INFLUENCE OF GRAZING NATURAL VEGETATION DURING RAINY SEASON ON PERFORMANCE OF RED SOKOTO BUCKS

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ABSTRACT
The study was conducted to look into the effects of supplementing rainy season grazing of Red Sokoto bucks (RSB) with four protein sources (cottonseed cake, cowpea husk, Piliostigma reticulatum pods and soybean hulls) and three energy sources; maize offal, rice offal and wheat offal were used in a completely randomized design, with four treatments replicated three times were randomly allocated into four (4) treatment diets containing varied inclusion levels of soybean hulls. Supplement 1 served control diet, while 2, 3, and 4 contained varied levels of soybean hulls at 15.00, 22.50 and 30% respectively. Animals were offered their respective supplements at 400g per head per day (200g each in the morning and evening) and thereafter allowed to graze the available forages. The result showed that daily supplement intake (DSI) and total supplement dry matter intake (TSDMI) were not affected (p>0.05) by the dietary treatments. Daily weight gain – DWG (p>0.05), total weight gain – TWG (p>0.05) were similar among treatments. Also, initial live weight (ILW), final live weight (FLW) and feed conversion ratio (FCR) were not affected across the treatments, but treatment four had higher final live weight, total weight gain and better feed conversion ratio. It was concluded that feeding 30% of soybean hulls improved performance of Red Sokoto bucks. Based on the present study it could be recommended that inclusion of 30% of soybean hulls being best formulation could be used for feeding Red Sokoto bucks especially when grazing natural vegetation.
Keywords: Cottonseed cake, maize offal, performance, rice offal Red Sokoto bucks

INTRODUCTION

Goats as one of the ruminant animals serve as an important component of animal genetic resources. They provide important products for man in many parts of the world. In developed countries goats are valued mainly for their milk, fiber, and meat; while in the developing countries, they are valued mainly for meat, milk, fiber, and skins according to (Devendra, and Solaiman (2001).

Natural forage which forms the major supply of nutrient to the animals in the wet season often decline in nutritive content as a result of seasonal fluctuation and prolong period of dryness, thereby, grass becomes dry and of low nutritive value during the dry season leading to a marked decrease in voluntary intake and digestibility (Adebayo *et al.,* 2017). Ruminant stocks raised in the region where adequate feeds are unavailable, therefore, usually tend to reflect reduced productivity in terms of quality and quantity of obtainable products (Bamikole and Babayemi 2008).

Livestock production in Nigeria is faced with numerous challenges, including feed scarcity and high cost of conventional feeds, which have negative effects on the sector. According to Akinfala *et al*. (2021), feed scarcity is one of the biggest challenges facing livestock production in Nigeria. This is due to unavailability of arable land, unpredictable weather patterns, and inadequate investment in the sector. As a result, farmers struggle to find enough feed to sustain their animals, leading to low productivity and profitability.

Furthermore, the high cost of conventional feeds is another major problem facing livestock production in Nigeria. According to Okpara *et al.* (2021), the high cost of feed ingredients such as maize, soybean, and wheat bran, which are commonly used in livestock feed production, is a major constraint to livestock farmers in Nigeria. This is due to several factors such as limited supply, high transportation costs, and import restrictions. As a result, farmers are forced to either reduce the quality and quantity of feed given to their animals or incur significant costs in procuring these feeds, which negatively affects their profitability. As a result of the foregoing, there is need for supplementing diets of goats with unconventional and cheaper sources and more available protein sources such as soybean hulls to improve rumen ecology and activities of the host animals.

MATERIALS AND METHODS

Study Site

The experiments was conducted at Professor Lawal Abdu Saulawa Teaching and Research Farm, in the Small Ruminant Unit of the Federal University Dutsinma, Katsina State. Dutsinma Local Government Area lies on latitude 12^0 27'16.128'N and longitude $07^0$29'5544E. It has a land area of about 527, km^2 (203sq miles). It has an elevation of about 605m (1,985 ft.), with a population of 167,671. The Departmental Livestock Teaching and Research Farm, according to field survey (2018) using GPS was reported as 6.46 hectares (64,616M^2), on Latitude: 12^o25'39.3" N, Longitude: 7^o27'63.6" E and Altitude: 505m.

