

Castration and alternatives in pig: advantages and disadvantages

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This article reviews the advantages and disadvantages of various alternatives to the surgical castration of piglets. Producers use castrations against boar taint which is present in the meat. Alternative methods could be immunocastration, production with entire male pigs or castration with anesthesia and/or analgesia. Production with entire male pigs means to feed pigs to lower carcasses, as the boar taint is very low at that time. But this method is not suitable for all especially if pigs need to be fattened up to 180–200 kg. Castration with anesthesia and analgesia reduces pain and is suitable for welfare but the cost of anesthesia and analgesia is high for some producers. The expense of immunocastration is also higher than for entire pigs but advantages of this method are higher meat percentage, better carcass quality, improved feed conversion ratio.

Keywords: castration, immunocastration, boar taint, entire male pigs, castration with anesthesia or analgesia

1 Introduction

The pork producers castrate male piglets to reduce boar taint – formed by the compounds androstenone and skatole, which cause an undesirable odor in the meat and for controlling sexual and aggressive behavior. Surgical castration is usually performed without anesthesia or analgesia. Castration is painful procedure for male piglets (Prunier et al., 2006) and may adversely affect performance (von Borell et al., 2009; Aluwé. et al., 2014). Newborn piglets begin to perceive within minutes to hours after birth (Mellor et al., 2004; Mellor et al., 2003). For these reasons many European countries committed to stop surgical castration by 2018, provided that suitable alternative solutions would be found. Some countries started to use alternatives without pain relief. But there are still many surgically castrated piglets in EU (75% from all piglets). At this time none of the available alternatives are fully satisfying.

Male piglets castrations can be performed by:

- In the case of piglets less than seven days old, castration shall only be carried out by a veterinarian doctor or a person who has required knowledge in animal welfare and who has skills in the

implementation of these techniques with adequate facilities and hygiene conditions (Bee et al., 2015).

- For piglets over 7 days of age, castration may only be performed under anesthesia and long-term analgesia under the supervision of a veterinarian (Bee et al., 2015).

2 Castrations and alternatives methods in pigs

2.1 Immunocastration

Immunocastration is one of the leading and very useful alternative methods to surgical castration. It is an active method (vaccination) against gonadotropin-releasing factor (GnRF) (Batorek et al., 2012). It is used to reduce the production of sex hormones in male piglets. In females piglets suppresses the ovarian cycle. Immunocastration shows no inner chemical or hormonal activity (Dunshea et al., 2001; Bohrer et al., 2014; Čandek-Potokar et al., 2017).

The vaccination procedure consists of the administration of two subcutaneous doses at least four weeks apart, a second dose being given four to six weeks before

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slaughter. To reduce testosterone and androsterone levels in piglets, we apply a second dose. This causes the resulting levels of androsterone and testosterone to be very similar to those in castrated pigs within two weeks (Brunius et al., 2011). The resulting quality of the meat may be affected by the time between the last vaccination and slaughter (Aluwé et al., 2013). Results which we get could be very depending on genetics (D'Souza and Mullan, 2003) and feeding process (Needham and Hoffman, 2015).

For vaccination of male piglets against boar taint it can be use Improvac (made by Pfizer Ltd.) which is approved and licensed for the using in the EU. Some non EU countries like Australia, Brazil, Mexico and New Zealand also use Improvac (Tuytens, 2011). Improvac is not a typical vaccine. The difference between improvac and other vaccines is that a typical vaccines induce the production of antibodies against a foreign pathogen while improvac stimulates the production of antibodies against GnRH.

When immunocastration was introduced as alternative methods to surgical castration, some customers were skeptical. It was from the fear for residuals in meat and unknown long-term consequences to consumer. Customers also expected that the use of vaccination could become more expensive in final pricing. Customers were in two groups, first thought that immunocastration is a more humane method for reducing pain and the second one had doubts about the welfare benefits of the method. Some customers also commented that this had to be some sort of a hormone, which was considered as negative. Most of the customers thought that present practice (surgical castration) is fully acceptable and for this reason can't see necessity of an alternative. In summary most studies reported acceptance of immunocastration from consumer side (Lagerkvist et al., 2006; Giffin et al., 2008;), but we can find studies in Switzerland (Huber-Eicher and Spring, 2008) and from Norway (Fredriksen et al., 2010) which reported better acceptance for castration with anaesthesia than for immunocastration.

