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Intake and Nutrients Utilization of Molasses-Urea Block on Yankasa Rams Fed Maize Stover as Basal Diet

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Abstract

A sixty-day feeding trial experiment was carried out in the Ministry of livestock production unit. Yola Adamawa State, Nigeria. To evaluate the molasses-urea block's nutritional uptake and utilization by Yankasa rams fed maize stover as basal diet. Twelve rams were adopted for two weeks and subjected to four treatments diets with three different blocks formulations served as supplements fed to T_2, T_3 and T_4 while T_1 (control group) with an initial weight of 20.67 to 21.06kg, daily fed intake ranged from 531.50 to 780.67g, daily weight gain -14.28 to 17.32g, final weight gain was 18.00 to 22.00, feed conversion ratio -498.33 to 146.72 and water intake per hour per day ranged from 2.64 to 3.16 l/h/d, subjected to a completely randomized design (CRD). The highest weight gain was recorded in T_2 rams, this implies that different inclusion levels of blocks formulated supplements in the diets resulted to an efficient utilization of feeds in treatment two followed by treatment three as revealed in the feed conversion ratio.

Keywords:*Maize stover and molasse.s-urea block*

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I. Introduction

Inadequate nutrition is one of the main causes of low ruminant production in semi-arid zone of Nigeria, due to an unimproved native pastures, crop residues of high fiber, low protein and minerals deficiency the animals lived on. Tropical forages are characterized by their rapid growth especially during the wet season with preponderant yield exceeding

livestock requirements, which if not harvested and fed, continued to grow and quickly becomes fibrous and lignified (Osakwe, 2006).Multi nutrients blocks, cement and molasses as binders, enhance the energy and ammonia levels in the rumen when the ruminants' needs for protein and energy decrease during the dry season. They additionally provide an alluring option of being inexpensive and extremely useful, easy to transport, and ensuring a slow release of nutrients to the animals. In remote locations, utilizing blocks as feed supplements will ensure that animals are not merely maintained but can be sustained for high- yielding performance. Small-scale farmers can use the blocks technique because of how simple it is to prepare and maintain. (Ramchurn*et al*, 2000).

Urea Molasses Mineral Block (UMMB) is made by combining urea, molasses, and minerals in an appropriate proportion used for feeding cattle; in some countries, UMMB has also been tried in the diets of small ruminants. Use of non-protein nitrogenous (NPN) substances like urea has been widely tried to replace the costly source of proteins in ruminant diets (Forsberg et al., 2002).

II. Materials And Methods

Location of the study

The ministry of livestock production's facilities served as the site of the experiment, located in Yola north local government area, Adamawa State Nigeria, situated in the Northern Guinea Savanna between latitudes 7^{o} and 11^{o} N and longitudes 11^{o} and 14^{o} E of the equator, the rams were sheltered to reduce excessive heat. (Tukur and Adebayo, 1999).

Table 1: Formulations of four (4) different experimental diets

Ingredients	**Treatments**			
	T_1	**T_2**	**T_3**	**T_4**
Maize offal (basal diet)	basal diet only	basal diet	basal diet	basal diet
Molasses	-	36%	26%	40%
Rice offal	-	43%	43%	39%
Urea	-	5%	15%	10%
Cement	-	7%	9%	4%
Salt	-	9%	7%	7%

Preparation of molasses-urea block

Molasses is the by-product of sugar cane after sugar is extracted from the sugar mill, molasses, was one of the components used to prepare the molasses-urea block, urea, salt, and cement, was obtained from the local market, while the Savannah Sugar Company Numan, in

Adamawa state, Nigeria, provided the molasses. Rice mills provided the rice offal. An improvised wooden mold measuring 22 x 19 x 15 cm was built, a scale for components, diets, and animals weighing. Each animal's water consumption was measured using a graduated cylinder. The cool method was used to create the blocks (Sansoucy and Aarts 1986).The ingredients were added and thoroughly combined in the following ratios: 34% for molasses, 6% for cement, 10% for urea, 8% for salt, and 42% for rice offal. The mixture was carefully removed to form a block after being filled to the brim with a wooden mold and left for about two (2) weeks to set and solidify. The amount of molasses and urea in the mixture primarily determined how hard the blocks turned out, so a high level of these ingredients tends to reduce solidification (Sansoucy and arts, 1986).

Experimental diets

The harvested maize stover was dried, sliced into 3cm-long pieces, placed into a 100kg bag, and kept in store for the rams' nourishment. The stover was given as the main source of nutrition, with the three specially prepared blocks given as supplements on alternate days. When preparing the experimental meal, the amounts of the various substances in the supplements were precisely measured using a measuring scale and they were then combined in the proper order as shown in table one.

Feeding of experimental animals

Twelve rams were randomly allocated to four treatments with three replicates as indicated T_1, T_2, T_3 and T_4 in a completely randomized design (CRD), the rams were adopted for 2 weeks, Maize stover was placed inside their feeding trough; the blocks prepared were given ad libitum to an individual ram and replaced when exhausted. The feeding trial was for a period of 60 days, the basal diet and the supplements were weighed and recorded in the morning at 8.00 hours before given to each ram and the left over was weight at 16.00 hours the next morning, Water was measured using a 100ml cylindrical flask before given to the rams, amount of water consumed and the amount left over was also recoded, before fresh allocation were made.

