

NUTRIENT INTAKE AND PERFORMANCE OF UDA RAMS FED GRADED LEVELS OF *Piliostigma reticulatum* pods IN SEMI-ARID NIGERIA

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ABSTRACT

The study was conducted to assess the intake of *Piliostigma reticulatum* pods by Uda rams in semi arid environment of Nigeria. Twelve Uda rams were randomly allocated to 4 treatment diets with 3 rams in each treatment to serve as replicate and were housed individually in a completely randomized design (CRD) with inclusion levels of 0, 10, 20 and 30% *Piliostigma reticulatum* pods to serve as treatments 1, 2, 3 and 4, respectively. The feeding trial was designed to last for a period of 10 weeks in which daily records of feed intake were taken. The data generated was subjected to Analysis of Variance (ANOVA). Where significant differences between the means were indicated, Duncan's Multiple Range test (DMRT) was used to separate the means. Results of proximate composition indicated that dry matter values ranged from 96.76 to 98.49% in treatments D and A, respectively. Crude protein values ranged from 11.25 to 16.38% in C and A, respectively. Crude fibre values ranged from 23.02 to 26.03% in treatments C and D, respectively. There were significant ($P<0.05$) differences among all the parameters measured for nutrient intake. Feed intake indicated that there was no significant difference between treatments A, B and D, but treatment C differed ($P<0.05$) significantly. Dry matter intake (DMI) of animals in treatment C is low with 657.73(g) while treatment B has the highest DMI with 802.50 (g). The variation obtained in treatment C for crude fiber, clearly showed that the result was associated with individual differences that naturally exist among the experimental animals. Treatment A utilized protein better than other treatments, this is because it has or contains other sources of protein, such as soybean meal and cowpea husk but no kalgo pods. The study concluded that inclusion of *Piliostigma reticulatum* in the diets of Uda rams did not affect nutrient intake.

Keywords: Nutrient intake, Uda rams, *Piliostigma reticulatum* pods

INTRODUCTION

Ruminant animal production systems in Nigeria are generally characterized by limitations posed by non availability of year round feed resources due to prolonged annual dry season. Many grasses, such as *panicum maximum*, *pennisitum purpureum*, *Andropogon gayanus*, *Andropogon tectorum*, *cynodon nlemfuensis* and *cynodon dactylon*, have played prominent roles in forage research and livestock production in Nigeria (Lukuyu *et al.*, 2011). Most of these grasses are usually found as component of the natural vegetation that constituted the cheapest grazing resource to ruminant animals (Koura *et al.*, 2021; Olomonchi *et al.*, 2022). The MPTs also produces pods, fuel wood, and green manure and improve land use system These indigenous MPT species are well distributed throughout Nigeria and adapted to the hot tropical climate (Anele *et al.*, 2008). They thrive very well in soil that are low in pH and nutrient level and thus improve land use through fixation of atmospheric nitrogen. These indigenous MPT species are easily establish, have exhibited rapid re-growth after been lopped and ability to remain productive under repeated cutting at frequent intervals. The current utilization level of these indigenous MPT species is still low compared with their potentials. Browse tree are important in ruminant feeding system. They have been reported to be more nutritious than most grasses and herbaceous legumes and conserve their nutrient into dry season when feed resources are depleted (Yusuf *et al.*, 2023). One of such MPTs *Piliostigma reticulatum* pods (yayan kalgo) or Camel's foot pods. *Piliostigma reticulatum* is a leguminous plant belonging to the family Caesalpiniaceae, a family that comprises tree, shrubs or very rarely, climbers. The tree is perennial in nature and its vernacular names include Abefe, Monkey bread, Camel's foot, Kalgo and Okpoatu and these vary according to locality. The present study aimed at determining the intake of *Piliostigma reticulatum* pods by Uda rams under semi-arid conditions in Nigeria.

