NUTRIENT DIGESTIBILITY OF SHEEP FED DIFFERENT MULTI-NUTRIENT BLOCKS (MNB) AS SUPPLEMENT TO MILLET STOVER IN SEMI-ARID ZONE OF NIGERIA

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ABSTRACT
The study was conducted to determine the influence of multi nutrient blocks (MNB) as supplement to millet stover in the semi-arid region of Nigeria. From the results of proximate and in sacco degradability properties, four multi nutrient blocks (MNB) were selected and subjected to in vivo trial. Twenty (20) Yankasa sheep with average weight of 21.75 kg were used for the feeding trial. Each group of four animals with four replicates were randomly assigned to one of the five (5) treatments in a completely randomized design. Data on nutrient digestibility were collected and subjected to analysis of variance (ANOVA). The study lasted 56 days. The results of the present study showed that there were significant (P <0.05) differences in all the parameters measured. On average, T3 (55% wheat bran + 5% locust bean pulp + 40% Faidherbia albida) was better in values compared to the other four treatments. Therefore, use of multi nutrient blocks is strongly recommended in feeding regime of ruminant animals in semi-arid regions where the quality roughages is poor.
Keywords: Multi Nutrient Blocks (MNB), Millet Stover, Supplement, Nutrient digestibility, Sheep.

INTRODUCTION

Feed availability has been the major factor affecting ruminant livestock production during the dry season. Poor quality roughages such as crop residues and dry grasses are the available feed resources for feeding ruminants during the dry season. These feed resources are characterized by low intake and digestibility which result in poor animal performances. Supplementation with conventional protein base feed to ameliorate the problem is not within the reach of the small holder farmers. The use of agro- industrial by-products by livestock farmers especially in Nigeria is restricted to few, wealthy individuals because of high cost FAO (1996). Browse plants have been used as supplements to a wide range of forages and agricultural by-products. Norton (1998) stated that they have been incorporated into concentrates as substitute for more expensive processed protein source such as groundnut cake, cotton seed cake, palm kernel cake etc. Studies by Njidda et.,al (2009) and El-Bahiery (2009) showed that *Ziziphus Mauritania* and *Faidherbia albida* have high crude protein (CP) content and could be used as supplement for feeding ruminants. Multi- nutrient blocks are licks that contain various nutrients such as energy, protein, mineral, vitamins and other nutrients mixed together from various feed ingredients that are used as livestock feeds Sansoucy (1998). Feeding of the blocks is convenient and inexpensive method of providing array of nutrients required by both the rumen microbes and animals, which may be deficient in the normal diet Leng (1997) sorghum stover. The objective of the study was therefore to determine haematological indices of sheep fed different multi-nutrient blocks as supplement to millet Stover.

MATERIALS AND METHODS

Study Area

The study was carried out at the Livestock Teaching and Research Farm of the Department of Animal Science, University of Maiduguri, Borno State.

Feed Ingredients and Preparation

The feed ingredients used for the study are millet bran, rice bran and wheat bran as energy sources. While *Faidherbia albida* pods and *Ziziphus mauritania* fruits served as protein sources, locust bean pulp was used as a binder and also for energy source for multi nutrient blocks.

Multi Nutrient Block Formulation

The blocks were formulated using *Faidherbia albida* pods and *Ziziphus mauritania* fruits as protein sources while Millet bran, Rice bran and Wheat bran served as energy sources, Locust bean pulp was used as a binder and also served as an energy source. All ingredients were used in various proportions and cold method of production was used as described by Leng (1997).

Mixing of Feed Ingredients

The feed ingredients were mixed manually in a 200 L drum cut to a height of 50 cm. Batches of 15 kg (ingredients) were mixed in various ratio in order to get a homogeneous mixture as recommended by Mohammed *et al*. (2007).

Table 1: Percentage composition (%) of the Multi- Nutrient Block (MNB)

Percentage (%) of Feed Ingredients Used in the Formulation of the Multi-Nutrient Blocks (MNB)
T1 = 55% MB + 5% LBP + 40% FA
T2= 55% MB + 5% LBP + 40% ZM
T3= 55% WB + 5% LBP + 40% FA
T4= 55% WB + 5% LBP + 40% ZM
T5= 55% RB + 5% LBP +40% FA

Abbreviation: MB=Millet bran, FA=*Faidherbia albida*, LBP= Locust bean pulp, ZM=*Ziziphus mauritania*, RB= Rice bran and WB= Wheat bran

Feeding and Management

Prior to the commencement of the study, the animals were given prophylactic treatment consisting of intra-muscular injection of oxytetracycline (LA: 1ml/10kg body weight, multi vitamin and ivormetin 1m/50kg). The basal diet (millet stover) were chopped into 2-3 cm length in order to avoid wasting and selection. Basal diet and water were provided *ad-libitum,* while the supplement was included in all the treatments except T1 (control).

