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Effect of Feeding Diets Containing Graded Levels of Melon Seed Husk Meal on Performance of Feedlot Bunaji Bulls

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Abstract

A 90-day study was conducted to determine the effect of feeding diets containing graded levels of melon seed husk meal on performance of feedlot Bunaji bulls. Eight Bunaji bulls aged two years and weighing 105 Kg on the average were randomly divided into four groups of two bulls each and allotted to four dietary treatments in a Completely Randomized Design in which each bull formed a replicate. Forages of elephant grass and water were offered *ad libitum* while concentrates containing the melon seed husk meal was fed at 3.0% body weight of the bulls. The experimental diet was formulated using maize offal, palm kernel meal, soya bean haulm, cowpea husk, soya meal, rice offal, melon seed husk, bone ash and table salt. The melon seed husk meal was included in the diets at 0, 5, 10 and 20% at the expense of palm kernel meal corresponding to T1, T2, T3 and T4 respectively. Results obtained at the end of the study showed that there was no significant difference ($p > 0.05$) in the initial body weight, average daily forage intake, average daily feed intake, average daily body weight gain and final body weight. There were significant differences ($p < 0.05$) in the average daily concentrate and water intakes as well as feed conversion ratio whose values for T1, T2, T3 and T4 were 3.58, 4.15, 3.92 and 3.66 kg, 13.06, 13.39, 12.39 and 13.82 litres and 20.11, 16.87, 19.47 and 17.98 respectively. It was concluded that inclusion of melon seed husk meal in the diets enhanced the performance of the feedlot Bunaji bulls.

Keywords: Performance; Feedlot; Bunaji bulls, melon seed husk meal

Introduction

Melon (*Citrullus lanatus* ThunbMansf), popularly known as 'Egusi' is a native of Africa. According to Schippers (2000) melon was probably introduced to Asia, Iran and Ukraine from Africa. During processing after maturation on the farm, the seeds are removed from the fruit, washed, sun-dried and sold in large quantities (tonnage) annually for commercial purpose (as a special soup condiment). In processing the seeds, large quantities of melon husks are generated and discarded by burning, which pollutes the environment (Ogbe and George, 2012). Proximate analysis of melon seed husk revealed that, it contains essential nutrients such as crude protein (4.68-19.94%), crude fibre (6.07-51.50%), Ether extract (2.05-11.90%), and minerals such as sodium, potassium, phosphorus, calcium, magnesium, iron, zinc, copper and manganese (Ogbe and George, 2012; Abdulrazak *et al.*, 2014; Idoko *et al.*, 2014) and energy value of 1440.11kcal.

The presence of essential nutrients and minerals imply that melon husks could be utilized as a feed ingredient for herbivores (Abdulrazak *et al.*, 2014). Nigeria produces copious quantities of melon seeds annually. Processing the melon seeds generate tonnages of melon seed husk which become an environmental hazard in themselves as well as the disposal method (burning). Converting the melon seed husk to the feeding of cattle will help in ameliorating livestock feed shortage thereby enhancing animal performance. Additionally, it will eliminate the environmental hazard of burning the melon seed husk.

The aim of the study was to evaluate effect of feeding diets containing graded levels of melon seed husk meal on performance of feedlot Bunaji bulls

Materials and Methods

The study was conducted at the Cattle Unit of the Livestock Teaching and Research Farm of the Federal University of Agriculture, Makurdi. Makurdi is located on latitude 7° 14' N and longitude 8° 31' E and a height of 90 meters above sea level in the Southern Guinea Savannah ecological zone of Nigeria. The rainy season spans from May to October, while dry season spans from 22.3°C to 33.41°C; the mean relative humidity is 64.58%, (Ahemen *et al.*, 2011).

Eight Bunaji bulls, aged two years and weighing 105 kg on the average were used for the study. The animals were purchased from International Cattle Market, North Bank, Makurdi and taken to the Livestock Teaching and Research Farm, Federal University of Agriculture Makurdi for the study. Each of the bulls was allotted a pen measuring 3.6 X 2.5m (length and width) constructed of wood and roofed with corrugated iron sheets, the animals were fed individually.

Four dietary treatments containing varying levels of melon seed husk meal were formulated; having melon seed husk meal included at 0.0, 5.0, 10 and 20% respectively as shown in Table 1. The test diets were served to the bulls once a day at the rate of 3.0% of their body weights, while fresh forage of elephant grass (*Pennisetum purpureum*) and drinking water were fed *ad libitum*. Salt lick was also provided for the bulls.

- i. Body weights were taken every 7 days using weighing band, and the body weight gain was determined by the differences between the current weights and the previous weights of the animals.
- ii. Feed intake was determined daily from the feed offered and leftover collected i.e separately for both the supplement and forage and then the total feed intake.
- iii. Water intake was determined by the difference between the quantity offered and the quantity left.
- iv. Feed Conversion Ratio (FCR); was calculated as the ratio of feed intake to live weight gain.

$$FCR = \frac{\text{Total Feed intake (kg)}}{\text{Total Weight gain (kg)}}$$

Collected data were analyzed using Analysis of Variance (ANOVA) package of Minitab Statistical Software, and significant differences in means were separated using Duncan's Multiple Range Test as outlined (Steel and Torrie, 1980). The study was conducted using the Completely Randomized design. The eight bulls were randomly allotted into four groups of two each and each animal served as a replicate.

