

GROWTH PERFORMANCE OF CROSSBRED WEANER RABBITS FED DEHYDRATED BOVINE RUMEN DIGESTA

UDEH, F.U., ANI, A. O., UZUCHUKWU, I.E. AND ONUORA, S.I

Department of Animal Science, University of Nigeria, Nsukka

Correspondence email: fredrickudeh11@mail.com; Tel: +234(806)2457193

ABSTRACT

Twenty four crossbred rabbit of mixed sexes were used to evaluate the effect of different inclusion levels of dehydrated bovine rumen digesta (DBRD) on growth performance, carcass and organ characteristics of weaner rabbits. Four diets were formulated to contain 0% (control), 5, 10 and 15% DBRD. The rabbits were randomly divided into four groups and allotted into four treatments of 6 rabbits each in a completely randomized design (CRD). The trial lasted for 8 weeks. The result showed that the final body weight, average daily weight gain and feed conversion ratio values of rabbits on 5, 10 and 15% DBRD diets were comparable ($p>0.05$) to those of rabbits on the control diet. The average daily feed intake was significantly ($p<0.05$) increased as the levels of the test material increased. Nutrient intake by the rabbits were significantly ($p<0.05$) increased with the increase in DBRD inclusion levels. Apparent nutrient digestibility was affected ($p<0.05$) significantly by the diets. It was concluded that up to 15% of graded levels of DBRD can be included in the diet of weaner rabbits without any deleterious effect on performance.

Key Words: Effect, DBRD, nutrient intake, growth performance, crossbred weaner rabbits.

INTRODUCTION

The acute shortage of animal protein in developing countries like Nigeria is quite alarming. Consequently, the rapid increase in the cost of animal protein source has now put it out of the reach of an average Nigeria (Oyenuga, 1982). Despite the numerous advantages associated with consumption of animal protein, the minimum, daily intake of 35g recommended by Food and Agriculture Organization (FAO, 1992) has not been met. An average Nigerian for instance consumes only about 10g per head per day of this minimum daily animal protein requirement. This could be attributed to low level of animal protein production. There is therefore, an urgent need to increase livestock production in the country especially those that are highly prolific with rapid turnover rate at very low cost. The production of animals like rabbits, with very short gestation periods and production cycles, can be a solution to the problem of protein shortage. Rabbits can be produced on forages alone, although production can improve by adding other feed supplements. The need to explore other less common, but potential, sources of animal protein such as rabbits has been supported (Bamgbose *et al.*, 2004). The advantages projected include the high reproductive rate, rapid maturity, high genetic potential, efficient feed utilization, limited competition with humans for food and high

quality nutritious meat (Cheeke *et al.*, 1986). However intensive livestock farming in Nigeria has been greatly affected by the high cost of feeds especially protein ingredients such as soybean cake and fishmeal. In addition there is intensive competition between human and animals for these feed ingredients and this has worsened the animal feed supply situation in the country. Therefore, there is an urgent need for alternative locally available and cheap sources of feed ingredients particularly those that do not attract competition in consumption between humans and livestock. One possible source of cheap material is dehydrated bovine rumen digesta (DBRD). Dehydrated bovine rumen digesta not only serve as a feed nutrient, recycling it will also reduce disposal and environmental pollution problem (Esonu *et al.*, 2006). High cost of livestock production can be checked by encouraging the production of livestock species that produce maximally with minimum input, such as rabbit (Ukachukwu, 1997). Many Nigerians have not recognized the economic importance of rabbit production as a source of animal protein and source of generating income (Lamorde, 1991). Rabbit is a farm animal of economic value. It is low in fat, succulent, nicely flavored and providing a palatable change for chicken and other meat in Nigeria. The present study was therefore conducted to determine the growth performance of crossbred weaner rabbits

fed diets containing dehydrated bovine rumen digesta (DBRD).

MATERIALS AND METHODS

Location of the experiment: The experiment was carried out at the Rabbit Unit of the Teaching and Research Farm, Department of Animal Science, University of Nigeria, Nsukka in Enugu State, Nigeria.

