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Title: Performance of Ram Lambs Fed Varying Levels of Cowpea Husk and Tiger Nut Waste (*cyperus esculentus*) as Supplement to Sorghum Stover in Semi Arid Zone of Borno State. Nigeria

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Abstract

The study was conducted to evaluate the performance of ram lambs fed mixture of cowpea husk and tiger nut waste as supplement to sorghum stover. A total of twenty (20) non-descript ram lambs with an average body weight of 21.50kg were used for the study. Five (5) diets were formulated consisting of mixture of cowpea husk and tiger nut waste at ratios of 100, 75:25, 50:50, 25:75 and 100 for treatments 1,2,3,4 and 5 respectively.T1 (100% Cowpea husk) was the control. The animals were weighed randomly and allotted to the five (5) treatments with four (4) animals per treatment in a completely randomized design. The study lasted for 12 weeks. The result of the proximate composition revealed that tiger nut waste had the highest (17.86%) value of crude protein with the lowest (5.00%) recorded in sorghum stover. The highest (32.12%) value of crude fibre was recorded in cowpea husk with the lowest (20.15%) recorded in tiger nut waste. There were no significant (P>0.05) differences in the final weight of the animals. However, there were significant (P<0.05) differences in weight gain and feed conversion ratio between the treatments. Animals on T3 recorded the highest (7.50 kg) weight gain and best feed conversion ratio (16.22) while the least (3.62 kg) weight gain was recorded in T5. The study concluded that tiger nut waste could form part of the complete ruminants' diets at 50% level of inclusion.

Keywords: tiger nut waste, performance, ruminants

Introduction

Livestock farmers in developing countries are faced with various problems mostly during the dry season of the year. The inability of ruminant livestock farmers to feed their animals with high quality forages all year round remain the most widespread technical constraints facing ruminant animal productivity in the developing nation (Okoruwa and Edokpayi, 2014). Crop residues are invariably bulky, high in fibre, poorly degraded in the rumen, low in nitrogen and minerals resulting in very low intakes (Osuji *et al*., 1995). However, there are serious shortages of animal feeds of conventional type. The grains are required almost exclusively for human consumption with increasing demand for livestock products as a result of rapid growth in the world economics and shrinking land areas (Oladele *et al*., 2010), future hopes of feeding the animals and safeguarding their food security will depend on better utilization of unconventional feed resources which do not compete with human food. Ben Salem *et al*., (2004) also reported that most common crop residues (i.e. straws and stubbles) have low CP content, in the range of 2-5% on DM basis and this suggests a basic limitation in the value of some of the residues. Thus non-conventional feeds could partly fill the gap in the feed supply, decrease competition for food between humans and animals, reduce feed cost, and contribute to self-sufficiency in nutrients from locally available feed sources (Jakmola, 2005). To overcome these problems, attention

must be paid on the utilization of unconventional feedstuff like tiger nut (*Cyperus esculentus* L.*).* It is often cultivated for its nutritive edible nuts and, has high content of soluble glucose of 21% (Bamishaiye, 2012). In spite of the numerous health benefits of tiger nut as human diet, its prospect as energy source for poultry and livestock production has not been dealt into extensively. Thus the nutritive quality of tiger nut, its present position as weed as well as information on its inclusion in ruminant's diet, stimulated this study**.**

Key word; Tiger nut, Ruminant, performance,

Materials and Methods

Location

The study was conducted at the University of Maiduguri Teaching and Research farm of the Department of Animal Science. Maiduguri is located between latitude 11^0 5 and 12^0 North and longitude 13^005 and 14^0 East at an altitude of 353 m above sea level (Inuwa *et al.,* 2020). Maiduguri is a typical Semi arid environment. Diurnal temperature of $>35^0$C is not uncommon for most part of the year.

Experimental Design

Twenty (20) non-descript ram lambs weighed on average 21.50kg were used for this study. The animals were balanced according to their weight and divided into five (5) groups. Five experimental diets consisting of mixture of cowpea husk and tiger nut waste were formulated and used as supplement for the study. Sorghum Stover was used as basal diet. The experimental diets were fed to the animals at different ratios of 100, 75:25, 50:50, 25:75 and 100 in treatment 1,2,3,4 and 5 respectively with four (4) animals per treatment in a Completely Randomized Design (CRD). However, the five experimental diets that were formulated and designated were:

Experimental diets

T_1 = 100% Cowpea husk (control)
T_2 = 75% cowpea husk + 25% Tiger nut waste
T_3 = 50% cowpea husk + 50% Tiger nut waste
T_4 = 25% cowpea husk + 75% Tiger nut waste
T_5 = 100% Tiger nut waste (control)
*Sorghum Stover only was used as the basal diet.