Statistical Analysis

The data collected from the study were subjected to analysis of variance (ANOVA) in a completely randomized design and means were separated using Duncan’s Multiple Range Test (Duncan, 1955).

III. Results

Table 1: Chemical composition (%) of experimental diets

Nutrients	Treatments			
	T_1	T_2	T_3	T_4
Dry Matter (DM)	81	89.5	92.0	89.5
Crude Protein (CP)	1.8	13.6	12.5	13.6
Crude Fibre (CF)	36	11	10	10.0
Ash	8	25.5	21.5	7.5
Nitrogen Free Extract (NFE)	34.9	38.9	41.7	53.9
Lipids	0.5	0.5	0.5	4.0

Key: Dry matter (DM). Crude protein. (CP). Crude fibre. (CF). Ash. Nitrogen free extract. (NFE) and lipids

Table 1 showed the chemical composition of maize stover used in the study. The crude protein (CP) obtained in this study was 1.8, which was lower than the reported values of 5.4 as reported by Nour *et al.* (1987). The DM, NFE and EE was also lower than the reported values as revealed by the same author, but the ash content were similar to that reported by Nour *et al*. (1987). The CF of maize stover in this study was higher than the values reported by Nour *et al.* (2012) who reported 33.2%. The CP of all the treatments (molasses-urea blocks) in this study 'was lower than the values reported by Onwuka (1999). The dry mater (DM), NFE, followed the same 'pattern but Ash and CF were however higher than that of Onwuka, (1999).

Table 2: Performance of Yankasa rams fed different formulations of molasses-urea blocks

Parameters	Treatments				
	T_1	T_2	T_3	T_4	LSD
Initial live weight (kg)	20.67	21.06	21.00	21.05	5.58
Final live weight (kg)	18.00	22.00	21.25	20.25	7.56
Weight gain (kg)	-2.33	0.97	0.250	-0.80	3.74
Daily weight gain (g/d)	-47. 67	17.32	4.46	-14.28	43.76*
Feed intake (g/day)	546.23	780.67	654.41	531.50	173.80*
Feed conversion ratio	-498.33	45.30	146.72	-33.22	63.27
Water intake l/h/d	2.64	3.16	3.03	2.79	1.99

* = Significant at $P < 0.05$.

Table 2 showed the feed intake. The feed intake (per head/day) ranged from 531.50g – 780.67g and the highest was recorded in treatment two (780.67g) followed by treatment three (654.41g) while the lowest was in treatment four (531.50g). The basal diet intake increased with increasing level of supplementation, this was observed in treatment two and treatment three which were affected by quantity of urea 10%, salt 9% in treatment two and urea 15% in treatment three. The inclusion of urea is within tolerable level and that was why rams consumed more in treatment two as compared to treatment one and treatment four, Salman (2007). Supplementation with multi nutrient blocks significantly ($P<0.05$) increased the intake of the basal diet, it provides a high potential for improving the utilization efficiency and the blocks provides an almost continuous supply of nutrients which is usually deficient in straws that limits fibre digestion in the rumen. Improvement in the basal diet intake due to multi nutrient blocks supplementation has been reported by some authors (Bheekhe*et al.,* 2002; Singh and Singh, 2003).The response to supplementation appears to have been entirely associated with stimulation of rumen microbial activity and for stimulation to occur the blocks must have provided nutrients that were limiting microbial growth. Multi nutrients blocks can be a source of rumen protein, macro and micro minerals, vitamins, pharmaceuticals and additives to manipulate rumen fermentation Ojo *et al.* (2001).

Water intake:

The daily water intake ranged from 2.64 l/h/d to 3.16 l/h/d and the highest was recorded in treatment two (3.16 l/h/d) and the lowest in treatment one (2.64l/h/d). The result obtained in this study were within the ranged as reported by ARC (1984), for water intake in rams under varying environmental temperatures

Daily weight gain:

The average daily live weight changes showed significant ($P<0.05$) differences influenced by the amount of supplementation consumed by the rams, this agreed with Hossain *et al.* (2003) that supplementation influenced daily weight gain of rams. Similarly, Tien and Bayer (2004) also observed that supplementation increased growth performance in lambs. The findings of this study also revealed treatment two recorded the highest daily live weight change/gain with higher dietary nitrogen (CP) as most suitable supplement. This agreed with Siulopwa and Simukoko (2001) who observed that increase nitrogen supplement increased DMI resulting in increased live weight gain; this implies positive response of the experimental animals to diet.

Urea provides fermentable nitrogen which is made available to the rumen microbes and utilized by the animals and this can increase the intake of feed up to 45%, it also increases digestion up to 20% (Campling *et al,* 1960), this has a positive effect in weight gain of rams.

Feed conversion ratio (FCR):

Feed conversion ratio shows that supplementation in treatment two resulted to a better utilization of feed followed by treatment three. The pattern of feed conversion ratio agreed with Gunje*et al.* (1990) which revealed an increased level of feed conversion ratio with corresponded increased in sources of crude protein and energy. The lower the feed conversion ratio values, the more efficient feeds are converted to meat in sheep, Smeaton (2003). This can be observed in the molasses-urea blocks formulation where the inclusion of urea as a source of fermentable nitrogen and molasses as source of energy influenced the weight gain of rams, (Campling *et al,* 1960).

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