Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Heifer Grazing on Ruzi Grass Pasture

Sittisak Khampa¹, Pala Chaowarat¹, Runson Singhaler² and Metha Wanapat³
¹Faculty of Agricultural Technology, ²Faculty of Humanities and Social Sciences, Rajabhat Maha Sarakham University, P.O. Box 44000, Thailand
³Tropical Feed Resources Research and Development Center (TROFREC), Department of Animal Science, Faculty of Agriculture, Khon Kaen University, P.O. Box 40002, Thailand

Abstract: Ten, one-year old heifers with initial body weight at 150±10 kg were randomly divided into 2 groups according to receive concentrate at 14% CP (1 kg/head/day) + Ivermectin (T₁) and cassava hay (T₂) (1 kg/head/day) and means were compared using t-test. All animals were grazing on ruzi grass pasture. The results have revealed that supplementation of cassava hay as anthelmintics replace ivermectin was non significant affected to fecal parasitic egg counts and average daily gain in buffaloes grazing on ruzi grass pasture (p>0.05). In addition, fecal parasitic egg counts dramatically declined for both treatment groups with 60.5 and 50.6%, respectively. However, Average Daily Gain (ADG) tended to be higher in swamp buffaloes fed on groups cassava hay (T₂) treatments than in those fed concentrate + ivermectin. However, digestion of coefficients of nutrients particularly organic matter was significantly higher in T₁ than those in T₂. It was, hence concluded that cassava hay could not only provide as a protein source but also high efficiency serve as an anthelmintics in heifer.

Key words: Cassava hay, fecal parasitic egg counts, anthelmintics, heifer

INTRODUCTION
Internal parasites in ruminants raised in the tropics have been found to be one of the big constraints, apart from feed availability. Furthermore, using commercial drenching could result in high cost of production. Studies using feeds containing condensed tannins have been shown to reduce internal parasitic egg counts in cattle, buffaloes, sheep and goats (Wanapat, 2000; Netpana et al., 2001). Control of Gastro-Intestinal (GI) use of term parasite late on nematodes has relied heavily on the use of anthelmintics (Wanapat and Khampa, 2006; Granum et al., 2007). These compounds have been used successfully but the development of anthelmintic resistance in GI nematodes (Geerts and Dorny, 1999) gives a clear indication that control programs based on use of anthelmintics are not sustainable. The objective of this experiment was conducted to determine the effects of supplementation of cassava hay as anthelmintic replace antibiotics on fecal parasitic egg counts and average daily gain in heifer grazing on ruzi grass pasture.

MATERIALS AND METHODS
Animals, diets and experimental design: Ten, one-year old of heifers weighing about 150±10 kg were randomly divided into two groups according to receive 2 groups of supplemental feeds by receive concentrate at 14% CP (1 kg/head/day) + Ivermectin (T₁) and cassava hay (T₂) (1 kg/head/day). During the first two weeks, animals had no supplements and grazed on ruzi grass pasture when fecal samples were analyzed for parasitic egg counts as a control. Following this period animals (3 each/group) were assigned to receive respective treatments by receiving concentrate at 14 %CP and drenching with ivermectin (T₁) and cassava hay (T₂) (Table 1, 2) while grazing on ruzi grass pasture. Feeds and fecal samples were collected at the end of each week for 6 weeks to be analyzed for chemical compositions (feed and feces) and fresh feces to be analyzed parasitic egg counts (Zajac, 1994). Composites samples were dried at 60°C and ground (1 mm screen using Cyclotech Mill, Tecator, Sweden) and then analyzed for DM, ether extract, ash and CP content (AOAC, 1985), NDF, ADF and ADL (Goering and Van Soest, 1970). In addition, digestion coefficients were calculated using Acid Insoluble Ash (AIA) as internal indicator from all feeds and excreted faces or rectal sampling according to Van Keulen and Young (1977).

Statistic analysis: The means of each parameter measured in the digestibility studies and internal parasitic egg counts were analyzed by the analysis of variance procedure of SAS (1998) and means were compared using t-test.

