Milk fatty acids and cheese from hay based diet and continuous or rotational grazing

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INTRODUCTION

Several studies have been carried out to understand the effects of the type of forage supplied to dairy cows on milk fatty acid (FA) profile and cheese texture (Martin et al., 2005; Chilliard et al., 2007). The aim of this work was to compare the FA profile of milk and the texture and colour of cheese deriving from a hay-based diet (H) or from two different grazing systems: continuous grazing on high biodiversity pastures (E) or rotational grazing on grasslands intensively managed (R).

EXPERIMENTAL DESIGN

<table>
<thead>
<tr>
<th>Continuous grazing (E)</th>
<th>Rotational razing (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>low stocking density (0.96 LU*ha-1)</td>
<td>high stocking density (1.36 LU*ha-1)</td>
</tr>
<tr>
<td>high botanical diversity</td>
<td>low botanical diversity</td>
</tr>
<tr>
<td>12 Montbeliarde cows</td>
<td>12 Montbeliarde cows</td>
</tr>
</tbody>
</table>

Botanical composition of E plot

- Species (n=72) SC* %
  - Festuca rigens
  - Agrostis tenuis
  - Trifolium repens
  - Arrhenatherum elatius
  - Anthoxanthum odoratum
  - Avenula pubescens
  - Dactylis glomerata
  - Plantago lanceolata
  - Trifolium pratense
  - Veronica arvensis

Botanical composition of R plot

- Species (n=31) SC* %
  - Trifolium repens
  - Bromus inermis
  - Dactylis glomerata
  - P.infoxanthum
  - Lolium perene
  - Calamagrostis epigeios
  - Lamium album

Start grazing: May 1st, R plot; June 1st, E plot

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RESULTS AND DISCUSSION

Milk chemical composition

<table>
<thead>
<tr>
<th>Milk characteristics</th>
<th>E</th>
<th>R</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>T</th>
<th>P</th>
<th>P TxP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat (g/l)</td>
<td>33.9</td>
<td>33.1</td>
<td>0.4</td>
<td>33.9</td>
<td>33.4</td>
<td>0.7</td>
<td>34.7</td>
<td>33.1</td>
</tr>
<tr>
<td>Protein (g/l)</td>
<td>33.3</td>
<td>32.7</td>
<td>0.6</td>
<td>32.1</td>
<td>32.2</td>
<td>0.7</td>
<td>33.3</td>
<td>32.2</td>
</tr>
<tr>
<td>Fat/Protein</td>
<td>1.17</td>
<td>1.02</td>
<td>0.15</td>
<td>1.12</td>
<td>1.14</td>
<td>0.15</td>
<td>1.15</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Cheese texture

- Cheese texture
  - Firmness (0-10)
  - Meltingness (0-10)
- Panel test for colour and texture evaluation
- At month ripening

Cheese colour

- Paste was less yellow for H than for pasture cheese.
- R cheese colour score was constant over the season while it decreased in E. Interaction could be explained by the forage content of β-carotene which decreased with sward maturity.

References

Acknowledgements

The experiment confirmed that cheese sensory properties are affected by cows’ diet (hay vs. pasture) and that milk FA profile affects texture. Differences in vegetative stage of grass species and animal feeding behaviour between the 2 grazing systems could explain the evolution of milk FA composition and cheese texture across the season.