
EFFECT OF MAIZE REPLACED WITH BAKERY WASTE ON GROWTH PERFORMANCE AND ECONOMIC OF PRODUCTION OF MEAT TYPE RABBIT

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ABSTRACT

The unconventional feed sources play a key role in reducing cost of feed by replacing the proportion of conventional feed ingredients. Thus this study was carried out to evaluate effect of maize replaced with bakery waste on growth performance and economic of production of meat type rabbit. Thirty weaned mixed breed rabbits aged between 5-6 weeks were used. The rabbits were randomly assigned to five dietary treatment groups with three replicates and two rabbits per replicate in the ratio of 1:1 (1 male and 1 female) in a completely randomised design (CRD). The bakery wastes were sundried to reduce the moisture content and incorporated at 0%, 25%, 50%, 75% and 100% levels of inclusion to replace maize in the experimental diets and designated as T1, T2, T3, T4 and T5 respectively excluding treatment one (T1). After 35 days feeding trial, data collected on feed intake, weight gain, price/kg feed and price/kg rabbit were subjected to Analysis of Variance (ANOVA). Growth performance of rabbits showed no significant ($P > 0.05$) difference across the treatment groups. However, highest total feed intake was recorded in T4 (50%) inclusion level as 2.11kg and lowest was observed in T5 (100%) inclusion level as 1.95kg. Feed cost per kg were significant similar ($P > 0.05$) in T2 (₦871.91), T3 (₦831.00) and T4 (₦785.22) but were significantly ($P < 0.05$) higher than T1 (₦470.55) and T5 (₦488.60). The trial showed that bakery waste can be used at 75% level of inclusion in the rabbit diets without causing any threat to the animals' performance.

Keyword: Growth performance, Bakery waste, Economics of production, Maize

INTRODUCTION

The supply of qualitative animal protein in sufficient quantity and at affordable cost has continued to remain a dream yet to be realised and indeed a perennial problem and a major challenge to the livestock industry in Nigeria and in most developing countries. Continuous quest to bridge the gap between population explosion and food shortages, has made it imperative to search for alternative means of survival. In order to ensure adequate supply of protein to the rapidly growing population of Nigeria, the output of animal products has to be increased especially with short cycle animals like rabbits, pigs and poultry (Ogbu and Herbert, 2016). Animal protein is very essential for growth, development and maintenance of human life as it contains all essential amino acids needed for this purpose. Unfortunately, poultry and pigs require food sources that are in direct competition with man, unlike rabbits that can be raised from forages and feed materials that freely abound in the tropics (Hassan *et al.*, 2012).

Rabbits (*Oryctolagus cuniculus*) are small mammals/pseudo-ruminants in the family of *liporidae* of the order of *lagomorpha*. They have large powerful hind legs and each foot has five toes, rabbits are hindgut digesters with a caecum that digest fibre. They are reared in cages/huges or deep litter for meat and wool, classified as a monogastric herbivore or pseudo-ruminants because of its ability to eat and digest forage but do not possess four stomach compartments and do not chew the cord or regurgitates but also does what is known as coprophagy (Ibrahim *et al.*, 2017). Rabbits have high growth rate, very high prolificacy and fecundity levels, quicker return on investment, short gestation period with high quality and nutritious meat as well as simple management techniques (Kuldeep *et al.*, 2014).

Rabbits have been recognised to have very important role to play in the supply of animal protein to Nigerians especially in the rural and peri-urban areas. They are efficient converters of feed to meat and can utilize up to 30% crude fibre as against 10% by most poultry species (Egboet *et al.*, 2001). To make rabbit rearing more viable as a small scale business, Alawa *et al.*, (1999) have advocated the development of alternative feeding materials that will be relatively cheap when compared with commercial feeds or conventional feed stuffs. (Igwebuike *et al.*, 2001). Efforts aimed at increasing animal protein supply must necessarily address the competition between man and livestock for feed

sources which has been resulted into shortage of such conventional feedstuffs like maize, soyabeans and groundnut cake for compounding livestock feeds (Amefuleet *al.*, 2004).

