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## Performance of Growing Grasscutters on Different Fibre Sources

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**Abstract:** Grasscutter meat constitutes an important source of much-needed animal protein. The grasscutter (*Thryonomys swinderianus*) is a wild herbivorous rodent found in the grasslands of Sub-Sahara Africa. It subsists mainly on grass and can digest almost any form of edible greenstuff. Intensive grasscutter production aims at achieving higher levels of DM intake through various vegetative and concentrate supplements to basal diet. The 15 weeks experiment evaluated the performance of twenty four (24) 13 weeks old growing grasscutters, allotted to four treatment groups of six animals each, which were fed diets containing four different fibre sources namely; wheat offal, palm kernel cake, maize sievates and a combination of equal amounts of all the fibre feedstuffs. The experiment involved two replicates per treatment and three growing grasscutters per replicate in a Completely Randomized Design. All the data was subjected to the analysis of variance. The performance of grasscutters, in respect of forage intake, concentrate intake, total feed intake and cost of feeding, was significantly ( $p < 0.05$ ) higher on the maize sievates than on other diets, while the rate of attainment of puberty was significantly ( $p < 0.05$ ) higher on the palm kernel cake than on other diets. These findings suggest that the performance of growing grasscutters was best on the palm kernel cake diet. Palm kernel cake can, therefore, be used as the preferred source of fibre for feeding growing grasscutters.

**Key words:** Performance, growing grasscutters, fed, different fibre sources

### INTRODUCTION

The grasscutter (*Thryonomis swinderianus*) is found in the grasslands and woody savannahs of the humid and sub-humid areas south of the Sahara (Adoun, 1993) and belongs to a group of wildlife animal species, which constitute an important source of much-needed animal protein in West Africa (Baptist and Mensah, 1986).

Commercial exploitation of unconventional livestock, like the grasscutter, may be justified on the grounds that these animals adapt to harsh environments and can utilize natural resources and digest almost any form of edible greenstuff, ranging from coarse grasses to roughages and household scraps (Muller-Heye, 1984). The digestive tract of the grasscutter with its large caecum is adapted predominantly to microbial digestion of feeds (Alaoginouwa *et al.*, 1996).

The aim of intensive grasscutter production is to achieve higher levels of DM intake through various vegetative and concentrate supplements to basal diet. Efficient and cost-effective production systems would, therefore, involve the intensive feeding of the grasscutter on roughages, including agricultural by-products and concentrates such as maize sievates, wheat offal and palm kernel cake, which provide easily fermentable energy and protein supplements. The objective of this experiment was to determine the performance of growing grasscutters fed different sources of fibre namely; maize sievates, wheat offal and palm kernel cake, in cassava-based diets.

### MATERIALS AND METHODS

The experiment was carried out at the Grasscutter Research Farm at Calabar, under the supervision of the Department of Animal Science, University of Calabar, Calabar, Nigeria. The research area is located at latitude 3° North and longitude 7° East, with annual rainfall of 3000-3500 mm, relative humidity of 57-93% and temperature of between 25 and 35°C.

Four different treatment diets, that differed only in their fibre sources, were formulated to contain either Wheat Offal (WO), Palm Kernel Cake (PKC), Maize Sievates (MS), or a combination of equal amounts of all the high-fibre feedstuffs (MWP) as shown in Table 1. All the ingredients used were purchased from the local market in Calabar. The composition of the test diets are shown in Table 1, while the proximate composition of the diets is shown in Table 2. The Apparent Digestibility Coefficients (ADC) of the various fractions (Dry Matter (DM), Crude Protein (CP), Crude Fibre (CF), Ether Extract (EE), Ash and Nitrogen Free Extract (NFE)) for the various diets (Table 3) were determined.

Twenty four (24) 13-weeks old growing grasscutters of equal weight were randomly allotted, in groups of six, to the four test diets. There were two replicates per treatment and three growing grasscutters per replicate in a completely randomized design. The experiment lasted for fifteen weeks. Water and feed were supplied *ad libitum*. The animals were weighed every two weeks throughout the experiment.

