



International 58th Meat Industry Conference “Meat Safety and Quality: Where it goes?”

Immunocastration of male pigs – situation today

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Abstract

Immunological castration of male pigs is an attractive alternative to surgical castration and nowadays is increasingly used in many countries to reduce boar taint and improve pork quality. Moreover, immunocastrated pigs showed reduced sexual and aggressive behaviour compared to entire male pigs, thus improving animal welfare. Carcass and meat quality parameters generally do not differ between immunocastrated and surgically castrated male pigs.

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1. Introduction

The history of surgical castration of male pigs dates back to 4000-3000 BC. Surgical castration is used to reduce aggressive behavior and produce taint-free meat by prevention of skatole and androstenone accumulation in fat. Nowadays, surgical castration is regarded as a stressful intervention with negative effects on animal health and welfare. Additionally, raising entire male pigs is more profitable because of leaner carcasses and improved feed conversion. The higher protein content in carcasses from entire males might indicate nutritional advantages of this meat compared to that from castrates. On the other hand, entire male pigs express their natural behavior including attempting to mate and fight which negatively affects animal welfare and causes difficulties in management.

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Alternative ways of rearing male pigs are being evaluated to address issues of boar taint and aggressive behavior. Active immunization against gonadotropin-releasing hormone (GnRH; also referred to as luteinizing hormone-releasing hormone, LHRH), so called immunocastration, is an attractive alternative to surgical castration. The use of immunocastration of pigs is increasing, with approximately 1.3 mill pigs being vaccinated worldwide every month using Improvac. In Scandinavia, however, there is no systematic use of immunocastration, even though its use has been approved (N Wuyts, Zoetis, personal communication, 19/05-2015).

This review provides an update of recent progress in the field of improving pig welfare by the means of immunocastration.

2. Aim and principles of immunocastration

The aim of immunocastration is to deactivate testicular functions by neutralization of the hormones of the hypothalamic-pituitary-gonadal axis. Basically, this involves vaccination of animals against either the pituitary luteinizing hormone (LH) or the hypothalamic gonadotropin-releasing hormone (GnRH), both are key hormones that regulate reproductive function. GnRH vaccination involves the injection of GnRH analog conjugated to a foreign protein and combined with an adjuvant, to initiate transient formation of anti-GnRH antibodies that can bind and inhibit the action of endogenous GnRH. Improvac, the vaccine against boar taint, developed in Australia and produced by Zoetis (formerly Pfizer Ltd., formerly CSL Limited, Parkville, Victoria, Australia), is approved in over 60 countries worldwide and has been in commercial use in the EU since 2009.

3. Quality of meat from immunocastrated pigs

3.1. Boar taint levels

Both androstenone and skatole are reduced in tissues from immunocastrated pigs to the levels found in surgically castrated pigs. Androstenone production is suppressed as a consequence of suppressed testicular development. The decrease in intestine-originated skatole is most likely due to increased hepatic metabolism and subsequent clearance in the absence of testicular steroids, particularly androstenone and oestrogens^{1,2}.

3.2. Carcass and meat characteristics

Generally, carcass-quality parameters did not differ between entire, surgically castrated and immunocastrated male pigs^{3,4}. Minor differences were found for dressing percentage (lower for immunocastrated) and lean meat content (highest in entire male pigs and lowest in surgically castrated pigs). Fuchs et al.⁵ observed leaner bellies from immunocastrated than surgically castrated pigs, although in another study no differences between immunocastrated and surgically castrated pigs were found⁶.

Studies investigating meat quality parameters in immunocastrated pigs also showed conflicting results. Aluwé et al.⁷ observed lower ultimate pH and higher cooking loss in meat from entire male pigs compared to immunocastrated. However, for the majority of meat quality parameters, there were no significant differences between immunocastrated and surgically castrated pigs⁷.

Generally, it can be concluded that carcass and meat characteristics are comparable between immunocastrated and surgically castrated pigs.

4. Animal health and welfare

From a welfare perspective the procedure of injecting the vaccine is obviously less harmful to the pig compared to surgical castration without anesthetics or analgesics. On the other hand, immunocastrated pigs behave as entire male pigs until after administration of the second vaccine and thus display increased aggressive behavior^{4,8}. However, after the second vaccination, aggressive behavior and mounting are reduced to the level of surgically castrated pigs⁹.

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