Global Advanced Research Journal of Agricultural Science Vol. 1(4) pp. 062-065, June, 2012
Available online http://garj.org/garjas/index.htm

Short Communication

The Nitrogen Balance of Indigeneous Yankasa Sheep fed a Basal Diet of Untreated Rice Straw Supplemented with Mineral Blocks

A. A. Mubi

Department of Animal Production, Adamawa State University, PMB 25 Mubi, Adamawa State Nigeria.
E-mail: abumub@yahoo.com; +234 081 3650 2487

Accepted 03 May, 2012

A research was conducted to determine the effects of two types of multinutrient block with or without molasses and a basal diet of rice straw on the performance of sheep. Three sheep were randomly allocated to three treatments group with a sheep per treatment in a metabolism cage the treatments were MNBM with basal diet, MNBW with basal diet and the Control. The metabolism trial was conducted to assess nitrogen balance in sheep fed a basal diet of rice straw and supplemented with MNBM and MNBW. Three Sheep were used for the trial, representing each treatment group. There was no significant (P>0.01) difference in the nitrogen retained between the supplemented group but differs (P<0.01) significantly with the control. The nitrogen retained were 5.78g/day, 24.96g/day and 25.87g/day for the control, MNBW and MNBM.There was no significant (P>0.01) difference between the supplemented groups, but differs (P<0.01) with the control group. The daily live weight change was – 0.02g/day, 0.39g/day and 0.40g/day for the control, MNBW and MNBM. The nutrient intake and digestibility by cattle was studied, the DMD of MNBM, MNBW and the control were 63.12%, 61.95% and 43.74%. CP digestibility was 77.11%, 75.87% and 42.27% for MNBM, MNBW and the control. The supplemented group had CF digestibility of 55.02%, 53.96% and 41.05% for MNBM, MNBW and the control.

Keywords: Nitrogen balance, Yankasa sheep, untreated rice straw, mineral blocks.

INTRODUCTION

In Guinea Savanna region, poor quality roughages are the major sources of feed used for feeding ruminant for a considerable part of the year (Preston and Leng, 1987). The long dry season results in the deterioration in both quality and quantity of grasses, which are the major feed resources for ruminants, the crude protein content of grasses drop below 4% during the dry season and are very low in phosphorus and energy. The feed are highly lignified thus digestibility is low and this characteristics lowers their intake and productivity of the ruminants (Capper *et al.*, 1989; Hadjipanayiotou et al., 1993a).

The effects of ruminants on unbalanced nutrient supply, in particular fermentable nitrogen and protein include low calving, low birth weight, high calf mortality, low weaning weight and reduced milk production. To increase the productivity of ruminants, alternative nutritional practices should be developed by the smallholder farmer in developing countries (Preston, 1986).

The supplementation by the use of multi-nutrient blocks containing fermentable nitrogen and other microbial growth factors, the enhancement of digestibility of crop residues, and that of straw by the

TABLE 2: Nitrogen balance in sheep offered rice straw and supplemented with multinutrient blocks

	TREATMENT				
PARAMETERS	**UMNB**	**MNB**	**R/S**	**Sed**	**Sig.Level**
Daily Feed Intake (Kg/DM/day)	1.22^{a}	1.09^{b}	0.94^{c}	0.05	**
Daily Faecal Output (Kg/DM/day)	0.55^{c}	0.59^{a}	0.56^{b}	0.02	**
Daily Urine Output (g/day)	0.53^{a}	0.51^{b}	0.58^{c}	0.02	**
Nitrogen intake (g/day)	7.85^{a}	7.37^{b}	3.92^{c}	1.60	**
Nitrogen in faeces (g/day)	9.22^{b}	9.47^{a}	2.70^{c}	0.10	**
Nitrogen in Urine (g/day)	7.85^{a}	7.39^{b}	2.29^{c}	0.19	**
Nitrogen Retained (g/day)	25.90^{a}	24.97^{a}	5.59^{b}	1.61	**

NB: Sed = Standard Error of Difference Between Two Means, abc = abc Means Within Same Row Having Difference Superscripts Differs Significantly, * = (P<0.05), * * = (P<0.01), UMNB = Multinutrient Blocks with Molasses, MNB = Multinutrient Blocks without Molasses, R/S = Rice Straw

manipulation of rumen function (Leng, 1997). Multi-nutrient blocks are finding ready acceptance in many parts of Africa by pastoralists as well as by smallholder farmers (Sansoucy *et al*., 1986).

The objective of the study is to determine the nutrient intake and digestibility of Native Yankasa sheep fed basal diet of untreated rice straw supplemented with multinutrient blocks.

