

**PE7.39 Impact of using vaccination with Improvac® on the sensory perception of meat from finishing male pigs 365.00**

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**Abstract—Boar taint is a sensory perception and the subjective sensory assessment of pork eating quality is one way to test the efficacy of any method of boar taint control. In a comprehensive database review, 17 studies were identified that included some form of sensory comparison. All studies included pork from Improvac vaccinated pigs, 16 from physically castrated pigs, 11 from entire boars and 8 from females. Methodologies included use of consumer panels and expert panels. In 15 of 16 comparisons pork from vaccinated pigs was considered of equivalent eating quality to pork from physically castrated pigs and in 1 comparison it was considered superior. In all 8 comparisons pork from vaccinated pigs was considered equivalent to pork from female pigs. In 8 out of 11 comparisons it was considered superior to pork from entire males, and on 3 occasions it was considered equivalent.**

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**Index Terms—sensory perception, acceptability, Improvac.**

### I. INTRODUCTION

The anti-gonadotropin-releasing factor vaccine Improvac can be used as an alternative to physical castration to control boar taint. Studies using objective, laboratory assays have shown that it is highly effective in reducing the concentrations of androstene and skatole, the key chemical compounds associated with boar taint [5, 7, 13]. Boar taint, however, is ultimately an experience perceived by pork consumers and subjective, sensory evaluations provide an additional way to test the efficacy of any control measures. By default, experiments including an evaluation of overall acceptability will also cover any possible

impact of the vaccination approach on factors such as tenderness, juiciness and toughness that also influence eating quality. The results of a number of sensory studies have been published, all showing no difference in sensory evaluation between pork from Improvac vaccinated pigs and pork from physically castrated pigs [2, 3, 4, 6, 8, 9, 10, 12], or in one case superiority [11]. Some authors have also reported superiority to pork from entire boars [2, 3, 9, 10]. These reports, however, all describe the results of individual studies, which are inevitable influenced by specific factors relating to both the method of pork production and the circumstances of the sensory evaluation. An overview of multiple studies can give additional insights into the impact of Improvac vaccination on eating quality.

### II. MATERIALS AND METHODS

A comprehensive review of data relevant to the field use of Improvac was undertaken at the end of 2008. The review included internal study reports belonging to Pfizer Animal Health and external publications. Out of 40 studies 18 were identified that included some type of sensory comparison. All studies included pork from vaccinated pigs, 16 included pork from physically castrated pigs, 11 included pork from entire males, and 8 included pork from females. In 10 cases consumer panels were used and in 7 cases expert panels were used, where the assessors were trained in the technique of sensory evaluation and could, therefore, be expected to detect smaller differences between samples. One study included both methods of evaluation. The available studies are described in summary form in Table 1, together with an indication of the individual study conclusion based on within-study statistical analysis. No meta-analysis was attempted.

### III. RESULTS AND DISCUSSION

The results from each study are summarized in Table 1. In 15 of 16 comparisons pork from vaccinated pigs was considered equivalent to that from physically castrated pigs and in one case

superior. Eight of these studies also included females and in all cases eating quality between vaccinated pigs, physically castrated pigs and females was considered equivalent. From the 11 studies that included entire boars, the pork from vaccinated pigs was considered to have superior eating quality in 8. These included studies in the Spain, UK, Australia and South Africa where entire boar production is common and boar meat forms a large proportion of the commercial pork supply. In three studies there was no difference in acceptability between vaccinated pigs and non-castrated boars. In 1 of these studies (China) low levels of the taint compounds androstenone and skatole may explain the lack of difference between vaccinates, castrates and the non-castrated boars. In the Chinese study the skatole concentrations in all boars, castrates and vaccinates was well below the sensory threshold of 0.2 µg/g and only 1 non-vaccinated boar had androstenone just above the sensory threshold of 1.0 µg/g. In the Thai study the androstenone and skatole levels in the boars were higher than in the vaccinates and castrates, with 13.2% of boars and 0% of the castrates and vaccinates having androstenone above the sensory threshold of 1.0 µg/g. Thus the lack of a difference in between vaccinates, castrates and boars in the Thai study is difficult to explain on the basis of taint compounds. Individual taint data from the Japanese study are not available.

#### IV. CONCLUSION

Whether assessed by trained experts or consumer panels the eating quality of pork from pigs vaccinated with Improvac was found to be at least equivalent to that of pork from physically castrated and female pigs. Pork from all three groups was frequently found to be superior to pork from entire boars, confirming that control of boar taint is important if pork meat is to remain an enjoyable product and maintain its current level of consumption.

