RUN -04

Performance and Serum Biochemistry of Grazing Bunaji Bulls Fed Supplementary Combinations of Agro Industrial by Products and Crop Residues

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Abstract
This study was conducted to evaluate the growth response and serum biochemical profiles of grazing Bunaji bulls supplemented diets of combinations of agro industrial by products and crop residues. The agro industrial by products were brewers dried grain, palm kernel cake, maize offal, wheat offal and cassava peels while the crop residues were soy bean haulms and rice straw. The dietary inputs were included at same level in each of the diets that they were components of. A total of 16 intact Bunaji bulls aged two years and weighing averagely 161.25 Kg were randomly allotted to four dietary treatments, T1, T2, T3 and T4 and fed the diets at 2.0 Kg per day for a period of 90 days. Growth parameters measured were daily body weight gain, water intake, and final body weight gain while serum biochemical evaluated were urea, total protein, albumin, globulin, Serum Glutamic Oxaloacetic Transaminase (SGOT), Serum Glutamic Pyruvic Transaminase (SGPT), cholesterol and creatinine. Mean values for daily weight gain, water intake and final body weight were 0.30, 0.33, 0.41 and 0.70 Kg; 11.60, 12.50, 13.30, and 15.50 litres and 187, 191.70, 197.90 and 225 Kg respectively and showed significant differences ($p<0.05$) . Mean values of biochemical parameters fell within reference values and were all statistically ($p>0.05$) similar. It was concluded that the tested diets improved the growth performance and serum biochemical indices of the Bunaji bulls and were recommended safe for feeding to Bunaji bulls during the dry season.

Keywords: Agro by-product, crop residues, Bunaji bulls

Introduction

Nigeria, as an agrarian country produces copious quantities of crops annually, the harvesting and processing of which generate huge amounts of crop residues and agro industrial by products. These crop residues and agro industrial by products are very useful in feeding herbivorous animals in general and ruminants in particular because of their inherent nutrients profiles. Cattle production in Nigeria is carried out mostly in the Northern part of the country whose weather is characterized by few months of rainfall and many months of dry season annually (Kallah, 2004). This weather pattern causes shortage in quantity and quality of pastures on a year round basis. Many authors have reported on the feed supplementation of cattle (Asizua*et al*., 2009; Beaty*et al*., 1994; Farmer *et al*., 2001). It is reasoned that supplemental feeding provides the ideal environment needed by rumen micro organisms to process the mostly scabrous feeds eaten by the ruminants and provide enough nutrients for the animals' body processes as well as fulfilling the production expectation for which they are kept (Moran, 2005; Norris *et al*., 2002).

It is based on this premise that this study was designed to evaluate the growth performance and serum biochemical parameters of grazing Bunaji bulls fed supplementary combinations of agro industrial by products and crop residues diets.

Materials and Methods

The study was carried out at the Livestock Teaching and Research Farm of the University of Agriculture, Makurdi, Benue State, in the North Central part of Nigeria. Makurdi has a maximum temperature of 35 °C and a minimum temperature of 28 °C. The humidity of the area is high (74%) all year round except in January, when the dry wind blows from the north and the annual rainfall is over 1000 mm (Mngutyo and Ogwuche, 2013).

A total of 16 Bunaji bulls weighing 161.25 Kg on average were sourced from the Makurdi International Cattle market, brought to the experimental site, individually identified by ear tags and quarantined for a period of 30 days during which they were exposed to recommended acclimatization protocols. Four bulls were allotted per treatment and fed 2.0 Kg each of the experimental diet. Four dietary treatments were formulated on the basis of using equal levels of the dietary components and are shown in table 1. Drinking water was provided for the bulls

ad libitum. The experimental diets were fed in the morning at 08:00 hours after which the bulls were grazed for six hours from 10:00 hours on natural grassland on the University.

The study was conducted using the Completely Randomized Design. Water intake was determined by measuring the left over from the amounts served. Body weight changes were determined by measuring the weights weekly. At the end of the 90 days feeding period, blood was collected from each of the bulls by puncturing the jugular vein. The collected blood was taken to the laboratory and analyzed using auto haematology analyser machine Midray 3500 (Mindray North America, USA).

