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EVALUATION OF GROWTH PERFORMANCE OF YANKASA LAMBS FED SUGARCANE PEELS: AN AGRICULTURAL ENTREPRENEURSHIP PROGRAMME FOR NATIONAL DEVELOPMENT.

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ABSTRACT

This study was conducted to evaluate the nutritional value of sugarcane peels. Randomized Complete Design (RCD) was used in this experiment. Ninety (90) days were used for feeding trial using (20) growing Yankasa lambs. Four different diets were formulated containing sugarcane peels to replace cowpea husk at 0, 15, 30, and 45 %. Inclusion of sugarcane peels in the diet of growing sheep up to 45% level did not adversely effect (P>0.05) performance. Such inclusion level led to decrease in the cost of feed/kg live–weight gain. However, animals on 15% sugarcane peels diet were better compared to other treatments in terms of weight gain but in terms of cost of production, animals on 45% sugarcane peels diet were the best for economic return. Therefore, it concluded that the use of sugarcane peels in the formulation of ruminant feeds would adversely reduce the cost of conventional feeds as well as urban solid waste, which is polluting our environment in terms of air (when sugarcane peels were burn) and blocking our water waste (Drainage). In view of this, it was recommended that, sugarcane peels could be included in the diet of growing _Yankasa lambs without adverse effect on performance. Therefore, entrepreneurs should use sugarcane peels as raw materials for the manufacture of Animals' feeds in order to utilize its potentials.

INTRODUCTION

The escalating cost of conventional feedstuffs has necessitated the search for cheap alternative feed resources that can meet the nutritional needs of livestock. Such feedstuff should have the advantage of cost as well as poses very low human food preference to eliminate competition between man and animals (Obioha, 1992). To alleviate the problems associated with feeding, using different unconventional feeds in the right proportion can reduce the high cost of feeds. The uses of residues and agro-industrial by-products as supplements are becoming increasingly popular in Nigeria. The suitability of grain offal and crop residues in feeding ruminant is also

well documented (Louca, 1982). Ration could be formulated from offal and crop residues for use as supplements instead of the conventional concentrate. The sugarcane peels are almost available throughout the year but more available during the dry season of the year. This is a waste obtainable from sugarcane; up till now it has not been used for any purpose. It is being dumped in the water ways causing environmental havoc by blocking drainage. In addition, the streets become unclean and burning it can cause additional environmental 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. Sugarcane peels is a waste product obtained when the cane is being processed for chewing. The peels are obtained from peeling of the sugarcane stem with a sharp knife. This exposes the inner tissues of the cane and gives easier access to the underlying, soft parenchyma tissue, which contains the juice. The peels consist of soil particles, wax pigments, fibrous materials and some of the underlying parenchyma cells (Ayoade, 2007). So far no work has been done about the quantity of sugarcane peels but there is much availability of sugarcane peels more especially during the dry season (October – February) in northern Nigeria because sugarcane is chew locally and the peels are thrown everywhere when the sugarcane was processed locally by peeling. (Ayoade, 2007) identified two methods of local processing of sugarcane as scraping and peeling.

Experimental Location

The study was conducted at the Federal College of Education (Technical) Bichi, Department of Agricultural Education, 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 the general area demarcated by the lines of longitude 8^0E and 9^0E and latitude 12^0N and 13^0N in the semi-arid zone of northwestern Nigeria. The area has two distinct seasons, a wet season (May – September) and dry season (October - April) with annual rainfall of 787mm and 980mm. (Kano Agricultural Development Authority, KNARDA, 2001)

Experimental Animals and their Management

Twenty (20) male lambs used in the experiment were purchased from Bichi market, Kano State. The animals were quarantine in the College Farm, 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

The principal ingredient for the experimental feed was sugarcane peels 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 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 (Table3.1). 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.

Experimental Design and Feeding Procedure

A Randomize Complete Design (RCD) (Steel and Torrie, 1980) was used 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 and weekly live weight changes of the animals were also taken. Prior to weighting feed were withdrawn at least 6 hours before the weighing

Statistical Analysis

SAS (1988) Software was used in the statistical analysis of the data and LSD was used in the separation of mean.

