**Immunocastration in Fattening Pigs and its Effects on Productive Performance**

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**Abstract**

According to the European and national legislation which set the minimum standards for pig protection, the castration of piglets after the age of seven days must be performed only under prolonged anaesthesia and analgesia. As far as welfare is concerned, pig castration in these conditions is mandatory in order to reduce to the minimum the pain generated by the surgical method itself. Immunocastration is an alternative method to surgical castration based on the use of antibodies against the gonadotropin releasing hormone (Gn-RH), which once neutralized suppresses testicles development and function and inhibits the smell of boar. The aims of this study were to see the immunocastration effects on productive performance in pigs PIC hybrids. Animals included in the study were PIC fattening pigs, grouped in two groups: A lot (n: 485) - surgically castrated pigs, and B lot (n: 604) - immunocastrated pigs. The fattening technology was identical for all pigs included in this study. Pigs’ immunization was performed using Improvac®. The results obtained showed that A lot recorded a daily average weight gain of 785 g, while loss due to mortality was 2.82 %. In the case of lot B, the recorded daily average weight gain was 834 g (49 g higher than the one in lot A), while loss due to mortality were 2.59 % (0.23 % lower than in lot A). Pig immunocastration is an acceptable method as far as welfare standards are concerned, reducing the stress generated by surgical castration. Productive performance in immunocastrated pigs are improved compared to the one of surgically castrated pigs.

**Keywords**: immunocastration, pig, productive performance

**1. Introduction**

According to EC Directive 91/630 amended by the EC Directive 2001/93/EC and to NSVA Order 202/2006 [1, 2], piglets younger than three weeks may be surgically castrated only under anaesthesia and by a veterinary surgeon. As far as welfare is concerned, pig castration under anaesthesia and supplementary medication will reduce to the minimum the pain and stress generated by the surgical method itself [3, 4]. Renouncing surgical castration and slaughtering the pigs at a lower weight does not affect their welfare but they may raise significant economic issues as the meat may be refused for sale due to its characteristic boar smell.

A survey carried out by some researchers, demonstrated that scientific experts perceive immunocastration as much a better method than surgical castration under anaesthesia and all have seen an increase in animal welfare that will be easier to implement and will make more economic sense [5, 6]. To this end, use of alternative techniques that will prevent the meat from smelling at slaughtering are very useful as far as animal welfare is concerned, however there are pork producers that are concerned that using these techniques may negatively influence consumers due to their not knowing what they consist of [7]. Immunocastration is one of these methods and it is based on the use of antibodies against the gonadotropin releasing hormone (Gn-RH). By neutralising this hormone, testicles development and function is suppressed, which will inhibit the appearance of boar smell of meat. Pigs thus immunized by the first dose of Improvac® will
retain all testicular functions until the administration of the first dose, which will trigger a strong immune response against FEGn and will lead to temporary immunological castration. This will directly control the androstenone production and by removing the suppressing effect of testicular steroids on the hepatic metabolism will indirectly reduce the skatole levels.

2. Materials and methods

Animals participating in the study were fattening pigs (n: 1089), PIC hybrids. The raising technology was the same for all pigs participating in the study and the animals were monitored after they had been marked on the production line. The pigs were grouped in two lots based on the castration technique applied: lot A (n: 485) surgically castrated pigs and lot B (n: 604) immunocastrated pigs.

The surgical castration of animals participating in the study (lot A) was carried out according to the applicable regulations regarding piglet protection - during the first week of life, with analgesics and performed by a veterinary surgeon. Immunocastration was performed on animals from lot B according to Improvac® vaccination protocol. Intramuscular vaccine administration of the first dose (2 ml) was performed on all non-castrated clinically healthy, nine week old male pigs, at the same time of their transfer from the growing pig sector to the fattening sector, while the second vaccine dose was administered six weeks prior to their slaughtering. The minimum four week interval between administrations was observed, as per protocol. Prior to their slaughtering, all vaccinated male pigs were examined in order to make sure that they had received both vaccine doses. Examination of vaccination efficiency consisted of monitoring the behavioural displays (mounting, aggressiveness), testicle volume, and fodder consumption.

Data obtained were statistically processed (by ANOVA) in order to compare the two lots.

3. Results and discussion

Results obtained for lot A – surgically castrated pigs during study period (Figure 1), have indicated a daily average weight gain of 785 g, 110 days of fattening period, mortality related loss amounting up to 2.82 %. Fodder conversion rate reached 2.89 kg/kg of weight gain, while the average delivery weight was 108.6 kg.

![Figure 1. Productive performance in lot A recorded during study](image)

Lot B – immunocastrated pigs (Figure 2), have recoded the following results: 834 g daily average weight gain, fattening period – 106.7 days, mortality related loss 2.59 %. Fodder conversion rate recorded was 2.7 kg fodder consumption/kg weight gain, while the average delivery weight was 112.3kg.

![Figure 2. Productive performance in lot B recorded during study](image)

It should be noted that following the first vaccine dose administration no change of animal behaviour or testicle size was recorded, as its role was to alert the immune system. Following the second vaccine dose administration the animals were calmer, without displays of aggressiveness or mounting, their weight, appetite and gain increased and approximatively two weeks after the second vaccine dose administration testicle size was reduced.
Comparing the above data to the results recorded for lot A we marked an increase of 6.2% of the daily average weight gain as opposed to the surgically castrated pig lot (p > 0.05), fattening period was three days shorter and mortality related loss was 8.1% lower compared to those of lot A (p > 0.05). Recorded fodder conversion rate was 7% less per 1 kg of weight gain in lot B compared to lot A, while the animal average delivery weight was 3.7 kg higher in lot B compared to lot A. The results were statistically non-significant.

As indicated by other studies, results obtained by our research have shown differences between groups concerning weight recorded at the beginning of the experiment and at the time of second vaccine dose administration. Moreover, the differences significantly increased at the end of the experiment when weight was lower in surgically castrated pigs compared to the immunocastrated ones [8, 9, 10]. Some studies suggested that immunocastrated male performance was similar to that of adult males until the second vaccine dose administration and following administration it would approach the value of surgically castrated pigs [11]. Immunocastration advantages are given by the fact that it minimizes the surgical castration related stress and similarly reduces post-surgical castration infections, hernias, pneumonia impact, pleuritis and related mortality.

4. Conclusions

Active immunization against FEGn is an alternative to pig surgical castration when productive performances are taken into consideration.

A 6.2% increase of daily average gain in immunocastrated pigs compared to the castrated lot is a considerable economic benefit for the farmer for a 100 day fattening period, together with the reduction of the fattening period by three days compared to the castrated lot.

References