



Original article

Nutritional potentials of sugarcane peels meal on nutrients intake and digestibility of Yankasa sheep

G. Saleh^{a,*}, P. S.A. Maigandi^b

^a*Department of Agric. Education, Federal College of Education (Technical) Bichi, Kano State.*

^b*Department of Animal Science, Usmanu Danfodiyo University, Sokoto Nigeria.*

*Corresponding author; Department of Agric. Education, Federal College of Education (Technical) Bichi, Kano State.

ARTICLE INFO

ABSTRACT

Article history,

Received 06 January 2015

Accepted 20 February 2015

Available online 26 February 2015

Keywords,

Nutritional potential

Sugarcane peels

Nutrients intake

Digestibility and yankasa sheep

This study was conducted to evaluate the nutritional potentials of sugarcane peels on nutrients intake and digestibility of Yankasa Sheep. Twenty (20) male growing Yankasa lambs aged 12 – 18 months, with an average initial weight of 17.93kg fed four different diets containing sugarcane peels to replace cowpea husk at 0, 15, 30, and 45 %. The sheep were randomly allocated to the four different experimental diets in a complete randomized design (CRD) for a period of 90 days. Results of this experiment indicate that, nutrients intake of all the treatments are significantly the same ($P>0.05$). The result of the digestibility study indicated that there was no significant differences between all the treatment means in terms of dry matter, crude protein, crude fibre, acid detergent fibre, ether extract, ash and nitrogen free extract digestibility. Apparent digestibility of this study shows that, sugarcane peels can be fed in the diet of growing sheep up to 45% level.

© 2015 Sjournals. All rights reserved.

1. Introduction

Livestock production in Nigeria is still dominated by the extensive production system. Under the extensive production system, land area for grazing and feed availability is severe limiting factors in high livestock producing zones of Nigeria (Muhammad and Abubakar, 2004).

In northern Nigeria, the problem of feed shortage is more severe during the long dry season when animals subsist on very poor quality grass and crop residues, thus leading to very low level of performance (Steinbach, 1997). At this time, pastures are dry and lignified so that they alone cannot satisfy the maintenance requirement of livestock (Le Houerou, 1980). Furthermore, the competition for grains between humans and animals in Nigeria has led to a drastic drop in the annual output of feed mills which produce supplementary feeds for livestock (Alawa and Umunna, 1993). During the dry season, the feeding value of the forage falls. Its digestibility, energy, protein and minerals contents all become low (Gatenby, 1991).

Proper nutrition is necessary for optimum livestock production. Unfortunately, there is shortage of forage supply in the north-western region of Nigeria. This is associated with rainfall distribution pattern of the area. The rainy season is very short (last between June and September). The average rainfall in the region is less than 750mm per annum (Ruthenberg, 1980). Animals gain weight during the wet season when good quality pastures are available. They however start to lose weight during the dry part of the year when pastures start to dry off. As the dry season progresses the pastures become rarely available and where they exist, are often of very low quality (Oyenuga, 1968; Steinbach, 1997). In this situation the search for alternative feed ingredient which is cheaper, available and easier to process is of paramount importance. One of such feed ingredients is sugarcane peels.

Ochepo et al (2012) recommend the inclusion of sugarcane peels in the diets of goats up to 40% without any significant effect. The sugarcane peels is almost available during the dry season. This is a waste obtainable from sugarcane; up till now it has not been used for any purpose. The peels are dumped in the waterways causing environmental havoc by blocking drainage. In addition, the streets become unclean and burning it cause additional environment pollution by adding to the global warming. In view of this, the utilization of sugarcane peels in the diets of ruminants will drastically reduce the above captioned problems as well as reducing the problem of feed scarcity especially during the dry season.

The aim of this study is to find out the nutritional potentials of sugarcane peels on intake and nutrients digestibility by sheep.

2. Materials and methods

Experimental location

This study was conducted at the Federal College of Education (Technical) Bichi, Department of Agricultural Science, Livestock Farm. The Farm is located within the College at about 40km west of Kano city in Bichi Local Government Area of Kano State. Kano is located within longitude 80E and 90E and latitude 120N and 130N in the semi-arid zone of North-western Nigeria. The area has two distinct seasons, a wet season (May – September) and dry season (October - April) with annual rainfall of 787mm and 980mm. KNARDA (2001).