Results of Experiment

Proximate Composition of Experimental Diets and Test Ingredients

Table 1 shows the proximate composition of the experimental diets and test ingredients fed to growing lambs. The dry matter (DM) contents of the experimental diets varied between 93 and 95%. Crude protein (CP) content was higher for treatment 1 (16.43%) and lower for treatment 2 (16.13%) while crude fibre (CF) content increased from treatment 1 (28.41%) to treatment 4
(31.36%) which means that CF content increase as the level of sugarcane peels increased in the diet. Acid detergent fibre (ADF) followed similar trend. Ether extract (EE) is higher in treatment 2 (6.63%) and lower in treatment 1 (2.39%). Ash content followed the same pattern with the EE. Nitrogen free extract (NFE) was higher in treatment 1(41.46%) and lower in treatment 3 (35.77%).

Table1: proximate Composition of the Experimental Diets

Parameters %	Treatments (Graded levels of sugarcane peels) (0)	(15)	(30)	(45)
Dry matter (DM)	95.41	94.67	95.00	93.72
Crude Protein (CP)	16.43	16.13	16.35	16.25
Crude Fibre (CF)	28.41	29.74	29.68	31.36
ADF	36.93	38.66	38.58	40.77
Ether Extract (EE)	3.39	6.63	4.85	5.42
ASH	10.31	11.51	9.78	10.63
NFE	41.46	36.05	35.77	36.31

Growth Performance by Growing Yankasa Lambs Fed Varying Levels of Sugarcane Peels.

Table 2 shows the growth performance per kg live weight gain by growing Yankasa lambs fed varying levels of sugarcane peels. From the table it can be seen that feed intake and Average daily gain (ADG) were not significantly affected (P>0.05) by the inclusion of sugar cane peels in the diets of the lambs. However, dry matter intake was significantly higher (P<0.05) in treatment 2 (905.47 g/day) compared to that of treatment 4 (817.05 g/day) whose value did not differ significantly (P>0.05) between other treatment means. Dry matter intake as % body weight was significantly higher (P<0.05) in treatment 1 (92.78 g/day) compared to treatments 2 (2.58 g/day) and 4 (2.49 g/day) whose values did not differ significantly (P>0.05) between that of treatment 3 (2.61 g/day). Feed efficiency in treatment 1 (0.17) did not differ significantly (P>0.05) between those of treatment 3 (0.19) and 4 (0.2) whose values also did not differ significantly (P>0.05) between that of treatment 1.

Table: 2. Growth Performance by Growing Lambs fed Sugar Cane Peels

Parameters %	Treatments (Graded levels of Sugarcane peels) (0)	(15)	(30)	(45)	LSD

Average Initial weight (kg)	17.98	17.88	17.90	17.96	
Average final weight (kg)	30.78	35.08	32.3	32.96	
Feed intake (g/day)	897.8	956.47	723.1	867.8	253.76
Dry matter intake (DMI) (g/day)	856.93^{ab}	905.47^{a}	840.87^{ab}	817.05^{b}	83.17
Average daily gain (g/day)	142.22	191.11	160.00	166.67	350.78
Dry matter intake as % body weight (g/day)	2.78^{a}	2.58^{b}	2.61^{ab}	2.49^{b}	2.37
Feed efficiency	0.17^{b}	0.21^{a}	$0.19.^{ab}$	0.20^{ab}	0.04

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

Cost of Production by Growing Yankasa Lambs Fed Varying Levels of Sugarcane Peels.

Cost of feed consumed decreased significantly (P<0.05) as the level of sugar cane peels increased in the diets from 38.77 naira in treatment 1 to 18.06 naira in treatment 4. Cost of feed per kg live-weight gain was significantly lowest (P<0.05) in treatment 4 (112 .74) compared to the rest of the treatment means while significantly the highest (P<0.05) value was recorded in treatment 1 (274.58). However, values from treatments 2 and 3 did not differ significantly (P>0.05) between each other.