MATERIALS AND METHODS

Study location:

The experiment was conducted in Adamawa State University, Livestock Teaching and Research Farm, Mubi, the study area as described by (Andrawus and Yusuf, 2001)

Treatments and experimental design

Three treatments were compared in a completely randomized block design. The experimental animals were allotted to three treatment groups with one ram per treatment in a metabolism cage. The treatments were

Ts_1 = Multinutrient blocks with molasses + Rice straw

Ts_2 = Multinutrient blocks without molasses + Rice straw

Ts_3 = Rice straw only – control

Digestibility Trial

Metal metabolism cages were used to determine the intake and digestibility of nutrients. The cages had facilities for collecting urine and faeces separately. The metabolism cages were constructed as described by Oyenuga (1961). Metal was used to cover the top of the cages. Wire mesh (1.91 x 1.91 cm) served as the floor upon which the animals could stay comfortably while allowing for easy passage of urine and faeces.

Removable fine wire mesh on the floor trapped all faeces and allowed passage of urine, which drained into a funnel placed at the mouth of a bottle below the cage in which the urine, was collected. The bottle contained 10 mls of concentrated sulphuric acid to prevent decomposition of nitrogenous compounds in the urine by microorganisms. Feeding and drinking troughs were fixed to the sides of the cages.

One ram at a time from each treatment was randomly selected for the trial for 10 days. The animals were weighed individually at the beginning and at the end of the experimental period. The basal diet (rice straw) was provided twice daily, at 8.00am and 3.00pm. The multinutrient block supplement was provided at 8.00am daily. The daily feed intake was recorded and samples were taken for chemical analyses.

The urine volume and faecal output were measured daily. Samples of the urine (20 mls) and 10 g of the faecal samples from each animal were collected daily and stored in a deep freezer for further chemical analyses. The adaptation period for this experiment was 7 days and this was followed by 10 days data collection period.

Statistical analysis

The data was analyzed using SAS (2001). Significant differences among treatment means were determined using the Least Significant Difference (LSD) method.

RESULTS AND DISCUSSIONS

Nitrogen balance in sheep offered rice straw and supplemented with multinutrient blocks

Higher nitrogen intake was recorded in the supplemented diets (UMNB and MNB). There was a significance (P<0.001) difference between the supplemented groups and the control. There was also difference (P<0.001) between UMNB and MNB groups. MNB supplemented group had the highest faecal nitrogen. There was a significant (P<0.001) difference in the faecal nitrogen in all the treatment groups.

The highest faecal nitrogen was obtained in MNB, UMNB and control group and this indicates significance difference between all the treatment groups. The faecal nitrogen was higher than the 3.39 $\pm$ 0.22, 3.03 $\pm$ 0.20 and 3.25 $\pm$ 0.20 in three formulated blocks with or without molasses reported by Samanta ,. et al (2003).

The nitrogen retention was significantly increased (P<0.001) with an increase in block intake, that is the UMNB had 25.90 and 24.97 for MNB which have no significant (P>0.001) difference; but there was a difference (P<0.01) between the control, and the treatment groups. UMNB exhibited the highest nitrogen retention. The increase of retained nitrogen in the UMNB is related increased in Nitrogen intake and digestibility. The faecal nitrogen obtained in the study is an indication that ammonia complexes are fully hydrolyzed in the gastrointestinal tract (Orskov, E.R., 1986). The faucal nitrogen is 9.22 for UMNB, 9,47 for MNB and 2.70g/day. There was a significant (P<0.001) difference in all the treatments. The control has the lowest due to low level of intake and nitrogen retained.

The nitrogen intake was slightly lower than the 35.6 and 34.3g/h/day reported by Moujahed et al., (2000). The faecal nitrogen of 17.2 and 12.3 and urine nitrogen of 14.2 and 14.3 as reported by Hussain (2001) were not similar. The nitrogen loss in UMNB and MNB in Faeces were low, Likewise the urinary nitrogen. The small figures in the control group are due to the low level of protein. The low nitrogen lost is an indication of proper nitrogen utilization by the animals

This is not consistent with the finding of Moujahed et al., (2000) which may be as a result of the methods processing of his diets or breed types.

Nitrogen retention increased significantly in UMNB and MNB. The decrease in faecal nitrogen– losses compared may be as a result of digestion in the rumen. This finding confirms the findings of Barry et al., (1986). A significantly (P<0.001) higher nitrogen retention in the animals on the supplementary diets implies that, the blocks had a higher potentials in contributing Nitrogen to the animals than the control group (Rice straw only)

Rice straw is abundantly available during dry session in most tropical region, it, utilization should be maximized by implementing technology which are technically easy to be adapted by rural/local farmers throughout the session. (Sundstol, et al 1978., and Ibrahim, et al., 1983).

