

EFFECT OF RAW BAMBARA NUT OFFAL (RBO) SUPPLEMENTED WITH ENZYME ON THE PERFORMANCE AND COST OF PRODUCTION OF BROILER FINISHER CHICKENS

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Abstract: A trial was conducted to determine the effect of graded levels of raw Bambara nut offal (RBO) with supplementary enzyme on the Growth performance and cost of broiler finisher birds. The experiment was carried out at the poultry unit of the Department of Animal Husbandry, Akperan Orshi Polytechnics, Yandev. A total of 120 four-weeks old broiler birds were randomly divided into four dietary groups of 30 birds each. The groups were randomly assigned to four diets containing 2808.76-3091.34 Kcal/Kg, metabolizable energy and 19.63-20.06% crude protein diets involving four levels (0, 10, 20, and 30kg) of raw Bambara nut offal (RBO) supplemented with exogenous enzyme, Biozyme. Each treatment was replicated three times with ten (10) birds per replicate placed in deep litter pens of fresh wood shavings. Feed and water were supplied ad libitum to the birds. There were no statistical differences ($p > 0.05$) on total feed intake, feed cost per kg and total feed consumed. However, both cost of feed per kg and cost of total feed consumed were least in treatment 4 which had the highest inclusion level of Bambara nut offal. Although there were no significant differences ($p > 0.05$) among the dietary treatments, it is evident from the results that high levels (30%) of enzyme supplemented raw bambara nut offal lowered the cost of feeding broiler finisher chickens.

Keywords: Growth performance, Broiler finisher, supplementary enzyme, Bambara nut, cost of broiler

INTRODUCTION

Emerging challenges to the broiler industry like the rising cost of feed have led to increase in retail price for poultry products. In order to stay competitive within the poultry industry and decrease the cost of production, several strategies are being employed, including the use of alternative feed ingredients and addition of exogenous enzymes to diets in order to cut cost while enhancing productivity among other benefits.

Feed remains the most important cost of Animal production (Atteh, 2002; Kehinde *et al.*, 2006). The need for feed ingredients, which will reduce the cost of production, is the basis for most new ingredients that are being brought to the fore in livestock feed and production research. This is because man and his livestock are in competition for basic ingredients and

such ingredients are not usually produced in sufficient quantities locally (Oluyemi *et al.*, 1978; Omojola and Adesehinwa, 2007). Therefore, availability of feed thus becomes the key factor limiting poultry production. Broiler feed is based primarily on cereal grains and vegetable protein meal, which is supplied for meeting most of energy and protein requirements in the poultry diet. Research into the use of cheaper industrial by products and wastes at various levels of dietary inclusion for poultry has therefore been intensified in the last few years to determine their efficiency of utilization in terms of growth and production (Longe and Adetola, 1983; Adeniji and Balogun, 2002).

Raw bambara nut offal (RBO), is a by-product of bambara nut milling industry that contains about 18.30% Crude Protein, 20% Crude fibre, 5.36% Ether extract, 41.64% Nitrogen-free extract, 10.2% moisture and 16.74MJ of gross energy (Ani and Omeje, 2007). Bambara nut is widely cultivated in the Northern and Southern States of Nigeria. The seeds are usually milled into flour, processed and consumed as *moi moi* (Enwere, 1998). Bambara nut offal has been used in the feeding of poultry and rabbits (Ani and Okafor, 2004; Ani, 2006; Ani and Omeje, 2007). However, its uses in the feeding of monogastric animals is limited by the presence of such anti-nutritional factors (ANFs) as protease inhibitors, phytate, haemagglutinins, tannins, cyanogenic glycosides and flatulence factors in the raw been (Ensminger, 1996; Enwere, 1998; Tiago, 2012). To improve the nutritional quality and to provide effective utilization of legume grains for poultry, it is essential that anti-nutritional factors be removed or reduced (Akande and Fabiyi, 2010).

Reduction of ANFs can be realized in various ways, by heat treatment and enzymatic degradation (Carsten, 2013). Hence, it is necessary to establish processing technique(s) to ensure its optimal utilization. Processing technique such as toasting (heat treatment) is a means of improving the nutritional value and protein digestibility of foods (Nergiz and Gokgoz, 2007; Iyayi *et al.*, 2008). It has been reported that toasting improves protein quality by inactivating anti-nutritional factors such as trypsin inhibitor and haemagglutinins and by unfolding the protein structure, thus making them more susceptible to attack

by digestive endogenous enzymes (Sathe *et al.*, 1984; Akande and Fabiyi, 2010; Carsten, 2013). Besides anti-nutritional factors, another limitation is its high fibre content (Ani, 2007). Poultry cannot fully utilize high fibre diets because they lack the digestive framework that can elaborately digest large amount of fibre. It becomes necessary, therefore to incorporate exogenous enzymes into their diets in order to enhance the breakdown of the non-starch polysaccharides (NSPs) present in fibre. Exogenous enzyme has been shown to reduce the viscosity of gut content and improve the utilization of nutrients (Acamovic, 2001; Khan *et al.*, 2006; Carsten, 2013). Therefore, a trial was conducted to determine the effect of graded levels of raw bambara nut offal (TBO) with supplementary enzyme on the growth performance and cost of broiler finisher birds.

