



GROWTH PERFORMANCE OF RED BORORO BULLOCKS FED TWO ENERGY AND TWO PROTEIN SOURCES IN MUBI, ADAMAWA STATE, NIGERIA.

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ABSTRACT

Twelve (12) Red Bororo bullocks with average age of 12 months and weight of 194.69 Kg were randomly allocated to four (4) experimental diets with three (3) animals each designated as treatments T_1 to T_4 in a Randomized Complete Block Design (RCBD). The animals in treatment T_1 - T_4 were given concentrates made of cotton seed cake and poultry droppings as sources of crude protein, Maize bran and local brewers' spent grain as sources of energy. Combination of 50:50 chopped rice straw and crushed groundnut haulms was fed to all animals ad libitum as basal diet. Clean water was provided to the animals ad libitum. After adjustment period of 7 days, Parameters determined were, proximate compositions of feed ingredients and experimental diets, initial live weights of the animals, final live weights, daily dry matter intake, daily weight changes, digestibility of treatment diets, feed conversion ratios and feed efficiencies. Data obtained were subjected to analysis of variance (ANOVA). Duncan multiple Range Test was used to separate the means where significant differences occurred. Results showed no significant ($P>0.05$) differences in initial live weights (ILW) across treatments. However, while the values for daily dry matter concentrate intake (DCI), daily dry matter roughage intakes (DRI) and daily total feed intakes (DFI) were significantly ($P<0.05$) different across treatments, values for final live weights (FLW), total weight gained (TWG), average daily weight gained (ADG), feed conversion ratio (FCR) and feed conversion efficiency (FCE) were highly ($P<0.01$) significant across treatments. It is concluded that with the exception of initial live weights, all the feed ingredients used in formulating the experimental diets positively affected all the parameters

measured across treatments. Therefore the feed ingredients could be used to formulate the trial diets for cattle fattening.

Key words: *Performance, Red Bororo, Bullocks, Energy, Protein.*

INTRODUCTION

It is known that nutrition is one of the main factors driving the functioning efficacy, efficiency and evolution of livestock system. The main challenges nowadays in ruminant production are to reduce feeding cost, improve products quality. The use of unconventional feedstuffs or browse and shrubs may contribute to decrease feeding cost and environmental impact (Yacout, 2016).

The high cost and to some extent unavailability of plant energy and protein sources especially maize and cotton cake respectively in livestock feed manufacturing and ration formulation on the farms has made interest to be focused on cheaper alternative sources (Chisoko, 2004., Ngongoni and Manyuchi, 1993). The least cost rations can be formulated by reducing the level of costly protein source like soybean cake and energy sources such as maize and alternatively substituting with poultry litter as protein source, local brewers' dried grain as energy source. Energy is the major nutrient requirement and normally the first limitation to production. Energy is provided in units of Metabolizable energy (ME) (Bruce and Frank, 1993). Energy for growth is determined by calculating for maintenance requirements plus the requirement for growth. Efficient utilization of nutrients depends on an adequate supply of energy which is of paramount importance in determining productivity of ruminants. Deficiency of energy retards kid growth, delays puberty, reduces fertility and depresses milk production (Devendra and Mcleroy, 1987). Energy limitation may result from inadequate feed intake, from low quality of diet. Proteins are the principal constituents of the animal body and are continuously needed in the feed for cell repair and synthetic processes. The transformation of food protein into body protein is an important process of nutrition and metabolism.

Non-supplemented pasture, rangeland and hay based finishing systems do not support rapid weight gains or in some cases, even allow animals to reach an appropriate slaughter weight at an age where carcass quality is considered to be optimum (Ott *et al.*, 2004). Forage constitutes some 85-94% of the Metabolizable energy intake of grass eaters the world over. In developed as well as developing countries, crop residues account for about 24% of the total energy suitable for ruminant livestock while agro-industrial by products account for

only 1% (Vapu, 2007). Cottonseed cake (CSC) has been used as a cheaper alternative to Soybean cake in livestock feeding and as a source of dietary protein (Adeyemo and Longe, 2007). Ahmad *et al.* (2004) replaced Sunflower meal with cotton seed cake at 30% to Holstein-Friesian heifers and obtained average daily dry matter intake (DMI) of 2.31Kg, average daily gain of 849g with feed conversion efficiency (FCE) of 2.72.

