In vitro Rumen Fermentation of Sauropus androgynus (L.) Merr. Compared to Hays of Different Quality

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Introduction

Katuk leaves (Sauropus androgynus [L.] Merr.) have a high crude protein (CP) content. Supplementing Katuk leaves to lignified forages, e.g., crop residues that are low in metabolisable energy (ME) and CP could increase the nutritional value of the feedstuffs.

Objectives

- To evaluate the chemical composition, the estimated metabolisable energy (ME) and net energy for lactation (NEL) values of Katuk leaves.
- To evaluate the effect of blending Katuk leaves with hay of differing quality on in vitro rumen fermentation using an in vitro gas production technique, namely the Hohenheim Gas Test (HGT).

Materials

Hay Low Quality
Hay Medium Quality
Hay High Quality
Kutuk Leaves (HL)

Methods

Chemical Analysis

Dry matter (DM)
Crude protein (CP)
Ash
Crude fat
Neutral detergent fiber on an ash free or organic matter basis (aNDFom)
Ash free acid detergent fiber (ADFom)
Acid detergent lignin (ADL)

Hohenheim Gas Test (HGT)

Cumulative Gas Production

Net gas production value of feedstuffs in 24 h incubation was found between 33.3 (low quality hay + 5% of Katuk leaves) and 49.6 (medium quality hay) ml 200 mg⁻¹ dry matter.

Results

Chemical Composition

Crude Protein (g kg⁻¹)
Crude Ash (g kg⁻¹)
Crude Fat (g kg⁻¹)
ADL (g kg⁻¹)

Chemical Analysis

<table>
<thead>
<tr>
<th>Material</th>
<th>Protein</th>
<th>Ash</th>
<th>Fat</th>
<th>ADL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hay Low Quality</td>
<td>123 g</td>
<td>20 g</td>
<td>10 g</td>
<td>2.3 g</td>
</tr>
<tr>
<td>Hay Medium Quality</td>
<td>150 g</td>
<td>15 g</td>
<td>8 g</td>
<td>2.5 g</td>
</tr>
<tr>
<td>Hay High Quality</td>
<td>180 g</td>
<td>10 g</td>
<td>5 g</td>
<td>2.7 g</td>
</tr>
<tr>
<td>Katuk leaves</td>
<td>150 g</td>
<td>20 g</td>
<td>10 g</td>
<td>2.5 g</td>
</tr>
</tbody>
</table>

Chemical Analysis

Effect of PEG Treatment on the Cumulative Gas Production

Gas production after 24 h incubation of Katuk leaves with PEG and without PEG did not differ.

Metabolisable energy (ME) and net energy lactation (NEL)

<table>
<thead>
<tr>
<th>Hay composition</th>
<th>ME (kJ kg⁻¹ DM)</th>
<th>NEL (kJ kg⁻¹ DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hay low + 5% Katuk</td>
<td>7.57</td>
<td>4.23</td>
</tr>
<tr>
<td>Hay low + 10% Katuk</td>
<td>7.87</td>
<td>4.53</td>
</tr>
<tr>
<td>Hay low + 20% Katuk</td>
<td>8.05</td>
<td>4.71</td>
</tr>
<tr>
<td>Hay medium + 5% Katuk</td>
<td>9.27</td>
<td>5.63</td>
</tr>
<tr>
<td>Hay medium + 10% Katuk</td>
<td>9.51</td>
<td>5.85</td>
</tr>
<tr>
<td>Hay medium + 20% Katuk</td>
<td>9.85</td>
<td>6.13</td>
</tr>
<tr>
<td>Hay high + 5% Katuk</td>
<td>10.01</td>
<td>6.31</td>
</tr>
<tr>
<td>Hay high + 10% Katuk</td>
<td>10.25</td>
<td>6.53</td>
</tr>
<tr>
<td>Hay high + 20% Katuk</td>
<td>10.47</td>
<td>6.71</td>
</tr>
</tbody>
</table>

Conclusion

No effect of PEG addition indicates that Katuk leaves do not contain tannin.

Moreover according to chemical composition, in vitro gas production and resulting ME and NEL estimation, the mixture of high quality hay with 20% of Katuk leaves was the best blend in terms of nutritive value for ruminants.

Reference:

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