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## NUTRIENT INTAKE OF RED SOKOTO BUCKS FED DIETS CONTAINING VARYING LEVELS OF *PILIOSTIGMA THONNINGII* (KARGO) PODS IN SEMI – ARID REGION OF NIGERIA

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### ABSTRACT

*Animal productivity could be enhanced by providing forages that are good and qualitative. Browse plants are feed resources that are relevant and valuable to livestock. Browse plants are defined as the palatable portions of a woody forage plants such as leaves, tender twigs, shoots, flowers, fruits and pods. Therefore, this study was conducted to evaluate the effects of feeding different inclusion levels of *Piliostigma thonningii* pods on nutrient intake and digestibility of male Maradi bucks. Sixteen growing Red Sokoto bucks weighing averagely 10-12±2.0kg were randomly allotted to four treatments in a Completely Randomized Design with four replications per treatment. Four diets containing *P. thonningii* pods at 0, 5, 10 and 15% were fed at 3.5 body weight/day for a period of 84 days. The parameters measured include; dry matter, crude protein, crude fiber, ash, ether extract and nitrogen free extract digestibility. The results of nutrient intake showed significant ( $P<0.05$ ) differences in all parameters except for dry matter and crude fiber. It was concluded that 15% inclusion level of *P. thonningii* pods enhanced nutrient intake by Kano Brown bucks. It was therefore, recommended that, *P. thonningii* pods could be included up to 15% level in the diet of Kano Brown bucks to enhance nutrient intake.*

**Keys words:** *Piliostigma thonningii*, nutrient intake, Inclusion levels and Bucks

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### INTRODUCTION

Fodder trees and shrubs are considered to supply small ruminants with bulk of some nutrients required such as protein, vitamins and minerals during dry season (Dicko and Sikena, 2003). Browse plants furnish animals with protein, energy, vitamins and minerals, thereby playing a crucial role as feed resource. The average crude protein of most browse plants in tropical Africa is 12.5%, average crude fiber content is 18.5% while their digestibility is moderate to high when fed in fresh form (Amodu and Otaru, 2004). *Piliostigma thonningii* is one of many browse species whose pods are consumed by different species of herbivorous animals in the arid and semi-arid zone of the world. *Piliostigma thonningii* known locally as ‘Kargo’ or ‘Kalgo’ is one of the medium-small size leguminous shrub that grow in the tropics. It is well-known browse specie in Northern Nigeria (Akin-Osanaiye *et al.*, 2009). *Piliostigma thonningii* (Kargo) is regarded as a plant with good fodder value in the Northern part of Nigeria and other parts of the arid and semi-arid areas of tropical and sub-tropical Africa (Iliyasu *et al.*, 2019). Animal productivity could be enhanced by providing forages that are good and qualitative. Therefore, the study aimed at evaluating the effect of feeding Kano Brown bucks different inclusion levels of *Piliostigma thonningii* (Kargo) pods on nutrient intake.

### Study area

The study was conducted at Kano University of Science and Technology Teaching and Research Farm Wudil, Kano State. It is located in the Sudan savanna vegetation zone of North-Western Nigeria and it lies within latitude 12°58'N and longitude 8°25'E on altitude of 408m above sea level. The climatic condition is characterized by low relative humidity with an annual rainfall of 890mm (occurring between May and October with a peak in August) and an annual temperature range of 38 - 43°C (Olofin *et al.*, 2008).

### Proximate composition of the experimental diets.

Representative samples of *Piliostigma thonningii* pods (Kargo), experimental diets and faeces were analyzed for proximate composition (dry matter, crude protein, crude fiber, ether extract, ash and nitrogen free extract) according to AOAC (2005) procedures.

### Experimental Animals and their Management

Sixteen (16) Red Sokoto bucks with an average body weight of 10-12 ± 1.2 kg were purchased from Wudil Livestock Market and used for the study. They were housed individually; antibiotic prophylaxis was administered using oxytetracycline (LA) 20% at dose rate of 10 mg/kg body weight. The animals were also dewormed using 1% Ivermectin injection subcutaneously and albendazole suspension (oral) at dose rate of 7.5mg/kg/body weight. The animals were subjected to two weeks adaptation period. The experimental diets were offered to the animals twice daily at 3.5% body weight i.e morning hours 8.00am and afternoon 4:00 pm. Clean water and mineral salt lick were also offered *ad libitum*. Groundnut hulm was offered as basal within the remaining hours of the day. The experimental animals were then transferred into individual feeding pens, and fed the experimental diets. The experiment lasted for 12 weeks (84 days).

### Experimental Design and Treatments

The experimental animals were randomly allotted to four treatments with four replications per treatment in a completely randomized design (CRD).

### Statistical analysis

The collected data were analyzed using analysis of variance (ANOVA) procedures of the Statistical Analytical Systems (SAS, 2009) software package version 9.2 and the means with significant differences were separated using Least Significant Difference (LSD) at 5% level of probability (P<0.05).

