MUSCLE LIPID COMPOSITION OF IBERIAN PIG MEAT AS RELATED TO GENETIC LINE.

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Background

Purebreed Iberian pig are integrated by several autochthonous porcine genetic lines developed traditionally in the south-west of the Iberian peninsula. Actually, exists a wide interest on the sector of Iberian pig producers in order to safeguard the maximum quality of Iberian pig producers which are based in the use of purebreed animals, avoiding the crossbreeding with foreing breeds, and in an extensive rearing system involving a nutritional strategy based on natural resources (acorns and pasture). Several authors have evidenced differences in growth performance and carcass characteristics between these Iberian genetic lines (Dobao *et al.*, 1985; Benito *et al.*, 1998). However, to our knowledge, do not exist available studies to determine differences in chemical parameters in pig tissues, which could give evidence of differences in the quality of meat an meat dry-cured products obtained from the differents Iberian pig genetic lines.

Objectives

The objective of this work is to evaluate the effect of three iberian pig genetic lines, *Censyra, Torbiscal and Entrepelado*, on the composition of intramuscular lipid tissue.

Methods

Twenty one castrated male Iberian pigs were divided into three groups of seven animals each, accordin to the genetic line, *Censyra, Torbiscal* and *Entrepelado*. The age of pigs at the begining of the fattening period was of 12 months and were kept in an extensive production system based on the availability of acorn and pasture (named as Montanera), in a 30 ha extension, during 75 days prior to slaughter. Pigs were slaughtered at a live weight of about 180-195 kg at a local slaughterhouse. Intramuscular lipids were extracted from *biceps femoris* muscles according to the method of Bligh and Dyer (1959). Total muscle lipid extract was fractionated into neutral and polar lipids on silica cartridges following the procedure described by Juaneda and Rocquelin (1985). Triacylglycerols were quantified by weighing, and phospholipids were quantified by phosphorus determination in total lipid extract according to the method described by Barlett (1959). Fatty acids were determined by gas chromatographic with an flame ionisation detector.

Results and discussion

Live weight of pigs at the begining of the fattening period and prior to slaughter differ ($p<0.05$) between the three Iberian pig genetic lines studied, due to the higher weights in *Torbiscal* genetic line in respect *Censyra* and *Entrepelado* genetic lines (121.8 vs 106.1 and 107.0 kg, respectively) (Table 1), in accordance with previous observations of Benito *et al.* (1998). Average total weight gain during fattenig period did not differ ($p<0.05$) between the three Iberian genetic lines studied. The increase in live weight ocurred during the fattening phase (only with acorn and pasture) showing a calculated daily gain of 905 to 963 g/day, in accordance with previous results reported by Mayoral *et al.* (1999). Carcass and fresh ham weights varie between the studied genetic lines, with higher weight in *Torbiscal* than in *Censyra* and *Entrepelado*, in agreement with the results of Benito *et al.* (1998).

In respect muscle lipid composition, the intramuscular lipid content in biceps femoris has not presented significant differences between the three Iberian pig genetic lines studied (Table 2). However, *Censyra* genetic line exhibited a sligh higher intramuscular lipid content than *Torbiscal* and *Entrepelado* pigs. The results of intramuscular lipids are in contrast with the results obtained by Benito et al. (1998). These autors found some significant differences in intramuscular lipid content in *Gracilis* muscle between the different Iberian pig genetic lines studied, as *Valdesquera*, *Torbiscal* and *Retinto x Torbiscal*. In contrast, the aubsence of signficant differences in intramuscular lipid content between the Iberian pig genetic lines in our study is in agreement with the absence of differences between purebreed Iberian pigs and crossbreeding of Iberian x Duroc pigs reported by Antequera *et al.* (1994) and Tejeda *et al.* (2001). In respect triacylglycerol and phospholipid contents, neither both were affected by genotype of Iberian lines.

