Comparison of grass species influence on dry matter degradability and its prediction using chemical composition

F. Jančík, P. Homolka, V. Koukolová
Institute of Animal Science, Prague, Czech Republic

Session: 52 – “Animal Nutrition Free Communications” ; Abstract number: 3770 ; E-mail address: jancik.filip@vuzv.cz

CONCLUSIONS
- the best EDDM was determined for Lolium perenne
- the best EDDM predictor was NDF
- using of two predictors increased equations accuracy level (R²)
- calculated equations are useful tool for practical use
- ensiling process had not significant influence on dry matter rumen degradability

OBJECTIVES
I. compare the most widely used grass species conserved by ensiling process according to dry matter rumen degradability parameters
II. evaluate the regression equations for prediction of effective dry matter rumen degradability (EDDM) of grass silages based on chemical composition of estimated samples
III. estimate the effect of ensiling process on dry matter degradability parameters

MATERIAL AND METHODS
Tested grasses:
- Dactylis glomerata L.
- Phleum pratense L.
- Lolium perenne L.
- Festuca arundinacea S.
- grass hybrid Felina

Ensiling process:
- grass forages were wilted, cut to 1 – 1.5 cm long pieces and ensiled without any additives into hermetic glass vessels (3 litre capacity)
- vessels were stored in dark and cool room for 10 and 20 weeks

Ruminal DM degradability:
- estimated by in sacco technique
- used two Holstein steers
- pore size of nylon bags was 42 µm
- incubation times were 0, 6, 12, 24, 48, 72, 96 hours

Determined degradability parameters:
a = portion of DM solubilized at initiation of incubation (time 0)
b = fraction of DM potentially degradable in the rumen
c = rate constant of disappearance of fraction b
EDDM2, EDDM5, and EDDM8 = effective degradability of DM calculated for each ingredient assuming rumen solid outflow rates of 0.02, 0.05 and 0.08 h⁻¹, respectively.

RESULTS

The influence of ensiling on degradability parameters

Comparison of species by parameters of rumen DM degradability of grass silages

<table>
<thead>
<tr>
<th>Grass species</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>EDDM2</th>
<th>EDDM5</th>
<th>EDDM8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dactylis glomerata</td>
<td>316.2</td>
<td>553.6</td>
<td>0.0416</td>
<td>687.4</td>
<td>565.8</td>
<td>504.4</td>
</tr>
<tr>
<td>Phleum pratense</td>
<td>245.9</td>
<td>652.4</td>
<td>0.0375</td>
<td>669.0</td>
<td>523.9</td>
<td>453.1</td>
</tr>
<tr>
<td>Lolium perenne</td>
<td>365.4</td>
<td>561.5</td>
<td>0.0451</td>
<td>753.2</td>
<td>631.1</td>
<td>567.7</td>
</tr>
<tr>
<td>Festuca arundinacea</td>
<td>369.3</td>
<td>524.7</td>
<td>0.0390</td>
<td>711.9</td>
<td>596.0</td>
<td>538.9</td>
</tr>
<tr>
<td>Hybrid Felina</td>
<td>290.0</td>
<td>579.5</td>
<td>0.0344</td>
<td>655.3</td>
<td>525.5</td>
<td>463.9</td>
</tr>
</tbody>
</table>

*In a column, means with same superscript letters are different (P < 0.05).

Prediction of EDDM using multiple regression

<table>
<thead>
<tr>
<th>EDDM</th>
<th>RMSE</th>
<th>R²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDDM2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y = 1083 + 0.464 CF - 0.962 NDF</td>
<td>19.66</td>
<td>0.892</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>EDDM5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y = 1035 + 0.337 CF - 1.035 NDF</td>
<td>18.75</td>
<td>0.920</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>EDDM8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y = 998.3 + 0.220 CF - 1.017 NDF</td>
<td>18.13</td>
<td>0.929</td>
<td>0.0012</td>
</tr>
</tbody>
</table>

This research was supported by the Ministry of Agriculture (grants MZE 0002701403 and MZE 0002701404).