

The effects of long-term immunocastration on meat quality traits of male Bísaro pigs

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Introduction: The Bísaro pig is a Portuguese autochthonous breed (Paixão et al., 2019) known for its reported meat quality (Martins et al., 2020). The main goal of the castration of male piglets is to prevent boar taint, but it attracts a negative public response (Prunier et al., 2006). Therefore, several alternatives have been studied, such as immunocastration (Bonneau and Weiler, 2019). The slaughter of Bísaro pigs occurs generally at ages older than 13 months, requested by the cured value-added industry. Because of the precocious puberty of this breed (Paixão et al., 2020), standard protocols up to three doses are not efficient to suspend the secretion of sex steroids throughout fattening, leading to the design of a long-term immunocastration protocol specific for this breed (Paixão et al., 2021). This study aimed to compare meat quality traits between surgically castrated, long-term immunocastrated (Improvac®) and entire Bísaro males.

Materials and methods: Thirty-eight male Bísaro pigs were studied [carcass weight (CW)= 126.7±14.0 kg]. The immunocastrated pigs (IC; n=11) were inoculated at 13, 17, 19, 49 and 53 weeks old. The study also included a group of surgically castrated males (SC; n=14) and age-matched intact boars (EM; n=13). Pigs were group penned and had ad libitum access to the same growing and finishing diets. The animals were weighed every 4 weeks up to week 57 when they were slaughtered. The following meat quality traits were evaluated in the *Longissimus* muscle (LM): pH was evaluated at 45 min (pH_{45min}) and 24 h (pH_{24h}) post mortem; Drip loss was assessed after 3 days of storage at 4°C, and cooking loss at an internal temperature of 75°C, and both were expressed as the percentage of loss vs. initial weight (Honikel, 1987); meat color coordinates, L*, a*, b* were obtained after 60 min of meat blooming; shear force (N/cm²) was assessed after cooking loss (sub-samples of 1 cm² cross-section, 4 cm in length) using a Warner-Bratzler rectangular hole probe coupled to a TA.XT plus texturometer. The fatty acid profile was assessed according to Barros et al. (2020) and expressed as percentage of total fatty acids.

Results: The pH_{45min}, L*, b*, drip loss, and shear force did not differ (P>0.05) among the groups. The pH_{24h} values were lower (P<0.001) in EM (5.4±0.08) than in IC (5.6±0.11) and SC (5.6±0.13). However, cooking loss tended to be greater (P<0.001) in IC (33.6±2.32) compared to EM (28.2±3.07) and SC (24.6±1.81). IC and EM groups show higher a* values (P<0.001) than SC (22.3±1.42, 21.9±1.12, 19.4±1.28, respectively).

The saturated fatty acids (SFA) and polyunsaturated fatty acids (PUFA) did not differ among groups (P>0.05). Still, the monounsaturated fatty acids (MUFA) in the EM group were lower (47.0±0.6) than in SC (51.2±0.6) and IC (50.3±0.6) (P<0.001).

Conclusion: The long-term immunocastration protocol tested on Bísaro pigs led to a meat quality similar to surgically castrated males and entire males. The main differences lie in color, with values similar to entire males and pH_{24h}, similar to surgically castrated males. IC animals had higher values of cooking loss comparing to the other groups. Regarding fatty acid content, immunocastration caused an increase in MUFA comparing to EM, whereas SFA and PUFA were not affected by the treatments.

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