Presentation Eva

Basic degrees (MSc, PhD) from Swedish University of Agricultural Sciences in Animal Science, Food Science/Meat Science.

Extensive experience (20 years) of deer and reindeer meat production systems in Scandinavia, New Zealand, Alaska, and Australia.

Present positions: Senior Meat Scientist, AgResearch, New Zealand. Affiliate Associate Professor (Animal Science) University of Alaska Fairbanks, USA.
Meat quality, how is it defined and what can affect it?

- pH and glycogen
- Colour and tenderness
- Tenderising enzymes
- pH surveys for deer and reindeer
- Reindeer in Scandinavia
- Deer in New Zealand
- PUFA
Ethical quality

• How is the meat produced?
• What have the animals been fed?
• How have the animals been handled/transported before slaughter?
What affects meat quality?

From farm to fork

- Genes
- Feeding
- Management
- Health
- Handling, transport
- Stunning
- Cooling
- Ageing
- Processing
- Cooking

Birth
Slaughter
Meat pH affect shelf life, tenderness, colour and water-holding properties

Source: Köttforskningsinstitutet, Sweden
Colour and pH

pH and colour of venison samples chilled at -1.5 °C for 3 weeks

Source: AgResearch
Tenderness and pH
Valid for beef and red deer venison

pH value

5.5 - 5.8 (normal pH value) Tender meat

5.8 - 6.2 (intermediate pH) Tougher meat
Inconsistent quality

> 6.2 (high pH, DFD meat) Tender meat
Reindeer husbandry and meat production in Fennoscandia

20 EU-licensed stationary and mobile reindeer slaughter facilities in Sweden.

Rules for slaughter similar to domestic species; transport guidelines, ante and post mortem veterinary inspection, stunning, slaughter hygiene, grading and chilling.

Average carcass weight = 27 kg
Red deer farming and venison production in New Zealand

Deer QA “gate to plate” program:

Provide total quality assurance to present the best possible venison to the market

17 licensed deer slaughter plants.

Rules for slaughter similar to domestic species; transport guidelines, ante and post mortem veterinary inspection, stunning, slaughter hygiene, grading and chilling.

Number of slaughtered deer in New Zealand 2005-2009

Average carcass weight = 55 kg
Pre-slaughter handling, stress and pH surveys in deer and reindeer

<table>
<thead>
<tr>
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<th>Ultimate pH (overall means)</th>
<th>Intermediate pH</th>
<th>High pH</th>
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</thead>
<tbody>
<tr>
<td>Red deer (n=3,500)¹</td>
<td>5.64</td>
<td>9.1%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Fallow deer (n=100)¹</td>
<td>5.93</td>
<td>68.3%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Reindeer (n=3,400)²</td>
<td>5.67</td>
<td>23.1%</td>
<td>6.0%</td>
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¹Pollard et al., 1999
²Wiklund et al., 1995

- Selection using the lasso identified as a stressful and glycogen depleting routine
- Poor nutritional status also causing high pH values
- Handling, lairage and behaviour at the plant not linked to pH
- Fallow deer difficult to handle
- Poor nutritional status identified

- Poor nutritional status also causing high pH values
Tenderness and ageing

No electrical stimulation, animals 1.5 – 2 years old, *M. longissimus*

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<thead>
<tr>
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<th>Shear force 1-3 days post mortem</th>
<th>Shear force 1 week post mortem</th>
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<tbody>
<tr>
<td>Beef (n=8)</td>
<td>11.7</td>
<td>9.8</td>
</tr>
<tr>
<td>Red deer (n=7)</td>
<td>11.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Fallow deer (n=8)</td>
<td>5.4</td>
<td>4.5</td>
</tr>
<tr>
<td>Reindeer (n=8)</td>
<td>2.9</td>
<td>2.6</td>
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- High proteolytic activity demonstrated in reindeer, red deer and fallow deer venison. Not specifically due to high concentrations of proteolytic enzymes but also to low levels of inhibitors to these enzymes
- Small muscle fibre size in reindeer
- No need for ageing reindeer meat

1 Barnier et al., 1999
2 Wiklund et al., 2001
3 Sims et al., 2004
4 Volpelli et al., 2003
5 Wiklund et al., 1997
Venison has a low fat content. But the fatty acid composition is important for shelf life (lipid and colour oxidation) and for the quality of processed products.
Is the “Meat of Kings” also the King of Meats?

Venison is unique – special attributes to mention:

Tenderness +

Drip loss −

Colour stability −

Other consumer appealing qualities are low fat content, favourable fat composition and high levels of minerals.
Natural

Exotic

Exclusive

Nutritious
Acknowledgements

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