MATERIALS AND METHODS

Experimental Site

The experiment was conducted at the Livestock Teaching and Research Farm of the Usmanu Danfodiyo University, Sokoto. The farm is located at the permanent site of the University along Kware-Illela road, at about 12km north of Sokoto metropolis. Sokoto state is located in the Sudan-Sahel in the extreme north-western part of Nigeria (Mamman *et al.*, 2000). Sokoto is characterized as an area with semi arid climate, low rainfall varying widely in amount from year to year and strongly seasonal. The annual seasonal temperature fluctuations are very wide. Humidity is low during the most of year with relatively high solar radiation and clear skies (SEPP, 1996).

The average temperature of 28.3°C, however the maximum daytime temperature are most of the year generally under 40°C, the dryness makes the heat bearable. The warmest months are February to April, where daytime temperature exceed 42°C. The rainy season is from late May to October; during which showers are a daily occurrence. Rainfall starts late and ends early with mean annual falls ranging between 500 mm to 1,200 mm.

Experimental Feed Preparation and Formulation

Piliostigma reticulatum pods were used to formulate a complete diet at 0, 10, 20 and 30% inclusion levels designated as treatments A, B, C and D respectively. The gross compositions of the experimental diets were shown in Table 1.

Table1: Gross Composition of the Experimental diet containing graded levels of *Piliostigma reticulatum* pods.

Ingredients	Graded Levels of <i>Piliostigma reticulatum</i> pods			
	A	B	C	D
<i>Piliostigma reticulatum</i> pods	0.00	10.00	20.00	30.00
Maize	17.00	17.00	17.00	26.00
Soyabean Meal	6.00	5.00	0.00	0.00
Cowpea husk	35.00	31.00	29.00	5.00
Wheat offal	23.00	16.00	12.00	0.00
Rice milling waste	18.00	20.00	21.00	38.00
Salt	1.00	1.00	1.00	1.00
Total	100	100	100	100
Calculate Analysis				
Crude Protein	12.50	13.40	13.40	13.40
Energy (kcal/kg ME diet)	2115	2104	2061	2168
Crude Fibre	20.00	21.70	23.90	24.90
Ether Extract	4.00	4.00	3.90	3.80

Experimental Animals and their Management

Twelve (12) Uda rams with average weight of 20 – 25kg were used for the experiment. The animals were purchased at Illela market in Illela Local Government Area of Sokoto state, deworm with Ivermectin (anti biotics) against internal and external, parasite, Multivitamin were also administer for correction of absent of some vitamins. The animals were however given Oxytetracycline (broad spectrum antibiotics). The animals were fed with cowpea husk and wheat offal before the commencement of the feeding trial.

Twelve Uda rams were randomly allocated to 4 treatment diets with 3 ram in each treatment to serve as replicate and were housed individually. Complete randomize design (CRD) as outlined by (steel and Torrie, 1980) were used in the experiment. The feeding trial is design to last for a period of 10 weeks in which daily records of feed intake and live weight changes were monitored. The representatives' samples of the experimental feeds and faeces were analyzed for proximate components as outline by (AOAC. 1990). The data generated were subjected to Analysis of Variance (ANOVA) using complete randomize design (CRD) as outline by (steel and Torrie, 1980). Where significant differences between the means are indicated, Duncan's multiple range test (DMRT) were use to separate the means (Duncan, 1955).

RESULTS AND DISCUSSION

Proximate composition of the experimental diets is presented in Table 2 below. The dry matter (DM) content in all the treatments are similar with the highest value of 98.49 and lowest 96.76%. The crude protein content of the diets varies from 16.38% in treatment A to 11.25 in treatment C. Crude fibre content of all the diets ranges between 23.02% as the lowest in treatment C and 26.03% in treatment D. Ether extract contentment ranges from 2.23% in treatment C to 4.89% in treatment A which is an indication that it increases with increasing levels of Kalgo pods in the diets. This is within the acceptable levels recommended by (Tewe, 1987; Asaolu, and Odeyinka, 2006) for sheep and goats in the tropics. CP and CF values obtained from the present study are consistent with the recommended level reported by (Gatenby, 2002). Nitrogen free extract ranges from 34.59 to 47.45% in all the diets and 47.41% in Kalgo pods which is below normal recommended level of 60% for ruminants (Messiner *et al.*, 1991). The CP contents of all the diets is more than 8% recommended for fattening sheep and similar to 11-13% recommended for optimum rumen microbial activity (NR 1981; Norton, 1994).