Agricultural and agro-industrial by-products have been the major focus of researchers.

A lot of research works has been conducted in Nigeria with effort to substitute maize with cheaper and readily available ingredient in order to reduce cost and over dependence on maize. Thus cassava peel meal, (Olorunsanyaet *al.*, 2007), Jack bean meal (Udedibieet *al.*, 2005) has replaced maize in rabbit diets with moderate results among many other similar studies.

Bakery waste is a by-product obtained from the process of baking from bread making industries. It has high concentration of carbohydrates and could therefore be a cheap and locally available substitute for maize in livestock diets.

This research work therefore aimed at investigation the effect of maize replaced with bakery wastes diet on growth performance and economic of production of meat type rabbit.

MATERIALS AND METHODS

Location of Experimental site

The research was conducted at the Teaching and Research Animal House, Rabbitary Unit, Department of Agriculture, Adeyemi Federal University of Education Ondo, Nigeria. Ondo state lies between Latitude 7° 47' N of equator and Longitude 3° 56' E of the Greenish Meridian and fall in the rain forest zone of Nigeria. It has an annual rainfall of about 1828mm with an average climatic temperature of 29^{0C} and 34^{0C}. This agro-ecological characteristic of the area is reported by Acuweather, (2015).

Sources of test Ingredient

Bakery wastes were collected from Ade-Super Bakery, Ondo, Ondo State Nigeria. These were sundried to reduce the moisture content. Other feed ingredients were purchased at Sunshine Feed Mill in Oka, Ondo, Ondo State. Five experimental diets were formulated in such a way that bakery waste replaced maize at 0, 25, 50, 75 and 100% levels.

Experimental Animals and their Management

Thirty weaned composite rabbits age 5-6 weeks were used and of both sexes (20 females and 10 males), were randomly allotted to five treatment groups. Each treatment had three replicates with three rabbits per replicate (one male and two females). The rabbits were housed intensively in well constructed hutches that were made of wire and woods with trays to collect the faeces as well as easy cleaning of the hutches. The hutches were cleaned twice daily throughout the research period. The experiment lasted for 6 weeks after one week of adjustment period. The rabbits on all the treatment were kept under close observation for proper monitoring indication of ill-health. The rabbits were dewormed against endoparasite using ivermectin. Coccidiosis was treated once using sulphadimidine and multivitamin soluble powder (Vitalyte) was given as an anti-stress.

Experimental Diets

The diets formulated were designated T1 to T5 and had the test ingredients bakery waste incorporated into the diets at the level of 0,25, 50, 75 and 100% inclusions for the experiment. All other feed ingredients were ground in a hammer mill, mixed being fed to the rabbits. Prior to the start of the experiment, the animals were fed normal diet and allowed an adjustment period of one week to enable the animals get acclimatized to the cages and diets. The diets and fresh water were provided *ad libitum* throughout the duration of the experiment.

Data collection

Data on performance (initial weight, final weight, daily weight gain, feed intake, feed conversion ratio) and other parameters were collected over a period of five weeks using weighing scale for weekly weighing of the animals. Feed intake was determined on daily basis by weighing the feed offered to the animals and the quantity of feed left unconsumed by the following morning. The difference in weight between the two gave the quantity of feed consumed per day. Mean daily weight gain and feed conversion ratio were also determined.

Economic Efficiency of Feeding Rabbit

The current market price of the feed ingredients within the duration of the study was used for the calculation of cost of economic efficiency of feeding rabbits.

To calculate the cost per kg feed, the price of each ingredient was taken and this was used to multiply the quantity (kg) of ingredients used in compounding each diet and then summed up for different

experimental diets. In evaluating the feed cost per kg weight gain, the total cost of feeding the rabbits was divided by the total body weight gain. The cost of feeding was the difference of the cost/kg weight gain of the control diet and those of other treatment diets as described by Obunet *et al.*, (2010).

