Immunocastration as the Alternative to Surgical Castration in Pigs: The Brazilian Experience.

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# Introduction

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>Surgical Castration, %</td>
<td>95</td>
<td>30</td>
</tr>
<tr>
<td>Entire males, %</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Immunocastrated, %</td>
<td>0</td>
<td>70</td>
</tr>
</tbody>
</table>

1 De Briyne et al (2018), 2 Personal information

- **Analgesia**: effectiveness of alleviate pain is questionable
- **Prolonged analgesia and anaesthesia**: High cost (De Briyen et al., 2016)
- **Low technology in slaughterhouses**
- **Uncertainty of consumers**

![Image of pigs with flags]
Introduction

Will the EU manage to ban pig castration by 2018?

Anaesthesia and analgesia: Methods (Castrum consortioun)

Entire male: On line reliable methods at slaughterhouses

Immunocastrade : Experience
Immucastration Principle

Entire male pig

- SKATOLE
- Many steroids
- Fertility
- Libido
- Behaviour
- Androstenone
- GnRH
- LH and FSH
- Hypophysis
- Hypothalamus
- Brain
- Testis
Vaccination Scheme

Zoetis (Improvac)

0  9 weeks  4-5 weeks before slaughter

Accidental self injection

Tools to assess effectiveness of immunocastration:

- Testes size
- Behavior observations (mounting)
- On line reliable methods at slaughterhouses
Meat Quality

>120 kg BW

Intramuscular fat and tender meat

Immuscastrated and Surgical Castrated > Entire male

<table>
<thead>
<tr>
<th>European Stakeholder Survey (PIGCAS)</th>
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<tbody>
<tr>
<td>- Fear of self-vaccination (stakeholders)</td>
</tr>
<tr>
<td>- Fear of consumers’ acceptance</td>
</tr>
<tr>
<td>- Opinion of consumers has been not thoroughly investigated</td>
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<tr>
<td>- Swedish consumers expressed preference immunocastrates</td>
</tr>
<tr>
<td>- France, Germany and Netherlands fear is overestimated: 70% accepted</td>
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<tr>
<td>- Scientist perceive immunocastration as a better alternative (PIGCAS)</td>
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</tbody>
</table>

Animal welfare

Effect of immunocastration and raising entire male pigs on mounting behavior (Teixeira and Tocchet (2014))

Disturbance hormonal homeostasis

Damages to the hypothalamus (Molenaar et al., 1993)

Not confirmed latter studies (Hilbe et al., 2006)
Effect of surgical castration, immunocastration and raising entire male pigs on the performance from 20kg to slaughter

<table>
<thead>
<tr>
<th></th>
<th>Castrated</th>
<th>Immuno</th>
<th>Entire</th>
<th>r.s.d.</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n farms</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>ADG (kg)</td>
<td>0.72</td>
<td>0.72</td>
<td>0.72</td>
<td>0.07</td>
<td>0.987</td>
</tr>
<tr>
<td>ADFI (kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G:F (kg/kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>1.84</td>
<td>1.83</td>
<td>0.24</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.36</td>
<td>0.40</td>
<td>0.41</td>
<td>0.21</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td>b</td>
<td></td>
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abc Within row, means without a common superscript differ (P<0.05)


Average body weight at slaughter = 120 kg

Feed cost kg gain ($/kg gain) = FC_{Meth} \times \text{diet cost} ($0.27)

Gross Margem ($/kg gain) = ADG_{Meth} \times \text{Cost kg BW} ($0.98)

Revenue ($) = GM - (ADG_{Meth} \times \text{Feed cost kg gain})

Vaccine cost ($) = 1.10

Feed conversion 4%
### Carcass Traits

Effect of surgical castration, immunocastration and raising entire male pigs on carcass traits

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<tr>
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<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
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</tr>
<tr>
<td>Lean meat (%)</td>
<td>60.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>61.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>62.4&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fat thickness (mm)</td>
<td>14.7&lt;sup&gt;c&lt;/sup&gt;</td>
<td>13.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>12.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Carcass yield (%)</td>
<td>78.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>77.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>77.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gastrointestinal tract (kg)</td>
<td>7.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.0</td>
<td>&lt;0.001</td>
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Farm was included as random factor

Feeding Strategies

**Ad libitum**

- Higher ADG
- Similar FC
- **Worst lean meat and fat thickness**
- **Less carcass skin lesion**

**Feed restriction**

- Similar ADG
- Similar FC
- **Similar lean meat and fat thickness**
- **Similar carcass skin lesion**

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**Immunocastrated vs. Entire Male**

- Batorek et al. (2012)
Feeding Strategies

Ad libitum

Immunocastrated vs. Entire Male

✓ Higher ADG
✓ Similar FC
✓ Worst lean meat and fat thickness
Nutrient Requirements

Feed intake (10d)
Hormones (10d)
Prot. Dep. (10d)

Estimated SID lysine (g/MJ DE)

NRC et al. (2012)

Body weight (kg)

0 10-14 week 3-14 weeks before slaughter

?
Immunocastration allow to abolish boar taint. But one concern in Denmark is the occurrence of the so-called non-responders and have to be pre-sorted at farm level or sorted at the slaughter line.

Immunocastration improvement animal welfare compared to entire males.

Immunocastration allow to have similar feed conversion, lean meat percentage and back fat thickness compared to entire males. However, better intramuscular fat and tender meat are obtained with immunocastration for heavy pigs.

Public acceptability: Fear of self-vaccination and consumers’ acceptance
Thank you very much!!

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