



Performance And Nutrients Intake Of Fattening Kano Brown Buck Goats Fed Diets Containing Sugarcane Peels Meal

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ABSTRACT

This study was conducted to evaluate the performance and nutrients intake of fattening Kano brown buck goats fed diets containing sugarcane peels meal. Sixteen (16) Kano brown buck goats aged between 12 – 18 months, with an average initial weight of 17.55 – 17.83kg fed four different diets containing sugarcane peels meal to replace wheat offal at 0, 25, 50, and 75 % replacement levels. The bucks were randomly allocated to the four different experimental diets in a complete randomized design (CRD) for a period of 90 days. The data generated were subjected to analysis of variance (ANOVA) using SAS (2007) software. Results of this experiment indicate that, average daily gain of the experimental animals did not differ significantly ($P>0.05$) between treatments while the average daily feed intake differ significantly ($P<0.05$). However, no significant differences ($P>0.05$) were recorded in feed conversion ratio between treatments which shows the indication that the diets were better utilized by animals. Moreover, nutrients intake of all the treatments are significantly affected ($P<0.05$) except ash which is not significantly ($P>0.05$) affected. The result of fattening performance and nutrients intake of Kano brown goats bucks fed sugarcane peels meal containing diets indicated that incorporation of sugarcane peels meal up to 75% as replacement of wheat offal is an indication of its potential as an alternative feed ingredient for goats. Therefore, inclusion of sugarcane peels in the diets of ruminants will reduce the urban solid waste and improve livestock production. Also the result of the experiment could be used to improve sugarcane production and additional job creation in Nigeria.

Keywords: sugarcane peels meal, fattening performance, nutrients intake, Kano brown buck goats and wheat offal.

INTRODUCTION

The goat population in Nigeria makes it the second most important livestock species. Thus, with a population of 34.5 million goats in the country, only India could be said to possess more goats than Nigeria in the tropics and the sub tropics. Goat contributes to the sustenance of small holders and landless rural poor. They also produce meat, milk, fibre, skin and manure (Adu and Ngere, 1979). The Nigerian breeds of goats are Sokoto red, Sahel or Desert goat, and West African Dwarf Goat (WAD). The Sokoto Red (Maradi) carries about the half of the total goats' population in Nigeria and it is believed that Kano brown goats is said to be a strain of the Sokoto red goats.

Recent researches revealed that feeds constitute about 75 - 80% of the cost of livestock production in Nigeria. For ruminant animals there are inadequate availability of conventional pastures and very expensive industrial feed by-products such as wheat offal and cotton seed cake. LeHouerou (1980) reported that in North-western Nigeria, the problem of feed shortage is severe especially during the long dry season (about 8 months in a year); during which animals subsist on very poor quality grass and crop residues, thus leading to very low levels of performance. At this time, pastures are dry and highly lignified, and cannot satisfy even the maintenance requirements of livestock.

Saleh (2015) reported that Sugarcane peels produced in Nigeria are much available during the dry season (October – February) in Northern Nigeria where sugarcane is chewed locally and the peels are thrown everywhere when the sugarcane is being processed locally by peeling. Sugarcane peels can become environmental pollutant if left around street as waste without any utilization. These peels contribute to the excessive accumulation of urban solid waste; they block streets and water ways making them dirty and when set on fire, they can cause air pollution which constitutes environmental hazards such general discomfort, acute respiratory illness and possibly leading to death. In this situation the search for alternative feed ingredient which is cheaper and easier to obtain as well as easier to process becomes of paramount importance. The use of sugarcane peels as feedstuff during the dry season will help in reducing the problem of feed shortage especially in the Northern part of the country where the sugarcane peels are available and utilized at the period. According to Ayoade *et al.* (2007) exploitation of cheap feed resources for animal production would lower the market price of animals and their products in Nigeria. Saleh (2015) recommended that sugarcane peels could be incorporated into the diet of growing goats up to 75% as inclusion level to replace maize bran without significantly affecting performance.

MATERIALS AND METHODS

Experimental location

Feeding trial was conducted at the Federal College of Education (Technical) Bichi, Department of Agricultural Education, Teaching and Research Farm, 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 (KNARDA, 2001).

Experimental animals and their management

Sixteen (16) Kano brown goat bucks used in the experiment and were purchased from Bichi market, Kano State. The animals were quarantine in the College Farm, for two weeks, vaccinated with *PPR* vaccine and given prophylactic treatment with Avomec® against *endo* and *exto* parasites and also treated with oxytetracycline HCl (a broad spectrum antibiotic). Prior to the experiment, the animals were managed intensively and group-fed with groundnut haulm and wheat offal.

Experimental feed preparation

The principal ingredient for the experimental feeds is sugarcane peels which was collected from the selling points within the Bichi local government 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 include the following: wheat offal, rice offal, groundnut haulm, cowpea husk, cotton seed cake, Sorghum Stover, bone meal and salt which were purchased from Kano and Bichi markets.

