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THE EFFECT OF IMMUNOCASTRATION ON CARCASS AND MEAT CUT YIELDS IN EXTENSIVELY REARED IBERIAN GILTS

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ABSTRACT

Iberian pigs are raised in Spain in extensive conditions with males and females free-ranging together. To avoid aggressive behavior, welfare problems, or even unwanted mating and pregnancies by domestic or wild boars, males and females are gonadectomized. However, Council Directive 2008/120/EC restricts female surgical sterilization. Therefore, the use of Improvac® as an alternative to gonadectomy would be highly beneficial for extensive Iberian pig farming. The aim of this study was to compare carcass traits of ovariectomized (CF), immunocastrated (ICF) and intact (IF) Iberian females. Seventy-five females (30 CF, 30 ICF and 15 IF) were used in this study. Animals were reared in extensive conditions and supplemented with a commercial concentrate until they reached commercial slaughter weight (around 160 kg of live weight) Carcass attributes were compared among these three groups of reproductive treatment. Results showed significant differences in the weights and yields of hams and loins among CF and the other two groups, but no differences were found for carcass and foreleg weights or yields among the three groups. Finally, there were no differences between IF and ICF for any of these carcass traits. In conclusion, immunocastration of female Iberian pigs does not negatively affect the weights or yields of carcass or commercial cuts with respect to intact females, yet, it improves certain carcass traits in comparison with ovariectomized females.

Key words: Iberian pig / carcass traits / GnRH inhibition / Improvac® / female / commercial cuts

1 INTRODUCTION

Extremadura, with 140,000 Iberian sows, is the region with the largest census of Iberian pigs in Spain (MAGRAMA, 2011). Traditionally, this breed is raised in extensive production systems, in free-ranging conditions, and pigs are fed with concentrates in large enclosures, but also with natural pastures and acorns in sparsely-forested grasslands called *dehesas*. This feeding system results in the production of meat with a large amount of intramuscular fat that is transformed in cured products that are very appreciated by consumers due to their excellent organoleptic properties (Cava *et al.,* 2000). In these extensive systems, gilts are slaughtered at 14–16 months of age. This implies that they are sexually mature and may become pregnant due to the occasional presence of domestic or wild boars. To avoid this problem, males and females are gonadectomized at younger ages, but the new regulations on animal welfare (EU Directive 120/2008/CE and Spanish RD 1135/2002 and 1221/2009) call for an alternative to gonadectomy of males and, most urgently, of females. In 2009, an anti-GnRH vaccine (Improvac®; Pfizer) was licensed in the E.U. for use in male pigs in a two-dose protocol. The effect is considered reversible, although evidence about that is lacking. It is sufficiently long to inhibit testosterone secretion and boar taint in finishing period of white pig breeds (Dunshea *et al.*, 2001; Batorek *et al.*, 2011), which is much shorter than in the case of Iberian pigs, especially if the latter are reared in extensive systems. The GnRH inhibition route could also be used to prevent estrus and ovulation in females

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(Gomez-Fernandez *et al.,* 2013). Some studies have been published comparing carcass and meat quality of ovariectomized, immunocastrated and intact crossbred Iberian gilts reared in intensive conditions (Fernandez-Moya, 2011; Mercado *et al.,* 2012; Gómez-Fernandez *et al.,* 2013), but none of them assessed the effects of immunocastration on growth and carcass performances of purebred Iberian females reared in extensive conditions during their typically prolonged finishing period. Therefore, the objective of the present study was to compare the weights and yields of commercially important meat cuts of immunocastrated (ICF), intact (IF) and ovariectomized ("castrated"; CF) Iberian females reared in extensive systems.

2 MATERIALS AND METHODS

2.1 ANIMAL RESOURCES

For this study, 75 Iberian gilts were used. At the age of 2 months, 30 females were ovariectomized following animal welfare indications, and the rest of the females remained intact until reaching 11 months of age. At this age, 30 intact females received the first dose of Improvac®, and 4 and 13 weeks later received the second and third doses, respectively. The remaining 15 females were kept unneutered throughout the study. Gilts were reared in extensive conditions confined in a large field enclosure where they grazed on natural pasture and were fed a commercial concentrate in rations of around 1.8 kg per animal per day, depending on the availability of natural pasture. When gilts reached around 105 kg of live weight, the finishing period started, therefore the rations were increased up to 4 kg per day. When reaching around 160 kg at an average age of 16 months, gilts were slaughtered and carcasses were studied.

2.2 MEASUREMENTS

Gilts were weighed at 12 months of age, when they approached 105 kg of approximate body weight and the day before slaughter. At the slaughterhouse, the carcasses, hams, forelegs and loins were weighed, and yields were calculated. Data were analyzed using the GLM procedure in SAS, with a model including reproductive treatment as a fixed effect and live weight as a covariate.

3 RESULTS AND DISCUSSION

Live and carcass weights for each female group are described in Fig. 1, which shows that there were no significant differences in live and carcass weights between CF, IF and ICF. Similarly, there were no differences in carcass yield among these groups. All females reached the target slaughter weight at 494 to 500 days of age. Gomez-Fernandez *et al.* (2013), in a similar study performed with crossbred Iberian × Duroc females immunocastrated at younger ages than in our study, found significant differences in carcass yield between intact females and the other two groups, i.e., ovariectomized and immunocastrated gilts.