With the expansion of poultry industry, storage and disposal of raw poultry manure has become an environmental problem due to associated water, air and soil pollutions (Benali and Kudra, 2002). Proper poultry manure management that preserves the environment, can contribute to both animal and human health. Poultry manure can be dried and used in ruminant feeding (Benali and Kudra, 2002). Dried poultry manure has been used as feed for ruminant animals (Thomas, 2010). The use of poultry manure as cattle feed had significantly ($P < 0.05$) improved economic beef production (Alam *et al.*, 2008). Information on the growth performance of red Bororo bulls fed two energy and two protein sources in Mubi region, Adamawa State, Nigeria is scanty. The research was therefore carried out to determine the effects of feeding the two protein and two energy sources on the growth performance of Red Bororo bulls.

MATERIALS AND METHODS

Experimental site

The study was carried out in Michika, Michika Local Government Area of Adamawa State, Nigeria.

Sources of the feeds

The ingredients used to formulate experimental diets were rice straw (RS), groundnut haulms (GH), poultry litter (PL), cotton seed cake (CSC) and local sorghum brewers' waste (LSBW). The rice straw and groundnut haulms were obtained from local farmers' farms after harvest. The leaves and straw portions of the rice straw were chopped manually into short lengths of about 2-3cm using local axe. They were bagged and stored before use. Groundnut haulms were purchased from local farmers. These haulms were crushed, bagged and stored before usage. Poultry droppings from deep litter system pens were gathered by thoroughly raking them to remove foreign material and then sun dried for four days. The droppings were ground, sieved and stored in bags before usage in formulating the supplemental diets as stated by Agle *et al.* (2010).

Animals and management

Twelve Red Bororo bullocks with an average weights of 194.69 Kg were purchased from Mubi and Uba Cattle markets in Adamawa State, Nigeria. The

animals were dewormed on arrival at the experimental pens with 7 to 10 mls liquid albendazole per animal by oral application. Prophylactic antibiotics (*Oxytetracycline*) LA of 10mls per animal i/m was applied on the animals. Dipping was also carried out in an acaricide solution to get rid of ectoparasites. The animals were tagged with wooden tags carrying figures. They were penned under shade made up of thatched roof with adequate ventilation. The pens were cleaned daily. Before the commencement of the experiment, the bullocks were fed rice straw chopped and mixed with groundnut haulms. They were fed this for seven (7) days to allow them adjust to the experimental diets. The groundnut haulms/rice straw mixture being the basal diet was fed to all the animals *ad libitum* throughout the experiment. The experimental diets and treatments were as presented in table 1. Proper medical care of the animals was carried out where necessary throughout the duration of the experiment.

Table 1: Experimental diets.

| Feed ingredients | TREATMENTS | | | |
|--------------------------|----------------|----------------|----------------|----------------|
| | T ₁ | T ₂ | T ₃ | T ₄ |
| Maize bran (%) | 36.25 | 0.00 | 79.23 | 0.00 |
| Brewers' dried grain (%) | 0.00 | 31.10 | 0.00 | 75.35 |
| Poultry droppings (%) | 62.50 | 67.65 | 0.00 | 0.00 |
| Cotton seed cake (%) | 0.00 | 0.00 | 19.52 | 23.40 |
| Bone meal (%) | 1.25 | 1.25 | 1.25 | 1.25 |
| Totals | 100 | 100 | 100 | 100 |
| Salt lick | <i>ad lib</i> | <i>ad lib</i> | <i>ad lib</i> | <i>ad lib</i> |
| G.Nut haulms/ | <i>ad lib</i> | <i>ad lib</i> | <i>ad lib</i> | <i>ad lib</i> |
| Rice straw (50:50) | | | | |

Parameters Determined

Parameters determined were proximate compositions of feed ingredients and experimental diets, initial live weights of the animals. Final live weights, daily dry matter intake, daily weight changes, digestibility of treatment diets, feed conversion ratios and feed efficiencies.

