PAT June, 2012; 8 (1): 209 -215; ISSN: 0794-5213

Online copy available at

www.patnsukjournal.net/currentissue

Publication of Nasarawa State University, Keffi

Effects of Groundnut Haulms Supplementation on Intake, Digestibility and Growth Performance of Rams

Ososanya, T. O.

Department of Animal Science,University of Ibadan, Ibadan, Nigeria tososanya85@gmail.com

Abstract

In the tropics, supplementation of Cynodon nlemfuensis hay with groundnut haulms improves the nutritional value of the hay thereby promoting live weight of rams during the dry season. The objective of this study was to develop a supplementation strategy for dry season when ruminant feeds are inadequate and growth in ruminants is staggared. For 70 d, effects of groundnut haulms supplementation on hay intake and growth performance of rams were assessed, after which digestibility was determined over 14d. Three levels of Cynodon nlemfuensis hay (100, 50 and 0g) and three levels of groundnut haulms (0, 50 and 100g) were described as GHO, GH50 and GH100 respectively. Supplementation had a positive linear effect (P ≤ 0.05) on intake, dry matter (DM) and fibre in GH50 compared to GH0 and GH100 respectively. Similarly, weight gain was highest in GH50 compared to GH0 and GH100 respectively. However, no significant differences (P ≤0.05) were observed among the treatments.It is therefore suggested that, in dry season, it is practical to supplement sheep with 50g/kg Cynodon nlemfuensis hay + 50g/kg groundnut haulm for improved weight gain and nutrient digestibility.

Keywords: *Cynodon nlemfuensis, Groundnut haulms, Weight gain and Nutrient Digestibility*

Introduction

The ability of the average Nigerian family to sustain animal protein intake is a sensitive barometer for assessing the physical and economic wellbeing of the nation. However, inspite of the enormous natural and human resources, Nigeria remains among the least consumers of animal protein in Africa (Egbunike, 1997).The consumption of animal protein especially from beef is becoming more difficult for most Nigerians in response to the high inflation rate and little disposable income. When meat and meat products are persistently excluded from meals, the human body drains its already scarce nitrogen reserves resulting in a negative nitrogen balance with attendant adverse effects on growth, reproduction, lactation, health and survival.

The production of West African Dwarf (WAD) sheep relative to their size is greater than that of cattle and they are better meat producers than N'dama cattle under comparable environmental and managemental conditions (Charray *et al., 1992)*. Therefore, it can be infered that the main bottleneck of livestock production in Nigeria is the inability of production to meet up with the demand due to rapid increase in population.

Small ruminants have received little attention towards breed improvement and commercialization so as to increase the intake of animal protein of Nigerians. Hamzat *et al.* (2003) reported that the sub optimal intake of animal protein in the developing countries has long been recognised while in some developed countries, more than 60g of animal protein is consumed per day.

However, it is noteworthy that feed constitutes 60 to 80% of the cost of animal production thus reducing the profit margin of the farmers. Therefore, it has become imperative that agro – industrial by products which are of no dietary importance to man be utilized for ruminants and monogastrics (Ogunmodede and Afolabi, 1978). Consequently, the purpose of this study was to develop a groundnut haulm supplementation strategy for smallholder farmers using locally available crop residues. The objective was to evaluate effects of GH on intake of CN hay and growth of rams. It was hypothesized that increasing levels of groundnut haulms would increase CN intake and would provide the nutrients necessary to improve digestibility and growth of sheep during dry season.

Materials and Methods

Management of Animals

Twelve WAD rams aged 6 months with similar body weight (18.47 ± 1.31 kg) were selected from the flock of sheep on the farm. The animals were dewormed using Albendazole and treated against ectoparasite using *Ivomectin* at the rate of 1ml/25kg body weight, thereafter, treated with Oxytetracycline 20% LA.

Three rations were formulated containing 100g/kg *Cynodon nlemfuensis* hay (GHO), 50g/kg *Cynodon nlemfuensis* hay and 50 g/kg groundnut haulms (GH50) and 100g/kg Groundnut haulms (GH100). The animals were fed *ad- libitum* between 0800 hours and 1400 hours while feed was offered in sufficient amounts twice daily. Fresh water was constantly available while salt lick was offered free choice.