Experimental diet formulation

Four complete experimental diet were formulated using varying levels of sugarcane peels to replace wheat offal at 0(control), 25, 50, and 75% inclusion levels as presented (Table 1 and Table 2 presents Proximate analysis of sugarcane peel meals based diets fed to fattening Kano brown goats). The diets formulated were balanced according to recommendations by NRC (1994). Four experimental diets were used to feed sixteen (16) fattening bucks. The diets were designated as diets A, B, C, and D representing experimental treatments.

Table 1 Composition of the Sugarcane Peels Meal Based Diets

Ingredients (%)	Experimental Treatments			
	A	B	C	D
Sugarcane Peels Meal	0	8.75	17.5	26.25
Wheat Offal	35	26.25	17.5	8.75
Rice Offal	20	15	10	10
Cotton Seed Cake	05	05	10	15
Sorghum Stover	10	10	10	07
Cowpea Husk	17	17	12	10
Groundnut Haulm	10	15	20	20
Salt	1	1	1	1
Bone Meal	2	2	2	2
Total	100	100	100	100
Calculated Values				
CP (%)	12.87	12.14	12.11	12.12

Experimental procedure and Duration of Study

Sixteen (16) Kano brown buck goats of about 12-18 months, with initial weight of 17.55–17.83kg were used in this experiment and were purchased from Bichi market and Kano Metropolis, Kano State. Four (4) 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*.

Fattening parameters

Average initial body weights of the goats were at the commencement of the experiment by using a weighing scale. Feed offered to the goats was calculated based on 3% body weight of the goats, while feed intake was determined by subtracting the weight of the left over feed (ort) from the weight of the feed offered the previous day. Weight gain of the goats was found weekly by determining the average weight gain of the goats per treatment for the week and subtracting this from that of previous week. Prior to weighing, feed were withdrawn at least 6 hours before the weighing. Average total weight gain was calculated by subtracting the average initial weight of individual goats from their average final weights. Total feed intake and weight were determined at the end of the study. Feed Conversion Ratio (FCR) was determined by calculating the ratio of the total of the feed consumed in grams and the total weight gained in grams per treatment.

Experimental Design and Statistical analysis

Completely randomized design was used in this study. The data generated were subjected to analysis of variance (ANOVA) using SAS (2007) software. Where differences in means manifest, the Duncan's multiple range test (DMRT) was used to separate them at ($P < 0.05$) level of probability.

Sampling and Analytical Procedure

Thoroughly mixed representative samples of the experimental diets and sugarcane peels were analyzed for proximate composition as outlined by the Association of Official Analytical Chemist (AOAC, 1990). Acid Detergent Fibre (ADF) was analysed in the samples as reported by Ranjhan and Krishna (1980).

RESULT AND DISCUSSION

Proximate analysis of sugarcane peel meals based diets fed to fattening Kano brown goats

The effect of proximate analysis of sugarcane peel meal based diets fed to fattening Kano brown goats is presented in Table 2. The dry matter compositions of the diets are almost the same. The crude protein of the diets ranging from 14.81 – 11.06% (A – D) are within the values recommendations by NRC (1994) for fattening of goats. The level of protein is reduced as the level of sugarcane peels meal is increased because the sugarcane peels contained high level of fibre. Also the fibre level of the diets is increased from treatment A – D (20.09 – 25.78%) as the level of sugarcane peels meal is increased. However, the CF values obtained from the present study were lower to the values of 16.31 – 15.00% reported by Ochepo *et al* (2012) when they fed complete diets containing sugarcane peels to goats. Also the CF values of this study are lower than the values of 29.74 - 34.24% reported by Saleh and Maigandi (2015) when they fed sugarcane peels containing diets to sheep.

Table 2: Proximate analysis of sugarcane peel meal based diets fed to fattening Kano brown goats

Parameters%	Treatments			
	A	B	C	D
Dry matter	93.03	93.92	94.75	93.04
Ash	13.72	12.85	11.71	15.08
Ether extract	8.15	6.32	6.02	5.47
Crude protein	14.81	13.63	13.75	11.06
Crude fibre	20.09	24.98	25.64	25.78
NFE	49.48	51.01	50.66	49.27
Cellulose	31.55	33.17	32.25	42.61
Hemicellulose	18.09	14.83	17.12	13.56
Neutral detergent fibre	52.64	51.44	52.74	58.78
Acid detergent fibre	34.55	36.61	35.62	45.22
Nuetral detergent lignin	3.00	3.44	3.37	8.60

SEM: standard error of mean a,b, c Means on the row with different superscripts are significantly ($p < 0.05$) different.

