

EFFECT OF INCLUSION OF HAULM OF DIFFERENT GROUNDNUT (*Arachis hypogaea*) VARIETIES ON INTAKE, NUTRIENT DIGESTIBILITY AND NITROGEN BALANCE IN YANKASA RAMS

H.Y. ADAMU¹, D.D. DUNG², O.S. LAMIDI², S.B. ABDU¹, M.R. HASSAN¹, M. KABIR¹ AND A. LAWAL³.
¹Department of Animal Science, Ahmadu Bello University, Zaria, ²National Animal Production Research Institute, Shika, A.B.U, Zaria, ³Yobe State College of Agriculture, Gajba, yusufhanwa@yahoo.com, 0803 586 5074

ABSTRACT

The work was carried out to study the intake, nutrient digestibility and nitrogen balance in Yankasa rams fed haulms of different groundnut varieties in concentrate diets. Nine Yankasa rams average weight 13.40kg \pm 2 were randomly assigned into three groups with three rams per group in a completely randomized design. The experimental diets consist of *Digitaria smutsii* hay as a basal diet which was fed *ad libitum* and concentrates which were supplemented with 10% of groundnut haulm of SAMNUT22 and Local Variety were offered at the rate of 1% of body weight per head daily. The results of the trial showed that animals fed 10% SAMNUT 22 haulm had highest ($p < 0.05$) DM, intake. Apparent digestibility of all nutrients was high ($p < 0.05$) in animals fed 10% SAMNUT 22 inclusion and had the best digestibility of all nutrients. It can be concluded from the trial that SAMNUT 22 can be included in the diets of Yankasa rams up to 10% without adverse effect on intake, digestibility of nutrients and nitrogen balance.

INTRODUCTION

The nutrition of sheep is the most important factor affecting performance. Poor nutrition results in low rates of production. It also affects the immune system. It is however an accepted fact during dry season of the year, that grassland in the tropics does not supply sufficient nutrients to stock for greater productivity. Moreover Range is declining due to increase in land use for crop production, overgrazing, urbanization and population increase (Lamidi, 2005). The fodder production for supplementary feeding is the only long term means for feeding the livestock. Groundnut is one of the dual-purpose legumes that appear more acceptable to the subsistence crop-livestock farmers of Nigeria. Studies have indicated that groundnut hay could meet the maintenance energy requirements of adult goats even at increasing levels of dietary inclusion (Malau-aduli *et al.*, 2003). On the other hand, Animals' scientist are highly concerned by plants breeders' efforts to change the distribution of plant nutrients to the point that the nutritive value of the crop residues becomes too low for animals to obtain even their maintenance requirements. Therefore, the objectives of this study were to evaluate the intake, digestibility and nitrogen balance in Yankasa rams fed with the haulm of different groundnut varieties.

MATERIALS AND METHODS

The experiment was conducted at the Department of Animal Science Farm, Ahmadu Bello University Zaria. The Groundnut haulm

was cultivated at breeder plot NAPRI, while *Digitaria smutsii* hay was harvested within NAPRI. Nine Yankasa rams average weight 13.40kg \pm 2 used in the study were purchased from the open market in Zaria. The rams were treated against ecto and endoparasites. The rams were randomly allotted to three treatments in a completely randomized design. The animals were weighed and housed in individual metabolism cages. The experimental diets consisted of supplementary concentrate diets formulated to consist of 0% and 10% of SAMNUT 22 and 10% of Local variety of *Digitaria smutsii* hay as basal diet and fresh clean water were offered *ad libitum* daily at 0800hr. In addition, the animals were offered concentrates which was supplemented with SAMNUT 22 and haulm from local variety of groundnut at 0% (control), and 10%. The supplement was offered at 1% of each animal's body weight. The experimental animals were allowed 14 days to adjust to the metabolism crates, followed by seven days of fecal and urine collection. Quantity of feed and refused was measured daily to determine feed intake. DM, EE, CF and Ash of the dried feed samples and feces were analyzed according to AOAC (2000) procedure. Nitrogen content of the dried feed samples, feces and urine were determined using Kjeldahl procedure (AOAC, 2000). The acid detergent fiber (ADF) and neutral detergent fiber (NDF) of feed samples, and feces were analyzed according to the procedure of Van Soest (1991). Data collected during the digestibility trials were subjected to one-way analysis of variance procedure of SAS (1998) to

evaluate for significant difference among treatment means. Duncan multiple range tests (DMRT) was used to compare treatment means (Duncan, 1955).