Digestibility Determination

Digestibility of the feed was carried out by the feacal and urine collection method. Animals were weighed and penned in individual metabolic cages for fourteen days. There were 7 days of adaptation and 5 days of collection. The urine and feed collected were bulked together. During the last seven days, total feed refused (ort), feaces and urine were collected. Urine samples were frozen while feed and feacal samples were dried at 65^{o}C to constant weight, milled and stored in air- tight polythene bags. Parameters considered during the experimental period were: body weight gain, feed intake, feed refused (ort) and efficiency of feed.

Analytical and Statistical Procedures

Dried milled samples of feeds and feaces were analysed for their proximate compositions (A.O.A.C., 1980). Nitrogen contents of feeds, feaces and urine were determined by the Micro- Kjedhal technique. The parameters consireded are: moisture content, Crude Protein (CP), Crude Fibre (CF), Ether extract (EE), Ash and Nitrogen free extract (Nfe).

Data obtained were subjected to one – way analysis of variance using ANOVA procedure of S. A. S. (1990). Significant treatment means were compared using the Duncan Multiple Range Test of the same package.

Results and Discussion

Shown in Table 1 is the proximate composition of *Cynodon nlemfuensis* hay supplemented with groundnut haulms fed to WAD sheep.

Table 1: Proximate composition of *Cynodon nlemfuensis* hay supplemented with groundnut haulms fed to sheep

	Treatments		
Parameters	GHO	94.00	GH100
DM Intake(%)	91.00	10.88	90.00
Crude protein(%)	7.88	21.92	12.68
Crude fibre(%)	22.58	2.28	22.01
Ether extract(%)	2.23	14.28	2.10
Ash(%)	10.34		17.31

GH0 =100g/kg *Cynodon nlemfuensis* hay, GH50 = 50g/kg *Cynodon nlemfuensis* hay and 50 g/kg groundnut haulms and GH50 = 100g/kg Groundnut haulms

The result obtained for dry matter ranged from 90% to 94% . The overall mean DMI was approximately 4% of mean body weight of the experimental animals. The result agrees with 3 – 5% body weight as dry matter intake for ruminants (ARC, 1980 and Davendra, 1988). The DMI of 4% obtained in this study implies that replacement of *Cynodon nlemfuensis* hay did not have adverse effect on dry matter intake.

The CP of the dietary treatments ranged from 7.8 % to 12.7% for GH0 and GH100 respectively. The CP increased as the level of groundnut haulms in the diet increases. Hadjipanayiotu (1990) reported 74 – 75% of protein digestibility for goats fed concentrate supplement while Waghorn *et al. (*1990) obtained 63.3 – 84.1% for sheep fed concentrate with roughage. Values obtained in this study were lower than values of 47.5 – 53.4% reported by Mba *et al.*(1982) for goats fed a browse plant plus concentrate diet. The low values in this study may be due to the maturity rate of the grass. The dietary CP increased as *Cynodon nlemfuensis* hay was replaced with groundut haulms

which was in accordance with the report of Adu (1982) where DMI of lambs increased with increasing dietary levels of crude protein.

The CF content ranged from 21.9% to 22.5% for GH50 and GH100 respectively. GH0 had the highest value of all the fibre with GH100 and GH50 respectively. CF was highest in GH0 due to the maturity of the grass during harvesting. The CF obtained in this study was below 42.0 – 61.0% obtained by Getachew (1994) for sheep fed a maize stover diet supplemented with legume hay and cotton seed cake.

The EE decreased from 2.3% for GH0 to 2.1% for GH100 respectively. These values were lower than 49.2% reported when WAD goats were fed with forage and *Albizia samen* mixture.

The ash content of 17.3% was obtained in GH100, followed by GH50 and GH0 with 14.3% and 10.3% respectively. These values were greater than 6.8% reported by Aribido (1990) when *Samarea saman* were fed to White Fulani calves.

The Nitrogen Free Extract (NFE) ranged between 45.9% to 56.9%. GH0 had the highest value of all the NFE values followed by GH50 and GH100 respectively.

