

CONSUMER ACCEPTANCE AND PREFERENCE OF PORK RIBS FROM IMMUNOCASTRATED AND PHYSICALLY CASTRATED BOARS

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Abstract—a significant percentage of the world population is sensitive to the boar taint and the limit of sensitivity is quite variable between cultures and genders. This paper was designed to carry out a consumer acceptance and preference test to compare the sensory properties of pork ribs from immunocastrated (IB) and physically castrated boars (PCB). 200 crossbred boars (Large White and Landrace) were allocated to two groups. 100 boars of each group were assigned to be immunocastrated – IB (the first dose of 2 mL was delivered at 8 weeks and the second at 4 weeks before slaughter) and physically castrated – PCB (performed in piglets aged 3 to 5 days). At 24 weeks of age (115 to 120 kg live weight) all boars were slaughtered, the carcass were chilled during 20 hours and the boneless pork ribs from the left side of each carcass were removed, vacuum-packed, frozen and sent to the Meat Technology Center, Institute of Food Technology, for sensory preparation. A Consumer Acceptance (Affective) test was carried out in a local supermarket using a consumer panel comprised of 135 panelists. The results of the consumer panel sensory assessment and preference showed that the scores given for both treatments were between “like moderately” and “like much”. Small differences ($P>0.05$) were found for flavor and overall acceptance attributes tested in favor of the IB compared to PCB. With regard to the preference test, cooked ribs from the IB were preferred ($P>0.05$) by 52% of the testers compared to 48% of panelists who preferred the PCB. The present results suggest that independent of the castration method applied the consumer accepted equally the cooked pork ribs although the preference test showed to be of a slightly superior for the meat from immunocastrated boars.

Index Terms—Affective Test, Immunocastrated Boars, Physically Castrated Boars, Pork Ribs.

I. INTRODUCTION

The production of entire male pig eliminates the need for physical castration and improves feed efficiency when compared to castrates. However, consumer acceptance from non-castrate males is hindered by a strong, objectionable odor in the heated meat (Gower & Ruparelia, 1992). A significant percentage of the world population is sensitive to the boar taint (Walstra et al., 1999) and the limit of sensitivity is quite variable between cultures and genders (Matthews et al., 2000). Font i Furnols et al. (2008) showed that consumers were not able to differentiate samples from gilts, immunocastrated and physically castrated boars. In a affective test carried out in a supermarket by Silveira et al. (2007) the consumers showed better acceptability and preference of meat from the immunocastrated pigs. The purpose of this study was to carry out a consumer acceptance and preference test to compare the sensory properties of pork ribs from immunocastrated (IB) and physically castrated boars (PCB).

II. MATERIALS AND METHODS

Animals. A total of 200 boars, Large White and Landrace, 100 of each group were assigned to be immunocastrated (the first dose of 2 mL was delivered at 8 weeks and the second at 4 weeks before slaughter) and physically castrated (performed in piglets aged 3 to 5 days).

Slaughter. The animals were raised in the same farm, reared separately by sex and slaughtered at 24 weeks of age (115 to 120 kg live weight) under normal processes for the commercial abattoirs (BRASIL, 1997).

Samples. After 20 hours of chilling at 0 to 4°C, boneless pork ribs from the left side of each carcass were removed, vacuum-packed, frozen and sent to the Meat Technology Center, Institute of Food Technology, for sensory evaluations.

Sample preparation. The samples were weighed, lightly salted (2% NaCl), wrapped in cellophane, baked in conventional electric oven and set aside when they reached 71°C internally. After cooking, the samples were coded, wrapped in aluminum foil, packed in coolers and transported to the supermarket.

Sensory assessment. A Consumer Acceptance (Affective) test was carried out in a local supermarket. A consumer panel comprised of 135 panelists, 58% men and 42% women, consume pork meat every day (45.2%) and belonged to the age range from 41 to 55 years (35%). Samples were presented to panelists in a monadic way in agreement with the balanced complete block design. Panelists were asked to score their opinions on a 9 point hedonic scale. A preference test was also carried out under supermarket conditions, comparing pairs of freshly cooked pork ribs obtained from both IB and PCB.

Statistical analysis. The results were evaluated by analysis of variance (ANOVA) and comparison of means by Tukey test using SAS, valued at a 5% level of significance. The GLM procedure of SAS was used to determine the significance of gender and preference test was analyzed using the table Square Bi-flow.

III. RESULTS AND DISCUSSION

The results of the consumer panel sensory assessment and preference are shown in Table 1.