Data collated data was analyzed using Analysis of Variance (ANOVA) in a Completely Randomized Design using MiniTab Statistical Software, Rehearse 15.0 (1991) while significantly different means were separated using Duncan Multiple Range Test as outlined by Steel and Torrie, (1980).

Table 1: Experimental diets fed to Bunaji bulls (%)

Input	Experimental Diets			
	1	2	3	4
Rice straw	24.75	24.75	24.75	24.75
Palm kernel cake	-	24.75	-	
Maize offal	-	-	-	24.75
Brewers dried grains	24.75	-	-	-
Wheat offal	-	-	24.75	-
Soya bean haulms	24.75	24.75	24.75	24.75
Cassava peels	24.75	24.75	24.75	24.75
Salt	1.0	1.0	1.0	1.0
	Nutrient composition			
Dry matter (%)	88.10	87.60	88.90	89.00
Crude protein (%)	11.75	10.90	10.40	12.69
Ether extract (%)	3.54	4.22	3.85	3.78
Crude fibre (%)	22.85	22.55	22.07	22.44
Ash (%)	5.10	5.05	5.35	5.01
Nitrogen free extracts (%)	56.75	57.28	58.33	56.08
Gross energy (MCal/Kg)	3.16	3.48	3.19	3.63

Results and Discussion

The results of the study are shown in Table 2. There was significant difference (P<0.05) in mean values of daily body weight gain; T4 had the highest value which was significantly higher than the other treatments that were similar to each other.

Table 2: Performance indices of grazing Bunaji bulls fed supplementary combinations of agro industrial by products and crop residues

Parameter	T1	T2	T3	T4	SEM
Initial weight (Kg)	160	162	161	162	5.17
Daily weight gain (Kg)	0.30 ^{b}	0.33 ^{b}	0.41 ^{b}	0.70 ^{a}	0.17
Daily water intake	11.60 ^{b}	12.50 ^{b}	13.30 ^{b}	15.50 ^{a}	0.78
Final body weight	187 ^{b}	191.7 ^{b}	197.9 ^{b}	225.0 ^{a}	7.31
Urea (mmol/l)	18.50	16.30	19.0	19.50	0.28
Total protein (g/dl)	68.20	69.00	71.50	71.20	2.52
Albumin (g/dl)	27.70	28.10	27.50	27.30	0.76
Globulin (g/dl)	47.20	46.35	47.00	46.80	1.22
SGOT (iu/l)	198.10	198.60	198.80	198.00	2.97
SGPT (mg/dl)	48.25	48.10	47.80	47.30	1.16
Cholesterol (mg/dl)	95.80	96.20	96.70	95.90	0.73
Creatinine (umol/l)	120.60	118.00	119.20	119.50	6.30

a,b, - means in same row with different superscripts vary significantly (p<0.05)
SGOT= Serum Glutamic Oxaloacetic Transaminase; SGPT= Serum Glutamic Pyruvic Transaminase

This pattern of mean values was similar for daily water intake and final body weight. The higher mean values for T4 were reasoned to be due to the higher crude protein and energy contents of the diet compared to the other treatments. The mean values compared favourably with reports of Asizua *et al*. (2009) when Ankole cattle and its Boran and Friesian crossbreds were either grazed alone or fed supplements additional to grazing and also that of Nkhonjera *et al*. (2008) when steers were stall fed. Mean values for all serum biochemical parameters were statistically similar ($p>0.05$) and within reference ranges. This implied that feeding the experimental diets ensured sufficiency of protein quality, had no intrinsic factor that could have caused a serious challenge to the heart, liver and kidneys of the animals. The animals will therefore not likely face the risk of myocardial infarction and emaciation (Daramola *et al*., 2005; Ugwuneme, 2011; Oduguwa *et al.*, 2012).

Conclusion and Recommendations

It was concluded that feeding the experimental diets did not hamper the performance of the Bunaji bulls nor compromised their health. It was recommended that the diets could be used in supplementing grazing Bunaji bulls feeding during the dry season

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