

Sex neutralization of heavy pigs from Iberian Peninsula breeds: solutions and limitations

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Introduction

Alentejano (AL) and Iberian (IB) pigs are two native breeds from Iberian Peninsula. Both breeds present: low prolificacy (Charneca *et al.*, 2012; Fernandez *et al.*, 2008) and low growth rate, but compensatory and relatively high growth rate (Freitas, 1999; Daza *et al.*, 2005) during the fattening/finishing phase called “Montanheira” in Portugal and “Montanera” in Spain. Recent studies show that both breeds are genetically related (Muñoz *et al.*, 2017). After weaning, pigs are mostly raised in free-range system and during the fattening period pigs have access to acorns and grass from the Mediterranean forest, usually from November to March (Charneca *et al.*, 2017; Lopez-Bote, 1998). For the certification of some dry-cured products from these breeds, like the high-grade hams, the animals can only be slaughtered with an age of at least 14 months and a bodyweight ranging from 145–210 kg since the quality of the products is related to the age, weight and diet of animals (Daza *et al.*, 2007; López-Bote, 1998). Because of that high slaughter age, sex neutralization is essential for the chain production success. Until now the gonadectomy of both males (avoid boar taint and aggressive and sexual behaviour) and females (avoid mating by wild boars) is a common practice, however, the foreseen voluntary end of surgical castration (SC) without pain relief in the EU requires the use of alternatives in these swine breeds management.

Options, main problems and risks

The options for sex neutralization are SC with pain relief and Immunocastration (IC). However, while SC with pain relief needs the development of a feasible and economically worthwhile procedure to be usable alternative, the two doses IC protocols already used in intensive swine genotypes and systems aren't effective in these heavy and aged pigs (Zamaraskaia and Rasmussen, 2015), so they have to be adjusted and tested in this case. Additionally, besides manipulation difficulties (extensive raising areas, poor facilities, low manpower), several risks must be considered when IC is proposed, namely: its effectiveness, the effects on performance, carcass, meat and dry-cured products characteristics (including sensorial) and finally, the acceptance by the industry and consumers.

State of the art of IC of females and males

A 3 doses pre-pubertal IC of Iberian gilts have long-term successful effects (ovarian quiescence). Protocol is relatively easy to apply at farm as it allows gender mixing before immunization and doesn't include vaccination during fattening period being effective until the usual slaughter age (Hernández-García *et al.*, 2013). So far, no adverse effects of IC females have been detected both on performance or carcass traits (Gómez-Fernández *et al.*, 2013, Martínez-Macipe *et al.*, 2016). For males a 3 dose protocol is also needed but in this case the immunisation efficacy has been variable, although a 100% efficacy was recently reached with a protocol in which the 3rd dose was administrated before the acorn-feeding (Hernández-García *et al.*, 2018) and when IC is concomitant with a specific nutritional plan (*ad libitum* feeding during 15 days since 3rd dose administration). In this last protocol besides desired effects on reproductive organs development and backfat androstenone and skatole levels, the supplemented pigs also presented greater foreleg, loin and prime-cuts yields than pigs with a standard 3 doses IC protocol. Immunocastrated males present higher growth rate than SC males from 40 to 105Kg of weight (Seiquer *et al.*, 2017) and also present less redness and saturation and higher drip loss in their muscles at about the same weight (100kg; Nieto *et al.*, 2017). At heavier weights (155 kg) IC males presented leaner carcasses, less intramuscular fat, higher shear force and rancidity than SC males (Martinez-Macipe *et al.*, 2016). According to Martínez-Macipe *et al.*, (2015) the effects of IC on male meat quality seem limited. Some studies were made on fresh products from IC males (e.g. García-Gudiño *et al.*, 2017) but no information is available regarding cured products (including sensorial).

Conclusions

Because of their long production cycle, which is necessary to obtain the high-grade products, sexual neutralization is needed in Alentejano and Iberian pigs. An effective IC protocol seems more easy to achieve in females than males, and the absence of possible detrimental effects of IC of females are more “clear” than in males. No studies were found on the IC effects on dry-cured products quality and finally, no studies of IC are available for AL breed. Therefore, further studies for protocol optimization and impact of IC on final high grade products from AL and IB pigs are needed.

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References: full references list and full open-access cited papers can be sent upon request to the corresponding author.