Compositional and sensory qualities of bull beef from different breeds and production systems

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Suckler bull beef production systems

• Traditionally: involves provision of a high concentrate ration for a prolonged period
  – Less profitable because of the higher cost of concentrates compared to grass silage or grazed grass diets

• Incorporating a grazing period prior to finishing on a concentrate diet:
  – Reduces the production cost of late-maturing suckler bulls
  – But late-maturing suckler bulls may not meet the market requirements in terms of adequate carcass fat cover at a particular carcass weight

• Early-maturing breed types may be more suitable for a grass-based production system
  – Due to a higher genetic potential to deposit fat
Introduction

• **Aim:** To determine the influences of breed maturity and inclusion of a period of grazed grass in a suckler bull production system on the compositional and sensory characteristics of beef.

• **Hypothesis:** Late-maturing breed types could be replaced by early-maturing breed types, to achieve adequate fat cover and product quality specifications, in a suckler bull beef PS.
Materials and Methods

- **Animals**
  - Spring-born suckler bulls (n = 56)

- **Design**
  - 2 breed types × 2 production system- factorial arrangement
    - **Breed types (B)**
      - Early-maturing (EM)- Aberdeen Angus and Hereford-sired
      - Late-maturing (LM)- Charolais and Limousin-sired
    - **Production system (PS)**
      - Ad libitum concentrates to slaughter (C)
      - Grass silage *ad libitum* plus 2 kg concentrate daily during the winter (123 days) followed by 99 days at pasture and then C (GSPC)
Materials and Methods

• **Measurements:** on *Longissimus thoracis* muscle

  - Compositional analysis
  - Sensory analysis (trained panel)

• **Statistical analysis:**

  - General Linear Model (SPSS).
    - B, PS, interactions --> fixed factors
## Results and Discussion

### Proximate composition (g/kg)

<table>
<thead>
<tr>
<th>Breed (B)</th>
<th>EM</th>
<th>LM</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>C</td>
<td>s.e.m  B</td>
</tr>
<tr>
<td>PS</td>
<td>C</td>
<td>C</td>
<td>GSPC</td>
</tr>
<tr>
<td>Intramuscular fat</td>
<td>55.21&lt;sup&gt;c&lt;/sup&gt;</td>
<td>27.71&lt;sup&gt;b&lt;/sup&gt;</td>
<td>26.18&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Moisture</td>
<td>720.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>738.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>747.1&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Protein</td>
<td>228.7</td>
<td>233.3</td>
<td>228.5</td>
</tr>
<tr>
<td>Ash</td>
<td>10.48</td>
<td>12</td>
<td>11.19</td>
</tr>
</tbody>
</table>

* *p*<0.05, ** *p*<0.01, *** *p*<0.001; I: interaction effect
## Sensory characteristics

<table>
<thead>
<tr>
<th>Breed (B)</th>
<th>EM</th>
<th>LM</th>
<th>s.e.m</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>C</td>
<td>GSPC</td>
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<td></td>
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<tr>
<td>Tenderness</td>
<td>4.82&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.51&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>4.63&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>4.19&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Juiciness</td>
<td>5.09</td>
<td>4.91</td>
<td>4.84</td>
<td>4.82</td>
</tr>
<tr>
<td>Beefy flavour</td>
<td>4.54</td>
<td>4.4</td>
<td>4.55</td>
<td>4.5</td>
</tr>
<tr>
<td>Abnormal flavour</td>
<td>2.29&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.28&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.41&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Flavour liking</td>
<td>5.45&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.03&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.46&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.10&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall liking</td>
<td>5.16&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.71&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>5.03&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>4.59&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup>Scale 1-8 (8 extremely tender/juicy/intense flavour/liked); * p < 0.05, *** p < 0.001
Conclusion

• Using early-maturing in pasture based system:
  – increased the intramuscular fat content but this did not result in different sensory characteristics

• A period at pasture prior to finishing on concentrates:
  – led to a decrease in the sensory quality of the beef as assessed by a trained panel — may be related to differences in marbling fat.
Acknowledgments

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Thank you for your attention!!