Experimental diets, animals and management: Fresh Bovine Rumen Digesta was collected from Nsukka abattoir and sun dried until the desired moisture content of 7.95% was reached. It was then crushed in a hammer mill and incorporated into the experimental diets. Four experimental diets were formulated to contain 0, 5, 10 and 15% dehydrated bovine rumen digesta (DBRD). The percentage composition of the diets is presented in Table 1. A total of twenty-four 4 weeks old mixed sex crossbreeds (Chinchilla x New Zealand) weaner rabbits, with initial average weight of 0.91kg were used for the experiment. The rabbits were obtained from a reputable Farm in Enugu Metropolis. They were randomly assigned to four dietary treatments comprising four levels (0% (Control), 5%, 10% and 15%) of dehydrated bovine rumen digesta (DBRD). Each treatment was replicated 3 times with 2 rabbits per replicate. A three-tier cage was used with 2 rabbits housed per cage denoting replicates. The animals were acclimatized by placing them on diet containing *Centrosema pubescens* and growers mash for one week before the experimental diets were introduced. Experimental feed and water were given *ad libitum* to the animals, taking note of the quantity supplied and the left over. Feeding of the animals was done around 8am and 4pm daily. The rabbits were individually weighed at the beginning of the experiment to obtain the initial weight and then subsequently weighed at weekly intervals. The experiment lasted for eight weeks. The rabbits were de-wormed with Pirazine (containing piperazine citrate as its active ingredient) and other routine management practices such as cleaning of drinkers, feeders and the cages were done. At the end of the experimental period, three rabbits from each treatment were randomly chosen for apparent nutrient digestibility study.

Proximate and Statistical analyses: Proximate analysis of feeds and faecal droppings used was done according to AOAC (1990). Data collected were subjected to analysis of variance (ANOVA)

as described by Steel and Torrie (1980). Significant means were detected and separated using Duncan's New Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Table 2 shows the effect of varying dietary levels of dehydrated bovine rumen digesta (DBRD) on growth performance of weaner rabbits. There were no significant differences ($p>0.05$) among the treatments in average daily weight gain, final body weight and feed conversion ratio. However there were highly significant differences ($p<0.01$) in average daily feed intake among treatments, with T4 (15% DBRD) having the highest value of 107.20 ± 0.22 g/day/rabbit and T1 (0% DBRD) having the lowest value of 94.10 ± 0.47 g/day/rabbit. This result agrees with the finding of Okpanachi *et al.* (2010) which showed that there were no significant difference ($p>0.05$) in average daily feed intake of rabbits fed diets containing varying levels of DBRD. As shown in Table 2, the average daily feed intake increased significantly with increase in DBRD levels. Rabbits fed the control diet (0% DBRD) consumed 94.10 ± 0.47 g/day/head while those on treatment 4 (15% DBRD diet) consumed 107.20 ± 0.22 g/day/rabbit. The values (94.10 ± 0.47 g- 107.20 ± 0.22 g) obtained in the present study are higher than the values (50.71g – 54.60g) reported by Olabanji *et al.* (2007) who showed that there were no significant difference in average daily feed intake of weaner rabbits fed diets containing varying levels of sunflower. The present results agree with those of Dairo and Egbeyemi (2012) which showed that weaner rabbits fed diets containing varying levels of DBRD differed significantly ($p>0.05$) in their daily feed intake values of 53.55g – 61.42g. However, these values are lower than the values obtained in the present study. The observed significant increase in average daily feed intake may be attributed to the acceptability, palatability and high protein content of the test material (DBRD). The crude protein range of 9-20% had been reported for rumen content (Dairo *et al.*, 2005). Also the increased feed intake of the birds on the diets containing dried rumen digesta meal is understandable, dried rumen digesta contain high fibre which tend to increase the total fibre content of the diet and dilute other nutrients. Animals must therefore eat to meet their energy