Amount of feed offered to each group of sheep were recorded. Refusal were collected each day and weighed before next feeding. Total feed consumed was determined by difference. Fresh water and salt lick were offered *ad libitum.* Samples of the diets were taken for chemical analysis. Sheep were allowed a period of 7 days to adjust to the experimental diets, after which they were weighed once weekly. The study lasted for 12 weeks feeding and 2 weeks digestibility trials.

Chemical and Statistical Analysis

Feed samples were analyzed for Dry Matter (DM), Crude Protein (CP), Crude Fibre (CF), Acid Detergent fibre (ADF) and Neutral Detergent Fibre (NDF) AOAC (2005), Goering and Van Soest (1970) and Joslyn (1970) methods respectively. The data collected were subjected to analysis of variance procedures for a complete randomized design (Steel and Torrie, 1960) while means were separated at ($P<0.05$) using Duncan (1955) multiple range test.

Results and Discussion

The result of proximate composition of the experimental feed ingredients is shown in Table 1. Tiger nut residue had the lowest dry matter content of (89.15%). This could be due to high moisture content of the tiger nut. The value was similar to 89.60% reported by Belewu *et al*. (2007). Tiger nut waste had the highest (17.86%) crude protein content while the lowest (5.00%) was recorded in sorghum stover. The lower crude protein value obtained in sorghum stover could

be due to stage of maturity and varietal differences. This agrees with the findings of smith (1993) that most crop residues are low in crude protein which is below the minimum level of 7% crude protein required in forages to enhance voluntary intake, digestibility and utilization by ruminants. The crude protein value of tiger nut waste was higher than 14.19%reported by Singh *et al.* (2011).this could be attributed to the varietal differences. The values of crude fibre, NDF and ADF were all higher in cowpea husk compared to other feeds, indicating high fibre content of crop residues. The values of crude fibre and NDF were lower than 38.60 and 76.60% respectively as reported by Babu *et al*. (2014). This could be as a result of variety and stage of maturity. The nitrogen free extract content (50.00%) of sorghum stover was higher than (46.68%) reported by Babu *et al*. (2014). This could be attributed to the stage of maturity and sampling procedure.

Table1: Proximate Composition (%DM basis) of Feed Ingredients and Tiger nut Residue

Parameters	Sorghum stover	Cowpea husk	Tiger nut residue
Dry matter	93.00	90.50	89.15
Crude protein	5.00	12.72	17.86
Crude fibre	30.00	32.12	20.15
Ash	5.00	8.10	10.85
Ether extract	3.00	5.45	7.82
Nitrogen free extract	50.00	32.11	33.55
NDF	40.00	66.11	55.85
ADF	20.00	46.24	42.91

ADF- acid detergent fibre, NDF- neutral detergent fibre

The performance of ram lambs fed mixture of cowpea husk and tiger nut residue (TNR) as supplement to sorghum stover is shown in Table 2. The result reveals significant ($P<0.05$) differences among all treatment groups, the initial and final weights of the rams. Animals on all the treatment groups gained weight, indicating that, the diets had positive effect on the live weight performance of the sheep's. However, T3 was significantly ($P<0.05$) different from other treatments in the weight gain, feed conversion ratio and dry matter intake. The highest value of weight gain recorded by animals on T3 could be due to low feed conversion ratio and high dry matter intake compared to others treatment groups. The highest value (89g/day) was recorded by T3 and was higher than the value (53g/day) reported by Abil *et al.* (1992) when cotton seed cake and maize were replaced with wheat bran in the diet of sheep. The lowest feed conversion ratio value (16.22) was recorded in T3which revealed the ability of animals on T3 to convert feed consumed to weight gain. This could be to treatment effect which increase feed intake. The highest dry matter intake value (1480g/day) was recorded by animals on T3.The value was higher than value (1364g/day) reported by Belewu *et al*. (2007), and agrees with the report of Devant *et al*., (2000) who states that, dry matter intake is an important factor in the utilization of feeds by ruminants and is a critical determinant of energy and performance in small ruminants.

Table 2: Performance of Ram Lambs Fed Mixture of Cowpea Husk and Tiger Nut Residue as Supplement to Sorghum Stover.

	TREATMENTS					
Parameters	T1 (100% CH)	T2 (75%CH +25%TNW)	T3 (50%CH+50%TNW)	T4 (25%CH+75%TNW)	T5 (100%TNW)	SEM
Initial weight(kg)	22.00	21.50	21.00	21.25	21.75	4.29
Final weight(kg)	27.50	27.00	28.50	26.38	25.38	4.63
Weight gain(kg)	5.50^{b}	5.50^{b}	7.50^{a}	5.12^{b}	3.62^{b}	0.63
Ave. daily gain(g)	65.48^{b}	65.48^{b}	89.29^{a}	60.95^{b}	43.10^{b}	7.51
DMI (supple. g/day)	612.50^{b}	606.25^{c}	618.75^{a}	595.38^{d}	589.12^{e}	2.50
DMI(Basal diet g/day)	792.20^{b}	793.75^{b}	861.25^{a}	747.92^{c}	577.58^{d}	21.93
DMI(Total g/day)	1404.7^{b}	1400.0^{c}	1480.0^{a}	1343.3^{d}	1166.7^{e}	24.20
DMI (%BW)	1.96	1.93	1.93	1.96	2.18	0.14
FCR	24.65^{ab}	23.35^{ab}	16.22^{b}	23.47^{ab}	32.27^{a}	4.65

a,b,c,d,e= means in the same row with different superscript are significantly (P<0.05) different.CH-cowpea husk,TNW-Tiger nut waste,FCR-Feed Conversion Ratio, DMI-dry matter intake.SEM- standard error of mean.BW-Body Weight