Sources of Experimental Animals and their Management

Twelve Red Sokoto bucks with an average initial weight of 5 ± 2 kg were procured for the study/ Three (3) Red Sokoto bucks were randomly allocated to four (4) diets, in individual face – in cubicles of 2 by 2 metres, housed in the same pen with slanted concreted floors, under a common roof. The house was fully illuminated, well ventilated and was sanitized periodically. Prior to the arrival of the bucks, the cubicles were cleaned and disinfected with Diskol-ES (Tiscol) at the rate of 2.5mL/L of water. Also 10% formalin was used as a fumigant.

On their arrival, the bucks were quarantined and adapted for three (3) weeks during which their bodies were sprayed with acaricide, using Amitraz® 1ml/litre against external parasites. They were dewormed with Albendazole at 12.5mg/kg[1] body weight against internal parasites. Antibiotic, i.e Oxytetracycline L. A. (Kepro®) 20%, at 1ml per 10kg body weight was injected intramuscularly. Groundnut haulms and maize offal were offered to the bucks during the quarantine period and adaptation period of three (3) weeks before the commencement of the experiment.

Experimental Diets and Animal Feeding

Two experimental diets were used for the study: basal and supplemental diets.

The basal diets were free range grazing. The basal diets were fed to the bucks, *ad libitum.* Some of the spieces of grasses and legumes usually found in the grazing area were: *Pennisetum purpureum, Panicum maximum, Andropogon gayanus, Ipomoea eriocapa, Centrosema pubscences,Chloris gayana Commelina benglensis, Chlorise gayana, Senna tora, Cassia occidentalis, Bauhinia thonningii, Triumfetta rhomboidea.*

Four supplemental diets containing 12% crude protein with varying inclusion level of soybean hulls were formulated. The supplements designated as T1, T2, T3 and T4 contained cottonseed cake, *Piliostigma reticulatum* pod meal, maize offal, wheat offal, cowpea husk, rice offal, bonemeal and salt as presented in Table 1. Diet 1, is a control as such does not contain soybean hulls while 2, 3 and 4 contain varying levels of soybean hulls. Each buck was offered its respective supplementary diet at 400g per head per day (200g each in the morning and in the evening) at about 8:00 am; they were allowed to consume the feed for one hour (8:00 am to 9:00 am) and thereafter allowed to graze the available forages at the University Teaching and Research grazing area for about 7 – 8 hours (9:00 am to 4:00 pm) in order to obtain their basal diets. Feed left-overs were collected and weighed immediately after the bucks were released for grazing. On their returns from grazing, they were kept in their individual cubicles. Clean drinking water and saltlick were provided *ad-libitum* for the duration of the experiment. Water and salt lick were provided *ad libitum.* The experiment lasted for 6 weeks after two weeks of adjustment to the experimental diets.

Experimental Design

The experiment was conducted in a Completely Randomized Design (CRD) with four (4) treatments of three (3) animals each as a replicate.

Statistical Analysis

Data generated was analysed using SAS (2002) Difference among means were separated at ($p<0.05$) using Duncan Multiple Range Test (DMRT, 1955) of the same statistical package.

Table: 1 Ingredients and Chemical Composition of the Experimental Diets

Ingredients %	Treatments			
	T1	T2	T3	T4
Soybean hulls	0.00	15.00	22.50	30.00
Maize offal	30.00	15.00	7.50	0.00
Wheat offal	22.00	18.00	15.00	14.00
Rice offal	10.00	17.00	20.25	22.00
Cottonseed cake	10.00	8.00	10.00	9.00
Cowpea husk	11.00	10.00	11.00	12.00
P. reticulatum	14.00	14.00	11.00	10.00
Bonemeal	2.50	2.50	2.50	2.50
Common Salt	0.50	0.50	0.50	0.50
Dry Matter	89.47	90.53	89.73	90.30
Organic Matter	81.89	82.11	80.64	78.35
Crude Protein	18.94	21.75	19.63	21.06
Ash	7.58	8.42	9.09	11.95
NDF	65.24	67.55	66.90	63.61
ADF	35.65	38.50	42.65	39.75
Hemicellulose	29.59	29.05	24.25	23.86

NDF = Neutral Detergent Fibre and ADF = Acid Detergent Fibre.