Advantages: without castration, there is a smaller chance for complications or possible infections in case of cryptorchidism or inguinal hernia, better feed conversion ratio, increased meat content and good quality of the carcass (Aluwé, 2015).

Disadvantages: possible chance of accidental self-vaccination, high product costs, challenging evaluation of the success of the vaccination, sometimes a third vaccination is required, currently limited market options, producers question the necessity of immunocastration because the prevalence of boar taint was low when producing EM (Aluwé, 2015).

2.2 Entire male pigs

Another alternative method to surgical castration is production with entire male pigs. The main problem with this method is that entire male piglets could be aggressive and have a more active sexual behaviour, which is not good for welfare. Researches point out, the standard behaviour may cause and increase in prevalence of lameness or cutaneous lesions (Holinger, 2015). Aggression occurs in groups of whole male pigs, that can lead to chronic stress. For welfare, stress is perceived as an undesirable factor that affects health and behavior. Stress can be described as a situation of threatened homeostasis or perceived threatened homeostasis due to a short-term (acute) or long-term, mostly repeated (chronic) stressor (Moberg, 2000).

Some countries like England, Spain, Ireland, Netherlands etc. have started to feed pigs to lower carcasses because the boar taint is very low at that time. Local farmers in these countries have good expertise to manage such farms. Breeding of piglets needs to have good management and housing conditions have to meet their specific needs (good staff, quality food with lot of nutrition, optimal space) which is really important in lower weight categories. Breeding piglets to lower weight categories as alternative method to surgical castration is a more acceptable way because this method respect the physical integrity of the animals. But this method is not suitable for all farmers because some pigs need to be fattened up to 180–200 kg. With a low risk of boar taint, pigs can be fed to a weight of 100–110 kg bodyweight (Dostálová et al., 2008). Adam (1978) evaluated androstenone levels in different live weights of 60, 75 and 90 kg in his study. Pigs at 60 kg showed an androstenone level in the range of 0.4 to 1.0 mg g⁻¹, while pigs at 90 kg had a range of 0.5 to 2.6 mg g⁻¹.

Advantages: without castration, simple, less labour, increased meat content and good quality of the carcass, better feed conversion ratio, there is a smaller chance for complications or possible infections in case of cryptorchidism or inguinal hernia (Aluwé, 2015).

Disadvantages: do not eliminate aggressive, active and sexual behaviours, increased probability of lame piglets (Aluwé, 2015).

2.3 Castration with anesthesia and/or analgesia

Many countries banned surgical castration of piglets without anesthesia, and in these countries are piglets castrated with full or local anesthesia and analgesia. In these countries if breeders want to get a higher quality certificate, they must perform castration with at least analgesia. It must be noted that analgesia during castration reduced pain and doesn't eliminate it

sufficiently. Therefore, if castration is necessary, it should be performed under effective anesthesia and analgesia to reduce post-operative pain (Némethová, 2018).

Using local anesthesia (LA) before castration could to have a positive effect on long term weight gain of pigs, indicating that this technique is good for welfare for pigs and also has economic benefits for producers (Telles, 2016).

Advantages: less painful for animal (during and after castration), increased wound healing and decreased inflammation, better active behaviour after the procedure (Aluwé, 2015).

Disadvantages: no demonstrable changes for welfare, expensive cost, no major changes in behavior, for whole procedure piglets must get three injections, (two for castration and one for analgesic) (Aluwé, 2015).

3 Conclusions

Of these alternative castration methods, we are unable to accurately determine which is the best. Each mentioned alternative has its positive and negative characteristics. The final decision and the choice of method will be determined by the specific breeders on the basis of their conditions. In the future, if there is a total ban on classical castration, exemptions should be granted to production systems which have high constraints pertaining to a high slaughter weight, a high fat content of the products, or outdoor rearing.

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