Data Analysis

Data collected were subjected to analysis of variance (ANOVA) while difference between treatment means were examined and separated by Duncan Multiple Range Test with the aid of Statistical Package for Social Sciences (SPSS) version 13.

RESULTS AND DISCUSSION

Table 1 summarises the effect of maize replaced with graded levels of bakery waste diet on growth performance of rabbits. Although there was no significant variation ($P>0.05$) in all the parameters, final weight, initial weight, weight gain, feed intake, and feed conversion ratio. However, there were slight differences in the numerical values of the parameters. T2 (25%) recorded highest total body weight gain of (0.330kg) while T4 (75%) recorded the highest total feed intake of 2.11kg and weekly feed intake of 0.422kg respectively.

Table 1: Effect of maize replaced with bakery waste diet on growth performance of rabbits

Parameters	Replacements Levels (%)					SEM	LOS
	T1	T2	T3	T4	T5		
Initial weight (kg)	0.57	0.53	0.57	0.51	0.54	0.63	NS
Final weight (kg)	0.88	0.86	0.84	0.82	0.83	0.78	NS
Total body weight gain (kg)	0.31	0.33	0.27	0.31	0.29	0.64	NS
Weekly body weight gain (g)	62.60	66.00	54.40	62.40	58.20	12.23	NS
Total feed intake (kg)	2.02	1.98	2.01	2.11	1.95	2.98	NS
Weekly feed intake (kg)	0.40	0.40	0.40	0.42	0.39	0.56	NS
Feed Conversion Ratio	6.45	6.00	7.38	6.76	6.70	3.45	NS

NS: Not Significant, LOS= Level of significant, SEM= Standard Error of Mean

The results obtained in this study were in conformity and also numerically higher than those earlier reported by Dairo and Oyaleke (2004). The superiority in the values recorded in this study may be attributed to the safety and high quality of the diets since the diets were balanced for all the nutrients required by this class of the animal.

Table 2: Economics of production of rabbit fed maize replaced with bakery waste diet.

Parameters	Replacements Levels (%)					SEM	LOS
	T1	T2	T3	T4	T5		
Feed cost/kg (N)	470.55 ^b	871.91 ^a	831.00 ^a	785.22 ^a	488.60 ^b	100.28	**
Total feed intake (kg)	2.02	1.98	2.01	2.11	1.95	2.98	NS
Daily feed intake (g)	57.71	56.57	57.42	60.28	55.71	1.23	NS
Total body weight gain (kg)	0.313	0.330	0.272	0.312	0.291	0.64	NS
Feed cost/ kg rabbit (₦)	6.45	6.00	7.38	6.76	6.70	1.67	NS

** Significantly different, NS: Not significantly different

^{ab} mean value within row carrying different superscript differ significantly.

The result of economics of production of rabbit fed maize replaced with bakery waste was presented in Table 2. Results showed that there was no significant ($P>0.05$) difference in all the parameters except in feed cost/kg. Feed cost per kg were significant similar ($P>0.05$) in T2 (₦871.91), T3 (₦831.00) and T4 (₦785.22) but were significantly ($P<0.05$) higher than T1 (₦470.55) and T5 (₦488.60). Results showed that it is not economical to use bakery waste at these levels when compared with the control diet. This result is in conformity with the observation of Dairo and Oyaleke (2004) who evaluated the response of growing rabbits fed bakery waste meal in place of maize. They observed significant decrease in feed intake and weight gain as the level of bakery waste increases.

CONCLUSION

The study showed that bakery waste could be a good feed substitute for maize in rabbit diet at a lower level of replacement. However effort should be made to control bloat that was observed in rabbit fed maize replaced with bakery waste diets.

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