Nutrient intake of Uda Ram Lambs fed Kalgo pods (*Piliostigma reticulatum*) is presented in Table 3 below. There were significant ($P<0.05$) difference among all the parameter measured. Feed intake indicated that there is no significant difference between treatments A, B and D but treatment C differ ($P<0.05$) significantly. These may however associate feed value or genetic make-up of the animal in the treatment. Dry matter intake (DMI) of animals in treatment C is low with 657.73(g) while treatment B has the highest DMI with 802.50 (g). The reason

Table 2: Chemical Composition of Experimental Diets and Kalgo pods (*Piliostigma reticulatum*)

Parameter (%)	Treatments				Kalgo pods
	A	B	C	D	
Dry matter	98.49	98.34	97.58	96.76	97.55
Ash	17.96	18.92	13.63	12.52	3.67
Ether extract	4.89	3.02	2.23	5.88	5.86
Crude fibre	24.94	25.42	23.02	26.03	27.98
N F E	34.59	37.73	47.45	39.52	47.41
Crude protein	16.38	13.25	11.25	12.81	12.63

associated with the fact is as same as the one scaled above for feed intake. Ether extracts ranges from 45.96 as the highest and 14.67 as the lowest. The highest is obtained from treatment D while the lowest is obtained from treatment C. while treatment A and B has 37.22 and 24.24 respectively, something in crude fiber, it is clearly shows that treatment C has the lowest also with value of 151.41 and treatment B has highest values of 203.97 (g) respectively. The variation obtained in treatment C, can be clearly shows that are as a result of or associated to individual differences that naturally exist among the experimental animals. This can however be linked to the report of (Payne, 1990; Lynch *et al.*, 1992), that individual variation affect the rate of intake in sheep and other ruminant animals. CP intake in treatment A is higher with the value of 124.68 g and lowest in treatment C with 73.96g, and that of B and D are with value of 106.33 and 100.13g respectively. Treatment A utilizes protein better than other treatments, this is because it has or contain other sources of protein, such as soybean meal and cowpea husk but no kalgo pods which is 0% inclusion level of Kalgo, but however, treatment B and D that has 10 and 30% Kalgo inclusion utilized it better than that of the treatment that contains 20%. This is because of the fact that, variation exists between the animal in the treatment and other treatment.

Table 3: Nutrient Intake (g/day) by Uda Ram Lambs fed Kalgo pods (*Piliostigma reticulatum*)

Parameter	Treatments				SEM
	A	B	C	D	
Average feed intake	0.77 ^a	0.82 ^a	0.67 ^b	0.81 ^a	0.26
Dry matter intake	761.19 ^b	802.50 ^a	657.73 ^c	781.63 ^{ab}	75.96
Ether extract intake	37.22 ^{ab}	24.24 ^b	14.67 ^c	45.96 ^a	2.66
Crude fiber intake	189.84 ^{ab}	203.97 ^a	151.41 ^b	203.47 ^a	18.53
Crude Protein Intake	124.68 ^a	106.33 ^{ab}	73.96 ^c	100.13 ^b	10.45
Nitrogen free Extract	263.30 ^b	302.78 ^{ab}	312.10 ^a	308.92 ^a	30.34

Mean value with different superscript are significantly different

CONCLUSION

The study concluded that inclusion of *Piliostigma reticulatum* in the diets of Uda rams did not affect nutrient intake.

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