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Effect of different rates of cassava leaves hay on growth performance and fecal parasitic eggs in gastro-intestinal cattle

Sophany MORM[1]*, Sansophorn KONG[2], Sophea IV[3]

[1] Department of Animal Science, Faculty of Agriculture and Food Processing, National University of Battambang, Cambodia;
[2] Faculty of Veterinary Medicine, Royal University of Agriculture, Cambodia;
[3] Animal health and Production Office, Battambang Provincial Department of Agriculture, Forestry and Fisheries, Cambodia.
Corresponding author: Email: sophanymorm@gmail.com

Abstract

The people at rural areas are popular for animal husbandry but their farming matches with technical shortage constraints. Anyways, parasite sides were challenges on livestock production. The study aims to examine the effects of cassava leave hay (CLH) to decline parasite egg counts in cattle ruminants. Twenty-seven local cattle were selected with average initial body weight between 149.78 ± 0.40 kg or 150.17 ± 1.59 kg with regardless sexual, ranking age 6-7 months, $P > 0.05$, respectively. The trials were divided into triple groups: "Treatment 0" providing fresh grass and rice straw (FG-R), "Treatment 1" (FG-R) and cassava leaves hay (CLH) 0.5% compared to body weight and "Treatment 2" (FG-R) and cassava leaves hay (CLH) 1% compared to body weight. During the test period in sixth weeks: Treatment 0 was equal to 1,155.75 eggs, an increased 4.15%. Treatment 1was equal to 902.89 eggs, declined 13.92% and Treatment 2 was equal to 781.10 eggs, declined 22.53%, P=0.001<0.05, respectively. CLH was correlated with the number of parasite egg counts. It may conclude that CLH 1% has the potential to improve body weight gain and minimize feed intake with an apparent negative impact on gastro-intestinal tract in local cattle.

Keywords: Cassava hay, condensed tannin, fecal parasitic eggs, gastro-intestinal tract, *Indu brasil-Hariana*.

Introduction

Cattle rising have not improved at present due to farmers not yet understanding on the technical raising by keeping animals healthy (Miranda et al. 2009). The majority of rural farmers are raising cattle for agricultural labor (Chantalakana 2001). Whereas, feeding animals does not meet the needs of animals and furthermore feeding provided to cattle were contaminated by parasite eggs which were affected to weight gain (Miranda et al. 2009). Majority of farmers are shortage understanding on parasite impacts (Adèle et al. 2010) so they injected another anti-parasitic medicine to their cattle to obtain healthy and growth to serve in agriculture sector but vet-medicine is costly that lead to declining production and instability (Khampa et al. 2009).

Cassava originates in the north of South America and west of Mexico. The scientific name of cassava is *Manihot esculeta* in family *Euphorieacees* and its resilience with infertility soil (Nartey 1978). Cassava (*Manihot esculenta) is* a popular crop and it provides premium yield (Preston 2001; Wanapat and Ogle 2001). Recently, cassava has dried to provide ruminant feeds (Wanapat et al.1997). Cassava leaves contained crude protein 19.5% and Tannin 40 g/kg of dry matter (Granum et al. 2007). The cassava leaves consumption that contains condensed tannin (CT) within a reasonable level is helping to maintain the nutrients of animal feed and toxic components has ability to control and reduce the number of parasites in ruminants (Barry and McNabb, 1999).

Actually, cassava foliage plays important role in increasing goat productivity (Seng and Preston 2003). It is also an effective natural remedy for controlling the formation of parasite eggs in the gastro-intestinal tract of cattle and stimulates growth rate (Grannum et al.2007; Sittisak et al. 2009 and Khampa et al. 2009).

Natural medicine is a necessary part of livelihood improvement in rural areas. *Manihot esculenta* leaves were protein sources and their abilities to control parasite eggs. Due to seeing it benefits to inspire the research on "Effects of cassava leaves hay on growth rate performance and parasite egg counts in gastro-intestinal cattle" with this study aim to examine the effects of cassava leaves hay (CLH) to declining parasite eggs in gastro-intestinal (GI) and growth rate performance of *Indo brasil-Hariana breed*.

