



## EFFECTS OF VARIOUS SUPPLEMENTATIONS ON PERFORMANCE OF YANKASA RAMS DURING EARLY RAINY SEASON GRAZING IN GUINEA SAVANNAH ZONE

<sup>1</sup>Yakubu, A. K., <sup>1</sup>Yahya, M. M., <sup>2</sup>Chana, Z. M. and Usman, I. A.

<sup>1</sup>Department of Animal Science, Modibbo Adama University, Yola

<sup>2</sup>Department of Animal Science, University of Maiduguri.

**Corresponding Author's Email:** yakubukirfiahmed@gmail.com, **GSM:** 08036780390

### ABSTRACT

This study was conducted to assess the performance of growing Yankasa rams fed various supplements during early rainy season grazing. The study was conducted at Abubakar Tafawa Balewa University Teaching and Research Farm, Bauchi. Sixteen (16) growing Yankasa rams were fed four supplemental diets, which comprises of African locust bean pulp (ALBP) + Maize bran, ALBP meal + poultry litter (PL), ALBP meal + cotton seed cake (CSC) and ALBP meal + groundnut haulms (GNH). The animals were allowed to graze natural pasture from morning to evening (9am-5pm) within a specify area of one kilometer. Six hundred grams (600g) of the supplemental diets were offered twice a day, 300g in the morning before grazing and 300g in evening after grazing. The study lasted sixty (60) days in a Complete Randomized Design (CRD) of four treatments with four replications. Data were taken on feed intake and live weight changes. The results showed no significant differences in terms of dry matter intakes, total weight gain, average daily weight gain and feed conversion ratio. Crude protein, crude fibre and organic matter intakes were also not affected. Parameters affected ( $P < 0.05$ ) were ether extracts, Ash and acid detergent fibre intakes. It was concluded that, based on the performance of the animals in terms of total weight gain and average daily weight gain, supplementation with ALBP meal + CSC before and after grazing gave the best result. It was recommended that, supplementation with ALBP meal + CSC at equal ratio (50g ALBP and 50g CSC) during early rainy season grazing should be encouraged as it gave the best daily weight gain of 83.33g/head/day.

**Keywords:** Yankasa, Rams, Grazing, Supplements, Growth, Performance

### INTRODUCTION

Small ruminants like sheep and goats plays a significant role in the livestock sector in Nigeria (Lakpini, 2002). But their production is limited by inadequate and high cost of feeds (Lamidi and Ologbose, 2014), which is more persistent in dry season when grasses are matured, became more fibrous and low in crude protein content (Oni *et al.*, 2010). This is the reason why non-conventional energy and protein of farms and agricultural waste origin are currently being utilised for livestock production in Nigeria (Okonkwo *et al.*, 2008). Several authors (Yakubu *et al.*, 2017; Salihu *et al.*, 2018; Abdullahi *et al.*, 2019) have search for the use of cheaper agro-industrial by-products and waste materials to be used at various levels of inclusions in small ruminant diets to determine how they are utilised in term of growth and production, and also to identify the most suitable one in terms of nutrition, and all year-round availability. African locust bean pulp (*Parkia biglobosa*) is yellow substance that when it is riped, it taste sweet, this indicates the content of sugar in it, thus an energy source. The yellow pulp contains beta carotene an indicator of vitamin A that is known to improve appetite and growth performance in livestock (Gernah, 2007; Yakubu *et al.*, 2017). Poultry litter is a waste material from poultry farms constituting health hazard due to inadequate means of disposal, when not use as fertilizer (Lanyasunya *et al.*, 2006). The fertilizer value of poultry litter is well known, for its higher nitrogen content and numerous organic substance. The nutritional concentration of poultry litter waste can varie, depending on a variety of some factors (Tasistro *et al.*, 2004). This study investigates the use of various supplementation on the performance of Yankasa rams.

## MATERIALS AND METHODS

### Experimental Site

The experiment was conducted at the Abubakar Tafawa Balewa University Bauchi Teaching and Research farm, located at Yelwa along Tafawa Balewa Road, Bauchi. Bauchi State occupies a land area of about 49,119km<sup>2</sup> (18,965sq mi), approximately 5.3% of Nigerian's total land area. The average annual rainfall ranges from 700mm in the north to 1300mm in the south western part of the state. The rain usually starts in April and ends in October. Minimum temperature of 22°C is usually in December/January while maximum temperature of 40°C is around March/April (BSOW 2018).

### Experimental Animals and their Management

Sixteen (16) growing Yankasa rams of approximately 12-15 months of age with an initial weight of 20±1 were purchased from livestock Markets (Durun) in Bauchi State. The rams were quarantined, dewormed and treated against ectoparasites with *ivemectine* injection which a broad-spectrum antibiotic administered subcutaneously. The rams were group fed and managed intensively during a 2-week adaptation period prior to the commencement of the experiment.