#### REFERENCES

[1] Boghassian, V., et al. (1995). Immunocastration - A strategy to produce 'taint-free' high quality pork from intact boars. In Proceeding 41st Int Cong Meat Sci Tech, San Antonio, Texas, 1995

- [2] Chumkam, S. and Jintasataporn, O. (2004). The Effect of Vaccination on Boar with GnRH Vaccine (Improvac) on Growth Performance, Testicular Function and Boar Taint. In Proceedings Int Sym Anim Plant Prod Food Environ Sec, Bangkok, Thailand, 2004
- [3] D'Souza, D.N., and Mullan, B.P. (2002). The effect of genotype, sex and management strategy on the eating quality of pork. *Meat Science* 60: 95–101
- [4] D'Souza, D.N., and Mullan B.P. (2003). The effect of genotype and castration method on the eating quality of pork from male pigs. *Journal of Animal Science*. 77: 67-72.
- [5] Dunshea, F. R., et al. (2001). Vaccination of boars with a GnRH vaccine Improvac eliminates boar taint and increases growth performance. *J. Anim. Sci.*, 2001, 79(10), 2524–2535
- [6] Font i Furnols, M., et al. (2008). Consumers' sensory acceptability of pork from immunocastrated male pigs. *Meat Science*. 80: 1013-1018
- [7] Jaros, P., et al. (2005). Effects of active immunization against GnRH on androstenone concentration, growth performance and carcass quality in intact male pigs. *Livestock Production Science*, 92, 31-38.
- [8] Jeong, J., et al. (2008). The effects of immunocastration on meat quality and sensory properties of pork loins. In Proceedings 20th Int Pig Vet Soc Cong, Durban, South Africa, 2008
- [9] Jeong, J., et al. (2008). The effects of immunocastration on meat quality and sensory properties of pork bellies. In Proceedings 20th Int Pig Vet Soc Cong, Durban, South Africa, 2008
- [10] Lodge, N.J., et al. (2008). Eating quality of pork loin steaks from light slaughter weight boars and boars vaccinated with Improvac. In Proceedings 20th Int Pig Vet Soc Cong, Durban, South Africa, 2008
- [11] Silveira, E.F.T., et al. (2008). Vaccination of boars with a GnRH vaccine (Improvac) and its effects on meat quality. In Proceedings 20th Int Pig Vet Soc Cong, Durban, South Africa, 2008
- [12] Singayan-Fajardo, J., et al. (2006). Eating quality and acceptability of pork from Improvac immunized boars. In Proceedings 19th Int Pig Vet Soc Cong, Copenhagen, Denmark, 2006
- [13] Zamaratskara, G., et al. (2008). Effect of a gonadotropin-releasing hormone vaccine (Improvac™) on steroid hormones, boar taint compounds and performance in entire male pigs. *Reproduction in Domestic Animals*. 43: 351-359 Improvac® is a registered trademark of Pfizer Pty Ltd

Table 1: Summary of 18 sensory studies assessing the eating quality of pork from Improvac vaccinated boars.

Country (reference)	Panel type	Treatments compared	Outcome regarding pork from vaccinated pigs
Mexico *	Consumer	PC IC G	Equivalent to castrates and gilts
Chile *	Consumer & Expert	PC IC	Equivalent to castrates
Brazil [11]	Consumer	PC IC	Superior to castrates
Philippines	Consumer	PC IC G	Equivalent to castrates and gilts
[12]			
Australia *	Consumer	IC B G	Equivalent to gilts and better than boars
South Africa *	Expert	PC IC B	Equivalent to castrates and better than boars
Spain [6]	Consumer	PC IC B G	Equivalent to castrates and gilts and all better than boars
USA *	Expert	PC IC	Equivalent to castrates
China *	Consumer	PC IC B	Equivalent to castrates and no different to boars
Thailand *	Expert	PC IC B	Equivalent to castrates and no different to boars
Thailand	Expert	PC IC B G	Equivalent to castrates and gilts and all better than boars
[2]			
Korea [8]	Expert	PC IC	Equivalent to castrates
Korea [9]	Expert	PC IC B G	Equivalent to castrates and gilts and better than boars
Japan *	Consumer	PC IC B	Equivalent to castrates and boars
United Kingdom[10]	Expert	IC B	Superior to boars
Australia	Consumer	PC IC G	Equivalent to castrates and gilts
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Australia	Consumer	PC IC B	Equivalent to castrates and both better than boars
[3]			
Australia	Consumer	PC IC B G	Equivalent to castrates and gilts and all 3 better than boars
[4]			

PC = physical castrate; IC = Improvac vaccinated; B = non-vaccinated entire boar; G = female pig/gilt

\* Data on file with Pfizer Animal Health, New York, NY