RESULTS AND DISCUSSION

Growth performance of Red Soloto bucks is shown in Table 2. The result showed that daily supplement intake (DSI) and dry matter intake of the supplements (DMIS) were not significantly ($p>0.05$) affected by the dietary treatments. The highest values were 0.25 and 0.27Kg perday. These were recorded by bucks fed diet 2 and diet 1. The values of dry matter of the supplement intake which ranged from 0.19 to 0.25Kg per day are appreciably lower than 728.04 to 741.26g/day reported by Yusuf (2021), 341.96 to 404.23g/day reported by Shuwa *et al.* (2011) and 595.02 to 669.00 reported by Ibrahim *et al.* (2014) for Red Sokoto bucks fed cottonseed cake or urea and sabara meal respectively. This difference may probably be explained due to differences in management practices, age/weight and composition of the diets used in the three experiments. Initial live weight (ILW) and final live weight (FLW) were not affected across the treatments this is in agreement with findings of Ibrahim *et al.* (2014) who obtained similar results with Red Sokoto bucks fed with sabara meal. Treatment four had higher final live weight, total weight gain. Daily weight gain (DWG) and total weight gain (TWG) were similar ($p>0.05$) among the treatments, although all the animals gained weight which indicated that the intake of energy and protein were all above maintenance requirements.

Table 2: Growth Performance of Red Sokoto Bucks fed with the Experimental Diets.

Parameters	Diets				SEM	LS
	T1	T2	T3	T4		
DSI (KG)	0.27	0.25	0.21	0.22	0.26	NS
DSDMI (KG)	0.25	0.22	0.19	0.19	0.24	NS
ILW (KG)	9.40	9.20	8.80	9.40	0.25	NS
FLW (KG)	10.38	10.23	9.89	10.66	0.25	NS
TWG (KG)	0.98	1.00	1.06	1.23	0.46	NS
DWG K(g)	0.02	0.02	0.02	0.03	0.06	NS
FCR	0.25	0.22	0.18	0.15	0.12	NS

Means along the same row with different superscripts are statistically (<0.05) different; DSI = Daily Supplement Intake; DSDMI = Daily Supplement Dry Matter Intake; ILW = Initial Live Weight; FLW = Final Live Weight; TWG = Total Weight Gain; DWG = Daily Weight Gain and FCR = Feed Conversion Ratio. SEM = standard Error of means, NS = Not Significant;

The result of daily weight gain reported in this study (20.00 – 30.00/day) is within the range (21.52 – 42.36/day) reported by Sua *et al.* (2008) for Red Sokoto bucks grazin natural vegetation supplemented with CSC or urea, and (28.24 to 36.59/day) reported by Shua *et al.* (2008) for Red Sokoto bucks grazing natural vegetation. The feed conversion ratio was not affected by the dietary treatments. Treatment four recorded better feed conversion ratio. The figures which ranged from 0.15 to 0.25 are lower than 5.14 and 5.57 and 9.56 and 15.98 reported by Shua *et al.* (2011 and 2018) for Red Sokoto bucks fed cottonseed cake or urea. This indicated that the diets in the present study were not utilized efficiently by the bucks.

CONCLUSION AND RECOMMENDATION

The performance of animals in terms of final live weight (FLW), total weight gain (TWG) and better feed conversion ratio (FCR) were better improved when bucks were fed with the diet containing 30% inclusion levels of soybean hulls than other supplements. Based on the present study it could be recommended that inclusion of 30% of soybean hulls being best formulation could be used for feeding Red Sokoto bucks especially when grazing natural vegetation.

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