Materials and Methods

Animals and their Management

The experiment was carried out at the poultry unit of the Department of Animal Husbandry, Akperan Orshi College of Agriculture, Yandev. A total of 120 four-weeks old broiler birds were randomly divided into four dietary groups of 30 birds each. The groups were randomly assigned to four diets containing 2808.76-3091.34 kilocalorie, metabolizable energy and 19.63-20.06% crude protein diets involving four levels (0, 10, 20, and 30kg) of raw Bambara nut offal (RBO) supplemented with exogenous enzyme, Biozyme. The gross composition (%) of the diets is presented in Table 1. Each treatment was replicated three times with ten (10) birds per replicate placed in deep litter pens of fresh wood shavings. Feed and water were supplied *ad libitum* to the birds. A general flock prophylactic management strategy and routine vaccinations were administered as and when due.

TABLE 1: INGREDIENTS COMPOSITION OF EXPERIMENTAL DIETS (%)

Ingredients	T1(0)	T2(10)	T3(20)	T4(30)
Maize	42.83	36.27	29.67	24.00
FFSB	37.77	34.33	30.93	25.93
Rice offal	15.00	15.00	15.00	15.00
RBNO	0.00	10.00	20.00	30.00
Bone meal	3.50	3.50	3.50	3.50
Methionine	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Common salt	0.40	0.40	0.40	0.40
Enzyme	0.00	+	+	+
	100.00	100.00	100.00	100.00

Calculated analysis:

ME (Kcal/kg)	3091.34	2996.48	2901.56	2808.76
CP (%)	20.01	20.03	20.06	19.63
CF (%)	8.59	8.79	8.98	9.13
EE (%)	8.90	8.26	7.62	6.72
Methionine (%)	0.57	0.58	0.58	0.58
Lysine	1.05	0.95	0.85	0.72
Ca (%)	1.46	1.45	1.44	1.37
P (%)	0.83	0.81	0.79	0.77

+ Enzyme included at the rate of 300 per 100kg of feed

Measurement of growth parameters

At the beginning of the experiment, birds in each replicate were weighed individually and subsequently on weekly basis. Feed intake was determined daily by the weigh-back technique. Feed conversion ratio was calculated from the data on live weights and feed intakes as quantity (g) of feed consumed per unit(g)

weight gained over the same period (Jabeen *et al.*, 2004).

Cost of production

Feed cost per Kg was calculated by summing up the cost of each ingredient that was included to make 1kg of feed in order to determine the cost effectiveness of the various treatment diets.

Statistical analysis

Data collected was subjected to analysis of variance (ANOVA) in a completely randomized design (CRD) as outlined by Steel and Torrie (1980) using Statistical Package for the Social Sciences (SPSS, 2003) windows version 17.0.

Results and Discussion

Results of the performance of broiler finishers fed graded levels of bambara nut offal supplemented with enzyme is presented in table 2 below.

Table 2: Performance and production cost of broiler finishers fed graded levels of raw bambara nut offal with supplementary enzyme

Parameters	T1(0)	T2(10)	T3(20)	T4(30)	SEM
Number of birds	30	30	30	30	-
Initial body weight (g)	780.30	780.60	780.12	781.1	3.01
Final body weight (g)	1,414.71	1,413.33	1,413.27	1,411.10	7.31
Average daily feed intake (g)	66.27	66.89	72.42	79.21	5.22
Total feed consumed (kg)	1.39	1.41	1.52	1.66	0.27
Average daily weight gain (g)	30.21	30.13	30.15	30	0.24
Feed conversion ratio	2.19	2.22	2.40	2.51	0.07
Feed cost per Kg (N)	114.45	118.10	109.76	96.46	-
Cost of total feed consumed (N)	159.09	164.41	164.56	157.63	6.31

Discussion

Table 2 shows the effects of graded levels of Bambara nut offal supplemented with Biozyme on the performance and cost of broiler finisher production. There were no statistical differences ($p>0.05$) on total feed intake, feed cost per kg and total feed consumed. However, both cost of feed per kg and cost of total feed consumed were least in treatment 4 which had the highest inclusion level of Bambara nut offal. Although there were no significant differences (>0.05) among the dietary treatments, it is evident from the results that high levels (30%) of enzyme supplemented raw bambara nut offal lowered the cost of feeding broiler finisher chickens. It therefore, implies that more profit could be made by supplementing 30% of raw bambara nut offal with enzyme compared to 10% and 20%. This findings corroborates the findings of Hosamani *et al.* (2001)

Conclusion and Recommendation

The present study suggests that up to 30% Bambara nut offal could be utilized in the feeding of broiler chickens without any deleterious effect on their performance. It could also lower the cost of production. Based on this, it is recommended that up to 30% of Bambara nut offal, which is cheap and available as a waste can be used for broiler finisher production. Further study is also recommended.

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