Performance of fattening Kano brown buck goats fed diets containing sugarcane peels meal

Results on performance by fattening bucks fed sugarcane peels were shown in Table 3. The average initial body weight and average final body weight were not significantly affected ($P > 0.05$) by the inclusion of sugarcane peels based diets. It can also be observed that average daily gain of the experimental animals did not differ significantly ($P > 0.05$) between treatment means, where the highest value was recorded in treatment A (30.03g/day) and the lowest value was recorded in C (17.22g/day). These values were closely similar to the values of 15.4 – 28.4g reported by Adebawale and Taiwo (1996) when they fed agricultural residues and agro-industrial by-products as a complete diet for West African Dwarf Goats (WAD). Average daily feed intake differ significantly ($P < 0.05$), where the highest was obtained in treatment A (585.05g/day) then followed by B, C and D (448.54) respectively. These values are lower than 710.8g/day reported by Ramli *et al.* (2005) for goats fed fermented sugarcane bagasse feed but is similar to the values of 436.0 - 582.0 g/day reported by Mohammed *et al* (2014) when they fed poultry litter wastes (PLW) and fore-stomach digester to Sahelian goats. The variation in the above mentioned daily feed intake recorded by different authors could be due to factors like size of the animals and variation in level of nutrients composition in feeds. No significant differences ($P > 0.05$) were recorded in feed conversion ratio between treatment A, B, C and D with treatment A having the highest value of 144.05 and treatment D recording the lowest value of 26.45. The non significant difference in FCR in this

study is an indication that the diets were better utilized by animals fed and that the animals had better ability of converting feed to meat.

Table 3: Performance of fattening Kano brown buck goats fed diets containing sugarcane peels meal

Parameters	Treatments				SEM
	A	B	C	D	
Initial weight (Kg)	17.63	17.80	17.83	17.55	0.62
Final weight (Kg)	20.33	21.80	19.40	17.55	0.73
Total weight gain (Kg)	2.70	2.03	1.55	1.58	0.40
Average daily weight gain (g)	30.03	22.25	17.22	17.59	4.41
Average daily feed intake (g/d)	585.05 ^{aa}	540.12 ^{ab}	495.91 ^b	448.54 ^c	15.17
FCR	144.05	97.11	31.64	26.45	32.08

SEM: standard error of mean ^{a,b,c} Means on the row with different superscripts are significantly ($p < 0.05$) different.

Nutrients Intake of fattening Kano brown goats fed diets containing sugarcane peels meal

The result of nutrients intake of fattening Kano brown goats fed diets containing sugarcane peels meal were shown in Table 4. The CP intake in treatment A is significantly recorded the highest value ($P < 0.05$) of 80.61 g/d and treatment D recorded the lowest value of 46.16 g/d. Similar trend was also recorded in crude protein intake as % dry matter intake because highly significant (< 0.05) with the values of 14.81% and treatment D recorded the lowest value of 11.06%. The CFI values in this study recorded of 107 – 126g are lower than the values reported by Ochepeo *et al* (2012) when they fed complete diets containing sugarcane peels to goats and the values are also lower than the values reported by Saleh and Maigandi (2015) when they fed sugarcane peels containing diets to sheep for CFI of 249.57 - 269.29%. The nutrients intakes in this study is satisfactory, this agrees with the report of Adeloye (1994) who reported that crude protein and high dry matter intakes result in positive weight gain.

Table 4: Nutrients Intake of fattening Kano brown goats fed diets containing sugarcane peels meal

Parameters	Treatments				SEM
	A	B	C	D	
Crude protein Intake (g/day)	80.61 ^a	69.14 ^{bb}	68.32 ^b	46.16 ^c	3.77
Crude protein intake as % dry matter Intake (g/day)	14.81 ^{aa}	13.63 ^a	14.54 ^{aa}	11.06 ^b	0.51
Crude fibre intake (g/day)	109.34 ^{cc}	126.46 ^a	120.47 ^b	107.59 ^c	2.37
Ether Extract intake (g/day)	44.36 ^a	32.06 ^b	28.29 ^c	22.74 ^d	2.41
Ash intake (g/day)	71.1	230.5	62.7	51.2	43.02

SEM: standard error of mean ^{a,b,c} Means on the row with different superscripts are significantly ($p < 0.05$) different.

CONCLUSION

The result of fattening performance and nutrients intake of Kano brown goats bucks fed sugarcane peels meal containing diets indicated that incorporation of sugarcane peels meal up to 75% as replacement of wheat offal is an indication of its potential as an alternative feed ingredient for goats. Therefore, inclusion of sugarcane peels in the diets of ruminants will reduce the urban solid waste and improve livestock production in Nigeria.

RECOMMENDATIONS

This study recommends that sugarcane peels meal could be incorporated into the goats' diet up to 75% as replacement of wheat offal. However, further studies should be carried out in order to evaluate digestibility, hematology and economic incorporation. Also the result of the experiment could be used to improve sugarcane production and additional job creation in Nigeria.

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