EFFECT OF FEED RESTRICTION ON THE FAT QUALITY OF MEAT FROM IBERIAN PIGS DESTINED TO DRY-CURED INDUSTRY

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Introduction

Sensory characteristics of Iberian dry-cured products are highly appreciated. The fat content and fatty acid (FA) profile of raw meat take a key role in the flavour compound formation during the ripening process and the oily appearance of Iberian dry cured-products (Ruiz *et al.*, 2000). Further, an insufficient fat content enhances dehydration and the products would ripen too quickly, impairing the appropriate development of quality (López-Bote, 1998). In order to increase fat deposition, Iberian pigs are traditionally slaughtered between 150 and 160 kg BW. The feeding program used in most farms consists of a restricted feeding from 30 to 100 kg for development of the bones and the muscle tissue, and subsequently, *ad libitum* access to a high caloric diet rich in oleic acid until to slaughter. However, the restricted feed intake (FI) level may affect the FA deposition because the endogenous lipid synthesis is reduced (Nürnberg *et al.*, 1998), and consequently the quality of final product could be modified. The aim of this study was to evaluate the influence of the feed intake level on fatty acid composition and melting point of fat from meat of Iberian pigs destined to dry-cured product industry.

Table 1: Composition of the experimental diets.

Item	34 to 97 kg BW	97 kg BW to slaughter
Main ingredients, %		
Barley	56	58
Wheat	15	30
Soybean meal, 44% CP	14	7
High oleic sunflower oil	1.7	2.5
Others	13.3	2.5
Calculated nutrient composition[a], %		
NE (kcal/kg)	2.332	2.394
Lysine	0.82	0.61
Starch	44.1	47.2
C 16:0	0.36	0.40
C 18:0	0.08	0.11
C 18:1	1.59	2.13
C 18:2	0.94	0.89
C 18:3	0.07	0.08
Analysed composition[b], %		
Crude protein	14.8	12.8
Crude fibre	4.2	4.5
Ether extract	3.3	4.0

[a]According to FEDNA (2003); [b]According to AOAC (2000).

Materials and Methods

A total of 96 castrated male crossbreed Iberian x Duroc pigs 125d of age with an average weight of 34.8 kg were used. Pigs were separated into two experimental groups according to the FI level during the growing phase from 34 to 97 kg BW: 1.6 (LOW) *vs* 2.1 (HIGH) kg feed/d. Pigs were placed in two barns of 90 m^2 in a semi-intensive controlled-environment and had *ad libitum* access to water. When each experimental group reached 97 kg BW, pigs were fed *ad libitum* a finishing diet rich in oleic acid up to slaughter (Table 1). At the preplanned slaughter age of 350 d (with an average weight of 156.4 and 174.9 kg BW for the LOW and HIGH groups) all pigs were electrically stunned, exsanguinated and eviscerated. Twenty carcasses from each treatment were randomly selected and subcutaneous fat (SF) and *longissimus dorsi* muscle (LM) samples were taken at the level of the last rib. All samples were vacuum-packed and kept at –20ºC for subsequent analyses. Lipids from inner and outer SF layers were extracted independently by method proposed by Bligh and Dyer (1959), while neutral and polar intramuscular lipids were obtained according to the method developed by Marmer and Maxwell (1981). Fat extracts were methylated and analysed by gas chromatography as described by Rey and López-Bote (2001). Additionally, the melting point of both SF layers was determined using AOAC 920.157 procedure (AOAC, 2000).

The experimental unit for data was a SF or LM sample from 20 carcasses sampled at random per treatment. Data were analysed as a completely randomized design using the GLM procedure of SAS (SAS Inst., Inc., Cary, NC, USA).

Results and Discussion

The SF from pigs with a LOW FI level showed higher C18:2, C18:3, and C20:5 content in the inner layer but lower C18:1 content in the outer layer than the SF from pigs with a HIGH FI level (Table 2). As expected, the outer layer had higher content of unsaturated FA and lower melting point than the inner layer in all experimental groups. However, FI level did not modify the melting point of inner and outer layer of SF, and similar values for water migration during the ripening and for the brightness or oiliness of the final product could be expected among primal cuts from all

experimental pigs. Furthermore, no FI levels effect was observed for the main FA composition either from the neutral or the polar muscle lipids, which are the major source of the volatile aroma and flavour compounds produced during the curing process.

Table 2: Effect of feed intake level (LOW *vs* HIGH) on the fatty acid profile and the melting point of the subcutaneous (SF) and intramuscular (IF) fat.

Item	LOW	HIGH	SEM (n=20)	*P*<	LOW	HIGH	SEM (n=20)	*P*<
SF fatty acid content, %	Inner layer				Outer layer			
C 16:0	24.81	24.64	0.19	0.55	23.75	23.43	0.20	0.28
C 16:1 *(n-7)*	2.03	1.99	0.05	0.63	1.98	2.07	0.05	0.28
C 18:0	15.04	14.41	0.32	0.17	13.76	12.37	0.30	0.01
C 18:1 *(n-9)*	46.62	47.53	0.37	0.09	49.04	50.75	0.33	0.01
C 18:2 *(n-6)*	6.53	6.20	0.08	0.01	5.97	5.78	0.11	0.27
C 18:3 *(n-3)*	0.343	0.324	0.005	0.01	0.302	0.296	0.006	0.47
C 20:5 *(n-3)*	0.087	0.078	0.003	0.04	0.103	0.103	0.004	0.99
C 22:6 *(n-3)*	0.035	0.019	0.006	0.07	0.063	0.065	0.008	0.89
SF melting point, ºC	33.2	33.7	0.7	0.67	29.9	29.7	0.2	0.46
IF fatty acid content, %	Neutral lipids				Polar lipids			
C 16:0	26.72	27.18	0.24	0.19	25.00	25.52	0.39	0.35
C 16:1 *(n-7)*	4.10	4.44	0.15	0.11	3.31	3.79	0.17	0.04
C 18:0	13.34	12.72	0.37	0.24	11.62	11.35	0.36	0.60
C 18:1 *(n-9)*	49.36	49.73	0.50	0.60	42.18	44.54	1.26	0.19
C 18:2 *(n-6)*	2.35	2.14	0.11	0.17	10.47	7.88	1.34	0.17
C 18:3 *(n-3)*	0.110	0.099	0.006	0.21	0.233	0.184	0.018	0.05
C 20:5 *(n-3)*	0.060	0.057	0.004	0.51	0.469	0.281	0.063	0.04
C 22:6 ***(n-3)***	0.054	0.063	0.008	0.47	0.132	0.090	0.018	0.11

Conclusions

The fatty acid content of intramuscular fat and the melting point of subcutaneous fat were not affected by feeding restriction before fattening at the studied levels. Therefore, no effect of feeding restriction level from 34 to 97 kg BW on the profile of volatile compounds and on the curing losses of dry-cured products is expected.

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