Table 3: Cost of Production by Growing Lambs fed Sugar Cane Peels

Parameters %	**Treatments (Graded levels of Sugarcane peels)**				**LSD**
	(0)	**(15)**	**(30)**	**(45)**	

*Cost of Feeds/kg diet (N)	43.19	35.51	28.74	21.43	-
Cost of feed consumed/day (₦)	38.77^{a}	33.96^{b}	25.42^{c}	18.60^{d}	3.26
Cost of feed/kg Live weight gain (₦)	274.58^{a}	180.81^{b}	161.35^{b}	112.74^{C}	38.65

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

**Feed cost/kg was calculated on the bases of prevailing market prices of ingredients as at November, 2007 ($1Dollar = ₦128.00)*

DISCUSSION

Proximate Compositions of Experimental Diets

Characteristics of the experimental diets results on proximate composition showed that crude protein content (16.13 - 16.43%) of the experimental diets were within the values of 15 - 18% recommended by ARC (1990) for growing sheep. Bawala *et al.* (2008) reported 8.76 – 17.82% CP levels when they replaced sugarcane tops (grass) with *Leucaena leucocephala* foliage in the diet of growing sheep. The slightly decreasing level of CP as the level of sugarcane peels increased in the diets might be compensated by the increasing level of ether extract as the level of sugarcane peels increased. Crude fibre (CF) increased as the level of sugarcane peels increased in the experimental diets. However, EE, CF and NFE values obtained from the present study were comparable to the report of Muhammad, (2006).

Performance Characteristics of the Experimental Animals

Results of this experiment indicate an increase in feed intake with increasing levels of sugarcane peels in treatment 2 even though treatment 3 and 4 had a lower feed intake compared to treatment 2 but all the treatments are significantly the same (P>0.05). Variations in feed 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 (1992) had earlier reported that individual variation affects the rate of feed intake in sheep and other ruminants. This experiment also indicated that, the average daily gain (ADG) of 199.11g/day obtained for animals on 15% sugarcane peels diet was better than the ADG of 90.58 g/day

reported by Bawala *et al.* (2008) when they replaced sugarcane tops (grass) with *Leucaena leucocephala* (legume) foliage. Maigandi *et al.* (2002) reported an ADG of between 68 and 93g/day when they replaced fore-stomach digesta (FSD) with cowpea husk in the diet by growing sheep. The lower value of ADG exhibited by animal on treatment 1 (0% sugarcane peels diet) could be associated with high level of cowpea husk (45%) and low fibre content of the treatment compared to others. The 45% cowpea husk level was above the 30% reported by Maigandi (2001) when he used cowpea husk as a replacement for fore-stomach digesta. The author found out that weight gain starts to decrease when the level of inclusion exceeded 30% in the diet of growing sheep. Likewise Mc Donald *et al*. (1988) reported that sheep and other ruminant poorly utilize low fibre diets. Another explanation for the relatively good ADG at 15% inclusion level of sugar cane is probably the level of crude fibre content might be the most acceptable level for growing sheep. Also the Average daily gain (ADG) recorded for this experiment (142 – 191g/day) is comparable to what had been reported for conventional feed ingredients. For example, Adu and Brinkman (1981) reported ADG value of 78 - 183g/day when they fed fatten sheep with varying levels of guinea corn and *Digitaria smutsii* hay as source of roughage. The decrease in DM intake from treatment 3 (30% sugarcane peels diet) to treatment 4 (45% sugarcane peels diet) is an indication that 15% of sugar cane peels in the diet might be the optimum level of inclusion.

Results on economics of incorporating sugarcane peels in the diets of growing lambs in this study indicated that cost of feed per kg live – weight gain was lowest (N112.74) at 45% inclusion level of sugarcane peels followed by 30% inclusion level of the sugarcane peels (N161.35) and then 15% level (N180.81). Thus, the control diet (0% sugarcane peels diets) is more expensive (N274.58) in terms of cost compared to other treatments. The results of the present study indicated that once sugarcane peels are included in the diet of growing sheep even at 15%, the cost of feed per kg live weight gain will be significantly reduced. It is evident, therefore, that the use of unconventional feeds can reduce the cost of livestock production. Similar observations were made by Maigandi *et al*. (2002) when they used fore-stomach digesta in the diet of growing sheep and Muhammad, (2006) when he used rice milling waste in the diet of growing sheep.

Conclusions

The sugar cane quality and its positive effects on the performance of growing lambs is an indication of its potential as an alternative feed ingredient for growing sheep. Furthermore, the sugarcane peels are waste obtainable from all the peeling centers free of charge. Therefore, it inclusion in the diets of ruminants will reduce the cost of livestock production and reduce urban solid waste which is polluting our environment in terms of air (when burnt) and blocking our water ways (drainage).

Recommendations

Finally, it is recommended that sugarcane peels could be incorporated into the diet of growing 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 by the

entrepreneurs to formulate cheaper feed packages to be used as supplement for sheep and other ruminants especially during the long dry seasons.

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