### Experimental Design and Feeding Procedure

Completely Randomised Design (CRD) was used in the experiment as outlined by Steel and Torrie (1980). Sixteen (16) growing Yankasa rams were assigned to four (4) dietary treatments coded as Diets A, B, C and D respectively with four (4) animals per treatment. The animals were allowed to graze natural pasture from morning (9am) to evening (5pm). Six hundred grams (600g) of supplementary diets were offered twice a day, three hundred grams (300g) in the morning before grazing and remaining 300g in the evening after grazing. African locust bean pulp, Maize bran, cotton seed cake, poultry litter and groundnut haulms were used as a supplement at various proportions as shown in Table 1. Water was offered *ad-libitum*.

**Table 1: Composition of the Supplemental Diets (%)**

	Supplements			
	A	B	C	D
Natural Pasture	ALBP + MB	ALBP + PL	ALBP + GNH	ALBP + CSC
(Grazing)	(50:50)	(70:30)	(50:50)	(50:50)

ALBP=African locust bean pulp, MB= maize bran, PL= poultry litter, GNH= groundnut haulms and CSC= cotton seed cake.

### Data Collection

The rams were weighed prior to the commencement of the experiments and thereafter on a weekly basis in the morning (8-9 am). Daily record of feed intake and left over were taken throughout the experiment.

### Chemical Composition of the Supplemental Diets

Chemical composition of the supplemental diets were determined to know their crude protein (CP), crude fibre (CF), ether extracts (EE), and Ash according to AOAC, (2005). Fibre fraction such as neutral detergent fibre (NDF), acid detergent fibre (ADF) were analysed according to method described by van Soest *et al.* (1991).

### Data Analysis

Data generated from the experiment were subjected to analysis of variance (ANOVA) using SPSS version 20. Where differences exist, Duncan's Multiple Range Test were used to separate the means.

## RESULTS AND DISCUSSION

The proximate composition of supplemental diets are shown in Table 2. Dry matter (DM) content ranged from 89.21% in treatment B to 86.26% in treatment C. Crude protein (CP) content were 16.36%, 16.29%, 16.24%, and 16.20% for treatment B, C, D and A respectively. Crude fibre content was 11.90% in treatment A, 11.76% in treatment C and 11.52% in treatment D while



treatment B had 10.26%. Ether extract content ranged from 2.85% in treatment B to 4.14% in treatment C. Higher value 7.29% was obtained in treatment C, while the lower value (5.40%) was in treatment A. Organic matter was higher in treatment B (82.73%) followed by treatment A (82.23%) while treatment C and D were recorded with 78.97% and 81.88% respectively.

**Table 2: Chemical Compositions of Supplemental Diets**

Parameters (%)	Treatments			
	A	B	C	D
Dry matter	87.63	89.21	86.26	88.11
Crude protein	16.20	16.36	16.29	16.24
Crude fibre	11.90	10.26	11.76	11.52
Ether extracts	3.10	2.85	4.14	3.11
Ash	5.40	6.48	7.29	6.23
Organic matter	82.23	82.73	78.97	81.88

There were no significant differences across the treatments, in terms of initial body weight and final body weight, the initial body weight ranged from 21.12kg to 22.12kg, while the final body weight ranged from 25.50kg to 26.87kg. Total weight gain and average daily weight gain were significantly ( $P<0.05$ ) affected by the dietary treatments, the values ranged from 4.12kg to 5.00kg and 68.66g to 83.33g to for total weight gain and average daily weight gain. There was significant ( $P<0.05$ ) difference across the treatments in term of supplemental feed intake and feed conversion ratio. Supplemental feed intakes were 477.06g, 479.84g, 489.20g and 499.66g in treatments C, B, A and D respectively. Dry matter intake (DMI) ranges from 411.51g in treatment C to 440.25g in treatment D, treatment A and B were recorded with the values of 428.68g and 428.06g respectively.

**Table 3: Performance of Growing Yankasa Rams Fed Various Supplements During Early Rainy Season Grazing**

Parameters	Treatments				SEM	LOS
	A	B	C	D		
Initial weight (kg)	22.12	21.37	21.37	21.12	0.72	NS
Final weight (kg)	26.87	25.62	25.50	26.12	0.66	NS
Total weight gain (kg)	4.75 <sup>ab</sup>	4.25 <sup>b</sup>	4.12 <sup>b</sup>	5.00 <sup>a</sup>	0.21	*
ADWG (g)	79.16 <sup>a</sup>	70.83 <sup>b</sup>	68.66 <sup>b</sup>	83.33 <sup>a</sup>	3.54	*
Supplemental feed (g)	489.20 <sup>a</sup>	479.84 <sup>b</sup>	477.06 <sup>b</sup>	499.66 <sup>a</sup>	6.99	*
DMI supplement (g)	428.68	428.06	411.51	440.25	6.21	NS
Feed conversion ratio	5.41 <sup>b</sup>	6.04 <sup>a</sup>	6.00 <sup>a</sup>	5.28 <sup>b</sup>	0.22	*

ADWG= average daily weight gain, DMI= dry matter intake, A=ALBP+MB; B=ALBP+PL; C=ALBP+GNH; D=ALBP+CSC SEM= standard error of mean, LOS= level of significance, NS= not significant, <sup>abc</sup> Means within the same row with different superscript are significantly different\* ( $P<0.05$ ).