RESULTS AND DISCUSSION

Feed Intake

The results of the feed intake (Table 1) showed that DMI was highest (1113.23g) at 10%SN22 followed by (1102.28g) 10% LV level of inclusion in the supplement and were statistically similar ($p>0.05$) but significantly ($p<0.05$) higher compared to 1043.59g (control diets). The increased DMI of supplement diets containing 10% SN22 could be an indication of increased palatability of groundnut haulm to sheep. This observation is in conformity with earlier works reported by Adebowale (1988) who reported that groundnut haulms supplementation improved palatability, increased minerals and vitamins, better rumen function and has a laxative influence on the gastrointestinal tract (GIT) of Yankasa sheep.

Digestibility and Nitrogen study

Table 2 shows the results of calculated digestibility Coefficient and were significantly different ($P<0.05$) with inclusion of 10% SN22 in the diets. The increase in the apparent digestibility of Dry matter, Organic matter, Crude Protein Ether extract, NFE, ADF and NDF as a result of SAMNUT 22 groundnut haulm supplementation. This can be attributed to an increasing level of the Crude protein that was ingested. This agrees with the previous study on the effect of increasing dietary Crude protein level on Nitrogen or Crude protein digestibility (Sahlu *et al.*, 1993). The most probable explanation for this phenomenon is in the fact that diet contains SAMNUT 22 haulm might result in high palatability and better utilization of the nutrients by the rams. The results of nitrogen study are also indicated in table 3. The results showed that all the rams had positive nitrogen. The significant high urinary N observed in control compared to 10%LV can be explained by the fact that excess ruminal ammonia is absorbed and excreted in the urine in the form of urea (Murphy and Colucci 1999). Animals fed diets containing 10%SN22 had highest nitrogen absorbed (13.37g) and nitrogen balance (11.68g) and nitrogen retained as percentage of intake (52.36g) in their body and significantly higher compared to other treatments. This is in agreement with the report of Woodward and Reed, (1997).that nitrogen

depends on good digestibility of nutrients and / or utilization. In some cases this effect is sufficient to maintain an adequate N balance.

CONCLUSION

Based on the results of this study, it can be concluded that SAMNUT22 have feeding value as a fodder for small ruminant and can be included up to 10% in the diets of goat without adverse effect on intake and digestibility of nutrients.

REFERENCES

- Adebowale (1988). The performance of goats fed maize straws treated with organic wastes 10th Annual Conference. Nigerian Society for Animal of production 29(1): 40-46
- AOAC (2000). Association of Official Analytical Chemists 17th Revised edition. In: Official methods of Analyses, Washington DC pp. 210 – 240.
- Duncan, B.D.(1955).Multiple Range Test and Multiple F- Test Biometrics 1:1-42.publishers Ltd. Pp.8
- Lamidi, O.S. (2005). The Use Of Some Non-Conventional Protein Sources For Fattening Cattle Poultry manure as supplement for cattle grazing the natural pastures, Ph.D Thesis. Dept. Anim. Sci. Ahmadu Bello University. Zaria, Nigeria.
- Malau-Aduli, B.S, Eduvie, L. Lakpini, C.A.M. and Malau-Aduli, E.O. (2003). Chemical compositions, feed intakes and digestibilities of crop residue based rations in non-lactating Red Sokoto goats in the subhumid zone of Nigeria. *Anim. Sci. Journal.*, 74: 89-94.
- Murphy, A and Colucci, P.E. (1999) A tropical forage solution to poor quality ruminant diets: A review of *Lablab purpureus*. *Livestock Research for Rural Development* (11) 2 1999. <http://www.cipav.org.co/lrrd11/2/colu.htm>
- Sahlu, T., Hart, S.P. and Fernandez, J.M.(1993).Nitrogen metabolism and blood metabolites in three goats breed fed increasing amount of protein. *Small Rum. Res.* 10: 281-292
- VanSoest, P.J., Robert, J.B. and Lewis, B.A. (1991). Method for dietary fibre, neutral detergent fibre and non-starch polysaccharides in relation to animal nutrition. *Journal of Dairy Science* 74:3583-3597
- Woodman, H F and Evan, R F (1974). The nutritive value of fodder cellulose when fed to ruminants and pigs. *Agricultural Science*, XXXVII 202 -223.

