEM[1] (n=12)	0.99	0.44	0.33
Probability[2]			
Duroc strain	0.020	0.045	NS
Sex	NS	NS	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.10). Values in a column with different superscripts (a, b) are significantly different (P < 0.05).

Table 3. Effect of Duroc sire strain on the fatty acid profile of the subcutaneous fat.

	C16:0, %	C18:0, %	C18:1, %	C18:2, %
Duroc strain				
DU 1	21.96	11.01^{ab}	49.52	11.72
DU 2	22.08	10.67^{b}	50.27	11.01
DU 3	21.99	11.54^{a}	49.62	11.12
SEM[1] (n=12)	0.33	0.21	0.32	0.25
Probability[2]				
Duroc strain	NS	0.021	NS	NS
Sex	NS	0.019	0.014	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.10). Values in a column with different superscripts (a, b) are significantly different (P < 0.05).

Table 4. Effect of Duroc sire strain on the fatty acid profile of the intramuscular fat.

	C16:0, %	C18:0, %	C18:1, %	C18:2, %
Duroc strain				
DU 1	19.34^{b}	12.35^{b}	53.84	7.00^{a}
DU 2	20.44^{ab}	12.70^{ab}	54.11	5.58^{b}
DU 3	21.54^{a}	13.19^{a}	52.88	5.41^{b}
SEM[1] (n=12)	0.48	0.22	0.35	0.31
Probability[2]				
Duroc strain	0.013	0.046	NS	0.003
Sex	NS	0.029	NS	NS

[1] SEM: standard error of the mean.
[2] Probability: NS = non significant (P > 0.10). Values in a column with different superscripts are significantly different (a, b; P < 0.05) or tended to be significant (x, y; 0.05 < P < 0.10) .

IV CONCLUSION

The meat quality of the Duroc sire strain DU1 x Iberian dam crossbreeds is the most adequate to the Iberian dry cured products industry within the three strains evaluated, mainly due to its fatty acid profile and meat color, despite its lower intramuscular fat content compared to strain DU3, as it is enough for its quality and technological purposes.

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