GROWTH AND FAECAL EGG COUNT RESPONSE OF SHEEP GRAZING NATURAL PASTURE TO CASSAVA LEAVES AND PEELS SUPPLEMENTATION

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ABSTRACT

This project explores the unlimited availability of cassava wastes in Nigeria by conducting experiments as to the efficacy of cassava leaves and peels in promoting growth and eradicating worm burden in sheep. Sheep (n= 24) grazing natural pastures made up of the West African dwarf breed aged 18-24 months with average weight of 17.96±0.89kg were randomly assigned to 6 dietary treatments of varying levels of cassava leaves (CL) and cassava peels (CP) namely : 100% CL, 100% CP, 75% CL/25% CP, 25% CL/75% CP, 50% CL/50% CP, and natural pasture (0% CL/0% CP), in a complete randomized design. Results showed that weight gain (g/day) varied ($P<0.05$) across treatments from 23.21 to 44.64 with sheep supplemented with 75CL/25CP having the highest ($P < 0.05$) weight gain and least values observed in sheep supplemented with 100%CPwhich was statistically the same with the control treatment. There were reduction highest ($P < 0.05$) in faecal egg count of identified nematodes namely *Moneiza spp., Eimeria steidai* and *Trichostrongyle spp.* in sheep fed the CL supplemented diets. It was therefore concluded that weight gain with a reduction in faecal egg count in sheep grazing natural pasture could best be enhanced through the supplementation of cassava leaves and peels with dietary levels of 75% CL/25% CP.

INTRODUCTION

In Nigeria, sheep play significant role in the socio-economic life of rural and poor resource farmers. They contribute to the nutrition of people by producing protein of high biological value to the populace and are kept as source of financial reserves for the rearers and insurance against crop failure (Nuru, 1985). Sheep adapt to wide range of environment, but there productivity is been challenged due to combination of factors including poor feeding and prevalence of gastro-intestinal parasites. The unavailability of traditional diets for sheep which consist mainly of grasses especially during the dry season (Sodeinde *et al.*, 2007) has prompted farmers to search for alternative, readily farm available by-products for feeding sheep. Cassava leaves and peels are readily available under-utilized by-products from cassava harvesting and processing which have been generally considered to contribute significantly to environmental problems when left in the surroundings of processing plants or carelessly disposed off. Cassava leaves and peels if well managed and processed have been found to be beneficial to livestock, been successfully used as livestock feed, particularly in ruminant diets (AlliBalogun *et al.*, 2003; Fasae *et al.*, 2007). On a dry matter basis, cassava leaves have high protein and mineral content (Adegbola and Okonkwo, 2002 and Murugeswari *et al.*, 2006) and its tannin content have been found to reduce faecal egg counts in ruminant animals (Netpana *et al.*, 2001). The peels of cassava on the other hand are a good energy source for livestock. This experiment therefore investigates into the efficacy of cassava leaves and peels in promoting growth and in reducing faecal egg count in sheep grazing natural pastures.

MATERIALS AND METHODS

Twenty four West African Dwarf sheep managed semi intensively at the small Ruminant Experimental Unit of the Teaching and Research Farms of the Federal University of Agriculture, Abeokuta, Ogun State, Nigeria, with average weight of 17.96±0.89kg were used for an 8 week experiment. The animals were randomly allotted to six supplementary dietary treatments of varying levels of cassava leaves (CL) and cassava peels (CP) namely : 100%CL, 100%CP, 75%CL/25%CP, 25%CL/75%CP, 50%CL/50%CP, and natural pasture (0%CL/0%CP). Cassava leaves were collected from neighbouring communities after the harvesting of the tuber crop, they were sun dried for 5days before feeding the animals. Cassava peels were collected from the gari processing unit of the University and also sun dried. Animals were offered the supplementary cassava leaves and peels every morning before releasing the animals to graze for 6 hours. Data were collected for eight weeks starting from the first week. Feed intake of the supplementary diets was accurately measured daily and weight gain was recorded weekly with the aid of a spring balance. Samples of feed was taken and

determined for its chemical constituents (AOAC, 1995).The hydrocyanic content in feed and faeces were also determined as described by Bradbury *et al.* (1999). Analyses of tannin were carried out by method described by Makkar *et al.* (1993). Faecal samples of about 2 to 4 grams were obtained directly from the rectum of each animal at the beginning of the experiment and on weekly basis and analyzed for faecal egg count using Mcmaster technique. Data collected were subjected to one way analysis of variance in a completely randomized design (SAS 1999) and significant means were separated using Duncan multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