Conclusion

The study concluded that tiger nut residue should form part of complete diets of ram lambs with better finishing weight and feed conversion ratio at 50% replacement.

References

AOAC (2005) *Official Methods of Analysis*. Association of Official Analytical Chemist. Washington, D .C. 15th Edition.

Babu, J., Kumari1, N. N., Reddy, Y. R., Raghunandan, T. and Sridhar, K. (2014). Effect of feeding sweet sorghum stover based complete ration on nutrient utilization in Nellore lambs. *Veterinary World 7*(11): 970-975.

Bamishaiye, E.J.and Bamishaye O.M (2012). Tiger nut: As a plant its derivatives and benefits. *African Journal of food and Agriculture, Nutrition and Development.*, 11, 5157-5170.

Belewu, M. A. and Abodunrin, O. A. (2008). Preparation of Kunnu from unexploited rich food source: Tigernut (*Cyperusesculentus*). *Pakistan Journal of Nutrition.* 7:109-111.

Belewu, M. A. and Belewu, K. Y. (2007). Comparative physcio-chemical evaluation of tiger-nut, soya bean and coconut milk sources. *International Journal Agriculture and Biology*. 9:785-787.

Belewu,M.A.,Orisameyiti,B.R. and Ajibola,K.A.,(2007).Effect of feeding Graded Levels of Tiger nut (*Cyperus esculentus*) Seed Meal on Performance Characteristics of West African Dwarf Goat.*Pakistan Journal of Nutrition* 6 (6):528-529.

BenSalem, H., Nefzaoui, A. and Makkar, H.P.S. (2004). Towards better utilization of non-conventional feed resources by sheep and goats in some African and Asian countries. In: Nutrition and feeding strategies of sheep and goats under harsh climates. Proceedings of the Ninth Seminar of the Sub-Network on Nutrition of the FAO-CIHEAM Inter-Regional Cooperative Research and Development Network on Sheep and Goats, Hammamet (Tunisia), 8-10 Nov 2001. pp. 177–187.

Inuwa, L., Adamu, S. B., Marte, U. M., Yusuf A. M. G., Tukur, M. A., and Danbaki, A. A. (2020). Replacement Value of Soya Bean Residue for Soya Bean Meal in the Diet of Broiler Finisher Chickens. *Nigerian Journal of Animal Science and Technology* 3(1):106-112

Jakmola, R. C. (2005). Evaluation of locally available feed and fodder to improve the quality and formulate the complete economic rations with high roughage diet. Final Reports (1999-2005) National Agricultural Technology Project, CSWRI, Avikanagar, 67 p.

Okoruwa, M.I. and Edokpayi, I.M. (2014) Evaluation of Energy Utilization and Haematological Indices of West African Dwarf Goats Fed Varying Levels of Yam Peels and Cowpea Husk. *Scholars Journal of Agriculture and Veterinary Science*. ***1(4A):255-259.***

Oladele, A.K.,Osundahunsi, F.O.and AdebowaleA.Y.(2010). Influence of Processing Techniques on the Nutrients and Anti-nutrients of Tiger nut (*Cyperus esculentus* L.).*World Journal of Dairy and Food Science*. 2010;2:88-93

Osuji, P.O., Fernandez-Riviera, S. and Odeyo, A. (1995). Improving Fibre Utilisation and Protein Supply in Animals Fed Poor Quality Roughages. ILRI Nutrition Research and Plans. In: Wallace, R.J. and A. Lahlou-Kassi (Eds)., Rumen Ecology Research and Planning, 1. *International Livestock Research Institute*, Addis Ababa, pp:1-22.

Singh,B.B.,Musa,A.,Ajeigbe,H.A. and Tarawali,S.A.,(2011).Effect of Feeding Crop Residues of Differeent Cereals and Legumes on Weight gain of Yankassa rams.International *Journal of Livestock Production*,2(2):17-23.

Smith,O.B.,(1993).Feed Resources for Intensive Small holder Systems in the Tropics:The role of Crop Residues.Proceedings of the XVII International Grassland Congress.18-21 February,1993.Rockhampton,Australia.

Steel, R.G.D and Torrie, J.H. (1980). Principles and procedures of Statistics. ABiometrical approach. 2nd ed.McGraw-Hill Book Co. New York, USA.