EFFECT OF GRADED LEVELS OF BREWERS DRIED GRAIN ON THE PERFORMANCE OF GROWING RABBITS: 1. GROWTH PERFORMANCE AND ECONOMY OF PRODUCTION

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ABSTRACT

The experiment was conducted to investigate the growth performance and economy of production of growing rabbit fed graded levels of brewers dried grains, five diets were formulated in which brewers dried grains (BDG) was included at 0%, 10%, 20%, 30% and 40% respectively. Thirty (30) 6-8 weeks old growing rabbits were randomly allotted to the dietary treatment, with three replicate of two rabbit per replicate in completely randomized block design. Results showed that Rabbit on 40% BDG had a significantly ($P<0.05$) better average daily weigh gain (13.86g/d) and feed conversion ratio. (FCR) The feed cost per kg gain (N/gain) was significantly ($P<0.05$) lower at 40% BDG. Based on these BDG at 40% gave the best performance and could be recommended as the best inclusion level of growing rabbits.

Keywords: Brewers dried grain, growing rabbit, Growth and Economy

INTRODUCTION

Increased rabbit production is one way of meeting the animal protein requirement of the Nigeria populace (Iyeghe-Erakpotobor etal 2002). Nigeria is currently plaques with food crisis. This is due to the growing population and serious drop in food production. The inadequacy in food supply in Nigeria tends to be more serious with protein deficiency when compared to the availability of Calorie. Shortage of protein, particularly, those of animal origin prevail in most tropical Africa countries (including Nigeria). It has been estimated that an average Nigeria consumes only about 8.6g of animal protein as against 53.3g consumed by citizens of the developed country (FAO 1982). Increase in population of human is leaving no hope of even having surplus grain to compound an economically viable livestock feed. Christopher etal (1997), Onimisi (2005). Current research efforts in most developing countries are therefore aimed at identifying potential feed sources that have little or no demand by human. Such could be cheap and available for compounding livestock ratio as it will reduce competition between man and livestock. Some of this potential feed material that is being investigated include by products from industries and waste from cattle ranches, abattoir and poultry houses. Alawa and Ummuna (1993) Addulmalik etal (1994).

Addressing the problem of shortage of animal protein in Nigeria calls for total exploitation of all the potential sources of animal protein to meet the satisfactory level of intake one of these sources is to increase the production of short production cycle animals such as rabbit poultry and pigs, and reduce the cost of production of livestock feed and other related industrial waste. Aduka and Olukos; (1990) analyses Brewers dried grain to

contain 27.23% crude protein, 11% crude fibre which is sufficient to meet the protein and fiber requirement for growing rabbits. This study was therefore carried out to determine the growth performance and economy of production of growing rabbit fed graded level of brewers dried grains.

MATERIALS AND METHODS

Study Area

The research was conducted at the Taraba State College of Agriculture livestock research farm, Jalingo, Nigeria. it lies within the Guinea savannah Zone of Nigeria on latitude $8^0$50″N and longitude $11^0$25″E. it is characterized by six month of rainy season (May to October) and five months of dry season (November to May).

Source of Brewers Dried Grain

The Brewers dried grain were obtain from the Local beer Brewer within Jalingo metropolis. The sundried brewers dried grains was sampled for analysis then stored in feed bags until incorporated on the test diets.

Experimental Designed and Animal Management

Thirty (30) New Zealand White and Chinchilla weaner rabbit, averaging 510.3g in weight and aged between 6-8 weeks were randomly divided into five groups of six animals per group. Each animal was housed in a standard hutch of 120 by 150cm and raise 120cm from the ground in a three-tier hutch system, the animal were each provided with a feeder and drinker. Each animal were dewormed and given acaricide bath prior to experiment. The rabbits were obtained from small-scale producers in Jalingo. The rabbit were weighed and randomly assigned to five (5) treatment groups (T1, T2, T3, T4 and T5) in completely randomized block designed (CRBD) with six (6) rabbit per group, each treatment was replicated three times with two rabbits per replicate. The experiment lasted for eight weeks after an intial adjustment period of one week.

Data Collection

Daily feed intake and weekly weights were recorded. The feed conversion ratio were calculated and no mortality was recorded during the experimental period. The cost of the feeding stuff used for the formulation of the experimental diet were also recorded to determine the cost of the feed formulated per kilogram.

Chemical and Statistical Analysis

Proximate analysis of the Brewers dried grains and the experimental diet were carried out using the procedure, describe by AOAC (1990) Data generated were subjected to analysis of variance (Steel and Torrie, 1980) and Duncans multiple range test was used to separate the treatment means.