Table 2 shows the intake and digestibility of WAD sheep fed *Cynodon nlemfuensis* hay supplemented groundnut haulms

Table 2: Intake and nutrient digestibility of sheep fed *Cynodon nlemfuensis* hay supplemented with groundnut haulms

Parameters	GHO	GH50	GH100	SEM
Intake (kg)	24.97^{b}	39.57^{a}	28.86^{b}	±23.45
Weight gain (kg)	1.20	1.85	1.68	±0.32
Dry matter (%)	77.70	82.50	77.19	±0.67
Crude protein (%)	8.84^{b}	10.50^{ab}	11.58^{a}	±0.71
Ether Extract	2.03	2.02	2.09	±0.04
Crude fibre	21.39	22.09	20.84	±0.44
Ash	14.88^{b}	12.98^{c}	18.02^{a}	±0.82
NFE	53.86^{a}	52.41^{a}	47.47^{b}	±0.38

GH0 =100g/kg *Cynodon nlemfuensis* hay, GH50 = 50g/kg *Cynodon nlemfuensis* hay and 50 g/kg groundnut haulms and GH50 = 100g/kg Groundnut haulms, Nfe = Nitrogen Free extract

Animals on all the treatments had initial liveweight which ranged from 1.72 kg to 2.02 kg. Animals on GH100 had the highest initial live weight of 2.02kg followed by animals on GH0(1.80 kg) and GH50 had the least of 1.72kg. Animals on GH50 and GH100 gained more weight than GH0. Replacement of CN at 50g/kg did not suppress the digestibility values. Also, digestibilities of CP, CF, EE, Nfe and DMI increased as CN hay was replaced with GH. This could be adduced to the feed of these two groups which had GH and a mixture of both GH and CN hay .

DM values ranged from 77.70% (GH0) to 82.50% (GH50). On the metabolic weight basis, the mean dry matter was: 148.00g/day/kg $^{0.75}$ (GH0), 157.14g/day/kg $^{0.75}$ (GH50) and 146.90g/day/kg $^{0.75}$ (GH100). There were no significant differences (P≤0.05) between the treatment means. These values obtained were higher than those obtained by Lu and Potchioba (1990) which were 58.1g – 97.8g/day/Wkg $^{0.75}$. Similarly, Adeneye and Sunmonu (1994) recorded 65.3 – 68.88g/ day Wkg $^{0.75}$, while Adu and Osinowo (1989) obtained higher values of 114.19 – 133g/day/Wkg $^{0.75}$ for WAD lambs fed Gambia grass hay plus concentrate diets. The highest value obtained in this study in GH50 was probably due to high intake of the treatment diets.

CP values obtained ranged from 8.84% (GH0) to 11.53% (GH100). The mean values obtained in GH50 and GH100 were high because of the inclusion of groundnut haulms in these diets. There were no significant differences (P≤ 0.05) between the treatment means. Hadjipanayiotu (1990) recorded CP intakes of 192 – 238 d/day. Also, Anugwa (1990) who fed forages only to WAD sheep obtained 57.7g/day.

EE values ranged from 2.02(GH50) to 2.09 (GH100). The highest value in GH100 was a result of leguminous nature of groundnut. There were no significant differences (P≤ 0.05) between the treatment means.

The CF values varied from 20.84(GH100) to 22.09 (GH50). The highest value obtained in GH50 may be due to the inclusion of *Cynodon nlemfuensis* which is high in CF. There were no significant differences (P≤0.05) between the treatment means. Anugwa (1990) reported higher value of 20.93g/day/W$^{0.75}$ which was in agreement with this study. However, the values obtained in this study were at variance with values of 33.7 – 89.7g/day obtained by Adebowale *et al.* (1993).

The ash values ranged from 12.98 (GH50) to 18.02 (GH100). There were no significant differences (P≤ 0.05) between the treatment means.

Conclusion

The chemical characteristics of groundnut haulms and *Cynodon nlemfeuensis* hay were consistent with literature (Mosi and Butterworth, 1985). Savadogo *et al*.(2000) confirmed that groundnut haulms had a high crude protein content. Leng (1990) and Savadogo *et al*.(2000) reported that when ruminants are fed hay, intake is relatively low due to high fibre and low nitrogen content leading to insufficient nutrients to meet requirements of such animal. However, such deficiencies can only be met by supplementing hay with low levels of CP or non – protein nitrogen, such as groundnut haulms used in this study. Consequently, 50 – 80g/kg of groundnut haulms could be incorporated into diet of sheep for optimum weight gain and efficient nutrient utilization during dry season.

References

Adebowale, E. A., Taiwo, A. A. and Greenalgh, J. F. D. (1993). National survey of small ruminant production in Oyo State, Nigeria. In: A. O. Ayeni and H. G. Bosman (eds). Goats production system in the tropics. Production International Workshop, Ile Ife, Nigeria, 6 – 9 July, 1992.
Pudoc, Wageningen. Pg. 187 – 194.

AOAC (1990). Official method of analysis, Association of Official Analytical Chemists. Washington, D. C. 15th Edition.

