EFFECTS OF LHATRUS SATIVUS SEED EXTRACTS ON IN VITRO DRY MATTER DIGESTIBILITY OF LUCERNE CHAFF

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*Lathyrus sativus*, a protein rich legume, has the potential to be used as animal feed. However, it contains the non-protein amino acid, oxalyl-L-α,β-diamino propionic acid (ODAP) which has neurotoxin activity in humans and livestock. The symptoms range from inability to walk to complete paralysis of the lower limbs and in extreme cases, death (Getachew et al. 1994). An experiment was conducted to investigate the effects of *L. sativus* seed extracts on in vitro dry matter (DM) digestibility of lucerne chaff.

A flask containing 300 ml of 60% ethanol and 100 grams of ground *L. sativus* seed was placed in a shaker at room temperature for 6 hours. After extraction, the mixture was centrifuged and the supernatant was vacuum reduced to 2/3 of the original volume. The ODAP concentration was measured by the method of Rao (1978).

Freshly collected rumen fluid from sheep on a maintenance diet was immediately transferred to an anaerobic hood and filtered through 4-layers of cheesecloth. 1 ml of rumen fluid was inoculated into a tube containing 30 ml basal medium and 0.4 grams of ground lucerne chaff, and 4 levels of ODAP extracts (0, 52, 104 and 157 µg/ml) were added. Triplicated samples for each treatment were incubated at 39 °C in an anaerobic hood for 24, 48 and 72 hours. After each incubation period, the samples were centrifuged, washed, dried and weighed.

The results in table 1 show that within each incubation period, the DM digestibility of lucerne chaff was significantly reduced with increasing levels of ODAP extract. The greatest loss of digestibility for 24, 48 and 72 hours incubation was 17.4%, 12.4% and 11.3% respectively. The digestibility of lucerne chaff in each treatment increased with incubation time, and the highest ODAP group always had the lowest digestibility.

Table 1. Effects of different levels of extracts on DM digestibility of lucerne chaff (g/g)

<table>
<thead>
<tr>
<th>Incubation time (hours)</th>
<th>Level 1</th>
<th>Level2</th>
<th>Level3</th>
<th>Level4</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>0.4431±0.0030</td>
<td>0.4202±0.0055</td>
<td>0.3932±0.0026</td>
<td>0.3563±0.0072</td>
</tr>
<tr>
<td>48</td>
<td>0.5242±0.0013</td>
<td>0.5099±0.0017</td>
<td>0.4795±0.0015</td>
<td>0.4603±0.0015</td>
</tr>
<tr>
<td>72</td>
<td>0.5339±0.0023</td>
<td>0.5124±0.0031</td>
<td>0.4868±0.0009</td>
<td>0.4738±0.0072</td>
</tr>
</tbody>
</table>

Values with different superscript are significantly different at P=0.05

The significant drop in DM digestibility may be due to an interaction of ODAP with rumen microorganisms. This is supported by a report that found that ODAP was toxic to non-ruminal organisms such as Neurospora crassa, Staphylococcus aureus, Escherichia coli and Candida albicans (Adiga et al. 1962). Other unknown compounds contained in the crude extracts may also be responsible for this effect. Getachew et al. (2000) found that tannins were a major contributor to the inhibition of rumen microbial activity and reduced rumen fermentation of various toxic plants. Therefore, further work is required to investigate the effects of ODAP on microbial growth and whether tannins are also present in *L. sativus*.


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