

# Immunocastration: Is it an Effective Alternative to the Surgical Castration of Male Pigs?

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## Introduction

Surgical castration of young male piglets to prevent boar taint and aggressive behaviour is routine practice in the pork industry worldwide. This essay looks at the effectiveness of immunocastration as an alternative to surgical castration in terms of its impact on boar taint, meat quality and animal welfare.

## Discussion

Boar taint is an unpleasant odour and flavour in pork meat caused by the accumulation of androstenone and skatole in the adipose tissue of intact boars. Although surgical castration has been known to cause increased cortisol concentrations and stress vocalisations, it is commonly performed without any anaesthesia or analgesia (Sutherland *et al.*, 2012). Rising animal welfare concerns are placing increased pressure on producers to stop surgical castration and look at alternatives. Recent studies have concentrated on comparing the impact of rearing entire males, surgical castration, and immunocastration on boar taint, meat quality and overall welfare.

Immunological castration using Improvac™ has been used in Australia and New Zealand since 1998 (Aleksic *et al.*, 2012). Improvac™ works by stimulating the formation of specific antibodies against GnRH. As a result, the hypothalamic-pituitary-gonadal axis is disrupted, temporarily inhibiting testicular function (Albrecht *et al.*, 2012). Successful application involves two doses, the first usually given at 8 weeks of age, the second 4-6 weeks before slaughter (Aleksic *et al.*, 2012).

A study conducted by Aleksic *et al.* (2012) investigated the effectiveness of immunocastration in preventing boar taint. Androstenone and skatole concentrations were measured in adipose tissue taken from three groups of 30 crossbred boars (Landrace/Yorkshire dams X Duroc/Pietrain sire) including surgically castrated pigs (SC), entire males (EM) and immunocastrates (IC). The study found that skatole concentrations in EM were significantly higher than the average level found in SC and IC. Androstenone content in adipose tissue of IC was below the limit of detection while, in EM, androstenone content averaged  $0.66 \pm 0.13$  mg/g. This agrees with results reported by Skrlep *et al.* (2012) showing that concentrations of androstenone and skatole in IC and SC boars were below the sensory threshold that can cause boar taint. The results obtained in both studies indicate that immunocastration is an effective alternative to surgical castration in preventing boar taint.

In addition, studies have also shown superior production performance in immunocastrates compared with surgical castrates. Immunocastrates tend to have better feed efficiency and higher food intake, resulting in faster growth compared to SC pigs (Batorek *et al.*, 2012). It is believed that the interim between the first and second vaccination enables exploitation of boar-like growth potential (Skrlep *et al.*, 2012). Skrlep *et al.* (2012) looked at the effect of immunocastration on carcass traits and meat quality. The study was undertaken in commercial rearing conditions with random allocation of male crossbred piglets (Large White Landrace dams X Duroc boars) to three treatment groups, including surgical castrates (n=20), entire males (n=19) and immunocastrates vaccinated at 11 and 20 weeks of age (n=21). In terms of the carcass, IC was intermediate for all fat-deposition traits with a 2.4% leaner carcass than surgically castrated pigs. Both EM and IC had significantly less fat deposits than SC. Looking at meat quality, intramuscular fat content for IC (1.5%) was lower than SC (1.9%) but was similar to EM. IC also had a lower drip loss than EM and SC. Drip loss assesses the water-holding capacity of meat – high drip loss is correlated with a reduction in meat yield and quality. With a leaner carcass than SC and a lower drip loss than EM, these results suggest that along with better growth performance, immunocastrates have superior carcass and meat quality.

Apart from eliminating boar taint, removal of testicular hormones (in surgical castrates) also reduces aggression and sexual behaviour. When considering the impact on animal welfare, it's important to

take into account that immunocastrated pigs are essentially entire males until after the second vaccination. Entire males tend to spend more time engaging in social, aggressive and sexual behaviour than castrated males (Albrecht *et al.*, 2012). Albrecht *et al.* (2012) compared the influence of immunocastrates, intact boars and barrows on agonistic and mounting behaviour. In this study, two successive batches of 33 and 39 male fattening pigs ((Large White X Landrace) X Pietrain) were allocated to three treatment groups: immunised males (IM), castrated males (CM) and entire males (EM). Behavioural traits were assessed from analysis of video recordings taken for 96 hours during test periods. Test periods 1 and 2 were carried out before and after second vaccination, respectively.

During test period 1, IM performed significantly more agonistic and mounting behaviours (number of mountings and total mounting time) than SC, with levels comparable to those of EM. Studies show that mounting behaviour can result in skin lesions, leg problems and high levels of stress and fear in those frequently mounted (Albrecht *et al.*, 2012). While EM maintained high frequencies of mounting, following the second vaccination, IM showed a significant decrease in mounting behaviour. Fight time and duration was also significantly decreased in the IM group to levels comparable to SC. Interestingly, less agonistic behaviour was observed in all treatment groups, indicating aggression levels will decline over time if groups remain stable. However, one limitation of this study was that aggressive behaviour was not tested over a particular resource, such as food. Considering other authors believe aggression is resource-related, the behaviour of the pigs could have been affected by other factors not included in this study (Albrecht *et al.*, 2012).

## Conclusion

Immunocastration is an effective welfare-friendly alternative to surgical castration. Vaccination with Improvac™ effectively reduced boar taint compounds without affecting meat quality (Skrlep *et al.*, 2012; Aleksic *et al.*, 2012). Moreover immunocastrated pigs demonstrated better production performance than surgical castrates with higher growth rates and leaner carcasses (Skrlep *et al.*, 2012). Although welfare may have been temporarily compromised between vaccinations, the second vaccination effectively reduced aggressive and sexual behaviour to levels comparable with those of surgical castrates (Albrecht *et al.*, 2012). Therefore, immunocastration can be considered as an effective alternative for improved animal welfare when compared with surgical castration and rearing entire boars.

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