Table 1: The effect of different varieties of groundnut haulm on feed intake of Yankasa rams fed *D smutsii* hay as basal diet

Parameters	% of inclusion level of groundnut haulm varieties			SEM
	T1 (0%)	T2 (10% LV)	T3 (10% SN22)	
Intake (g/d)				
Supplement	371.39 ^b	393.81 ^a	388.58 ^a	2.6
<i>D smutsii</i> hay	750.5 ^b	798.63 ^a	792.01 ^a	5.12
TFI	1121.9 ^b	1182.36 ^a	1180.59 ^a	7.68
TDMI	1043.59 ^b	1102.28 ^a	1113.23 ^a	7.15

^{a, b}: means within the same row bearing different superscript are significant different ($p < 0.05$), SEM: standard error of means, LV =local variety and SN22=SAMNUT22

Table 2: The effect of different varieties of groundnut haulm on digestibility Coefficient and nitrogen balance of Yankasa rams fed *D smutsii* hay

Parameters	% of inclusion level of groundnut haulm varieties			SEM
	T1 (0%)	T2 (10% LV)	T3 (10% SN22)	
Digestibility coefficient (%)				
Dry Matter	46.44 ^a	30.54 ^b	46.45 ^a	1.04
Organic Matter	51.13 ^a	34.76 ^b	49.20 ^a	1.01
Crude Protein	56.76 ^b	56.68 ^b	59.78 ^a	0.45
Ether Extract	76.99 ^b	75.65 ^b	80.94 ^a	0.51
Crude Fibre	52.89 ^a	49.86 ^b	51.5 ^{ab}	0.15
Nitrogen Free Extract	56.77 ^b	54.24 ^c	59.18 ^a	0.55
Acid Detergent Fibre	67.58 ^b	76.40 ^a	79.76 ^a	1.25
Neutral Detergent Fibre	40.02 ^b	40.31 ^b	44.94 ^a	0.54

^{a, b}: means within the same row bearing different superscript are significant different ($p < 0.05$), SEM: standard error of means, LV =local variety and SN22=SAMNUT22

Table 3: The effect of groundnut haulm of different varieties on nitrogen balance of Yankasa rams fed *D smutsii* hay

Parameters	Percent of inclusion level of groundnut haulm varieties			SEM
	T1 (0%)	T2 (10% LV)	T3 (10% SN22)	
Nitrogen balance, g/day				
Nitrogen Intake	22.5 ^a	20.5 ^c	22.43 ^b	0.03
Nitrogen losses in Urine	1.93 ^a	1.62 ^c	1.75 ^b	0.04
Nitrogen losses in faeces	10.00 ^a	8.87 ^b	9.00 ^b	0.01
Total Nitrogen Lost	11.93 ^a	10.56 ^c	10.75 ^b	0.02
Nitrogen absorbed	13.31 ^a	11.56 ^b	13.37 ^a	0.02
Nitrogen Balance	10.57 ^a	9.94 ^b	11.68 ^a	0.02
N retained as % of intake	46.97 ^b	48.48 ^b	52.36 ^a	0.27

^{a, b}: means within the same row bearing different superscript are significant different ($p < 0.05$), SEM: standard error of means, LV =local variety and SN22=SAMNUT22