The fatty acid composition of the muscle tissue was very similar in the three genetic lines of Iberian pigs studied. Linoleic acid (C18:2 n-6) was the only fatty acid, of quantitative importance, to be affected by genetic line of the Iberian pig (Table 3). In this sense, this fatty acid of *biceps femoris* presented a higher proportion in *Entrepelado* compared to *Censyra* and *Torbiscal* genetic lines. This fact could be related to the sligh lower content (differences not significatives) (see table 2) of total intramuscular lipids in *Entrepelado* pigs. Some authors have reported the lower proportion of polyunsaturated fatty acids in total lipids in pig muscles when increasing the lipid content (Leseigneur-Meynier and Gandemer, 1991), due to a dilution effect of polyunsaturated fatty acids by the higher proportion of monounsaturated and saturadte fatty acids.

Conclusions

Data reported in this work did not evidenced noticeable differences between the three Iberian pig genetic studied, *Censyra*, *Torbiscal* and *Entrepelado*, in muscular lipid composition. However, these previous results must be confirmed by a most extensive study including fatty acid composition of triacylglycerol and phospholipid fractions and the analysis of the different classes of both, triacylglycerols and phospholipids.

Pertinent literature

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Tables

Table 1. Growth performance, carcass and ham weights of Iberian lines (data are expresed in kg).

	Iberian lines		
	Censyra	*Torbiscal*	*Entrepelado*
	n = 7	n = 7	n = 7
Initial fattening weight	106.1 ± 1.6[b]	121.8 ± 3.2[a]	107.0 ± 2.7[b]
Slaughter weight	181.2 ± 4.4[b]	193.4 ± 3.3[a]	179.4 ± 3.9[b]
Fattening weight gain	75.1 ± 3.4	71.6 ± 2.8	72.4 ± 2.0
Carcass weight	151.4 ± 3.4[b]	164.6 ± 2.0[a]	150.7 ± 3.6[b]
Green ham weight	10.0 ± 0.2[b]	11.1 ± 0.2[a]	10.1 ± 0.2[b]

On the same row, means with different supercripts differ significantly ($p<0.05$).

Table 2. Lipid contents of *biceps femoris* muscle (results expresed as g kg^{-1} of muscle). In parenthesis, results expressed as percentage of total lipids.

	Iberian line		
	Censyra	*Torbiscal*	*Entrepelado*
	n = 7	n = 7	n = 7
Total lipids	87.8 ± 3.8	81.7 ± 6.7	80.6 ± 5.4
Triacylglycerols	79.2 ± 4.1 (90.20)	74.1 ± 5.8 (90.69)	71.8 ± 5.4 (89.08)
Phospholipids	8.2 ± 0.6 (9.34)	7.2 ± 0.7 (8.81)	8.4 ± 0.6 (10.91)

Table 3. Fatty acid composition of total intramuscular lipids of *biceps femoris* from Iberian pig lines. (mean ± standard error).

	Iberian line		
	Censyra	*Torbiscal*	*Entrepelado*
	n=7	n=7	n=7
C14:0	1.09 ± 0.02	1.13 ± 0.04	1.10 ± 0.02
C16:0	22.18 ± 0.26	22.53 ± 0.23	22.06 ± 0.31
C18:0	9.59 ± 0.23	9.93 ± 0.17	9.51 ± 0.21
Saturated	33.21 ± 0.47	33.95 ± 0.25	33.01 ± 0.43
C16:1	3.58 ± 0.14	3.46 ± 0.14	3.44 ± 0.10
C18:1	51.96 ± 0.54	51.94 ± 0.41	51.42 ± 0.51
Monounsaturated	56.55 ± 0.38	56.38 ± 0.39	55.98 ± 0.52
C18:2	7.58 ± 0.31[ab]	7.12 ± 0.25[b]	8.29 ± 0.57[a]
C20:4	1.59 ± 0.14	1.55 ± 0.11	1.64 ± 0.21
C18:3	0.31 ± 0.01	0.31 ± 0.01	0.33 ± 0.01
Polyunsaturated	10.24 ± 0.52[ab]	9.68 ± 0.45[b]	11.12 ± 0.91[a]

Results expressed as percentage of total fatty acid methylesters.
On the same row, means with different supercripts differ significantly ($p<0.05$).