Experimental animals and their management

Twenty (20) lambs used in the experiment were purchased from Bichi market, Kano State. The animals were quarantine in the College Farm, Department of Agricultural Science, Federal College of Education (Technical) Bichi, Kano State for two weeks, dewormed with Banmith II® (12.5mg/kg body weight), sprayed with Triatic® against extoparasite and treated with oxytetracycline HCl (a broad spectrum antibiotic). Prior to the experiment, the animals were managed intensively and group-fed with cowpea hay and wheat offal.

Experimental feed preparation

sugarcane peels

The principal ingredient for the experimental feed is sugarcane peels which was collected from the selling points within the metropolitan area of Kano State. The peels were sun dried on a floor for a period of 3 – 4 days depending on sunlight intensity and finally milled with a hammer mill to produce sugarcane peels meals.

Other feed ingredients

Other feed ingredients for the preparation of the feed include the following: groundnut haulm, cowpea husk, bone meal, wheat offal, and maize, cotton seed cake and salt, which were purchased from Kano metropolitan market.

Experimental diet formulation

Four complete experimental diet were formulated using varying levels of sugarcane peels to replace cowpea husk at 0(control), 15, 30, and 45% inclusion levels (Table 1.). The four experimental diets were used to feed twenty (20) growing lambs. The diets were designated as diets 1, 2, 3, and 4 representing experimental treatments.

Table 1

Composition of the Experimental Diets containing varying level of sugarcane peels.

Ingredients (%)	Experimental Treatments			
	1	2	3	4
Sugarcane Peels	0	15	30	45
Cowpea Husk	45	30	15	0
Maize	2	2	2	2
Cotton Seed Cake	32	37	42	47
Wheat Offal	10	5	5	2
Groundnut Haulm	10	10	5	3
Salt	0.5	0.5	0.5	0.5
Bone Meal	0.5	0.5	0.5	0.5
Total	100	100	100	100
CP	16.43	16.13	16.35	16.25
CF	28.41	29.74	29.68	31.36

Experimental design and feeding procedure

A Completely randomized design (CRD) (Steel and Torrie, 1980) was use in this experiment with number of animals representing replication and graded levels of sugarcane peels representing treatments. Five (5) animals were allocated to each treatment and were balanced for weight. Each animal was housed in a pen measuring 2m x 1m x 2m, which was previously disinfected. Each group was assigned to one of the experimental diets and fed ad libitum in the morning and evening for 90 days. Water and salt lick were also offered ad libitum.

Data collected

Daily feed intake was kept for the whole 90 days feeding trial.

Metabolism trial

At the end of the feeding trial, metabolism study was conducted using three (3) animals from each treatment. The animals were fed the same experimental diets used for the feeding trial. The trial lasted for twenty one (21) days (14 days for adaptation and 7 days for collection of faeces). Daily feed intakes were kept. Harness bags were used to collect the faecal output. Total faecal output from each animal was recorded daily and 5% of it was oven-dried at 80oC for dry matter determination and proximate components determination.

Sampling and analytical procedure

Thoroughly mixed representative samples of the experimental diets, and faeces were analyzed for proximate composition as outlined by the Association of Official Analytical Chemist (AOAC, 1990).

3. Results

Nutrients intake by growing yankasa lambs fed sugarcane peels

Results on nutrients intake by growing lambs fed sugar cane peels were shown in Table 2. It can be observed that crude protein intake did not differ significantly ($P>0.05$) between treatment means. Crude protein intake as % dry matter intake differed significantly ($P<0.05$) between treatments; with treatment 1 (16.43 g/day) having the highest value compared to treatment 4 (16.28 g/day) with the lowest value.

Table 2
Nutrient Intake by Growing Lambs fed Sugar cane Peels.