requirement to sustain rapid growth and development, hence the increased feed intake. The results of this study also agree with earlier reports (Ash and Akoh Petaia, 1992; Opara, 1996; Esonu *et al.*, 2002). Data on nutrient intake of weaner rabbits fed graded levels of DBRD are presented in Table 3. Protein intake, ether extract intake, crude fibre intake, nitrogen-free extract intake and dry matter intake were significantly ($p < 0.01$) influenced by the treatments. Crude protein intake (CPI) was highest ($17.30 \pm 0.04\text{g}$) in the control group (0% DBRD) and decreased with increase in DBRD inclusion level in the diets, while the lowest value ($15.01 \pm 0.70\text{g}$) was obtained in T4 (15% DBRD). These values are higher than the values reported by Etchu *et al.* (2014) and Doma (1994). The high crude protein intake may be due to high DMI caused by the nature of the diets. Although nitrogen-free extract and ether extract intakes were significantly ($p < 0.01$) affected by the diets, such observation does not agree with the result reported by Etchu *et al.* (2014) which showed that there were no significant differences in most nutrient intake parameters observed in rabbits fed diets containing rumen content. There was an increase in dry matter intake (DMI) with increasing fibre levels which is in agreement with the report of Butcher *et al.* (1981) and Abour-Ashour and Barakat (1986). The DMI was in the range of 4.97 to 5.69% of their body weight and therefore were comparable with the range of 4 to 7% reported by Reddy *et al.* (1977) for rabbits under temperate conditions. The DMI values were higher than those reported by Aduku *et al.* (1986) and Etchu *et al.* (2014). The result of the crude fibre intake agrees with the observation of Deblas *et al.* (1981) which indicated that the crude fibre of a diet had significant effect on the DMI.

Conclusion

It is evident from the results obtained in this study that up to 15% DBRD can be included in the diet of weaner rabbits without any deleterious effect on performance of rabbits.

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Table 1: Percentage Composition of Experimental diets

Ingredient	T1	T2	T3	T4
Maize	48.00	43.00	38.00	33.00
Wheat offal	19.00	19.00	10.00	15.00
Dehydrated				
rumen contact	0.00	5.00	10.00	15.00
GNC	12.50	12.50	12.50	12.50
PKC	16.00	16.00	16.00	16.00
Bone meal	4.00	4.00	4.00	4.00
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated composition:				
CP%	15.95	16.04	16.12	16.14
Energy				
(MJME/kg)	3.68	3.81	3.85	4.21
CF%	5.00	6.00	8.00	10.00
Determined composition:				
Dry matter	90	85	90	85
Crude protein	15.95	16.04	16.12	16.14
Ash	10	10	10	20
Ether -extract	5.25	5.3	5.2	5.15
Crude fiber	5.28	6.30	8.29	10.31
NFE	53.52	48.36	53.39	38.4

Table 2: Growth performance of rabbit fed graded levels of rumen content

Parameters	0%	5%	10%	15%	Levels of Sig.
Initial body wt (kg)	0.92±0.02	0.88±0.02	0.90±0.02	0.90±0.03	NS
Final body wt (kg)	2.66±0.26	2.48±0.06	2.44±0.04	2.48±0.07	NS
Ave daily wt gain (g)	41.48±1.92	44.22±1.13	43.57±0.74	44.34±1.23	NS
Ave daily feed intake (g)	94.10±0.47 ^d	98.51±0.36 ^c	103.63±0.21 ^b	107.20±0.22 ^a	**
Feed conversion ratio	2.28±0.27	2.23±0.06	2.38±0.04	2.42±0.07	NS

a, b, c, d-Row means with different superscripts are statistically significant at 1% or 5% = (p<0.01), * = (p<0.05)**,
NS = not significant.

Table 3: Nutrient intake of rabbits fed graded levels of rumen content

Parameters	0%	5%	10%	15%	Levels of Sig.
Protein intake	17.30±0.04 ^a	16.70±0.04 ^b	15.80±0.06 ^c	15.01±0.7 ^d	**
Ether extract	4.94±0.03 ^d	5.22±0.02 ^c	5.39±0.01 ^b	5.52±0.02 ^a	**
Crude fibre	4.97±0.03 ^d	5.22±0.02 ^c	5.49±0.02 ^b	5.69±0.01 ^a	**
NFE intake	55.32±0.12 ^a	50.36±0.26 ^b	47.64±0.17 ^c	41.16±0.08 ^d	**
DM intake	84.69±0.43 ^c	83.73±0.31 ^c	91.12±0.19 ^b	93.27±0.19 ^a	**

a, b, c, d-Row means with different superscripts are statistically significant at 1% or 5% = (p<0.05) ** , (p<0.01)*
 NS = Not significant.