RESULTS AND DISCUSSION
Chemical composition of feeds and digestibility of nutrients: The chemical compositions of concentrate
Table 1: Ingredients of concentrate used in the experiment (%DM basis)

<table>
<thead>
<tr>
<th>Ingredients (DM%)</th>
<th>Concentrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cassava chip</td>
<td>60.0</td>
</tr>
<tr>
<td>Fine rice bran</td>
<td>6.0</td>
</tr>
<tr>
<td>Brewer's grain</td>
<td>6.0</td>
</tr>
<tr>
<td>Urea</td>
<td>3.0</td>
</tr>
<tr>
<td>Molasses</td>
<td>3.0</td>
</tr>
<tr>
<td>Sulfur</td>
<td>0.5</td>
</tr>
<tr>
<td>Salt</td>
<td>0.5</td>
</tr>
<tr>
<td>Mineral mix</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Table 2: Chemical composition of concentrate, cassava hay and ruzi grass

<table>
<thead>
<tr>
<th>Analyzed composition (%)</th>
<th>Concentrate</th>
<th>Cassava hay</th>
<th>Ruzi grass</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>90.5</td>
<td>90.1</td>
<td>42.1</td>
</tr>
<tr>
<td>OM</td>
<td>91.2</td>
<td>91.2</td>
<td>89.6</td>
</tr>
<tr>
<td>Ash</td>
<td>8.7</td>
<td>9.3</td>
<td>10.0</td>
</tr>
<tr>
<td>CP</td>
<td>14.2</td>
<td>24.5</td>
<td>7.2</td>
</tr>
<tr>
<td>NDF</td>
<td>18.5</td>
<td>41.3</td>
<td>35.2</td>
</tr>
<tr>
<td>ADF</td>
<td>10.1</td>
<td>20.1</td>
<td>26.8</td>
</tr>
<tr>
<td>CT</td>
<td>-</td>
<td>3.4</td>
<td></td>
</tr>
</tbody>
</table>

DM = Dry Matter, CP = Crude Protein, OM = Organic Matter, NDF = Neutral Detergent Fiber, ADF = Acid Detergent Fiber, CT = Condensed Tannins

diets, cassava hay and ruzi grass fed in heifer are shown in Table 1 and 2. Crude proteins of concentrate, Cassava Hay (CH) and ruzi grass were 14.2, 24.5 and 7.2%, respectively. As compared between the 2 groups found that heifer fed cassava hay (T2) supplementation had higher average daily gain and digestion coefficients especially that of organic matter than those fed concentrate + ivermectin (T1) (229.3, 215.4 g/day and 75.1, 68.3%, respectively). These could be due to effect of supplemental cassava hay it contained good-quality protein with condensed tannins (Wanapat et al., 2000a, b; Hong et al., 2003).

Effect on internal parasitic egg counts: With regards to internal parasitic egg counts, during the first two weeks, the results were similar for all. As shown in Table 4 when treatments were imposed, parasitic egg counts in both groups started to decline from the first week to the last 6 week. The rates of decline were higher in concentrate + ivermectin and the reduction were obtained at 60.5 and 50.6% for concentrate + ivermectin (T1) and cassava hay (T2) groups, respectively. This lower rate of reduction T2 could be attributed by lower amount of cassava hay (condensed tannins) consumed by animals as higher results were previously reported by Netpana et al. (2001) and Granum et al. (2007).

Condensed Tannin (CT) containing forages have the potential to help control anthelmintic resistant Gastro-Intestinal Parasites (GIP). The CT may have direct or indirect biological effects on the control of GIP. Butter et al. (2000) reported that direct effects might be mediated through CT nematode interactions, thereby affecting physiological functioning of GIP. Condensed tannins also may react directly by interfering with parasite egg hatching and development to infective stage larvae (Athanasiadou et al., 2000, 2001).

The findings of Sokerya and Rodriguez (2001) and Sokerya and Preston (2003) showed that Eggs per Gram (EPG) counted in goats fed the cassava and cassava + grass treatments steadily declined during the experiment from about 4000-5000 eggs/g of fresh feces in the first 30 days to about 1500 eggs/g after 70 days. Moreover, Hur et al. (2005) found that goat like eating fresh pine needles and dry oak leaves, these feedstuff could be used as an alternative method for controlling coccidial infection in goats in order to reduce a dependence on Chemotherapeutics as the sole method for controlling coccidial infection in goats.

Indirect effects on resistance and resilience could be mediated by changes in the supply of digested protein. The CT can improve protein nutrition by binding to plant proteins in the rumen so preventing microbial degradation and increasing amino acid flow to the duodenum. Protein supplementation appears to be effective in enhancing specific immune responses
against intestinal parasite infection (Bown et al., 1991). Nevertheless, this effect of CH supplementation should be noted since its effect was similar to using dewormers. It is therefore, concluded that cassava hay could be used as a protein source as well as an anthelmintic to reduce internal parasitic egg counts especially with its easy use and availability by smallholder farmers in the tropics.

**Conclusions and Recommendations:** Based on these experiments, cassava hay containing condensed tannins and was used in various forms, could provide as a good source of protein, improve digestibility and reduce internal parasitic egg counts in heifer. Cassava hay could be used successfully especially under smallholder farming system to sustain heifer productivity and hence, recommended for use on farms.

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**REFERENCES**