In conclusion, improved intake, dry and matter digestibility, microbial nitrogen protein and nitrogen balance may be achieved when low quantity forage diets are supplemented with multinutrient blocks.

REFERENCES

Andrawus AU, Yusufu WH (2001). Effects of Dates of Sowing on Growth and Yield of Soybeans in The Northern Guinea Savanna Environment of Nigeria. *Sabondale Journal of Technical Education* **4**: 82-87

AOAC (2000). *Official Methods of Analysis*. 17th Ed. Association of Official of Analytical Chemists, Gaithersburg. MD Germany.

Barry TN, Marley TR, Duncan SJ (1986). The role of Condensed Tannins In The Nutritional Value of *Lotus Pedunculatus* for Sheep 4. Sites of Carbohydrate and Protein Digestion As Influenced by Dietary Reactive Tannins Concentrations. *British Journal of Nutrition* **55**:123-137.

Capper BC, Thompson EF, Richawi S (1989). Voluntary intake and digestibility of barley straw as influenced by variety and supplementation with either Barley grain or cotton seed cake, *Animal Feed Science Technology*. **26:** 105-118.

Hadjipanayiotou M, Verhaeghe L, Aleen M, Kroufoleh AR, labban LM, Shurbaji A, Al-Wadi M, Dassonki M, Shenkar B, Amin M (1993a). Urea Block 1. Methodology of Block Making Of Different Formulae Tested in Syria. *Livestock Resources For Rural Development* **5** (3) : 6-15

.Hussain MC, Haque MH, Aziz SA, Mozumder MS, Ali MI (2001). Effect of Urea Molasses Straw (UMB) on the Productive and Reproductive performance of Indigenous (Zebu) Cows Under Village Condition of Bangladesh, *Pakistan Journal of Biological Science*. **6** (7): 807-808.

Ibrahim MNM, Fernando DNS, Fernando SNFM (1983). Evaluation of Different Methods of Urea-Ammonia Treatment for Use at the Village Level In: *The Utilization of Fibrous Agricultural Residues as Animal Feeds* (editor P. Doyle). *Proceedings of the Third Annual Workshop of the Australian-Asian fibrous Agricultural Residues Research Network* held at the University of Peradeniya, Sri Lanka, 17-22, April, 1983, School of Agriculture and Forestry University of Melbourne, Parkville, Victoria, Australia.

Leng RA (1997). *Tree Foliage in Ruminant Nutrition*. FAO Animal Production and Health Paper No 139 Food and Agriculture Organization, Rome, Italy.

Moujahed N, Kayouli C, Thewis A, Beckers Y, Rezgaris D (2000). Effects of Multinutrient Blocks and Polyethylene Glycol-4000 Supplies on Intake and Digestion by Sheep fed *Acacia cyanophylla* Lidl. Foliage Based Diet. *Animal Feed Science Technology,* **3** (20): 219-238.

Orskov ER (1986). Strategies For Rural Development With Emphasis On Livestock Production, Resource Utilization and FAO Assistance, In*: Utilization of Agricultural By-Products as Livestock Feed in Africa.* D. A. Little A.N. Said (Eds) Proc. Of A Workshop Held At Ryalls Hotel, Balantyre, Malawi, September, 1986, Pp 159-164.

Oyenuga VA (1961). Nutritive Value of Cereal and Cassava Diets For Growing and Fattening Pigs In Nigeria. *British Journal of Nutrition*. **15** :327-332.

Preston TR (1986): *Better utilization of crop residues and by-products in animals feeding research guidance*2: A practical manual for research workers. FAO animal production and health paper 50/2 FAO: Rome. pp: 154.

Preston TR, Leng RA (1987). *Matching ruminant production system with available resources in the tropics Penumbul Book Armidate*. Australia pp: 83

Samanta, A. K., Singh, K. K., Das, M. M., Maity, S.B and Kundu, S. S. (2003). Effect of Complete Feed Block on Nutrient Utilization and Rumen Fermentation in Baribari Goats. *Small Ruminant Research*, **48** :95-102

Sansoucy, R (1986): *The Sahel manufacture of molasses blocks.* World animal review. 57:40 – 48.

SAS (2001).Statistical Analysis System, SAS 2001 SAS/STAT Software. Release 8.02. SAS Institute Inc. Cary, NC, USA.

.Sunstol F, Coxworth T, Mowat DN (1978). Improving the Nutritive Value of Straw and other Low-Quality Forages by Treatment with urea. *World Animal Review,* **5** :40.