

The Effect of Immunocastration on Some Meat Quality Characteristics

Ioana Andronie*, Monica Parvu, Constantin Nitu, Viorel Andronie

Spiru Haret University, Faculty of Veterinary Medicine: 032091 Bucharest, B-dul Energeticienilor nr.11, Romania

Abstract

Surgical castration of male pigs has become increasingly less accepted at present due to the fact that it is a direct animal welfare concern. UE welfare conditions demand that this method be dropped starting 2018 in order to eliminate the stress and associated pain it induces. Immunocastration is one of the alternatives to surgical castration that ensures male pig welfare and eliminates the boar smell of the meat. The objective of this research has been to identify the immunocastration effects on meat quality, compared with the meat from surgically castrated pigs. The animals assessed during research were fattening PIC pigs, grouped into two lots: surgically castrated pigs (SC) and immunocastrated pigs (IC). Pig immunization was achieved by means of ImprovacTM. The results have shown that immunocastrated pigs recorded a 60.2% carcass meat compared to the 59.69% carcass meat achieved in surgically castrated pigs, thus displaying statistically insignificant differences ($p>0.05$). Fat layer thickness was significantly lower in immunocastrated pigs compared to the marker lot ($p\leq 0.05$). *Mycoplasma hyopneumoniae* lung lesions recorded were lower in immunocastrated pigs compared to the surgically castrated animals ($p>0.05$). Despite the fact that differences have been statistically insignificant, we are able to confirm that immunocastrated pigs display a lower incidence of respiratory disease compared to surgically castrated pigs. In this study there were not significant differences in meat quality between surgically castrated pigs and immunocastrated pigs.

Keywords: immunocastration, meat, pigs

1. Introduction

Surgical castration is common practice in our country. According to the provisions of EC Council Directives 120/2008 on swine protection, castration may be surgically performed within seven days from farrowing and only with prior anaesthesia after the 7th day of life. The procedure is extremely aggressive and harsh as far as animal welfare is concerned [1]. Alternative methods to surgical castration are currently being promoted, based on the fact that in the past years several animal welfare aspects have been implemented, such as the ban on raising egg laying hens in non-improved battery cages and housing pregnant sows in collective boxes. The consumers'

perception regarding the gradual exclusion of surgical castration has been well accepted, as reported by several authors. Results of sensory studies have also shown that up to 75 % of consumers were sensitive to the specific boar smell which impacts pork consumption and last but not least indicates a switch of preference towards other meat quality or origin [2-4].

The successful pig immunocastration with ImprovacTM entails the administration of two vaccine doses, the first dose when piglets are at least 4 weeks old and the second dose 4 to 6 weeks prior to their slaughter.

The purpose of this study was to monitor and assess the effects of pig immunocastration on some meat quality characteristics.

* Corresponding author: Andronie Ioana,
ioanaandronie@gmail.com

2. Materials and methods

The study was performed in two pig fattening farms (A and B), both run by up-to-date management practices and fully equipped modern technologies. The animals undergoing the study were PIC fattening pigs (n: 1089), grouped into two lots: surgically castrated pigs SC (n: 485) and immunocastrated pigs IC (n: 604). The study was carried out under the current raising conditions in the two pig fattening farms.

The pigs were grouped into two lots according the castration technique applied: lot A (n: 485) surgically castrated (SC) pigs and lot B (n: 604) immunocastrated (IC) pigs.

Surgical castration was performed during the first week after farrowing with prior anaesthesia, by the veterinarian, in compliance with the applicable regulations regarding piglet protection.

Immunocastration was performed to lot IC, in accordance with the ImprovacTM vaccination protocol. The first dose of vaccine was administered to male, non-castrated, clinically healthy piglets during their 9th week of life, while the second dose of vaccine was administered to the same lot 6 weeks prior to their slaughtering. The minimum four week interval between the two inoculations was observed, as per protocol.

Prior to their slaughtering, the pigs immunocastrated by ImprovacTM were assessed in order to ascertain their double vaccine inoculation. The assessment of vaccine effectiveness tested behavioural displays (freshening bounce, aggressiveness), testicle volume, and fodder consumption.

The study also monitored the slaughtering stages by assessing the rate of carcass meat, thickness of dorsal fat layer and lung exam.

Data obtained were ANOVA statistically processed in order to be able to compare the two lots.

3. Results and discussion

At farm A, lot IC recorded 60.2% carcass meat (Figure 1) compared to 59.69% recorded in the surgically castrated pigs. The results show that the differences are statistically insignificant ($p > 0.05$).

At farm B, the rate of meat in lot IC (Figure 2) recorded 59.08 % carcass meat, 0.09% lower than in the surgically castrated pigs (59.17 %), thus

displaying statistically insignificant differences ($p \geq 0.05$).