There were no significant differences across the treatments in terms of crude protein (CP) and crude fibre (CF) intakes. CP values ranged from 67.03g in treatment C to 71.49g in treatment D. CF values were 43.91g, 48.39g, 50.71g and 51.01g in treatments B, C, D and A. There were significant ( $P<0.05$ ) differences across the treatments, in terms of ether extract (EE) and Ash intakes. EE intakes was higher ( $P<0.05$ ) in treatment C 17.03g than those in treatment D (13.69g), treatment A (13.28g) and treatment B 12.19g while in Ash intakes, the highest value 29.99g was recorded in treatment C while the lowest values 23.14g was recorded in treatment A. There were no significant variations in

term of organic matter (OM) intakes, the values ranged from 336.27g in treatment C to 364.56g in treatment D. treatment A and B were recorded with the values 356.53g and 354.05g respectively.

**Table 4: Nutrient intake of Growing Yankasa Rams Fed Various Supplements During Early Rainy Season Grazing**

Parameters (g)	Treatments				SEM	LOS
	A	B	C	D		
Crude protein	69.44	70.03	67.03	71.49	1.01	NS
Crude fibre	51.01	43.91	48.39	50.71	0.60	NS
Ether extracts	13.28 <sup>bc</sup>	12.19 <sup>c</sup>	17.03 <sup>a</sup>	13.69 <sup>b</sup>	0.44	**
Ash intake	23.14 <sup>c</sup>	27.13 <sup>b</sup>	29.99 <sup>a</sup>	27.42 <sup>b</sup>	0.42	*
Organic matter	356.53	354.05	336.27	364.56	5.78	NS

NDF = neutral detergent fibre, ADF= acid detergent fibre, A=ALBP+MB; B=ALBP+PL; C=ALBP+GNH; D=ALBP+CSC SEM= standard error of mean, LOS= level of significance, NS= not significant, <sup>abc</sup> Means within the same row with different superscript are significantly different\* (P<0.05).

Total weight gain and average daily weight gain in the present study recorded in treatment D (5.00kg) and (83.33g) were lower than the weight gain (7.25kg) and (86.31g) reported by Inuwa *et al.* (2020) when the author fed ensiled camel fore-stomach digesta with NPN were fed to Uda rams. But higher than the weight gain (2.75kg) obtained by Millam *et al.* (2020). The values (5.28 to 6.04) obtained for feed conversion ratio in this study were nearly the same with the values (5.23 to 8.49) reported by Abdullahi *et al.* (2016). The higher FCR indicates that rams on treatment C was the poorest in converting the feed they consumed into live weight gain, on the other hand, rams on treatment D had the least FCR indicating that rams on this treatment perform best in converting the feed they consumed. There was significant difference in terms of supplementary feed intake. The values (477.06 to 499.66g) in this study were higher than the feed intake (285.00g to 328.75g) reported by Abdullahi *et al.* (2016). When the author determine the performance of Yankasa rams fed urea treated sorghum chaff as a basal diet supplemented with maize offal in semi-arid environment of Nigeria. The differences could be as a result of age of the animals and nutrient content of the various supplements. Dry matter intake recorded in this experiment (411.51 to 440.25g) were lower than (1028 to 1661g) by Bello and Tsado (2013), when supplemented sorghum stover with graded levels of poultry droppings for growing Yankasa rams. And lower than (677.78g) and (609.33g) reported by Yerima *et al.* (2020).

The crude protein (CP) intake (67.03g to 71.49g) in this experiment were lower than the CP intake (146.93 to 159.19g) reported by Kwaide *et al.* (2019). Also lower than (95.12 to 149.78g) by Mijinyawa *et al.* (2020) when the author fed untreated and treated sorghum stover with supplements to Yankasa rams. The values (43.91g to 51.01g) obtained for crude fibre (CF) were lower than the (274.07g to 310.85g) reported by Kwaide *et al.* (2019). The ash intake in the present study (23.14g to 29.99g) were lower than the (68.00 to 71.6) reported by Mohammad *et al.* (2014) when fore-stomach digesta with poultry litter was fed to Sahelian Goat. Organic matter intake (336.27g to 364.56g) in this study were lower than the OM (1067.89 to 1102.98) reported by (Abdullahi *et al.*, 2020). The NDF values (107.48g to 128.68g) obtained in this study were lower than NDF values (263.81g to 307.46g) reported by Mijinyawa *et al.* (2020). The ADF Values (90.32 to 99.71g) in this experiment were lower than the ADF (272.58 to 294.47) reported by Aliyu *et al.* (2021) when growing Yankasa sheep were fed untreated and urea treated acha straw with different supplementation.





## CONCLUSION AND RECOMMENDATION

It was concluded that, based on the performance of the animals in terms of total weight gain and average daily weight gain, supplementation with ALBP + CSC before and after grazing gave the best dry matter intakes of 440.25g/head/day. It was recommended that, supplementation with ALBP + CSC at equal ratio (50:50) during early rainy season grazing should be encouraged as it gave the best daily weight gain of 83.33g/head/day.

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