THE PROTOCOL OF IMMUNOCASTRATION CAN AFFECT CARCASS FATNESS, MEAT QUALITY AND FAT COMPOSITION OF HEAVY GILTS

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I. INTRODUCTION

In recent years, around 30% of pig carcasses intended for the Protected Designation of Origin “Teruel dry-cured ham” (Teruel ham) are being rejected at the abattoir being commercialized as regular carcasses. The main reason is the lack of backfat thickness [1], which guarantees the adequate dry-curing process. The problem is detected mainly in gilts because males are castrated and castration increases the retention of fat tissue. Then surgical castration of gilts could be a solution but it is currently prohibited in EU [2]. Another alternative could be the immunocastration, which consists in a vaccine, applied in two doses, that immunizes against gonadotropin-releasing hormone (GnRH), and is indicated for temporary oestrus suppression. There is a well stablished protocol in male pigs, because its use is more spread out, but not in females. The aim of this trial was to find the optimum moment for application of the second vaccine for immunocastration on carcass fatness, meat quality and fat composition in gilts intended for Teruel ham.

II. MATERIALS AND METHODS

A total of 48 Duroc x (Landrace x Large White) gilts (average 26.5 kg body weight-BW) were randomly allocated to four experimental treatments (n=12) according to the time of the second dose administration: intact females (control) or vaccinated (using Vacsincel®, Zoetis) with 60, 75 or 90 kg BW. The first dose had been previously administered to vaccinated groups with approximately 30 kg BW. All animals were slaughtered when they achieved around 125 kg BW. At the abattoir, backfat thickness was measured at the level of *Gluteus medius* muscle (m. GM) and a section of 400 ± 20 g of the left loin (*Longissimus thoracis* muscle) and a sample of fat (20 ± 5 g) from the coxal region were excised from each carcass. The day after slaughter, colour was measured with a Minolta chromameter, which provided the CIELAB values. After, all samples were stored at -20ºC until subsequent analyses. The chemical components analysed were: moisture by the oven drying method, protein by a Kjeldahl analyser and intramuscular fat using an ANKOM equipment. Cooking loss determination was carried out using a Precisterm water bath and hardness was measured, in cooked samples, with a Warner-Bratzler device attached to an Instron Universal testing machine attached to a PC. Fatty acid profile of subcutaneous fat was determined by a Hewlett-Packard gas chromatographer. Data were analyzed statistically using GLM of SAS package. The model included the moment of application of the second dose as main effect and the slaughter weight as a covariate for backfat depth. Means were separated by a *t-test* and the experimental unit was the animal.

III. RESULTS AND DISCUSSION

Intact females tended to have thinner fat thickness at m. GM than immunocastrated gilts (Table 1; p=0.06), which agrees with Daza *et al*. [3], irrespectively of the application moment of the second dose. Also, it seems that fatness increased by advancing the second injection. A similar effect was detected among the vaccinated groups in intramuscular fat content of loin but the difference was only numerical. In fact, no significant impact of immunization against GnRH was found on any meat characteristic studied (p>0.10). Gamero-Negrón *et al.* [4] neither found effects in meat quality of Iberian females. With regard to the composition of the fat, the effects were also limited and only detected in the inner layer; intact females showed lower proportion in

monounsaturated fatty acids than those vaccinated at 60 kg BW with those treated at 90 or 75 kg BW in an intermediate position (p=0.03).

Table 1. Impact of immunocastration in carcass fatness, meat quality and composition of subcutaneous fat of gilts.

	Intact females	Vaccinated at 90 kg	Vaccinated at 75 kg	Vaccinated at 60 kg	SEM[1] (n=12)	Significance
Fat thickness at GM muscle[2], mm	15.9	19.1	19.5	21.1	1.346	0.06
Colour parameters						
*L**	47.2	47.8	48.6	47.6	0.775	0.70
*a**	3.08	3.06	3.13	3.24	0.255	0.98
*b**	7.06	6.89	7.21	7.00	0.341	0.94
*C**	7.76	7.57	7.89	7.76	0.365	0.96
H°	67.4	65.9	66.7	64.7	1.825	0.81
Chemical composition						
Moisture, %	72.5	72.5	71.4	72.2	0.511	0.52
Protein, %	22.6	23.1	22.8	22.3	0.210	0.12
Intramuscular fat, %	3.31	2.88	4.36	4.02	0.574	0.40
Cooking losses, %	26.4	26.5	25.0	25.0	0.735	0.44
Warner–Bratzler shear force, kg	1.61	1.73	1.86	1.82	0.109	0.55
Fatty acids of subcutaneous fat[3]						
Inner layer						
Total SFA, %	42.4	40.2	42.7	40.3	0.570	0.06
Total MUFA, %	44.1[b]	45.5[ab]	45.2[ab]	46.2[a]	0.380	0.03
Total PUFA, %	13.5	14.3	12.1	13.5	0.549	0.28
PUFA/SFA ratio	0.32	0.36	0.29	0.33	0.017	0.24
n6/n3 ratio	10.2	9.99	10.08	10.01	0.213	0.92
Outer layer						
Total SFA, %	38.6	37.2	38.5	37.6	0.444	0.35
Total MUFA, %	46.7	47.2	47.9	47.7	0.432	0.35
Total PUFA, %	14.7	15.6	13.5	14.6	0.521	0.29
PUFA/SFA ratio	0.38	0.42	0.35	0.39	0.017	0.33
n-6/n-3 ratio	10.2	9.55	9.95	9.52	0.182	0.15

[1] SEM: standard error of the mean.
[2] Measured at *Gluteus medius* muscle.
[3] SFA: saturated fatty acids; MUFA: monounsaturated fatty acids; PUFA: polyunsaturated fatty acids.

IV. CONCLUSION

It can be concluded that the application of the second dose for immunocastration at 60 kg BW, in gilts intended for Teruel ham, provided the best results in carcass fatness and that fat resulted more monounsaturated. However, more studies about genital tract development and sexual hormones are necessary because the effect is not permanent and the occurrence of oestrus would be undesirable.

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