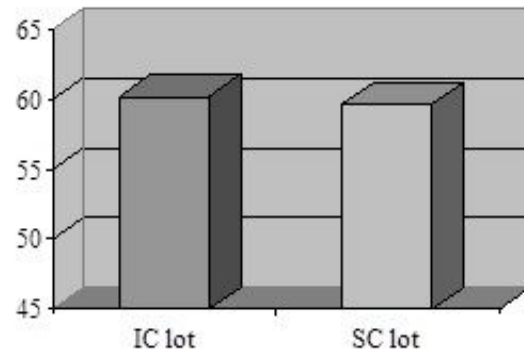


Figure 1. Carcass meat (%) recorded at farm A

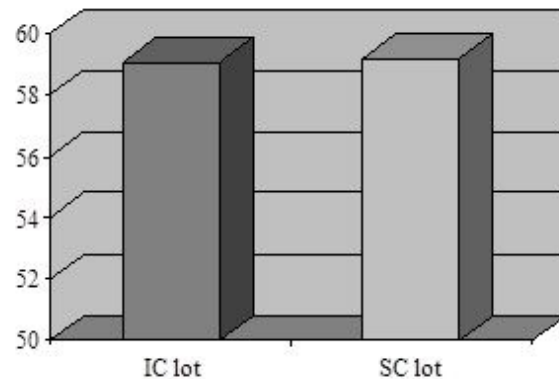


Figure 2. Carcass meat (%) recorded at farm B

The results of other studies have shown that there is no difference in meat quality between the immunocastrated and surgically castrated pigs and the meat from immunocastrated pigs was accepted by consumers [4-6].

Thickness of dorsal fat layer (Figure 3) was different in the two lots, namely narrower in the immunocastrated pigs than the SC lot, with an average of 5 mm ($p \leq 0.05$). The differences reached up to 3% in the case of meat rate, in favour to carcasses from immunocastrated male pigs.

Also, Gispert et al. (2010) [5] reported that surgically castrated males had the thickness of the dorsal fat layer higher than immunocastrated pigs. As far as lung lesions were concerned, examination in the slaughter house revealed that lot SC (Figure 4) displayed an average of 9% respiratory surface impacted and 25% incidence of *Mycoplasma hyopneumoniae* incurred lesions compared to lot IC, which displayed only 5%

respiratory surface impacted and 20% incidence of *Mycoplasma hyopneumoniae* incurred lesions.

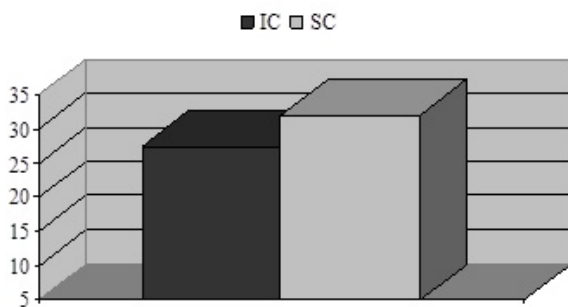


Figure 3. Thickness of dorsal fat layer

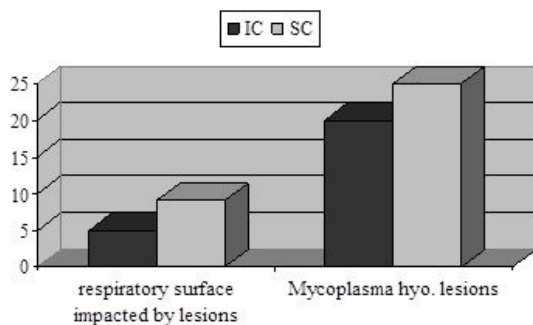


Figure 4. Lung lesion incidence (%)

The results obtained offer the grounds to conclude that immunocastrated pigs have displayed a lower incidence of respiratory disease compared to surgically castrated pigs ($p > 0.05$).

4. Conclusions

Immunocastration did not produce changes in carcasses, as the latter were similar to those from surgically castrated pigs. % carcass meat was not significantly higher in the tested lot compared to the SC lot. Carcass uniformity was achieved to a higher extent in immunocastrated pigs as far as the meat percentage was concerned.

Significant effects were recorded in the dorsal fat layer thickness, with considerably lower thickness in immunocastrated pigs compared to the surgically castrated ones.

Lung incidence of *Mycoplasma hyopneumoniae* incurred lesions was 5% lower in immunocastrated pigs compared to the surgically castrated animals, which reaffirms the conclusion that immunocastrated pigs displayed a decreased incidence of respiratory disease compared to surgically castrated pigs.

References

1. EFSA, Welfare aspects of the castration of piglets. Scientific report of the scientific panel for animal health and welfare on request from the commission related to welfare aspects of the castration of piglets European food safety authority AHAW / 04 – 087, http://www.efsa.eu.int/science/ahaw_opinions/512_it.html.
2. Ge Backus, CAMPIG: consumer acceptance in the EU and in 3rd countries of pig meat obtained from male pigs not surgically castrated, Workshop on alternatives to pig castration, 2015, Brussels.
3. Bonneau M., Prunier A., Alternatives to piglet castration. In Proceedings of the 56th European association of animal production, 2005, S27: 5–8 June, Uppsala, Sweden.
4. Font i Furnols M., Gispert M., Guerrero L., Velarde A., Tibau J., Soler J., Hortos M., García-Regueiro J. A., Perez J., Suarez P., Oliver M.A., Consumers' sensory acceptability of pork from immunocastrated male pigs, *Meat Science*, 2008, 80: 1013-1018.
5. Gispert, M., Oliver, M. À., Velarde, A., Suarez, P., Perez, J., Font i Furnols, M., Carcass and meat quality characteristics of immunocastrated male, surgically castrated male, entire male and female pigs, *Meat Science*, 2010, 85: 664-670.
6. Pauly C., Spring P., O'Doherty J.V., Ampuero Kragten S., Bee G., Growth performance, carcass characteristics and meat quality of group-penned surgically castrated, immunocastrated (Improvac®) and entire male pigs and individually penned entire male Pigs, *Animal*, 2009, 3:1057–1066.