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INFLUENCE OF SEX TYPE ON CARCASS CHARACTERISTICS IN PIGS FED A PHOSPHORUS DEPLETION-REPLETION STRATEGY

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I. INTRODUCTION

The characteristics of the carcass as a final product depend both on the genetic and sexual type of pigs and on the diet with which they were fed [1, 2]. Feeding strategies such as phosphorus (P) depletion-repletion have been studied with the purpose of reducing the amount of inorganic P in feed for pigs [3]. In a previous study, it was observed that P depletion-repletion strategy did not significantly affect the bone volume in carcasses of entire male pigs [4]. However, there is few information about the effect of this feeding strategy for other pig sexual types, as well as on the characteristics of the final product. For this reason, the objective of the work was to use a non-destructive technology to evaluate carcass characteristics in pigs of different sexual types, fed with the same P depletion-repletion strategy.

II. MATERIALS AND METHODS

In this study, 70 pigs of different sexual types (entire female – EF and immunocastrated female – IF, entire male - EM, surgically castrated male - CM, immunocastrated male - IM; 14/sex: 2/pen) were fed a restricted diet (60% of the digestive requirements of P and Ca) from 10 to 19 weeks of age and a control diet (all nutritional requirements) from 20 weeks of age until slaughter. The pigs (IM and IF) were immunocastrated (Improvac®, Zoetis, Spain) at 14 and 19 weeks of age. Pigs were slaughtered on three different days, at 25 ± 1 weeks of age with an average body weight of 113.73 ± 10.45 kg. At 24 h postmortem, the left carcasses were scanned with computed tomography equipment (CT; Brilliance 16, Amsterdam, NL). The CT images were analyzed with Matlab software (version R2008b; The MathWorks™ Inc., Natick, USA) to obtain the volume associated with each Hounsfield unit (HU), and the fat, lean and bone tissue content (-149 to -1, 0 to +140 and +141 to +1700 HU, respectively) were determined (Fig. 1). In addition, the proportions of low, medium, high and very high-density bones (+141 to +499, +500 to +999, +1000 to +1499 and ≥ +1500 HU, respectively) were determined from the total bone tissue. Statistical analysis was developed in SAS software, considering the pen as experimental unit and the sexual type as fixed effect, and a Tukey test was performed to find differences between the different sexes.

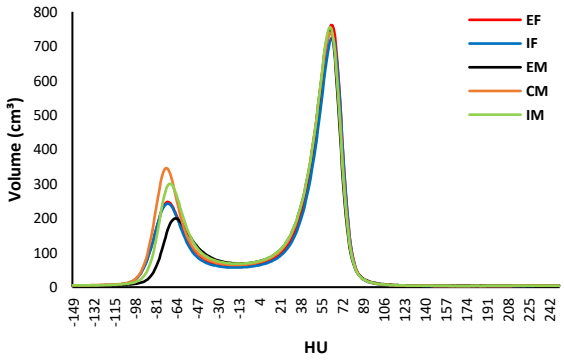


Figure 1. Histograms obtained from CT images of the carcasses for the different sexual types of pigs.

III. RESULTS AND DISCUSSION

The fat tissue content in the carcasses was affected by the sexual type of pigs ($P < 0.05$). The carcasses of the CM pigs showed higher fat content compared to the EM and IF pigs (13252.00 vs 9544.81 and 10659.00 cm^3, respectively); whereas the fat tissue content in the carcasses of the EM pigs was lower than in the CM and IM pig carcasses (Fig. 2A). Fàbrega et al. [5] found similar significant differences between the CM-EM and EM-IM pigs, attributing this behavior to higher feed consumption and lower social activity due to decreased testosterone (CM and

IM), causing greater fat accumulation. While the fat content was not significant between the EF and IF pigs, contrasting with other study [6]. There were no significant differences in lean tissue content between the different sexual types of animals (24233.80 ± 623.36 cm^3; $P > 0.05$); similar results were found in the lean meat estimation for 4 sexual types [2]. However, the carcass bone tissue content differed between the sexual types of the pigs ($P < 0.05$). Bone volume was higher in the EM pig carcasses than in those of the IF and EF pigs (2175.58, 1945.14 and 2017.09 cm^3, respectively); while carcasses of the IF pigs presented lower bone content than those of the EM, IM and CM pigs. In a study in live pigs using four sexual types, Carabús et al. [7] did not found differences in bone between sexual types.

On the other hand, the proportions of low, medium and high-density bones in the carcasses were not significantly different between sexual types (71.26 ± 1.41, 24.86 ± 1.24 and 3.74 ± 0.19%, respectively). Nevertheless, the proportion of very high-density bones was higher in the carcasses of the IF (0.18%) pigs than in those of the EM pigs (0.10%) (Fig. 2B).

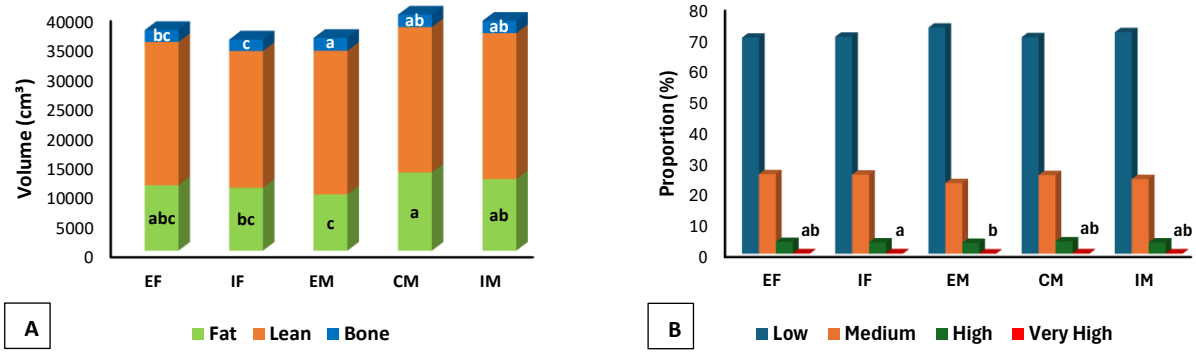


Figure 2. (A) Fat, lean and bone tissue content and (B) bone proportion in carcasses of different sexual types (Different letters show significant ($P < 0.05$) differences between sexes).

IV. CONCLUSION

The results indicate that the sexual type of pigs affect the fat and bone tissues content in the carcasses when the pigs were fed with the P depletion-repletion strategy. The CM and EM pigs had the highest fat and bone tissue volume, respectively. In addition, the pigs' sexual type only affected the proportion of very high-density bones, where the EM pigs had the lowest proportion.

ACKNOWLEDGEMENTS

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