Table 1: Composition of experimental diets containing melon seed husk meal fed to Bunaji bulls

Input	Experimental diets			
	1	2	3	4
Maize offal	30	30	30	30
Soya bean haulms	10	10	10	10
Cowpea husk	10	10	10	10
Palm kernel meal	20	15	10	0.0
Melon seed husk meal	0.0	5	10	20
Soybean meal	14	14	14	14
Rice offal	12	12	12	12
Bone ash	3.0	3.0	3.0	3.0
Salt	1.0	1.0	1.0	1.0
	Nutrient composition			
Dry matter	90.71	91.42	90.85	90.47
Crude protein	13.99	14.06	14.15	14.35
Ether extract	6.37	6.67	6.96	7.55
Crude fibre	16.84	18.82	20.79	24.74
Ash	4.35	5.20	5.60	5.90
Nitrogen free extracts	58.45	55.25	52.50	47.46
Metabolizable energy	3572.47	3467.02	3380.28	3227.65

Results and Discussion

The results of the effects of feeding diets containing graded levels of melon seed husk meal on the performance of feedlot Bunaji bulls are shown in table 2. The highest mean value of average daily concentrate intake was recorded for T2 and it was significantly different ($p < 0.05$) from the rest of the other treatments which were similar to each other. The similarity in concentrate intake of the bulls fed with 10 and 20% inclusion can be explained to be caused by the feeding behavior of the Bunaji bulls, where some animals have been reported to prefer eating concentrates while others prefer eating forages (Madziga *et al.*, 2013; Wuanor *et al.*, 2015).

Mean values for average daily forage intake showed no significant difference ($P > 0.05$). Mean values for T1, T2 and T3 were similar and the highest while the least value was recorded for T4. The average daily forage intake shows that treatment had no effect on it. Similarity in forage intake is attributed to forage been the natural feed of ruminants. This result contradicts other reports which had asserted that supplement and forage intakes were balanced for each other (Madziga *et al.*, 2013; Wuanor *et al.*, 2015). The highest mean value of average daily feed intake was recorded for T2, followed by T3 and then T4 while T1 recorded the least mean value. There was no significant difference ($p > 0.05$) in the average daily feed intake. The relatively lower feed intake in this study is reasoned to be caused by the nature of the elephant grass which would have undergone secondary thickening, becoming more fibrous and hindering much intake.

Table 2: Performance of feedlot Bunaji bulls fed graded levels of melon seed husk meal

Parameter	T1	T2	T3	T4	SEM	LOS
Initial body weight (kg)	99.50	112.00	110.50	98.00	8.12	NS
Average daily concentrate intake (kg)	3.58 ^b	4.15 ^a	3.92 ^b	3.66 ^b	0.37	*

Average daily forage intake (kg)	6.15	6.15	6.15	6.13	1.32	NS
Average daily feed intake (kg)	9.72	10.31	10.06	9.79	1.64	NS
Average daily water intake (lt)	13.06 ^b	13.39 ^b	12.39 ^b	13.82 ^a	0.74	*
Average daily body weight gain (Kg)	0.93	1.11	1.14	0.96	0.36	NS
Feed conversion ratio	20.11 ^a	16.87 ^d	19.47 ^b	17.98 ^c	0.25	*
Final body weight gain (kg)	143.00	167.00	157.00	147.00	13.77	NS

a,b,c, means on the same row with different superscripts vary significantly ($P < 0.05$) NS= not significantly different ($p > 0.05$) * significantly different; SEM= Standard error of mean

There was a significant difference ($p < 0.05$) in the average daily water intake with T4 recording the highest mean value followed by T2 then T1 and lastly T3. Average daily water intake responded to the melon seed husk meal inclusion which made the diets to have higher crude protein levels. The water intake pattern may be related to the need for additional water to be used in protein metabolism because in the process of breakdown of protein, water is used. Mean values for average daily body weight gain showed no significant difference ($p > 0.05$). Mean value for T3 was the highest followed by T2 then T4 while T1 had the least mean value. The average daily body weight gain pattern suggested that there was a response to the concentrate intake as the body weight gain corresponded to the concentrate intake. This shows that feed utilization was better by the bulls fed the melon seed husk meal included diets.

The average daily body weight gain (0.93-1.14 kg/day) in this study compares with the results of Wuanor *et al.* (2015), who worked with Bunaji bulls in the same environment. Feed conversion ratio mean values were highest in T1 followed by T2 and T4 and lastly by T3. There were significant differences ($p < 0.05$) in all FCR values which were at variance with those reported by Garcia (2013), Izeldin *et al.* (2009) and Wuanor *et al.* (2015). In general the melon seed husk meal included diets showed better FCR values than the control. This may have been caused by creation of a more suitable environment for the rumen microorganisms to breakdown the nutrients in the feed.

Conclusion and Recommendation

In conclusion, the result of this experiment has shown that inclusion of melon seed husk meal in the diets of feedlot Bunaji bulls improved the performance of the bulls. It is recommended that melon seed husk meal should be included up to 15% in supplemental feeding of feedlot Bunaji bulls.

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