The chemical composition of cassava leaves and peels as shown in the results of this study (Table 1) supports earlier establishment by several workers (Adegbola and Okonkwo, 2002; Fasae *et al.*, 2007). Table 2 presents the performance characteristics of West African Dwarf sheep grazing natural pasture supplemented with varying levels of cassava leaves and peels. The average DM intake (g/day) differed significantly ($P<0.05$) among the treatments with an increase with the level of cassava leaves inclusion in the mixed diets, suggesting the high degradability of cassava leaves in the rumen. This report is in accordance to the findings of Onwuka (1983) and Fasae *et al.*(2012) when the best proportion in terms of intake, digestibility and other performance parameters of ruminants increased in animals fed higher levels of mixed diets of cassava leaves. The lowest feed intake was observed in animals fed diet 100%CP, corroborating the findings of Adebowale *et al.*, (1981) when optimal levels of cassava peels was shown not to contribute more than 20% of a concentrate supplement in order to avoid reduction in performance. In the present study, sheep fed the experimental supplementary diets gained weight. The effect of supplementary diets on the weight gain of sheep was significant ($P<0.05$) across the treatments. The variation observed in the average daily weight gain could be attributed to the variation in the nutrient supply from the diets. However, they were within the range values of 28.75 - 55.20g/day previously reported for sheep fed cassava residues (Alli-Ballogun *et al.*, 2003 and Fasae *et al.*, 2012)) with exception of animals fed 100% CP and those on the control treatment that had lower values. Highest weight gain ($P<0.05$)was observed in sheep supplemented with mixed diet of cassava leaves and peels. This may be due to amount of protein, minerals, vitamins and energy levels present in the mixed supplementary diets which could have led to weight gain in sheep (Alli-Balogun *et al.*, 2003). Animals fed on diet 100%CP had the lowest ($P>0.05$) weight gain, which could be attributed to the low level of feed intake of cassava peel as a result of its low nutritive value, when compared with other diets. This agrees with earlier reports that cassava peels is a poor feed for ruminants when fed as a sole feed (Adebowale *et al.*,1981 and Fasae *et al.*,2007). There was an evidence of positive effect of anthelmintic activity of cassava foliage on the basis of observed reductions in nematode faecal egg counts (FEC) of animals fed the supplementary diets. These findings corroborate earlier reports (Seng and Preston, 2003, Fasae and Adelegan, 2012) when cassava foliage was fed at varying levels to ruminant animals, which was attributed to phyto-chemicals, which are generally referred as tannins present in cassava leaves. The results showed that *Moneiza spp.*, *Eimeria steidai* and *Trichostrongyle spp.* were the common nematodes identified in the faecal samples. *Moneiza spp* which is a tapeworm was cleared away by all supplementary diets containing cassava leaves and cassava peels except for the control treatment, indicating that the mixed diets of cassava leaves and peels were a poorer host for the infective larvae of *Moneiza spp.* Other indirect effects of cassava foliage could be the higher level of protein and the expectations that the tannins present in cassava foliage will enhance the supply of essential amino acids to the small intestine (Wanapat, 2003). However, previous studies had been reported to confirm an anthelmintic effect of tannins and related substances in temperate and tropical plants (Hoskin *et al.*, 2000; Kabesa *et al.*, 2000). Moreover, *Eimeria steidai* was found to be present in all treatments with the highest FEC observed in animals fed diet 100%CP, and minimal levels observed in animals supplemented with cassava leaves. This shows that cassava peels has little or no anthelmintic effect against the parasite. The result further shows that strongyle eggs was absent in animals supplemented with mixed diets containing cassava leaves. This data obtained for reduced worm egg counts supports the findings of Fasae and Adelegan, (2012) on the antiparasitic effects of cassava hay in goats

as well as in grazing cattle and buffaloes (Netpana *et al.*, 2001; Granum *et al.*, 2003). These authors found out that cattle supplemented with 1kg/head/day of cassava hay had a reduction in the faecal egg count in comparison to control with approximately 30% and 50%, respectively.