Table 1: Composition of experimental diets for growing grasscutters

Ingredients (%)	Experimental diets (source of fibre)			
	MWP	PKC	WO	MS
Cassava	37.00	37.00	37.00	37.00
Maize sievates	3.00	0.00	0.00	9.00
Wheat offal	3.00	0.00	9.00	0.00
Palm kernel cake	3.00	9.00	0.00	0.00
Groundnut cake	21.00	21.00	21.00	21.00
Soybean meeal	29.00	29.00	29.00	29.00
Salt	0.25	0.25	0.25	0.25
Bone meal	3.50	3.50	3.50	3.50
Vitamin premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00

MS = maize sievates, WO = wheat offal, PKC = palm kernel cake

Table 2: Proximate composition of the experimental diets for growing grasscutters

Nutrients (% of DM)	Treatments (Source of fibre)			
	MWP	PKC	WO	MS
Dry matter	91.04	90.96	91.25	90.92
Crude protein	21.63	20.44	22.18	20.01
Crude fibre	6.26	6.18	6.01	6.26
Ether extract	4.82	4.75	5.00	4.66
Ash	4.00	4.89	3.89	5.02
Nitrogen free extract	63.29	63.74	62.92	64.05
Calculated ME (kcal/kg)	2912.11	2919.04	2921.14	2909.12

Table 3: Apparent digestibility coefficients (%) of nutrients of the experimental diets fed to growing grasscutters

Diets	DM	CP	CF	EE	Ash	NFE
MWP	73.40	82.21	77.68	76.33	73.60	68.06
PKC	73.58	85.74	78.22	77.40	80.04	68.55
WO	73.47	86.20	76.96	84.43	74.41	68.26
MS	74.04	86.02	78.12	74.31	80.77	68.95
SEM	0.14	0.95	0.29	2.20	1.86	0.19

MS = maize sievates, WO = wheat offal, PKC = palm kernel cake

Records of daily feed (forage and concentrate) intake and daily weight gain were taken. All the data collected was subjected to the analysis of variance using the procedures of the GENSTAT (2007) software.

Table 4: Performance of growing grasscutters fed different fibre sources

Parameters	Treatments (Fibre sources)				
	MWP	PKC	WO	MS	SEM
Initial body weights (g)	1319.03	1323.21	1304.24	1415.22	64.21
Final body weight (g)	2292.21	2468.34	2345.23	2421.42	88.10 <sup>ns</sup>
Average daily forage intake (g)	202.91 <sup>b</sup>	179.04 <sup>c</sup>	195.11 <sup>bc</sup>	256.93 <sup>a</sup>	7.92
Average daily forage DM intake (g)	24.52 <sup>b</sup>	21.33 <sup>c</sup>	23.93 <sup>b</sup>	31.72 <sup>a</sup>	1.02
Average daily diet intake (g)	78.22 <sup>b</sup>	95.34 <sup>a</sup>	85.52 <sup>b</sup>	83.52 <sup>b</sup>	3.33
Average daily total feed intake (g)	102.74 <sup>b</sup>	116.31 <sup>a</sup>	106.41 <sup>b</sup>	113.83 <sup>a</sup>	3.43
Average daily weight gain (g)	10.62	11.63	11.83	11.12	2.14 <sup>ns</sup>
Puberty rate (%)	83.30 <sup>b</sup>	100.00 <sup>a</sup>	33.30 <sup>c</sup>	50.00 <sup>d</sup>	16.50
Feed conversion ratio	13.83	12.71	11.92	15.93	3.72 <sup>ns</sup>
Average daily cost of diet (N.k/kg)	6.30 <sup>c</sup>	7.63 <sup>a</sup>	6.84 <sup>b</sup>	7.51 <sup>a</sup>	0.28
Cost to gain ratio (N/kg)	0.86	0.64	0.68	0.71	0.34 <sup>ns</sup>

<sup>ab</sup>Means along the same row having no common superscript differ significantly at  $p < 0.01$ ; ns refers to non-significant differences between means. MS = maize sievates, WO = wheat offal, PKC = palm kernel cake

## RESULTS

The proximate composition of the experimental diets is presented in Table 2. The results show that the proximate composition of the various fractions (Dry matter, Crude protein, Crude fibre, Ether extract and Ash) did not differ significantly among the test diets.

