

EFFECTS OF A BOAR TAIN T VACCINE, IMPROVAC® ON TESTICULAR FUNCTION AND BOAR TAIN T IN SURGICALLY CASTRATED MALE PIGS

Jasbir Singh^{1*}, PC Kok², JS Fajardo², CS Lee² and D Hennessy³

¹Veterinary Research Institute, Ipoh, Malaysia

²Sunzen Corporation Sdn Bhd, Shah Alam, Malaysia

³Pfizer Animal Health, Parkville, Vic, Australia

*Corresponding author (phone: +06-09-7717127; fax: +06-09-7717132; e-mail: jasbir@umk.edu.my)

Abstract— The present practice in Malaysia of castrating male pigs to avoid the boar taint smell in pork is not in accordance to good animal welfare. Castrated males are also known to have poorer growth performance. Pfizer's Improvac boar taint vaccine has been proven to overcome the above issues. A field trial for the vaccine was recommended in Malaysia under the supervision of the Department of Veterinary Services, Malaysia to ensure the safety, potency and efficacy of the vaccine under local conditions. Twenty male pigs were recommended for the trial (10 vaccinated and 10 controls). Several parameters such as the body weight and testes width were measured and recorded at appropriate intervals. There was a slight increase in the weight gain and a significant decrease in testes size in the vaccinated pigs as compared to the non-vaccinated animals. This study demonstrated the efficacy of Improvac vaccine in suppressing testes function, testes growth and in controlling boar taint compared to surgical castrates.

Index Terms – boar taint, testicular function, surgically castrated, vaccine

I. INTRODUCTION

There is an increasing worldwide consumer demand for pork with more lean meat and less fat content. Due to this reason, raising intact (uncastrated) male pigs is attractive. The intact male pig has better feed conversion efficiency and a leaner carcass due to its functioning testis compared to the surgically castrated pig. There are also obvious advantages in animal welfare by avoiding surgical castration. However, pork from intact male pigs may exhibit an offensive odour, described as boar taint, which results in the pork being unacceptable to many consumers. The compounds responsible for boar taint include skatole (3-methylindole), a product of tryptophan breakdown in the gut and testicular 16-androstene steroids, mainly androstenone (5 α -androst-16-en-3-one), and these compounds are accumulated in fat tissue. Virtually 100% of boars in Malaysia are castrated to control boar taint. Active immunization against androstenone has been tried, but the effects on fat androstenone level and boar odour intensity were insufficient (Bonneau et al., 1994). More successful method of inhibiting sexual development in young boars and boar taint is immunization against gonadotropin releasing hormone (GnRH) to block the activity of GnRH and thereby "switch-off" the reproductive endocrine systems. In most experimental studies using GnRH vaccines during the eighties and early nineties several injections were required and/or severe local reactions at the site of injection were obtained due to the adjuvants (e.g. Falvo et al., 1986; Hagen et al., 1988; Bonneau et al., 1985). The objective of this study was to evaluate the efficacy of a boar taint vaccine, Improvac (Pfizer Animal Health), in reducing testicular function and boar taint in pigs under Malaysian conditions.

II. MATERIALS AND METHODS

Twenty male pigs were used, 10 castrates and 10 vaccinated with Improvac. At least 2 male pigs within a litter were randomly assigned to either the castrated or Improvac group. Castration was performed when the pigs were approximately 3-7 days of age using the normal practices for the farm. At three months of age, pigs found to be suitable for the study were moved to a single pen. Castrates and Improvac vaccinates were co-housed together. Animals were weighed at 7, 84, 140 and 169 days of age respectively. The 1st dose of Improvac was administered at approximately 9 weeks prior to slaughter (around 16 weeks of age). The 2nd dose was administered at 5 weeks prior to slaughter or around 20 weeks of age. Both doses were delivered with a 0.5 inch, 16-gauge needle at the neck behind the ear using a safety vaccinator. Blood samples were collected from all pigs at the time of the 2nd dose, again two weeks after the 2nd dose of Improvac and a final sample was collected on the day prior to slaughter. On each occasion when the pigs were restrained for bleeding, each Improvac vaccinate also had the width of their testes measured. At the end of the trial, both Improvac vaccinates and castrated pigs were slaughtered as is routinely performed in the farm and their belly fat analysed for boar taint compounds.

III. RESULTS AND DISCUSSION

Average daily weight gain over the duration of this study (84 to 169 days of age) was similar between both groups – castrates 0.89 g/day compared to Improvac vaccinates 0.91 g/day (Table 1). Testosterone was not detectable in the castrated pigs at all 3 time points. In the Improvac vaccinates, high concentrations of testosterone were recorded at the time of 2nd vaccination. However, at 2 weeks after the 2nd vaccination and prior to slaughter, testosterone in the Improvac vaccinates was not detectable. Testicular width in the Improvac vaccinates decreased significantly following the 2nd dose. Androstenone, the main boar taint compound, was not detectable in the belly fat from both the castrates and Improvac vaccinates. Mean skatole levels, while measurable in both groups, were well below the commonly used sensory threshold of 0.20 µg/g and not significantly different.

Table 1: Mean testosterone, testes size and the boar taint compounds skatole and androstenone in castrates and Improvac vaccinates.

Criteria	Castrates	Improvac
Testosterone (nMol) at 2 nd dose (20 weeks of age)	ND	4.42
Testosterone (nMol) 2 weeks post 2 nd dose (23 weeks of age)	ND	ND
Testosterone (nMol) at slaughter (25 weeks of age)	ND	ND
Paired testes width (mm) at 2 nd dose (20 weeks of age)	-	118
Paired testes width (mm) at slaughter (25 weeks of age)	-	86
Skatole in fat, mean (µg/g)	0.067	0.070
Androstenone in fat (µg/g)	ND	ND

ND = testosterone level below the limit of detection (0.17 nMol); androstenone level below the limit of detection (0.1 µg/g).

IV. CONCLUSION

The study confirms that Improvac is effective under Malaysian conditions in suppressing testicular function and is as effective as surgical castration in the control of boar taint. It also provides a humane alternative to overcome boar taint in entire boar.

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REFERENCES

- Bonneau M, Dufour R, Chouvet G, Roulet C, Meadus W, Squires EJ: The effects of immunization against luteinizing hormonereleasing hormone on performance, sexual development, and levels of boar taint-related compounds in intact male pigs. *J Anim Sci* 1994, 72:14-20.
- Falvo RE, Chandrashekar V, Arthur RD, Kuenstler AR, Hasson T, Awoniyi C, Schanbacher BD: Effect of active immunization against LHRH or LH in boars: reproductive consequences and performance traits. *J Anim Sci* 1986, 63:986-994.
- Hagen G, Andresen Ø, Blichfeldt T, Berg KA: Effects of immunization of young boars against gonadotropin releasing hormone. *Proceedings from the 11th Int Congr Anim Reprod & AI Dublin* 1988, 1
- Williamson ED, Patterson RLS, Buxton ER, Mitchell KG, Partridge IG, Walker N: Immunization against 5 α -androstenone in boars. *Livest Prod Sci* 1985, 12:251-264.

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