Results and Discussion

The chemical composition of BDG and experimental diets is shown in Table 2. The crude protein (CP) contents of the diets (15.38-18.31) was adequate for growing rabbits Omole

(1977): Recommended protein level of 18% for growing rabbits reared in tropical countries. However, the quality of dietary protein is very important in rabbit nutrition since voluntary feed intake has been found to increase with improvement in the quality of protein in the diet. (Kennedy and Hershberger, 1974: Spreadbury 1974). The crude fibre (CF) levels of the diet increased with increasing levels of Brewers dried grains (BDG) in the diets. The fibre level in the diet (11.59 – 15.60) is higher than the 10% recommended by Speadbury and Davidson (1988) as the ideal level for maximum growth of fryers Champe and Maurice (1983) Recommended a level of crude fiber in excess of 9% for normal growth of rabbits and for the prevention of enteritis. The metabolisable energy (ME) levels of the diet were 3045.71 , 2693.53, 2614.99, 2536.66, 2541.33 Kcal/kg for diet. 1 (control) 2, 3, 4 and 5 respectively. The energy levels of the diet were within the range of 2500 -2800 Kcal metabolisable energy level reported by Aduku and Olukosi (1990) and Anugwa, et al (1982) for growing rabbits. Except treatment 1(control) which is higher. This could be as a result of the higher level of maize in the diet.

Result of the performance of growing rabbits fed the experimental diet is shown in Table (3)

The average daily feed intake presented in Table 3 showed no significant ($P>0.05$) difference in the mean daily feed intake of rabbits fed the experimental diets. The values ranged from 44.73-57.90g/rabbit/day which is below what was reported by Adegbola and Usuji(1985) (53-66.65g/day) for rabbit fed diet containing 60% maize and varying levels of cassava leave.Although , the overall result indicates no significant ($P>0.05$) difference among treatment. However, there were slight increase in the numerical value for feed intake in treatment 4, the slight increase in feed intake seemed to be associated with the increasing level of crude fibre in the diets. (Adegbola and Osuji 1985). Champe and Maurice (1983) reported that rabbits require a level crude fibre in excess of 9% for normal growth. Generally the mean total feed intake values were relatively similar, this indicates that maize can be substituted with brewers dried grains up to 40% without compromising feed intake.

The average daily weight gain which ranges between 10.12 – 13.86 g/rabbit/day (table 3) differ significantly ($P<0.05$) among the treatments. The mean daily weight gain of 11.85, 10.12, 11.19, 13.61 and 13.86g/rabbit/day observed in the five treatments are quite comparable to the mean of 10 – 20g/day, reported by Cheeke (1987) for rabbits reared in tropical countries. Other studies in semi-arid environment gave daily weight gain between 5.20 and 10.00/rabbit/day. (Igwebuike et al, 1995: Igwebuike et al: 1998: Alade et al 2001). Aduku and Olukosi (1990) reported average daily gain of 15 – 20g as the common range in the tropics. Variation from this may be due to the depressive effect of high ambient temperature on feed intake and weight gain (Stephen, 1980) and this appears to be the case in the present study where temperatures as high as 34^{0c} were obtained in the course of the study. This is by far beyond the 16^{0c} – 19^{0c} and 21^{0c} - 25^{0c} given as the comfort zone for rabbits by fielding (1991) and Brody (1964) respectively.

Feed Conversion Ratio of rabbits fed graded levels of BDG.

The values for feed conversion ratio were not significantly (P>0.05) for all the treatments. The range of fed conversion ratio (3.61 – 5.00) recorded in this findings were superior to the range of 5.7 – 9.44 obtained by Abu and Ekpeyong (1993) for the rabbit fed palm oil meal affluent. However, all the FCR value, obtained in this study is higher than 3.6 reported by Rastogi (1989) who fed caged rabbits with pelleted diets. This observation may be attributed to enhanced feed intake and better utilization of pelleted diet therefore, the increase in weight gain of rabbits in treatment 4 lead to improvement in feed conversion ratio .The FCR values in this study fall within the range of 2.5 to 5.0 reported by other workers (Omole,1977, Aduku et al (1988), and Igwebuike et al ,1995) for growing rabbits in Nigeria. No mortality was recorded throughout the period of the experiments.