There were no significant differences in the consumer scores categories frequency (disliked very much, neither like nor dislike, like very much) for aroma, flavour and overall acceptability when IB pork rib meat is compared to PCB one. Considering the odour frequency scores rated as ‘like moderately’ IB was numerically slightly lower than PCB. Flavour and overall acceptance were rated higher than odour reaching close to ‘like much’ scores and PCB rib meat showed a mean score numerically slightly lower than IB. This may be due to the fact that, although consumers were asked to evaluate the odour immediately after the sample is presented, in some cases they waited more than recommended and part of the odour was gone. This outcome shows that meat from IB and PCB was not distinguishable by consumers, based on these sensory evaluations and the results from this study are consistent with the ones of Singayan-Farardo, Quizon & Hennessy (2006) who demonstrated that an untrained Filipino consumer panel was unable to detect any sensory quality differences between pork from castrated boars, gilts or immune castrated pigs. Similarly, in early studies Boghossian et al (1995) using a trained sensory panel showed that pork from immunocastrated boars was indistinguishable in sensory attributes to pork from female pigs. Boghossian, Hennessy, Reynolds & Walker, (1999) also showed that an untrained Japanese consumer panel was unable to distinguish between pork from gilts, physical castrates and immunocastrates.

In general, the scores given for both treatments were between “like moderately” and “like much”. Small differences ($P>0.05$) were found for flavor and overall acceptance attributes tested in favor of the IB compared to PCB.

With regard to the preference test, cooked ribs from the IB were preferred ($P>0.05$) by 52% of the testers compared to 48% of panelists who preferred the PCB, corroborating with previous research reported by Silveira et al., (2007) who found 66% of consumers preferred IB than PCB (34%, $p<0.05$). The conclusions from a choice experiment survey of Swedish consumers (Lagerkvist, Carlsson & Viske, 2006) and the earlier consumer survey from Australia report by Hennessy & Newbold (2004) signals a positive acceptance for using vaccines to control boar taint compared to physical castration. Despite consumer unease about the use of new technologies in food production, participants in these surveys found vaccination to control boar taint to be acceptable on animal welfare grounds compared with surgical castration, as long as there was equivalent taste quality.

Table 1. Average acceptance¹ and preference scores by an untrained panel (n=135) for both treatments.

Atributtes	IB	PCB
Odour	7.1 ± 0.13 ^a	7.2 ± 0.12 ^a
Flavor	7.7 ± 0.10 ^a	7.6 ± 0.12 ^a
Overall acceptability	7.7 ± 0.11 ^a	7.5 ± 0.13 ^a
Rib preference	70 (52%)	65 (48%)

¹Acceptance scale: 1 disliked very much, 2 dislike much, 3 dislike moderately, 4 dislike slightly, 5 neither like nor dislike, 6 like slightly, 7 like moderately, 8 like much, 9 like very much.

^aWithin a row lacking a common superscript letter differ significantly, $P<0.05$.

IB. Immunocastrated boars

PCB. Physically castrated boars

In the current study, when gender is taking into account there was also no significant difference ($P>0.05$) between treatments (Table 2) as far as the sensory attributes evaluated in this study is concerned. Sensory threshold values, above which carcasses are considered to be tainted, vary according to the sensitivity of the consumer and consumer populations (Bonneau et al., 2000). Dijksterhuis et al, (2000) reported that the contribution of androstenone and skatole to boar taint could be influenced by such factors as the relative concentration of both compounds, the methodology used for the sensory evaluation, different consumption habits (Matthews et al., 2000) and different human responses to androstenone (Weiler et al., 2000). Other studies have shown that women can detect more easily the smell of boar taint than men (Desmoulin et al., 1992; Bañon et al., 2003). FONT I FURNOLS et al. (2003) conducted a survey of 480 consumers using boars from the six different European countries containing different levels of androstenone and skatole and concluded that there was less acceptance of the odor and flavor by women than by men. This indicates a greater sensitivity of women to these compounds.

The differences between studies can be due to different cooking and evaluation methodology as previously discussed (Siret et al., 1997; Nute, Whittington, Warriss & Wood, 1995; Wood, Nute, Fursey & Cuthberston, 1995; Agerhem & Tornberg, 1995) as well as intrinsic differences in the perception of boar taint by the consumers depending on their origin, age, sex or androstenone sensitivity (Matthews et al., 2000; Weiler et al., 2000; Font I Furnols et al., 2003), or even differences in the breeds, ages of slaughter or rearing conditions of animals at slaughter.

Table 2. Average acceptance¹ and preference scores by men and women untrained panel (n=135) for both treatments.

Atributtes	IB		PCB	
	Men	Women	Men	Women
Odour	7.2 ± 1.4 ^a	6.9 ± 1.6 ^a	7.2 ± 1.4 ^a	7.3 ± 1.3 ^a
Flavor	7.8 ± 1.0 ^a	7.7 ± 1.4 ^a	7.5 ± 1.4 ^a	7.6 ± 1.3 ^a
Overall acceptability	7.7 ± 1.1 ^a	7.6 ± 1.6 ^a	7.5 ± 1.4 ^a	7.6 ± 1.5 ^a

^a Within a row lacking a common superscript differs, P<0.05.

IB. Immunocastrated boars

PCB. Physically castrated boars

IV. CONCLUSION

The present results suggest that independent of the castration method applied the consumer accepted equally the cooked pork ribs although the preference test showed to be of a slightly superior for the meat from immunocastrated boars.

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