THE UTILIZATION OF WATER HYACINTH (EICHHORNIA CRASSIPES) BY WEST AFRICAN DWARF (WAD) GROWING GOATS

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Confined growing goats were offered ad libitum sundried water hyacinth, cowpea pod and groundnut stubbles hand mixed in the respective proportions: 30:40:30 (diet 1); 30:30:40 (diet 2) and 40:30:30 (diet 3) to measure intake, feed conversion and rate of gain. Dry Matter Intake, DMI (56.14 ± 6.50g/kg dry matter intake (% of EW)) 3.49 ± 0.30, feed conversion (g gain/kg feed) 47.24 ± 5.80 and rate of gain (gd 11.00 ± 2.80 of goats fed diet 3 were higher (P < 0.05) than the corresponding (P > 0.05) mean DM1 (49.88 ± 6.50g/kg/BW).

MATERIALS AND METHODS

Feed description and Preparation

Water hyacinth (E. crassipes) was collected from River Majidun in Ikorodu Local Government, Lagos State of Nigeria. The roots were cut-off and discarded, the stalks and leaves were chopped to 3cm in length and sundried for about 5 days at an environmental temperature (22.8 - 33.8°C) and relative humidity (54.0 - 96.0%). Cowpea pod and groundnut stubbles were purchased at Sabo Goat Market in Ikorodu, Lagos, Nigeria. Sundried water hyacinth, cowpea pod and groundnut stubbles were hand mixed as experimental bulked feed samples were stored at -33.8°C and relative humidity (54.0 - 96.0%). Cowpea pod and groundnut stubbles were purchased at Sabo Goat Market in Ikorodu, Lagos, Nigeria.

RESULTS AND DISCUSSION

Chemical Composition

Composition of water hyacinth-based goat diets and proximate analysis of the diets are shown in Table 1 and chemical composition of the feed ingredients is depicted in Table 2. The DM contents of diets 1, 2 and 3 were similar with a mean value of 81.07%. Also the DM values of the feed ingredients were alike with a mean value of 81.07%.

The crude protein (UP), ether extract (EE) and the ash contents of the three diets were similar with the exception of the crude fibre (CF) of diet 3 which was about 25% below the similar mean CF value of diets 1 and 2 (30.75g/ 100g DM). This observation may be

Key Words: Water hyacinth, growing goats, intake, feed efficiency and weight gain.
ascribed to the relatively low CF value of *E. crassipes* which constituted 40% of diet 3.

**Table 1:** Composition of water hyacinth-based goat diets.

<table>
<thead>
<tr>
<th>Ingredients*</th>
<th>DIETS (g/100G DM)</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water hyacinth</td>
<td>30.00</td>
<td>30.00</td>
<td>40.00</td>
<td></td>
</tr>
<tr>
<td>Cowpea pods</td>
<td>40.00</td>
<td>30.00</td>
<td>30.00</td>
<td></td>
</tr>
<tr>
<td>Groundnut stubbles</td>
<td>30.00</td>
<td>40.00</td>
<td>30.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2:** Chemical composition of feed ingredients (g/100g DM).

<table>
<thead>
<tr>
<th>Ingredients*</th>
<th>Water hyacinth (stalk + leaves)</th>
<th>Cowpea pods</th>
<th>Groundnut stubbles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter, %</td>
<td>80.60</td>
<td>81.00</td>
<td>81.60</td>
</tr>
<tr>
<td>Crude protein</td>
<td>10.80</td>
<td>10.55</td>
<td>10.68</td>
</tr>
<tr>
<td>Ether extract</td>
<td>1.78</td>
<td>1.71</td>
<td>1.80</td>
</tr>
<tr>
<td>Ash</td>
<td>10.34</td>
<td>10.58</td>
<td>10.97</td>
</tr>
<tr>
<td>Crude fibre</td>
<td>31.00</td>
<td>30.50</td>
<td>22.94</td>
</tr>
</tbody>
</table>

*As fed basis.

**Table 3:** Performance of experimental goats on water hyacinth-based diets.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>DIETS</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of experiment (days)</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live weight Changes (kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>6.50</td>
<td>6.47</td>
<td>6.49</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>6.50</td>
<td>6.76</td>
<td>6.87</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Growth rate (gd-1)</td>
<td>8.55</td>
<td>8.20</td>
<td>11.00</td>
<td>2.80</td>
<td></td>
</tr>
</tbody>
</table>

**Feed intakes and Performance**

Dry matter intake (DM1) of goat fed diet 3 (56.14±6.50 g/kg 'BW') was 3.49% BW and was 12.55% higher (P < 0.05) than the similar (P>0.05) mean intake (49.88gkg of goats fed diets 1 and 2. This observation on intake was similar to intake of goats fed wheat straw (54±24gkg (Houston, 1988) and intake of sheep feed soybean slover (54.98gkg) (Dada et al., 1998). The similarly low (P<0.05) mean DM1 of goats fed diets 1 and 2 (49.88gkg- 'BWO may be attributed to their relatively high CF content (Table 1). A considerable body of authors are in support of kw DM1 due to high CF content of forage (Jones et al., 1972; El Hag, 1976; Sharma et al., 1977; Huston, 1978; Devendra, 1g78; Brown et al., 1984, 1988; Hennessy et al., 1983; Huston et al., 1988; Lascano et al., 1993). Feed efficiency of goats led diet 3 with 40% water hyacinth inclusion (g gain/kg feed) (47.24±5.80) was superior (P<0.05) to the corresponding (P>0.05) mean (40.55±5.80) of goats fed diets 1 and 2 with 30% water hyacinth inclusion. In support of this observation, CF content of diet 3 (22.94g/kg DM) was 24% lower than the mean (30.2g/kg DM) similar CF content of diets 1 and 2.

There were no differences shown in the initial weight (P>0.05) of the goats in the three diet groups. However, at the termination of the study (35 days) the mean final weight of goats fed diet 3 (6.87kg) was significantly (P<0.05) higher than the similar (P>0.05) weights of goats fed diets 1 and 2 which were 6.80 and 6.76kg respectively. Growth rate (gd 1) of animals fed diet 3 (11.00±2.80) was also significantly (P<0.05) higher than 8.55 and 8.20 (±2.80) of goats fed the respective diets 1 and 2. This result indicates that utilization of sundried *E. crassipes* by growing goats at up to 40% dietary level of inclusion is beneficial contrary to previous reports of its low palatability and DM1 due to its high ash and alkali metals contents by Hossein (1959); Parra (1975); Chatterjee et al, 1988. Futh beneficial level of inclusion of *E. crassipes* by growing goats will be necessary.

**REFERENCES**


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