Animals and experimental design

Twenty (20) Yankasa sheep with average weight of 21.75 kg were used for the feeding trial. Feeding trial was carried out using multi- nutrient blocks (MNB) as a supplement to millet stover. The four multi-nutrient blocks (MNB) were selected based on proximate composition and *in sacco* digestibility. Multi-nutrient blocks (MNB) that are high in crude protein (CP) content and dry matter degradability were selected as supplement. Each group of four animals with four replicates were randomly assigned to one of the five (5) treatments in a completely randomized design. The experiment lasted for 56 days.

Faecal sample collection

The faecal samples were collected from the animals from the metabolic cages for one week before the end of the experiment.

Statistical Analysis

All data collected were subjected to analysis of variance (ANOVA) using completely Randomized Design (CRD). Significant differences between means were compared using the Least Significant Difference (LSD) method.

RESULTS AND DISCUSSION

The results of nutrient digestibility of sheep fed different multi nutrient blocks (MNB) and millet stover based diet is presented in Table 2. The results showed that there were significant (P <0.05) differences in all the parameters measured. Dry matter digestibility, Crude protein digestibility, Crude fibre digestibility, Ether extract digestibility, Ash digestibility, Nitrogen free extract digestibility and Organic matter digestibility. The dry matter digestibility values were 58.05, 67.25, 68.89, 65.88 and 52.18% for T1, T2, T3, T4, and T5 respectively. The dry matter digestibility values between T2, T3 and T4 were statistically non-significant (P >0.05) difference. The highest value of dry matter digestibility was recorded in T3 (68.89%) while the lowest value was recorded in T5 (52.18%). The highest value was recorded in T3 (55*% wheat bran + 5% locust bean pulp + 40% Faidherbia albida*) this could probably due to different in ingredients used and also due to high crude protein content of *Faidherbia albida* in the formulation. However, the result of this study is in line with the work of Tamminga, S. (1993) who fed millet stover supplemented with cotton seed.

Table 2: Nutrient digestibility (%) of sheep fed different Multi-nutrient blocks (MNB) and Millet stover Based diet

	Treatments					
Nutrient digestibility	**T1**	**T2**	**T3**	**T4**	**T5**	**SEM**
Dry matter digestibility	58.05^{b}	67.25^{a}	68.89^{a}	65.88^{a}	52.18^{c}	1.71
Crude protein digestibility	50.16^{c}	58.85^{b}	70.10^{a}	59.05^{b}	47.50^{c}	2.97
Crude fibre digestibility	84.84^{a}	48.20^{b}	50.17^{b}	56.82^{b}	27.03^{c}	5.02
Ether extract digestibility	86.94^{c}	92.25^{a}	93.61^{a}	92.25^{a}	90.00^{b}	0.67
Ash digestibility	63.89^{a}	36.11^{c}	52.22^{b}	36.11^{c}	18.06^{d}	4.92
NFE digestibility	73.82^{b}	81.30^{a}	81.37^{a}	55.19^{c}	74.65^{b}	2.79
Organic matter digestibility	57.54^{c}	68.18^{b}	70.34^{a}	69.72^{b}	56.57^{c}	1.71

a, b, c, d = means in the same row with different superscripts are significantly (P>0.05) different
SEM = standard error of mean

CONCLUSION

The results of the present study revealed that there was no significant difference in all the parameter measured but highest values was recorded in T3 in all the parameters. The process of making multi nutrient blocks is simple and does not required sophisticated equipment and can be made by used of wide variety of by products which are available locally. It is recommended that small holder farmers in Nigeria could use multi nutrient blocks with T3 formulation (diets with 55% wheat bran + 5% locust bean pulp + 40% *Faidherbia albida* pods) in diets of sheep for improved performance. However, multi nutrient blocks should be part of farmers agronomic practices because it content various nutrients content such as energy, protein, vitamins, minerals and other nutrients mixed together from various feed ingredients. Thus, use of multi nutrient blocks is strongly recommended in feeding regime of ruminant animals in semi-arid regions with poor quality roughages.

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