

## VARIABILITY OF INTRAMUSCULAR FAT IN DUROC-CROSSED SLAUGHTER PIGS: EFFECT OF SLAUGHTER WEIGHT, NUTRITION, AND BOAR.

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### Background

A high intramuscular fat content (IMF) is a sought after characteristic for the raw material entering in the production of high quality dry-cured meats in Spain. IMF lowers curing and drying losses, modulates the speed of moisture loss, helps with the development of the typical flavour and texture of quality dry-cured hams, loins and shoulders (Guerrero *et al.*, 1996). Duroc-crossed slaughter pigs are widely used due to their high IMF content, and also to the high heritability of this meat quality trait (Soriano-Pérez, 2001). However, the variability of IMF content in Duroc-crossed slaughter pigs is very high (Virgili, 1998). This creates quality problems for producers of high-class dry-cured hams, such as hams from Iberian-crossed pigs and those with Denomination of Origin like Teruel ham.

### Objectives

A research was conducted to study the effect of slaughter weight, nutrition, and boar on the level and variability of IMF content in Duroc-crossed slaughter pigs.

### Methods

Slaughter pigs (castrates and gilts) from PIC Camborough 22 sows crossed with three different Duroc PIC L16 boars of the same genetic line were produced according to three treatments. In treatment (1), animals were raised under a standard nutritional program up to 105 kg slaughter weight. In treatment (2), animals were raised under a standard nutritional program up to 115 kg slaughter weight. In treatment (3), animals were raised under a specially designed nutritional program up to 115 kg slaughter weight. Feed and water were provided *ad libitum*. All the animals received the same diet up to 75 kg life weight. From 75 kg to slaughter weight, animals in treatment 1 and 2 received same diet (3200 Kcal/kg ME and 9.1 gr Lysine/kg), whereas those in treatment 3 received a diet with the same energy content but with a different lysine / ME ratio (3200 Kcal/kg ME and 4.3 gr Lysine/kg). Fifty nine samples of *m. semi-membranosus* (SM) from the three different treatments were analysed for IMF content using a Near Infra-red Transmittance apparatus (N.I.T.). These results are related to ether extract only and without acid hydrolysis. The results are given in percentage of fat in the meat and represent the extraction of triglycerides. To obtain the total lipid content, it is necessary to multiply by 1.2 (Wood, 1990). Data was analysed using GLM procedure of SAS (1999-2000).

### Results and discussion

Table 1 presents results of the IMF content for the three treatments. It confirms the large variability of IMF in Duroc-crossed slaughter pigs and shows the positive effect of increasing slaughter weights and the importance of nutrition during the finishing phase. Increasing slaughter weight from 105 to 115 kg live weight does not affect variability of IMF. Fig. 1 shows the level of variation according to treatment. Treatment 1 and 2 show a bimodal curve linked to the two different boar types used in the experiment. Treatment 3 i.e. diet modification in order to increase IMF content, tends to homogenize values and lowers the coefficient of variation by 12% in absolute terms. Table 2 shows the results of the IMF content for the different boars used. They reveal two boar types with different levels of IMF content. The boar with lower IMF content tends to show:

- a) Higher variability
- b) No response to increased of slaughter weight
- c) Greater response to dietary treatment.

### Conclusion

Duroc boars should be selected according to their IMF content. The high inherent variability of IMF content in Duroc breed calls for new quantitative genetic tools and the use of Marker Assisted Selection (MAS) in pure Duroc lines.

### References

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### Acknowledgments

The research was funded by P.I.C. España and Sociedad Cooperativa Ltda de Artesa de Segre.

Table 1. Extractable intramuscular fat content (%) in semi-membranous muscle of Duroc crossed pigs with three treatments

	Treatment		
	(1)	(2)	(3)
n	17	22	20
Average ± SEM	1.99 <sup>a</sup> ± 0.34	2.34 <sup>a</sup> ± 0.29	3.64 <sup>b</sup> ± 0.31
Min.	0.51	0.48	1.04
Max.	4.29	5.51	7.13
Coefficient of Variation, %	58	57	45

Table 2. Extractable intramuscular fat content (%) in semi-membranous muscle of Duroc crossed pigs from three boars progeny

	Boar (all treatments)		
	A	B	C
n	26	19	14
Mean ± SEM	2.97 <sup>a</sup> ± 0.27	3.23 <sup>a</sup> ± 0.31	1.16 <sup>b</sup> ± 0.37
Min.	0.51	0.72	0.48
Max.	5.84	7.13	5.63
Coefficient of Variation, %	47	55	74
Boar (treatment 1)			
N	8	6	3
Mean ± SEM.	2.35	2.31	1.22
Coefficient of variation, %	65	38	70
Boar (treatment 2)			
N	9	7	6
Mean ± SEM	2.93	2.84	1.21
Coefficient of variation, %	40	58	38
Increase of IMF, coef.*	125	123	99
Boar (treatment 3)			
N	9	6	5
Mean ± SEM	3.56	4.57	3.02
Coefficient of variation, %	38	43	56
Increase of IMF, coef.*	151	198	248

\*Expressed as percentage of treatment 1

Fig.1 Distribution of IMF in *m. semi-membranosus* in Duroc-crossed pigs: Effect of treatment.