Table 1: Composition of the Experimental Diets

Ingredients (%)	T1	T2	T3	T4	T5
Maize	48.00	40.00	32.5	25.0	19.10
BDG	0.00	10.00	20.00	30.00	40.00
Groundnut haulms	17.00	17.00	17.00	17.00	17.00
Maize offals	15.00	15.00	15.00	15.00	15.00
Groundnut cake	11.0	10.0	9.0	7.0	4.0
Fish meal	6.0	5.00	3.5	3.0	2.0
Bone meal	2.00	2.00	2.00	2.00	2.00
Salt	0.50	0.50	0.50	0.50	0.50
Premix*	0.5	0.5	0.5	0.5	0.5
Total	**100**	**100**	**100**	**100**	**100**
Calculated Analysis					
Cp	17.02	17.30	17.28	17.40	17.51
Cf	7.09	8.02	8.96	9.88	10.82
ME (Kcal/kg)	**2995.59**	**2707.00**	**2641.86**	**2588.63**	**2616.09**

Premix manufacture by animal care service consult (Nig) Ltd Lagos supply the following per kg of premix:- Vitamin A, 3,200,000 I.V: Vitamin D_3 640,000 I.V Vitamin E, 2,000 I.V Vitamin K, 800mg, Thiamine B_1, 600mg, Riboflavin B_2 1,600mg, Pyridoxine B_{12}, 600mg, Ncacin 600mg, Vitamin B_{12}, 4mg, Pantothenic acid, 200mg, Folic acid 2,000mg, Biotin 8mg, Choline chloride, 80kg Antioxidant 50g manganese 32g Zinc, 20g, Iron 8g, copper, 2g Iodine. 0.48g Selenium 80mg and Cobalt 80mg.

Table 2: Chemical Composition of the Experimental Diet and Brewers Dried Grain (BDG)

	Diet / Treatment					BDG
Constituents (%)	**1**	**2**	**3**	**4**	**5**	
Dry matter (DM)	88.63	88.17	89.23	88.51	89.53	88.24
Crude Protein (CP)	18.31	17.23	16.51	15.60	15.38	27.42
Crude Fibre (CF)	11.59	12.15	13.38	14.27	15.60	11.16
Ether Extract (EE)	10.87	8.69	8.25	7.72	7.55	7.43
Ash	5.23	5.11	4.86	4.52	4.28	4.80
Nitrogen free Extract (NFE)	41.91	38.06	37.63	37.58	38.33	46.04
ME/Kcal/kg	3045.71	2693.53	2614.99	2536.61	2541.33	3250.79

"ME" = Metabilisable energy, calculated according to the formula of Pauzenga (1985). ME = (Kcal/kg) = 37 x % cp + 81 x % EE + 35.5 x % NFE.

Table 3: Performance characteristics of growing rabbit fed graded levels of Brewers dried gains(BDG)

	Replacement levels of BDG for maize(%)Performance					
Parameter	**0**	**10**	**20**	**30**	**40**	**SEM**
Daily weight gain (g/d)	11.85[b]	10.12c	11.19bc	13.61a	13.86a	0.43*
Daily feed intake (g/d)	44.73	50.70	45.43	52.60	57.90	1.84[NS]
Feed conversion ratio	3.77	5.00	4.06	3.86	3.61	1.27[NS]
Mortality	0	0	0	0	0	

Key

SEM = Standard error of means

a,b,c,d= Means with different superscript in the same row differ significantly (P<0.05)

NS = Not significant (P>0.05), * = Significant (P<0.05)

Table 4: Economic performances of Rabbits fed graded levels of Brewers dried grains (BDG)

Replacement levels of BDG for maize (%)

Parameter	**0**	**10**	**20**	**30**	**40**	**SEM**
Total Feed intake (kg)	8.3	4.2	8.4	4.4	4.0	
Feed cost (N/kg)	66.78	58.75	49.155	41.43	33.31	
Cost (N/kg)	5.54	4.13	3.45	1.82	1.33	
Total weight Gain (g)	563.73	567	526.6	664.29	645	
Feed cost/kg Gain (N)	119.25[d]	102.19[c]	92.75[b]	62.77[a]	51.25[a]	0.42

a.b.c.d. means within a raw with different superscripts are significantly different (P<0.05).

Table 4 shows he economic analysis of performance of growing rabbit showed a lightly significant difference ($P<0.05$) in feed cost/kg of the diet. The feed cost (N/kg) of the graded levels of Brewers Dried Grains decreased with an increase in levels of brewers dried grain inclusion in the diet increases which generally led to reduction in feed cost (Abu et al 1999). Feed cost/kg gain (₦/gain) decreases from 119.25/kg gain (diets) to ₦51.25 (diet 5). This could be due to better utilization of Brewers dried grain (BDG). In the diet as a result of high CF. the least cost (N/gain) was observed in rabbits on diet 5 (N5.25/gain). These results have established that rabbits on treatment 5 (40% BDG) had a better FCR when compared to other treatments diets.

CONCLUSION

From the results obtained in this study 40% of BDG can be included in the diets of growing rabbits without any adverse effects on their biological and economic performance.

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