Digestibility of organic matter and NDF in concentrates accessed with enzymes methods using Daisy

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FEED EVALUATION

- iNDF and OM digestibility important for energy value

- Feed evaluation for concentrates in Denmark, reference methods
  - iNDF: 12 days incubation in the rumen
  - OM digestibility: EFOS method
EFOS METHOD

- Pepsin-HCl solution, 40°C 24h
- Heating, 80°C 45min
- Fibre degrading enzyme-acetate buffer, 40°C 24h
- Incubation, 60°C 18h
OBJECTIVE

- Estimate iNDF content and OM digestibility in concentrates using a commercial laboratory enzyme in Daisy incubator.
METHOD

- 69 different concentrate feeds
  - 52 from Denmark and 17 from Sweden
- iNDF: 0.0 to 30.8 % of DM
- OM digestibility: 45.9 to 100 %
METHOD

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- iNDF: 0.0 to 30.8 % of DM

- OM digestibility: 45.9 to 100 %

Poster, session 45
Thursday 8:30-11:30
METHOD

- 69 different concentrate feeds

- Pre-extraction with acetone
- NDF boiling (filter bag ANKOM procedure)
- Drying to determine NDF content
- Incubation in Daisy, 40°C 24h
  - Trichoderma Viride enzyme
- Washing and drying
METHOD

- 69 different concentrate feeds

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  - *Trichoderma Viride* enzyme + Gamanase
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- Drying
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2x2 factorial design
RESULTS

Gamanase mainly affects palm kernel cake (-9.8 and 10.3)
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No interactions between drying and Gamanase
RESULTS (+DRYING –GAMANASE)

Undigested NDF (% of DM) (reference method)

OM digestibility (% of OM) (reference method)

EFOS (% of OM) (reference method)

- $y=x$
TIME PROFILES
TIME PROFILES

- Some samples showed large variation

- Is 24h incubation enough?
  - 24h is most used (De Boever et al. 1985, Aufrère et al. 2007)

- Test incubation time
  - 20 (representative) samples incubated in 16, 24, 48 and 72h

- New correlation to iNDF and EFOS
  - 52 (Danish) samples incubated in 72h
RESULTS TIME PROFILES

- Digestibility of OM (%)
- Incubation time in Daisy (hours)

- Soya bean products
- Sun flower products
- Palm kernel cake
- DDGS
- Rape seed products
- Oat
- Artificially dried grass
- Other
RESULTS TIME PROFILES

![Graph showing the digestibility of OM (%) over incubation time in Daisy (hours) for various products: Soya bean products, Sun flower products, Palm kernel cake, DDGS, Rape seed products, Oat, Artificially dried grass, and Other.](image)
RESULTS TIME PROFILES

Digestibility of OM (%) vs Incubation time in Daisy (hours)

- Soya bean products
- Sun flower products
- Palm kernel cake
- DDGS
- Rape seed products
- Oat
- Artificially dried grass
- Other
RESULTS TIME PROFILES

- Digestibility of OM (%)
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- Soya bean products
- Sun flower products
- Palm kernel cake
- DDGS
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- Oat
- Artificially dried grass
- Other

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RESULTS – 72H INCUBATION

<table>
<thead>
<tr>
<th>Hours</th>
<th>R²</th>
</tr>
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<tbody>
<tr>
<td>24</td>
<td>0.67</td>
</tr>
<tr>
<td>72</td>
<td>0.80</td>
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RESULTS – 72H INCUBATION

\[ y = x \]

- Digestibility of OM (%)
- EFOS (% of OM) (reference method)
RESULTS – 72H INCUBATION

<table>
<thead>
<tr>
<th>Feedstuff</th>
<th>In vivo OMD</th>
<th>EFOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oat</td>
<td>81.3</td>
<td>78.2</td>
</tr>
<tr>
<td>Palm kernel cake</td>
<td>58.3</td>
<td>62.6</td>
</tr>
</tbody>
</table>

(Weisbjerg and Hvelplund, 1993)

Digestibility of OM (%): EFOS (% of OM) (reference method)
RESULTS – 72H INCUBATION

Digestibility of OM (%)

EFOS (% of OM) (reference method)

Artificially dried grass
Wheat bran

y = x
CONCLUSION

- Incubation in Daisy with Trichoderma Viride enzyme can be used for estimation of OM digestibility, but not iNDF content, in concentrate feeds

- 24h enzyme incubation is not enough for all feedstuffs

- NDF can be determined in the same process
Thank You