Methods

The research on the effects of using different levels of cassava hay on growth rate performance and faeces parasite egg counts in gastro-intestinal cattle was carried out at the Research and Training Farming (13°00'26.5" N; 103°18'49.0" E) of the National University of Battambang, Cambodia. The cattle (*n* = 27) were test with initial live weight 149.78 ± 0.40 kg or 150.17 ± 1.59 kg and ranking age from 6-7 months. These cattle were randomly assigned in 3 treatments (Treatment 0, Treatment 1 and Treatment 2) with 3 replications each in completely randomized design (CRD) according to Lentner and Bishop (1986). The test of cattle was crossed breed between *Indu brazil* and *Hariana* with regardless male and female. All cattle were vaccinated on blackleg and food and mouse disease (FMD) for 21 days prior to the test experiment. Table 1, Respectively.

The cassava leaves hay was provided 0.5% and 1 % compared body weight prior to providing basic diet feeding followed on both groups. e.g.: fresh grass and rice straw. Cassava leaves hay provided to cattle at 7: 00 am before providing a basic diet. Basic diet was provided two times a day at 7:30 am and 3: 00 pm (GMT+2h), respectively, in Treatment 1 and Treatment 2.

The sedimentation technique was used to explore parasite eggs which were addressed with McMaster Counting: Modified McMaster Technique to identify the number 1 gram of EPG. Procedure: weigh 4 grams of cattle faeces and place into a beaker with scale 150 ml, add NaCl 60 ml then stir it thoroughly with a fork or other appropriate material. Filter with laboratory test sieve by size 250 µm and transfer to another sieve size 53 µm to remove large pieces of grass debris. Using the pipette withdraw sample as the filtrate is being stirred to fill the compartment of the McMaster counting chamber slide then take it to test under compound microscope at 40 or 100 magnifications. To identify and count all eggs within the grid of both chambers and match the volume 2x0.15ml is equal 0.2grams. Parasite eggs in faeces 1gram is equal to the number of parasite eggs counted in both grids of McMaster chambers by multiplying the total of 50, it means that if we found "A" of parasite eggs in 1 gram is equal Ax50 (FAO, nd).

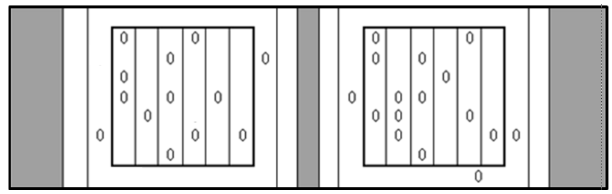

Fig. 1: McMaster slide with example nematode eggs. Count number of eggs with the grid of each chamber, ignoring those outside the squares. 11 parasite eggs seen in chamber 1 and 13 eggs seen in chamber 2 = (11 +13) x 50 =1,200 EPG.

To evaluate the effects declining parasite eggs of cattle were divided three groups with 27 heads, group "Treatment 0" providing fresh grass and rice straw (GF-R), "Treatment 1" (GF-R) and cassava leaves hay (CLH) 0.5% and "Treatment 2" (GF-R) and cassava leaves hay (CLH) 1%. To inspire cattle taste well with supplement feed has been adapted for 2 weeks prior the test period, in Treatment 1 and Treatment 2, respectively. On 25 May to 14 April 2012 was vaccinated on Blackleg, FMD and palatability test. On 15 April to 26 May 2012 was conducted the test trial period. During the test were recorded such as biweekly weight gain, cassava leaves hay, percentage of parasite eggs and daily temperature. Data on the condensed tannin (CT) and nutrient contents of feeding in table 2, chemical components of cassava leaves and parasite egg counts were explored and analyzed at the Institute of Technology of Cambodia (ITC) and the general laboratory of the National University of Battambang (NUBB), Cambodia.

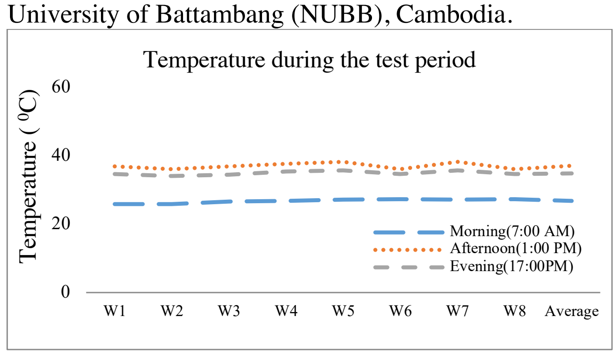

Fig. 2: Weekly of average temperature; data were collected at Research and Training Farm of the National University of Battambang.