Adeneye J A and E M Sunmonu (1994). Growth of male WAD sheep fed cassava waste or dried sorghum brewer's grain as supplements to tropical grass/legume forage. *Small Ruminant Research* 13:243-249.

Adu, I. F. (1982). Effect of energy and protein content on feed intake and nutrient utilization by Yankassa lambs. *Nigeria J. Anim. Prod*. 9: 90 – 95.

Adu, I. F. and Osinowo, O. A. (1985). Effect of dietary protein concentrate and feeding level on the performance of weaned lambs. *Nigeria Journal of Animal Production Research* 5: 46 – 56.

Agricultural Research Council (ARC 1980). The nutrients requirement of ruminant livestock, Commonwealth Agric. Bureau, Farhlam, England.

Anugwa, F. O. (1990). Feed intake, nutrient digestibility and nitrogen balance by sheep fed leaves of *Panicum maximum*, *Calopogonium mucunoides* and *Ficus elasticoides*. *Bull. Anim. Health Prod. Afri.* 38: 113 – 118.

Aribido, S. O. (1990). Intake and Digestibility of rain tree production. Samarea saman. JACQ by White Fulani calves. M.Sc. Thesis, Department of Animal Science, University of Ibadan. Unpublished.

Charray, J., Humbert, J. M. and Levif, F. J. (1992). Manual of sheep production in humid tropical Africa. C. T. A. Publication, Postbus 380, 6700. A. J. Wageningen.

Devendra, C. (1990). Goat and Sheep Production in the Tropics Intermediate Tropical Agricultural Series. Longman Scientific and Technical London Publisher. Pp 121 - 128.

Egbunike, G. N. (1997). What is animal science and how can Nigeria get out of malnourishment of livestock product. In A. D. Ologhobo, E. A. Iyayi, A. O. K. Adeshinwa, & A. M. Bamgbose (Eds.), *Proceedings of the 2nd Annual Conference of Animal Science Association of Nigeria* (pp. 1-12).

Getachew, G. and Bundstol, F. (1994). The effect of forage legumes supplementation on digestibility and body weight changes by sheep fed a basal diet of maize. *Anim. Feed Sci. and Tech*. 46: 97 – 108.

Hadjipanayiotu, M. (1990). Effect of grain on the performance of early weaned lambs

and kids. *Anim. Prod.* 51: 565 – 572.

Hamzat RA, Omole AJ, Oredein AO, Longe OG, (2003). Growth performance of African giant land snails (Archachatina marginata) fed dried kolanut testa and palm kernel cake mixture. African J. Livestock Exten., 2: 9–12.

Lu, C. D., and M. J. Potchoiba. 1990. Feed intake and weight gain of growing goats fed diets of various energy and protein levels. J. Animal Science 68: 1751

Mba, A. V., Manguis, A. and Awah, A. A. (1982). Influence of concentration supplementation with browse plant *Gliricidia sepium* on nutrient utilization and growth of the WAD (Fouta Djallon) kid. *Nig. Journal of Animal Production* 9(2): 63 – 73.

Mosi, A. K. and Butterworth, M.H.(1985). The voluntary intake and digestibility of combinations of cereal crop residues and legume hay for sheep. *Anim. Feed Sci. Technol.*, 12 (1985), pp. 241–251.

Leng, R. A.(1990). Factors affecting the utilisation of poor quality forages by ruminants particularly under tropical conditions. *Nutr. Res. Rev.*, 3 (1990), pp. 277–303.

Ogunmodede, B. K. and Afolabi, S. O. (1978). Replacements of Groundnut cake by Dried Poultry manure in the duets of laying hens. *Poultry Science* 19: 143 – 147.

Savadogo, M., Zemmelink, G. and Nianogo, A. J.(2000). Effect of selective consumption on voluntary intake and digestibility of sorghum (*Sorghum bicolor* L. Moench) stover, cowpea (*Vigna unguiculata* L. Walp.) and groundnut (*Arachis hypogaea* L.) haulms by sheep. *Anim. Feed SciTechnol.*, 84 (2000), pp. 265–277.

S.A.S (1999). Statistical analysis system. SAS Institute Inco. Raleigh. New Cary, USA.

Waghorn, G. C., Smith, J. F. and Ulyah, M. J. (1990). Effect of protein and energy intake on digestion and nitrogen metabolism in wether and ovulation in ewes. *Anim. Prod*. 51: 291- 300.