Effect of Cassava Hay in High-quality Feed Block as Anthelmintics in Steers Grazing on Ruzi Grass

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ABSTRACT : Six, one-year old dairy steers were randomly divided into two groups according to a Completely randomized design (CRD) to receive high-quality feed block (HQFB) without cassava hay and drenching (HQFB1+Ivomex) and HQFB with cassava hay (HQFB2) as block licks while grazing on Ruzi grass pasture. During the eight weeks, fecal parasitic egg counts dramatically declined for both treatment groups with 63.2 and 27.6% reduction from initial period for HQFB1+Ivomex and HQFB2, respectively. However, digestion of coefficients of nutrients particularly OM, were significantly higher in HQFB2 than, those in HQFB1+Ivomex, in addition, ADG of animals in HQFB2 tended to be higher than the group on HQFB1. It was, hence concluded that cassava hay could not only provide as a protein source but also serve as an anthelmintic in ruminants. ***(Asian-Aust. J. Anim. Sci. 2006. Vol 19, No. 5 : 695-698)***

Key Words : Cassava Hay, High-quality Feed Block, Anthelmintics, Ruminants

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 (Granum et al., 2002). These compounds have been used successfully but the development of anthelmintic resistance in GI nematodes (Pandey and Sivaraj, 1994; Geerts and Dorny, 1996) 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 use of high-quality feed block containing cassava hay on feed digestibility and parasitic egg counts in dairy steers grazing on Ruzi grass pasture.

MATERIALS AND METHODS

Animals, diets and experimental design

Six, one-year old of dairy steers (Holstein-Friesian Crossbred cows 75%) weighing about 150 kg were randomly assigned according to a completely randomized design (CRD) to receive two groups of supplemental feeds with and without drenching. 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 high-quality-feed block without cassava hay (HQFB1) and drenching with ivomex and high-quality feed block with cassava hay (HQFB2) (Tables 1 and 2) as lick blocks while grazing on Ruzi grass pasture. The pressure density of HQFB1 and HQFB2 are at 17 and 19 percents of lick blocks. 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). Composited 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) and acid insoluble ash (AIA). AIA was used to estimate digestibility of nutrients (Van Keulen and Young, 1977).

In addition, concentrate supplement was given to all animals at 1 kg/hd/d (Table 2). Urea-treated rice straw (UTS) was prepared by using 5% (W/W) urea mixed with 100 kg of water in 100 kg of rice straw (RS) batches (50:50, water to straw) and poured over a stack of straw and then covered with a plastic sheet for a minimum of 10 days before feeding to animals (Wanapat, 1990). UTS was also given in addition at 1.5 kg DM/hd/d when animals were penned during the evenings. Digestion coefficients were calculated using acid insoluble ash (AIA) as internal indicator from all feeds and excreted faces (rectal sampling).

Statistic analysis

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

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Table 1. Ingredients and chemical composition of high-quality feed block without cassava hay (HQFB1) and high-quality feed block with cassava hay (HQFB2)

Ingredients	HQFB1	HQFB2
Coarse rice bran	30	-
Cassava hay	-	30
Molasses	40	42
Urea	13	11
Limestone	12	12
Sulfur	1	1
Mineral mix	1	1
Salt	1	1
Tallow	2	2
Total	100	100
Chemical composition		
DM (%)	78.9	79.5
OM (% of dry matter)	73.8	77.9
CP (% of dry matter)	37.8	38.8
NDF (% of dry matter)	25.0	32.1
ADF (% of dry matter)	19.4	14.0
Condensed tannins (CT)	-	1.2

DM = Dry matter, CP = Crude protein, OM = Organic matter, NDF = Neutral detergent fiber, ADF = Acid detergent fiber.

Table 2. Ingredients and chemical composition of concentrate, urea-treated rice straw (5%) (UTRS) and Ruzi grass

Nutrient	Concentrate	UTRS	Ruzi grass
DM (%)	95.4	54.2	40
OM (% of dry matter)	90.9	91.0	92.2
Ash (% of dry matter)	9	8.2	7.7
CP (% of dry matter)	17.9	7.0	6.8
NDF (% of dry matter)	37.5	71.1	81.2
ADF (% of dry matter)	11.5	53.3	44.6

DM = Dry matter, CP = Crude protein, OM = Organic matter, NDF = Neutral detergent fiber, ADF = Acid detergent fiber. (Ingredients = cassava chips 70, cottonseed meal 8.5, brewer's grains 4, urea 4, molasses 5, tallow 4.5, sulfur 1, salt 1, limestone 0.5, mineral mix. 1%) as dry weight.

RESULTS AND DISCUSSIONS

Chemical composition and digestibility of nutrients

High-quality feed block (HQFB) compositions and chemical compositions are shown in Table 1 and 2. HQFB without cassava hay (CH) (HQFB1) and with CH (HQFB2) contained similar crude protein. CH used was at 30% in HQFB2 while in HQFB1, rice bran was used. Crude protein of CH and UTRS were 25% and 8.2%, respectively. As compared between the two groups, digestion coefficients in HQFB2 were significantly higher than in HQFB1+Ivomex especially that of OM (Table 3). These could be due to effect of supplemental CH in the block as it contained good-quality protein with condensed tannins (Wanapat et al., 2000ab; 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 HQFB1+Ivomex and the reduction were obtained at 63.2 and 27.6% for HQFB1+Ivomex and HQFB2 groups, respectively. This lower rate of reduction HQFB2 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. (2002).

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 parasitic egg hatching and development to infective stage larvae (Athanasiadou et al., 2000, 2001).

The findings of Seng Sokerya and Rodriguez (2001)

Table 3. Effect of supplementation of high-quality feed block on feed intake and digestibility of nutrients in dairy steers

Items	HQFB1 +Ivomec**	HQFB2*	P-value
High-quality feed block DM intake (kg/d)	0.48	0.41	0.748
Apparent digestibility (%)			
DM	63.4	71.2	0.059
OM	66.6	73.5	0.018
CP	76.5	76.0	0.459
NDF	59.5	64.3	0.735
ADF	48.9	55.7	0.357

* HQFB1 = High-quality feed block without cassava hay.
** HQFB2 = High-quality feed block with cassava hay.

Table 4. Effect of supplementation of high-quality feed block with or without cassava hay as anthelmintics in dairy steers grazing on Ruzi grass

Parasitic eggs/g of fresh feces	HQFB1 +Ivomec**	HQFB2*	P-value
Week-post feeding			
-2	560	555	0.186
-1	558	557	0.862
1	550	550	-
2	212	487	0.309
3	162	387	0.608
4	125	351	0.865
5	112	325	0.243
6	110	320	0.237
Mean	211.8	403.3	0.222
Reduction (%)	63.2	27.6	0.134
ADG (kg/hd/d)	0.41	0.45	0.317

* HQFB1 = High-quality feed block without cassava hay.
** HQFB2 = High-quality feed block with cassava hay.

and Seng 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 4,000-5,000 eggs/g of fresh feces in the first 30 days to about 1,500 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 coccidian infection in goats in order to reduce a dependence on Chemotherapeutics as the sole method for controlling coccidian 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 parasitic 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 anthemintics to reduce internal parasitic egg counts especially with its easy use and availability by small-holder 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 ruminants. Cassava hay could be used successfully especially under small-holder farming system to sustain ruminant productivity and hence, recommended for use on farms.

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