Ruminal hydrogenation of C18 in clover & ryegrass, an in vitro study

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Background
Fatty acids in forage consumed by dairy cows are hydrogenated by microorganisms in the rumen of the cow. Linolenic acid in feed is turned into more saturated fats. Feeding dairy cows' red clover or white clover can alter the composition of C18 fatty acids.

Method
Silage produced based on ryegrass, red clover and white clover, each cut at primary growth and third regrowth.

Silage samples incubated with rumen fluid from fistulated Holstein cows. Three replicates.

Fatty acid content of samples analysed using gas chromatography.

Results for silage from...

- perennial ryegrass, primary growth
- red clover, primary growth
- white clover, primary growth
- perennial ryegrass, third regrowth
- red clover, third regrowth
- white clover, third regrowth

Rate of disappearance

<table>
<thead>
<tr>
<th></th>
<th>C18:3</th>
<th>C18:2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryegrass</td>
<td>13.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Red clover</td>
<td>8.4</td>
<td>6.8</td>
</tr>
<tr>
<td>White clover</td>
<td>8.4</td>
<td>6.6</td>
</tr>
<tr>
<td>P</td>
<td>0.005</td>
<td>0.03</td>
</tr>
</tbody>
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Conclusion
With increased incubation time unsaturated fatty acids decreased and more saturated ones increased.

The rate of disappearance of linoleic and linolenic acid indicates that some mechanism inhibits ruminal hydrogenation in the clover samples. This shows that clover could be used to reduce the rumen hydrogenation rate and increase the amount of unsaturated fatty acids in milk.

Understanding ruminal biohydrogenation improves the possibility to produce milk with added value.

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