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# Efficiency of immuno-castration and use of Pietrain genetics as alternatives to ractopamine administration, in terms of carcass and meat quality in pigs

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## Introduction

Despite the advantages, in terms of growth rate and lean yield, there is evidence that feeding pigs with ractopamine (RAC) makes pigs more susceptible to stress and more aggressive. The use of high-lean growth potential genotypes, such as Halothane-free Pietrain pigs or immuno-castrates may allow producers to have the same performances as RAC-fed pigs at no detriment on animal welfare and meat quality.

The objective of this study was to evaluate the efficiency of immuno-castration and use of Pietrain genetics as alternatives to ractopamine administration, in terms of carcass and meat quality in pigs.

## Materials and Methods

A total of 756 pigs (115±5 kg liveweight) were distributed into two main groups (376 and 380 pigs each), receiving 7.5 ppm of ractopamine (RAC) or not (NRAC) in their diet during the last 28 days of the finishing period. Within each group, 377 castrates (CAS) and 379 immuno-castrates (IC), and two genotypes (379 controls, CONT, and 377 Pietrain$^{NN}$, PI) were represented according to a 2 x 2 x 2 factorial design. Castration took place at one day of age, while immuno-castration was performed through two subcutaneous injections of Improvac® (2 ml) at 10 and 4 weeks before slaughter.

Within each treatment group, pigs were weighed at the farm prior to transportation and their carcass traits (hot carcass weight and lean yield) obtained from the grading slips and the dressing yield was calculated. Meat quality was assessed on 336 carcasses (7/group) in the *longissimus dorsi* (LD) muscle at 24 h post-mortem by measuring pH and light reflectance (L*). A LD muscle chop was taken at the ¾ last rib level for the assessment of drip loss at 48 h post-mortem and other two chops were taken, vacuum-packed, aged for 5 days and frozen pending the analysis of shear force. Data were analyzed using the Proc Mixed procedure in SAS, with the animal as the experimental unit.

## Results and Discussion

**Table 1. Effects of ractopamine, castration method and genetics on carcass characteristics[a]**

| | With ractopamine | | | | Without ractopamine | | | | SEM | *P values* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CAS | | IC | | CAS | | IC | | | RAC | CAS | GEN | CAS*GEN |
| | CONT | PI | CONT | PI | CONT | PI | CONT | PI | | | | | |
| Live weight (Kg) | 115.8 | 116.2 | 117.5 | 117.5 | 115.6 | 116.1 | 116.9 | 114.8 | 0.75 | NS | NS | NS | NS |
| Hot carcass weight (Kg) | 92.6$^{ab}$ | 94.4$^{a}$ | 92.6$^{ab}$ | 92.6$^{ab}$ | 91.5$^{b}$ | 94.0$^{ab}$ | 91.0$^{c}$ | 90.1$^{c}$ | 0.66 | 0.001 | 0.0008 | 0.05 | 0. 004 |
| Dressing yield (%) | 80.1$^{ab}$ | 81.2$^{a}$ | 78.8$^{bc}$ | 78.9$^{bc}$ | 79.2$^{bc}$ | 81.1$^{a}$ | 78.0$^{c}$ | 78.5$^{c}$ | 0.34 | 0.01 | < 0.001 | 0.0001 | 0.01 |
| Lean yield (%) | 62.9$^{abc}$ | 62.6$^{bc}$ | 63.3$^{ab}$ | 63.7$^{a}$ | 62.5$^{bc}$ | 62.1$^{c}$ | 62.9$^{abc}$ | 62.4$^{bc}$ | 0.28 | 0.0004 | 0.002 | NS | NS |

[a] Within a row, means with a different superscript differ ($P$ <0.05)

**Table 2. Effects of ractopamine, castration method and genetics on meat quality traits[a]**

| | With ractopamine | | | | Without ractopamine | | | | SEM | *P values* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CAS | | IC | | CAS | | IC | | | RAC | CAS | GEN | RAC*CAS | RAC*GEN |
| | CONT | PI | CONT | PI | CONT | PI | CONT | PI | | | | | | |
| pHu | 5.8 | 5.7 | 5.8 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 0.03 | NS | NS | 0.04 | NS | NS |
| L* | 50.7 | 50.7 | 50.7 | 50.9 | 51.3 | 52.3 | 51.4 | 51.6 | 0.63 | 0.007 | NS | NS | NS | NS |
| Drip loss (%) | 2.9 | 2.9 | 3.9 | 3.5 | 3.7 | 4.0 | 3.7 | 4.0 | 0.40 | 0.01 | 0.06 | NS | 0.05 | NS |
| Shear force (Kg) | 2.9$^{c}$ | 3.4$^{ab}$ | 2.9$^{c}$ | 3.6$^{a}$ | 2.7$^{d}$ | 2.9$^{c}$ | 3.0$^{bc}$ | 3.2$^{abc}$ | 0.11 | 0.001 | 0.01 | <.0001 | NS | 0.009 |

[a] Within a row, means with a different superscript differ ($P$ <0.05)

- Carcass yield was higher ($P$ = 0.01) in RAC pigs and Pietrain castrates (Table 1)
- Carcasses from RAC pigs and IC were leaner ($P$ < 0.001 and $P$ = 0.002, respectively; Table 1);
- Feeding RAC to barrows reduced drip loss ($P$ = 0.05), while immuno-castration tended to increase it (3.8 *vs* 3.4 %; $P$ = 0.06; Table 2);
- Shear force (texture) values were slightly higher in pork from RAC-fed Pietrain pigs ($P$ = 0.009); and in pork from immuno-castrates compared to castrates ($P$ = 0.01; Table 2).

## Conclusions

Immunocastration more than the use of Pietrain genetics appears to be a viable alternative to the use of ractopamine, as it assures the production of lean carcasses without any major effect on pork quality.

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