Should future feed evaluation systems include description of fermentation kinetics in the rumen?

Lasse E. Sembach

Rajan Dhakal, Hanne H. Hansen, Nicolaj I. Nielsen & Mette O. Nielsen
Current systems already do!

**NorFor – Nordic feed evaluation system**
- Used for feed ration planning

Includes a model for feed degradation in rumen
Current systems already do!

Starch \( \% / \text{hour} \) +
Crude protein \( \% / \text{hour} \) +
NDF \( \% / \text{hour} \) +
Rest fraction \( \% / \text{hour} \)= 1 type of degradation curve
Does the NorFor model reflect reality?

<table>
<thead>
<tr>
<th>Feed</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat bran</td>
<td>VK40</td>
</tr>
<tr>
<td>Soybean hulls</td>
<td>SFD</td>
</tr>
<tr>
<td>Rye kernels</td>
<td>RKR</td>
</tr>
<tr>
<td>Rapeseed meal – DT-MJ 16/12</td>
<td>RDT</td>
</tr>
<tr>
<td>Rapeseed meal – 200</td>
<td>R200</td>
</tr>
<tr>
<td>Sunflower meal – 403470 20170103</td>
<td>SM40</td>
</tr>
<tr>
<td>Sunflower meal – 20/12-17</td>
<td>SM20</td>
</tr>
<tr>
<td>Palm kernel expeller</td>
<td>PEXP</td>
</tr>
<tr>
<td>Wheat middlings</td>
<td>VFM</td>
</tr>
<tr>
<td>Triticale</td>
<td>RFG</td>
</tr>
<tr>
<td>Sugar beet pulp Nak 26/10 - 16</td>
<td>SBPA</td>
</tr>
<tr>
<td>Sugar beet pulp Nyk 26/10 - 16</td>
<td>SBPY</td>
</tr>
</tbody>
</table>

Tested in 2 fermentations

4 samples of each feed

3 samples of the sugar beet pulps

Inoculated with buffered rumen fluid

Half the samples removed at 9 hours

Rest of samples removed at 48 hours
Cumulative pressure (PSI) vs Time for 48 hours samples
Percentage of degradation at 9 hours compared to 48 hours

Feed samples

% degradation

PEXP  SFD  RDT  SBPY  R200  VK40  SM20  SBPA  SM40  RFG  RKR  VFM
Findings

• Significantly different dry matter degradations between feeds after 9 hours

• Changes in dry matter degradation rate between feeds from 9 to 48 hours

• Feeds have different types of degradation curves
Why are these results interesting?

• OMD determined after 48 hours of incubation

• Rumen retention time for modern high yielding dairy cows <48 hours

--> Nutritional values overestimated

• Effects of degradation kinetics during the first 9 hours are unknown
Where to go from here?

• Compare gas degradation curves to degradation curves predicted by NorFor

• Production trial
Thank you