Parameters%	Treatment (Graded levels of Sugarcane Peels)				LSD
	(0)	(15)	(30)	(45)	
Crude protein Intake (g/day)	140.79	146.05	137.48	133.01	13.55
Crude protein intake as % dry matter Intake (g/day)	16.43 ^a	16.13 ^d	16.35 ^b	16.28 ^c	
Crude fibre intake (g/day)	232.53 ^b	269.29 ^a	249.57 ^{ab}	256.35 ^{ab}	25.58
Acid detergent fibre intake (g/day)	316.33 ^b	350.05 ^a	324.34 ^{ab}	333.11 ^{ab}	31.87
Ether Extract intake (g/day)	290.38 ^c	606.32 ^a	407.82 ^a	442.84 ^a	40.23
Ash intake (g/day)	88.31 ^b	104.22 ^b	822.37 ^a	86.87 ^b	17.78
Nitrogen free extract intake (g/day)	355.13 ^a	326.42 ^{ab}	300.84 ^b	296.67 ^b	32.06

Means in the same row with different super scripts are significantly different ($p<0.05$).

No significant differences ($P>0.05$) were recorded in crude fibre intake (CFI) between treatment 2, 3 and 4 with treatment 2 having the highest value of 269.29 g/day and treatment 1 recording the lowest value (232.53 g/day). However value in treatment 1 (232.53 g/day) is significantly lower ($P<0.05$) compared to that of treatment 2 (269.29 g/day). Similar trend was observed in the values of Acid detergent fibre intake (ADFI). Ether extract intake (EEI) in treatment 2, 3 and 4 are the same ($P>0.05$) while significantly the lowest value was recorded in treatment 1. Ash Intake was not significantly different ($P>0.05$) between treatments 1, 2, and 4 while significantly the highest value was recorded ($P<0.05$) in treatment 3 (822.37 g/day). Nitrogen free extract was not significantly different ($P>0.05$) between treatments 2, 3 and 4 while significantly the highest value was recorded ($P<0.05$) in treatment 1 even though it similar ($P>0.05$) with treatment 2.

Nutrients digestibility by growing yankasa lambs fed sugarcane peels

The result shows that, nutrient digestibility by growing Yankasa sheep fed varying levels of sugarcane peels. From table 3 it can be seen that dry matter, crude protein, crude fibre, acid detergent fibre, ether extract ash and nitrogen free extract digestibility did not differ significantly ($P>0.05$) between treatments.

Table 3
Nutrient Digestibility of Growing Sheep Fed Sugar Cane Peels.

Parameters%	Treatment(Graded Levels Of Sugarcane Peels)				LSD
	1	2	3	4	
DM Digestibility	53.65	59.97	48.11	48.39	12.97
CP Digestibility	50.49	57.49	44.73	50.99	22.44
CF Digestibility	50.56	57.49	44.73	49.41	14.89
ADF Digestibility	50.56	57.48	43.83	45.74	16.2
EE Digestibility	50.56	57.53	44.74	45.74	13.62
Ash Digestibility	50.56	57.49	44.74	46.83	13.49
NFE Digestibility	50.57	57.5	44.74	45.74	13.62

4. Discussion

Results of this experiment indicate an increase in nutrients intake with increasing levels of sugarcane peels in treatment 2 even though treatment 3 and 4 has a lower nutrients intake compared to treatment 2 but all the treatments are significantly the same ($P>0.05$). Variations in nutrients intake between all the treatments could be as a result of individual differences among the experimental animals. One possible reason for this is that, the animals were obtained from different sources with possible differences in management system. This has led to individual animal differences as regards to their adaptation to the feeding conditions, even though measures were taken to eliminate these differences at the beginning of the experiment. Payne (1990) and Lynch et al. (1992) had earlier reported that individual variation affects the rate of feed intake in sheep and other ruminates.

The result of the digestibility study indicated that there was no significant differences between all the treatment means in terms of dry matter, crude protein, crude fibre, acid detergent fibre, ether extract, ash and nitrogen free extract digestibility. Therefore, this study tends to point to the fact that, sugarcane peels does not affect the nutrients digestibility. This study could be related to the study of Preston et al , (1976) when they used chopped sugarcane to feed sheep and was found to be 60-70% digestible similar observation was made by the report of Bawala et al. (2008) on the sheep performance on sugarcane tops was highest when *Lucaena leucocephala* foliage was included at 25% in the diet. McDonald et al. (1988) also indicated that fibre fraction of a food as well as the species of animal concerned has the greatest influenced on digestibility.