## RESULTS AND DISCUSSIONS

### Proximate composition of experimental feeds

Results of the proximate composition of the experimental diets are presented in Table 1. Dry matter values varied from 90.89% in (T<sub>1</sub>) to 96.13% in (T<sub>4</sub>). Crude protein values increased numerically across the treatments with increasing levels of *Piliostigma thonningii* pods from 12.48% to 13.97%.

**Table 1. Proximate composition of the experimental diets**

Parameters (%)	Inclusion levels of P.T.P (%)			
	(0)	(05)	(10)	(15)
Dry matter	94.61	96.13	92.17	90.89
Crude protein	12.48	13.16	13.54	13.97
Crude fiber	21.48	21.25	21.12	20.86
Ether extract	1.93	1.57	1.39	1.25
Ash	5.40	9.52	7.69	8.82
Nitrogen free extract	58.71	54.50	55.20	55.10

The crude fiber values decreases numerically with an increased in the levels of *Piliostigma thonningii* from 21.48% in (T<sub>1</sub>) to 20.86% in (T<sub>4</sub>). Ether extract values recorded were 1.25% to 1.93%. The ash values of the diets were 5.40% to 9.52%. The nitrogen free extract values in the diets were 55.10% in (T<sub>4</sub>) to 58.71% in (T<sub>1</sub>). The experimental diets in this study had DM values similar to those (94.49% - 94.65%) reported by Abdurrahman (2017) at 0% and 15% inclusion levels of *P. reticulatum* pods in diets of small ruminants. Gatenby (2002) recommended 10-12% CP as the moderate level of CP for ruminant production. Therefore, the CP of the diets might be adequate for the growing Kano Brown bucks. The CF values obtained in this study were higher than values (16.88 – 17.77%) reported by

Abdurrahaman (2017). The NFE values obtained in this study were higher than 49.68 – 50.35% obtained by Abdurrahaman (2017). In contrast, the ash and EE content obtained in this study were lower than those (13.05 – 15.23% ash and 3.88 – 5.18% EE) reported by Abdurrahaman (2017). The differences might have occurred possibly as a result of different experimental location and stage of maturity of the test material. The values of ash obtained in present study were lower than the values 8.98 – 11.10% reported of Nayawo *et al.* (2010) when wheat offals replaced rice milling residue in the diets of Yankasa rams.

### Nutrients Intake (g/day) by Red Sokoto Bucks fed varying Inclusion Levels of *Piliostigma thonningii* Pods

Table 2 shows the results of nutrient intakes of Kano Brown bucks fed *Piliostigma thonningii* pods. There were significant ( $P<0.05$ ) differences in all parameters except dry matter and nitrogen free extract intakes. The mean values for ash intake followed the same pattern with crude protein intake. Ether extract intake (EEI) were similar ( $P>0.05$ ) in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> while T<sub>2</sub> mean value was significantly ( $P<0.05$ ) higher than the ether extract recorded for T<sub>4</sub>. Nitrogen free extract intake (NFEI) mean value (175.6g/day) was significantly ( $P<0.05$ ) lower in T<sub>2</sub> and T<sub>1</sub> had significantly ( $P<0.05$ ) higher NFEI value (189.16 g/day). Nutrient intake according to Ahamefule and Elendu (2010) is affected by palatability, gut fill and retention time in the rumen. The crude protein content of the experimental diets were higher than 7 % requirements for goats, hence its adequacy supported the high protein intake recorded in this study. The crude protein, ether extract, crude fiber, ash and nitrogen free extract intakes increased with increase nutrient content of the diets. Belewu and Yahaya (2008) reported an increase in crude protein intake with increase in dietary crude protein content, the current study agreed with thus study. Higher protein contents of diets have been reported to positively enhance intake of other nutrients (Adeleye, 1998).

**Table 2. Nutrients intake (g/day) by Red Sokoto bucks fed different inclusion levels of *Piliostigma thonningii* pods**

Parameters (g/day)	Inclusion levels of P.T.P (%)				LSD
	(0)	(5)	(10)	(15)	
DMI	304.83	309.73	296.90	293.05	112.23
CPI	40.21 <sup>b</sup>	42.40 <sup>ab</sup>	43.63 <sup>ab</sup>	45.01 <sup>a</sup>	0.28
CFI	69.21 <sup>a</sup>	68.46 <sup>ab</sup>	68.04 <sup>ab</sup>	67.21 <sup>b</sup>	0.53
AshI	17.4 <sup>c</sup>	30.67 <sup>a</sup>	24.78 <sup>b</sup>	28.42 <sup>ab</sup>	0.17
EEI	20.65 <sup>ab</sup>	20.68 <sup>a</sup>	20.66 <sup>ab</sup>	20.57 <sup>b</sup>	0.03
NFEI	189.16	175.6	177.9	177.53	64.71

<sup>abc</sup> Means within the same row with different superscript differs significantly ( $P<0.05$ ), LSD = Least significant difference. DMI (dry matter intake), CPI (crude protein intake), CFI (crude fiber intake), AshI (ash intake), EEI (ether extract intake) and NFEI (nitrogen free extract intake).

### CONCLUSION

It can be concluded that *Pillioistigma thonningii* pods can be included up to 15% in the diets of Red Sokoto bucks without adverse effect on the nutrient intake.

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