The Apparent Digestibility Coefficients (ADC) of the various nutrients (Table 3) viz: Dry Matter (DM), Crude Protein (CP), Crude Fibre (CF), Ether Extract (EE), ash and Nitrogen Free Extract (NFE), for the various diets were similar regardless of the sources of fibre in the diets.

Grasscutters fed the MS diet had significantly ( $p < 0.05$ ) the highest (256.93 g) forage intake, while the lowest (179.04 g) intake was observed with grasscutters fed the PKC diet. Average daily diet intake was significantly ( $p < 0.05$ ) highest (95.34 g) for grasscutters fed the PKC diet and lowest (78.22 g) for grasscutters fed the MWP diet. Grasscutters fed the PKC diet significantly ( $p < 0.05$ ) had the highest (116.31 g) daily total feed intake, while the lowest (102.74 g) total feed intake was observed with grasscutters fed the MWP diet.

One hundred percent (100%) of the six female grasscutters fed the PKC diet attained puberty before or by 22 weeks of age. This performance was significantly ( $p < 0.05$ ) higher than the 83.30, 50.00 and 33.30% observed among grasscutters fed the MWP, MS and WO diets respectively.

The average daily cost of feeding grasscutters was significantly highest (N7.63) for grasscutters fed the PKC diet, while the lowest (N6.30/day) was observed with grasscutters fed the MWP diet.

## DISCUSSION

Total feed intake and diet intake were significantly different among grasscutters, being highest on the palm kernel cake diet, though daily weight gain among grasscutters was not significantly different among growing grasscutters. The significantly ( $p < 0.05$ ) lower intake of forage and forage dry matter on the palm kernel cake diet was compensated for by the significantly

higher intake of the compounded diet which, because of its higher energy and less crude fibre content, partly explains the comparable weight gain on the palm kernel cake diet. The average daily total feed intake (102.74-116.31 g) obtained in this experiment is lower than the 150-250 g reported by Mensah (1995), while the average daily weight gain (11.12-11.83 g) agrees with the 8-13 g reported by Jori and Cherdonnet (2001) and the 7-12 g reported by Mensah (1995).

Closely related to daily feed intake and daily weight gain is the rate of attainment of puberty. Fast growth rate and early attainment of puberty are of economic benefit to the farmer. The results of this study show that the rate of attainment of puberty (before or by 22 weeks of age) was higher for grasscutters on the palm kernel cake diet (100%) than on the maize sievates (50%) or wheat offals (33.3%) diet (Table 4). The higher rate of attainment of puberty was the result of the significantly ( $p < 0.05$ ) higher intake of total feed and diet on the palm kernel cake diet than on the wheat offals and maize sievates diets. The higher intake of diet and total feed resulted in the comparably high daily weight gain, which stimulated faster physiological changes and therefore, the higher rate of attainment of puberty on the palm kernel cake diet at 22 weeks of age. Though not statistically significant, grasscutters on the PKC diet had the highest final body weight (2468.34 g), which performance underscores the faster rate of attainment of puberty on that diet. Adjanohoun (1988) reported 20 weeks as age of physiological maturity in female grasscutters.

The similarity in the proximate composition of diets and their Apparent Digestibility Coefficients (ADC), as well as the comparable feed conversion ratios, which are indicative of rate of feed utilization, explain the comparable weight gains on those diets.

The cost of feeding per unit weight gain was lowest on the palm kernel cake diet (N0.64/g) than on the wheat offal (N0.68/g) and maize sievates (N0.71/g) diets, suggesting that a more favourable cost per unit weight gain was achieved on the palm kernel cake diet.

**Conclusion:** The findings of this experiment suggest that the performance of growing grasscutters, as indicated by the significantly ( $p < 0.05$ ) higher rate of attainment of puberty, was best on the palm kernel cake diet. Palm kernel cake can, therefore, be used as the preferred source of fibre for feeding growing grasscutters.

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