Table 1: Characteristic of cattle body weight performance. Note: ns mean values of non-significant ($P > 0.05$).

Treatment	Samples	Mean of initial body weight (kg)	Min	Max	SEM	*P*-value
Treatment 0	9	149.78^{ns}	148.00	151.80	0.40	
Treatment 1	9	150.17^{ns}	144.90	158.00	1.59	0.18
Treatment 2	9	146.92^{ns}	140.00	154.00	1.54	

Table 2: Percentage of chemical component in cassava leaf, rice straw and fresh grass.

Type of feed	DM (%)	CP (%)	Ash (%)	OM (%)	ADF (%)	NDF (%)	(CT) g/kg
Cassava leaf	90	19.5	10.9	55.2	31.4	55.2	40
Fresh grass	30	7.5	4.3	13.6	NA	NA	0.7
Rice straw	90	3.2	9.87	NA	NA	69.1	NA

Data collection and analysis

The basic diet and cassava leaves hay for feeding intake was measured (Treatment 0, Treatment 1 and Treatment 2). Each cattle body weight was measured biweekly and cassava leave hay was scaled prior feeding daily. Parasite eggs were collected from rectum directly weekly and number of eggs per gram was calculated for the parasite eggs with regardless types. All data selected were analyzed for their statistical significance using a statistical package for the social sciences (SPSS, version 16.0 Chicago, USA). Data were analyzed using one way ANOVA to distinguish the impact of different dietary treatments and designed graphic with Scatter/Dot. The effects were considered to be significant at $P < 0.05$ and declared as trend/tendency at $0.05 < P < 0.10$.

Results

The average of initial cattle body weight selected for the test is 146.92 kg, 150.17kg and 149.78 kg of each group are non-significant difference: $P = 0.18 > 0.05$, table.1, respectively. While, average among of daily feed intake at the start and second week is non-significant different: P=0.638 or 0.094 but from week 4 to week 6 feed intake is significantly different between each group: Treatment 0, Treatment 1, and Treatment 2, $P = 0.005 < 0.01$ or $0.000 < 0.001$, respectively. Whereas, the average feed intake during the whole test is still significant: Treatment 1 and Treatment 2, among of fresh feed intake are almost equal either 10.91 or 10.92 ± 0.28 or 0.33 kg/head, and Treatment 0 less among of fresh feed intake was 10.62 ± 0.14 kg/head or Treatment 1 and Treatment 2 was 3.28 or 3.28 ± 0.08 or 0.10 kg/head and, Treatment 0 was 3.18 ± 0.04 kg/head of dry matter intake (DMI), Fig.3, respectively.

Meanwhile, the average of fortnightly weight gain between the groups: Treatment 2 was the highest weight gain, there is 6.43 ± 0.33 kg or Treatment 1 = 5.42 ± 0.26 kg, and Treatment 0 = 3.84 ± 0.49 kg is the lowest speed weight gain, fig.3, respectively. Thus, feed conversion ratio (FCR), Treatment 0 = 39.26 ± 4.79 kg is highest feed used, Treatment 1 = 28.31 ± 1.96 kg and Treatment 2 = 23.83 ± 1.20 kg is less feed used to gain 1kg of live weight. Fig.3, respectively.

The initial number of parasite eggs in the triple group: Treatment 0 = 1109.67 ± 177.99 eggs, Treatment 1 = 1048.78 ± 191.86 eggs and Treatment 2 = 1008.33 ± 146.22 eggs, $P = 0.47 > 0.05$. The group hasn't supplemented cassava leaves hay, parasite egg counts were a few increased during testing. Treatment 0 was to equal 1,155.75 eggs, an increasing of 4.15%. Treatment 1 was equal to 902.89 eggs, declined 13.92% and Treatment 2 was equal to 781.10 eggs, declined 22.53% ($P = 0.001$), respectively. So the group that used cassava leaves has correlated with number of parasite egg counts and improved body weight gain.