5. Conclusion

This study indicated that, sugarcane peels quality and its positive effects on the nutrients intake and digestibility of growing lambs is an indication of its potential as an alternative feed ingredient for sheep. Therefore, inclusion of sugarcane peels in the diets of ruminants will reduce the cost of livestock production in Nigeria.

Recommendations

Finally, it is recommended that sugarcane peels could be incorporated into the diet of sheep up to 45% level without significantly affecting performance. For best economic returns the inclusion rate should be up to 45%. Results of such experiments could be used to formulate cheaper feed packages to be used as supplement for sheep and other ruminants especially during the long dry seasons. And also the result of the experiment could be used to reduce the additional unemployment in Nigeria by providing job opportunities for our teaming Youth.

References

- Alawa, J.P., Umunna, N.N., 1993. Alternative Feed Formulation in the Developing Countries: Prospects for Utilization of Agro-Industrial by-products. *J. Anim. Product. Res.*, 13(2), 63 – 98.
- AOAC., 1990. Association of Official Analytical Chemists. Official Method of Analysis (15th ed) Vol. 1 Arlington, Virginia, USA.
- Bawala, T.O., Aina, Onwuka, C.F.L, Oni, A.O., Adebisi, Y., Alli, M.A., 2008. Studies on performance of sheep fed sugarcane *saccharum officinarum* tops supplemented with varying level of *Leucacna Leucocephala* Foliage: In

- Animal Agriculture Towards Millennium Development in Nigeria. Proc. Anim. Product., Ayetoro, Nigeria, PP 575-578,
- Gatenby, R.M., 1991. *The Tropical Agriculturist: Sheep*. Macmillan, Malaysia.
- (KNARDA, 2001). Kano Agricultural and Rural Development Authority Metrological Station Reports. Temper. Rec. Book Manag. Unit. No. 11-3
- Le Houerou, H.N., 1980. Chemical composition and Nutritive Value of Browse in Tropical Africa. Proceeding of International Symposium on Browse in Africa, Addis Ababa, Ethiopia INTRA – ITOVIC, France.
- Lynch, J.J., Hinch, G.N., Adams, D.B., 1992. *The Behaviours of sheep. Biological Principles and Implication for production*, C.A.B. International Wallington Oxon.
- McDonald, P., Edward, R.A., Greenhalgh, J.F.D., Morgan, C.A., 1988. *Animal Nutrition* (5th ed.), Longman, Malaysia.
- Muhammad, I.R. and Abubakar, S.A. (2004). Establishment and Management of sown Pasture: Forage Production and management in Nigeria (A Training Manual) Nat. Anim. Product. Res. Institut., shika A.B.U Zaria Pp 11-17
- Ochepo, C.O., Ochepo, G.O., Ayoade, J.A., 2012. The Utilization of Complete Diet Containing Sugarcane Peels By Goats. In: Sustainable Animal Production for National Food Security and Poverty Alleviation. Proc., 37th annual conference of the Nigerian Society for animal production. Univ. Agr., Makurdi, March 18-21, 2012, pp. 507 – 511.
- Oyenuga, V.A., 1968. *Nigeria's Food and feeding stuffs. Their chemistry and Nutritive value*. Ibadan University Press, Ibadan, Nigerian.
- Payne, W.J.A., 1990. *An introduction to Animal Husbandry in the tropic* (4th edition). Longman Singapor Publishers.
- Preston, T.R., Carcano, C., Alvarez, F.J., Gutierrez, D.G., 1976. Rice Polish as a Supplement in Sugarcane Diet: Effect of level of Rice Polishing and Processing the Sugarcane by Derid. Chopp. Trop. Anim. Product., 1, 150-163.
- Ruthenberg, H., 1980. *Farming System in the Tropics*. Clarendon Press Oxford, Britain.
- Steinbach, J., 1988. Sheep and Goats: Their Relative Potential for Milk and Meat Production in Semi – Arid Environments. In *Increasing Small Ruminants Productivity in Semi – Arid Areas*. ICARDA, Netherlands.
- SAS., 1988. *Statistical Analysis system (SAS/STAT) User's Guide Release 6.03 ed.* Statistical Analysis system institute Inc Cary NC., pp 549-640.