Untrimmed ham and foreleg weights for each female group are described in Fig. 2. This figure shows that there were no significant differences between CF and ICF, for neither ham nor foreleg weights. However, there were significant differences in ham weight between CF and IF. In contrast, Gomez-Fernandez *et al.* (2013)

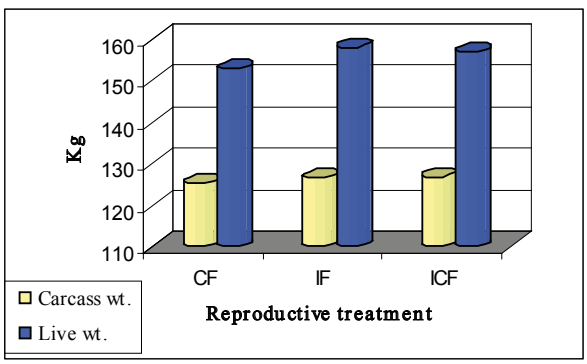

Figure 1: *Live and carcass weights for three groups of gilts: Ovariectomized females (CF), intact females (IF) and immunocastrated females (ICF). Different letters above the bars denote significant differences among treatments (P < 0.05).*

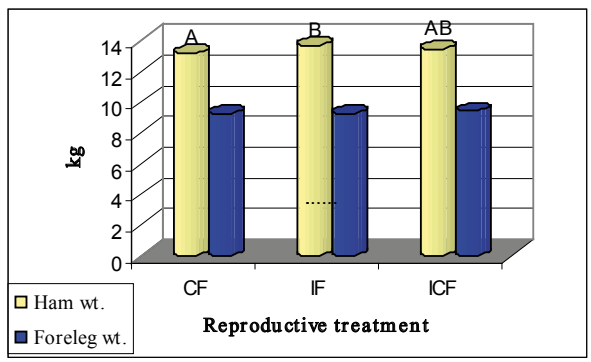

Figure 2: *Ham and foreleg weights for three groups of gilts: Ovariectomized females (CF), intact females (IF) and immunocastrated females (ICF). Different letters denote significant differences among treatments (P < 0.05).*

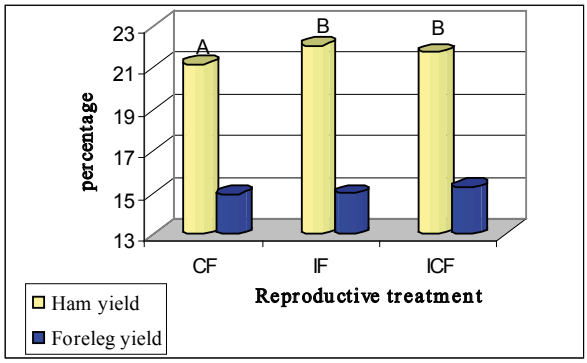

Figure 3: *Ham and foreleg yields for three groups of gilts: Ovariectomized females (CF), intact females (IF) and immunocastrated females (ICF). Different letters denote significant differences among treatments (P < 0.05).*

found significant differences for ham and foreleg weight between CF and the other female groups.

Ham and foreleg yields are depicted in Fig. 3. There were significant differences for ham yield between CF and the other two groups. However, there were no differences for foreleg yield among the three female groups. In contrast, Gomez-Fernandez *et al.* (2013) found significant differences for ham and foreleg weights between IF and the other female groups.

The weights and yields of loins are depicted in Fig. 4. There were significant differences in loin weight and yield for CF in comparison to other two groups. However, in the study performed by Gomez-Fernandez *et al.* (2013), they found differences between yield and weight of the loin for IF but not for the other two female groups.

Comparing our study with the study performed by Gomez-Fernandez *et al.* (2013), the main difference is that they immunocastrated females at an age of 5.5 months, i.e., these gilts were younger than those immunocastrated in our study, which received the first Improvac® dose at 12 months of age. However, comparing both studies, gilts were slaughtered at similar weights but at very different ages, likely due to the differences in genotype and production system, with 8.2 months for the crossbreed Iberian gilts in intensive system (in their study) and approximately 16 months for the purebred Iberian gilts in extensive system (in our study). For this reason, the results of Gomez's study indicate that there is a similar carcass composition between CF and ICF, whereas IF had better and statistically different performances than CF and ICF. In contrast, our study, shows no differences between IF and ICF, but we found significant differences between these two groups and CF, having the CF group the lowest performances.

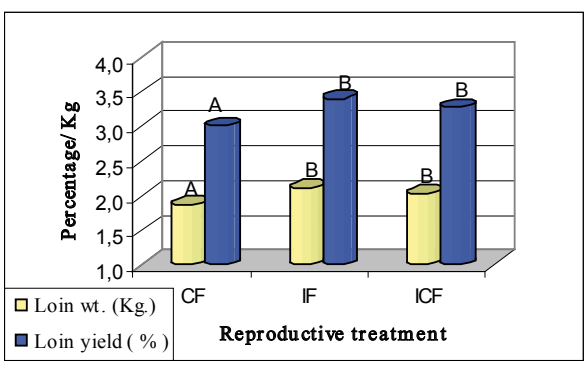

Figure 4: *Loin weight and yield for three groups of gilts: Ovariectomized females (CF), intact females (IF) and immunocastrated females (ICF). Different letters denote significant differences among treatments (P < 0.05).*

4 CONCLUSIONS

At a similar live weight at slaughter, the following carcass trait comparisons can be made among treatments:

There were no differences among the three female groups (intact, ovariectomized and immunocastrated) for the weights and the yields of carcasses and forelegs.

Intact and immunocastrated females had greater weights and yields for hams and loins than ovariectomized females.

Therefore, immunocastration of Iberian females was not detrimental for the yields of their commercially important cuts, i.e., hams, forelegs and loins.

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