Conclusion

From this study, there were evidence of improved growth rate and reduction in faecal egg count in sheep fed the mixed supplemented diets of cassava leaves and peels. It was therefore concluded that weight gain with a reduction in faecal egg count in sheep grazing natural pasture could best be enhanced through the supplementation of cassava leaves and peels with dietary levels of 75% CL/25% CP.

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Table 1: Chemical composition (%) of cassava leaves and peels

Composition	Cassava leaves	Cassava peels
Crude protein	20.06	4.26
Ether extract	8.39	1.65
Ash	16.07	5.23
Neutral detergent fibre	41.17	56.01
Acid detergent fibre	30.02	35.12
Acid detergent lignin	9.10	12.10
Tannin	3.24	1.70
Hydrocyanic acid (mg/kgDM)	35.22	28.55

Table 2: Effect of varying levels of cassava leaves and peels supplementation on the performance characteristics of sheep grazing natural pasture.

Parameters	100% CL	100% CP	75% CL/ 25% CP	50%CL/ 50% CP	25%CL/ 75% CP	NP	SEM
DM intake (g/day)	378.33^{c}	341.67^{b}	392.00^{a}	388.67^{a}	380.33^{b}	-	3.83
Initial weight(kg)	17.33	18.33	18.25	17.95	18.15	18.00	0.91
Final weight (kg)	19.03^{b}	19.80^{b}	20.75^{a}	20.18^{a}	20.13^{a}	19.30^{b}	0.96
Weight gain (kg)	1.70^{b}	1.47^{c}	2.50^{a}	2.23^{a}	1.98^{b}	1.30^{c}	0.35
Weight gain (g/day)	30.36^{b}	23.21^{c}	44.64^{a}	39.82^{a}	35.36^{ab}	26.25^{c}	1.63

^{a,b,c} *means in the same row with different superscript are significantly different (P<0.05)*

CL: Cassava leaves; CP: Cassava peel, NP: Natural pasture; SEM: Standard error of mean

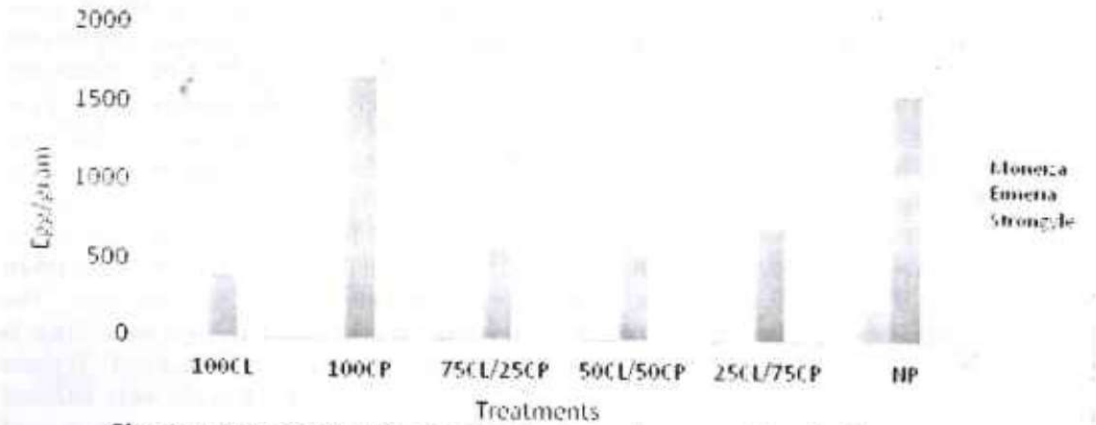

Figure 1: Effect of varying levels of cassava leaves and peels diets on faecal egg counts of sheep grazing natural pasture.