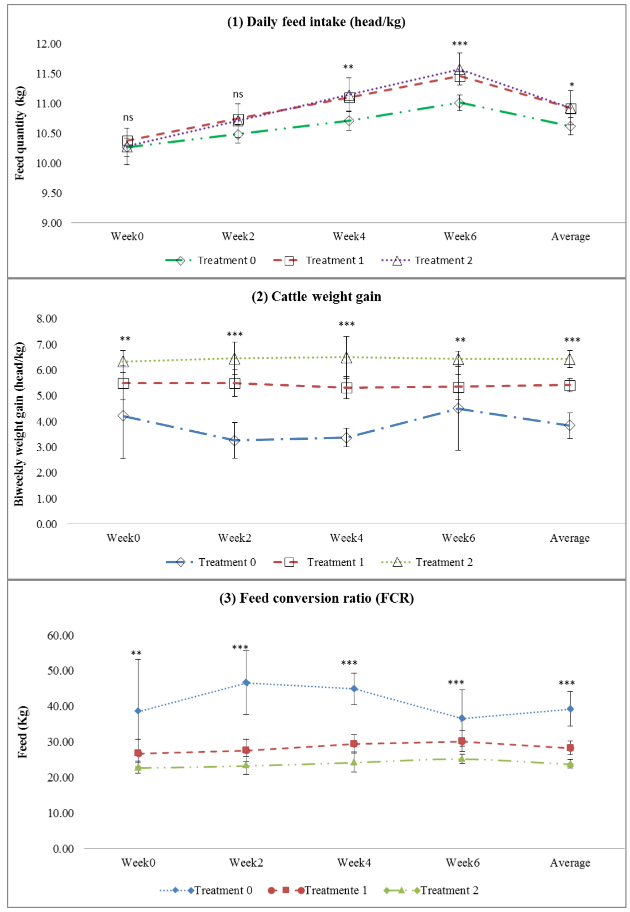

Fig. 3: Sixth weeks for experiment on local cattle with providing fresh grass, rice straw and supplemented cassava leaves hay; e.g.: Treatment 0, Treatment 1 and Treatment 2. Trials; $n = 9$ for each group and data were collected: 1) daily feed intake per week (head/kg), 2: fortnightly weight gain (head/kg) and 3: feed conversion ratio (FCR), respectively. The results were computed and represented; vertical bars indicate standard errors. Stars indicate which means differ between groups ($P < 0.05$).

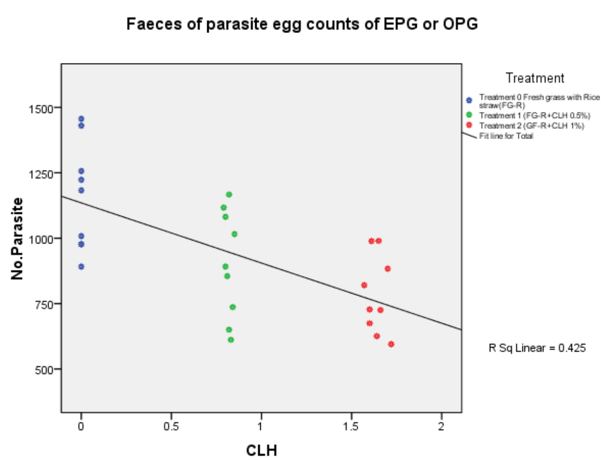

Fig. 4: Correlation mass of cassava leaves hay and parasite egg counts of EPG: Treatment 0; mean=1,155.75 eggs; n=27 heads; Treatment 1: mean = 902.89 eggs, $n = 27$ heads, and Treatment 2 = 781.10 eggs, $n = 27$ heads, $P < 0.001$, respectively. Each group was correlated to parasite egg counts, $R^2 = 0.425$.