The dry matter (DM), Ash, Ether Extract (EE), Crude fiber (CF) and Nitrogen free extract (NFE) were determined as described by AOAC (2008). The crude protein (CP) content was determined using Kjeidahl method of nitrogen determination. Neutral detergent fiber (NDF) and Acid detergent fiber (ADF) were determined by Van Soest *et al.* (1991) method. Daily dry matter intake (DMI) was obtained by

finding the differences between the daily feed offered and feed rejected. Daily weight changes were determined by weighing the animals every week, Weight change in a week divided by seven gave the average daily weight change. Dry matter intake as a percentage of live weight was obtained by dividing dry matter intake by the live weight of animal times hundred. Feed efficiency was calculated by dividing weight gain by feed intake.

RESULTS AND DISCUSSION

Effects of the experimental diets on the growth performance of Red Bororo bulls are presented in Table 2. The results reveal that, final live weights (FLW) which ranged from 288.75 to 367.50 Kg, average daily gain (ADG) 1.08 to 1.85 Kg, total weight gains of 98.75 to 166.25Kg, feed conversion ratios of 2.01 to 3.24 and feed conversion efficiencies of 0.31 to 0.49 were highly ($P < 0.001$) affected by the dietary treatments. Similarly, daily concentrates, roughage and total feed intakes were significantly ($P < 0.01$) different among treatments. The total and daily weight gains recorded in this study which were 98.75 to 166.25 Kg and 1.08 to 1.82 Kg respectively, were significantly higher than those recorded by Jokthan *et al.* (2013) of 33.60 to 55.80 Kg and 0.40 to 0.66 Kg respectively. The differences recorded may be due to the differences in animal species used, diets and initial weights of the animals since the older the animal the lower the rate of growth. The daily concentrates, total feed intakes and feed conversion ratios obtained in this study are at variance with earlier findings of Jokthan *et al.* (2013).

Table 2: Growth performance of Red Bororo bullocks fed the experimental diets

| Parameters | Treatments | | | | SEM | Sig. Lev |
|------------|---------------------|---------------------|---------------------|---------------------|-------|----------|
| | T ₁ | T ₂ | T ₃ | T ₄ | | |
| FLW (Kg) | 292.50 ^b | 288.75 ^b | 367.50 ^a | 296.25 ^b | 10.97 | *** |
| ILW (Kg) | 193.75 ^a | 185.50 ^a | 201.25 ^a | 196.25 ^a | 12.39 | NS |
| TWG (Kg) | 98.75 ^b | 103.25 ^b | 166.25 ^a | 100.00 ^b | 6.79 | *** |
| ADG (Kg) | 1.08 ^b | 1.13 ^b | 1.82 ^a | 1.10 ^b | 0.08 | *** |
| DCI (Kg) | 1.40 ^b | 1.15 ^c | 1.60 ^a | 1.04 ^d | 0.13 | ** |
| DRI | 2.1 ^b | 2.25 ^a | 2.06 ^b | 2.35 ^a | 0.24 | ** |
| DFI | 3.50 | 3.40 | 3.66 | 3.39 | 0.27 | ** |
| FCR | 3.24 | 3.0 | 2.01 | 3.08 | 0.05 | *** |
| FCE | 0.31 | 0.33 | 0.49 | 0.32 | 0.005 | *** |

However, the highly significant weight gain recorded in this work ranging from 1.08 to 1.13kg is similar to 0.60 to 1.03kg obtained by Bobbo *et al.* (2017) when they fed white Fulani bulls agricultural by-products supplemented with

concentrates. This in agreement with Brian (2010) who reported that dry matter intake (DMI) tends to increase with increasing dietary protein level but decrease with increasing energy density.

The results also revealed that values of feed conversion ratio (FCR) and feed conversion efficiency (FCE) which ranged from 2.01 to 3.24 and 0.31 to 0.49 respectively, were highly ($P < 0.01$) significant across treatments. It is concluded that with the exception of initial live weights, all the feed ingredients used in formulating the experimental diets positively affected all the parameters measured across treatments.

Conclusion and Recommendation: It is concluded that with the exception of initial live weights, all the feed ingredients used in formulating the experimental diets positively affected all the parameters measured across treatments. Therefore the feed ingredients could be used to formulate the trial diets for cattle fattening.

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