Discussion

The experiment on cassava hay intake for 1 kg showed that the number of parasite eggs declined for buffalo is greater than cattle (57.6 and 45%) during the test period (Grannum et al. 2007). Regarding (Sittisak et al. 2009) which used 1 kg of cassava hay of the initial cattle body weight 150 ± 10kg, parasite eggs declined 48.3%. Khampa et al (2009) used 1kg of cassava hay with ivermectin, parasite decline 64.8% and 1kg of cassava hay, parasite reduced 57.4% with initial cattle body weight 200 ± 10 kg, respectively. For the current research finding has been compared between non cassava trial and 0.5% and 1% of cassava hay compared cattle body live weight. Trial without CLH, parasite eggs were increased due to no CT in feed supplemented. CLH's use of 1% was declined 22.53% less than previous research; it would be a different type of animal test and climatic condition zone.

Conclusion

Used cassava leaves hay (CLH) is really affective to reduce number parasite egg counts in cattle gastro-intestinal tract. Furthermore, it had the effected to increasing sustainable daily weight gain and feed conversion ratio (FCR). CLH containing condensed tannins (CT) could provide the best protein source with much benefit to livestock improvement under small holder farming systems or semi-industry.

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References

Adèle M., Frank N., Dieter E., and Arne S. 2010. Intensive Farming: Evolutionary Implications for Parasites and Pathogens. *Evolutionary Biology* ,(37):59–67. DOI: 10.1007/s11692-010-9089-0.

Barry T. N and McNabb W. C. 1999. The implications of condensed tannins on the nutritive value of temperate forages fed to ruminants. *British Journal of Nutrition,* (81): 263-272.

Chantalakhana C. 2001. Contribution of water buffaloes in rural development. Proceedings of the Regional Workshop on Water Buffaloes for Food Security and Sustainable Rural Development.
Department of Livestock Development, Bangkok.
pp. 1-10. Retrieved from: www.mekarn.org/prohan /joom20075.htm.

FAO (Food and Agriculture Organization). *nd.* Guide to Veterinary Diagnostic Parasitology. retrieved from: https://www.rvc.ac.uk/review/ parasitology/index/index.htm.

Granum G., Wanapat M., Pakdee P., Wachirapakorn C., and Toburan W. 2007. A Comparative Study on the Effect of Cassava Hay Supplementation in swamp buffaloes *(Bubalus bubalis)* and cattle *(Bos indicus)*. *Asian-Australian Journal of Animal Science*, 20(9):1389-1396. DOI: 10.5713/ajas.2007.1389.

Lentner, M. and Bishop, T. 1986. Experimental Design and Analysis. Valley Book Co. VA.

Miranda P., Darryl S., Werner S., Sophal L., and Mom S .2009. Cattle feeding and Management Practices of Small-holder Farmers in Kampong Cham Province, Cambodia. IJERD – *International Journal of Environmental and Rural Development*, 2010:1–1.

Nartey F. 1978. Manihot esculenta (cassava): cyanogenesis, ultrastructure and seed germination. ISBN **:** 8716028937.

Preston T. R. 2001. Potential of cassava in integrated farming systems. In Proceeding of the international workshop on current research and development on use as cassava as animal feed.

T. R. Preston, B. Ogle and M. Wanapat (Ed.). Khon Kaen University, Thailand. Retrieved from: http://www. mekarn.org/procKK/pres.htm

Khampa S., Chaowarat P., Singhaler R., and Wanapat M.2009. Effects of Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Swamp Buffalo Grazing on Ruzi Grass Pasture. *Pakistan Journal of Nutrition,* 8(5):539-541.

Sittisak K., Pala C., Uthai K., Rungson S and Metha W.2009. Influences of Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Native Cattle Grazing on Ruzi Grass Pasture. *Pakistan Journal of Nutrition,* 8 (5): 568-570. ISSN 1680-5194.

Seng., S and Preston., T.R.2003. Effect of grass or cassava foliage on growth and nematode parasite infestation in goats fed low or high protein diets in confinement. *Livestock Research for Rural Development,* 15 (8).

Wanapat M., Ogle R.B. 2001. Role of cassava hay as animal feed in the tropics. Workshop on Current Research and Development on Use of Cassava as Animal Feed.Khon Kaen University, Khon Kaen, Thailand. Retrieved from: http://www.mekarn.org/ procKK/wana3.htm.

Wanapat M. Pimpa O. Petlum A and Boontao U.1997. Cassava hay: A new strategic feed for ruminants during the dry season 9 (2). Retrieved from: http://www.cipav.org.co/lrrd/lrrd9/2/metha92.