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Performance of Broiler Finishers Fed Dietary Bambara Groundnut (*Voandzeia subterrenea thouars*) Sievate Fortified with Exogenous Enzyme

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Abstract

A total of sixty 4 weeks old Marshal Broilers were used to evaluate the effect of replacing maize with Bambara groundnut sievate (BGS) fortified with exogenous enzyme Nutrizyme® on the performance of finisher broilers. Bambara groundnut sievate was used to replace maize at 0, 35, 45 and 55 % inclusion levels in a completely randomized design. Fifteen birds were randomly allotted to each treatment which was replicated three times with five birds per replicate. The result showed that 35% inclusion level of BGS did not significantly affect the live weight, average weight gain, average daily feed intake and feed conversion ratio relative to the control (0 %), but the feed cost (N71.20/Kg) and feed cost per Kg weight gain (N277) were lower than the control. Increasing the level of BGS beyond 35% is therefore not recommended as it will negatively affect the performance of the broilers.

Keywords: Marshal breed, bambara groundnut, exogenous enzyme, feed conversion ratio.

Introduction

Managing the nutrition of the various species of poultry is of great economic importance as feed cost account for over 70 – 75 % of the cost of production in poultry (Obioha, 1992). The expansion of livestock industries in Nigeria is critically dependent on the availability of feed and feedstuffs. In Nigeria, the high cost and scarcity of grain has promoted researchers interest in grain substitution in poultry diets (Aladi *et al.*, 2017). The increasing demand for protein and energy feed materials as human food increase in their cost, which is posing a serious problem on the supply of feed for poultry industries. The need to improve the level of animal protein consumption in Nigeria had led search for least cost ration for poultry and other livestock (Udedibie and Emenalorn 1993, Esonu, 1999). Agro by product are known to be very fibrous in nature, agro by products from milling, brewing processes, etc possesses low nutritive value and are generally low in energy sources compared to the maize and soybean meal. When high levels of agro by products are included in poultry ratio the diet will end up with high fibre content and low energy content.

Bambara groundnut (*Voandzeia subterrenea thouars*) sievate is a byproduct of Bambara groundnut flour production. According to NAS (1999), Bambara is a very valuable legume crop, is as good as maize in energy content, with a gross energy of 412 calories. BG Seeds have been indicated to be one of the potential and valuable sources of protein and energy in poultry and other livestock. The flour is used as human food. The BG sievate is available throughout the year and almost very cheap as it has little or no industrial or human uses as at now. The sievate contains 21.6% crude protein, 5.22% crude fibre and 12.44 MJ/kg gross energy (Amaefule and Iroanya, 2004). Onwadike and Eguakum 1994 reported that raw Bambara nut did not support weight gain in broilers but gave a negative protein efficiency value. This was attributed to the presence of trypsin inhibitors, haemagglutinin, tannic acid phytic and oxitate present in the raw seeds. These anti-nutritive factors and high fibre content have necessitated the use exogenous enzyme to enhance performance of broilers. One of such enzyme is Nutrizyme®. Nutrizyme is a multi-enzyme complex containing a range of hydrolases, with broad spectrum activity on several storage and structural carbohydrates.

This study evaluated the effect of replacing maize with Bambara groundnut sievate fortified with exogenous enzyme, Nutrizyme® on the performance of finisher broilers.

Materials and Methods

The experiment was conducted at the Poultry unit of the Imo State University Teaching and Research Farm, Owerri. Sixty 4 weeks old Marshal Strain of broilers at were randomly allocated to four treatment treatments diets which was further replicated three times in a completely randomized Designed (CRD). The broilers were raised on a deep litter system and feed and water were provided *ad libitum* throughout the experiment which lasted for 35 days. Four experiment diets were formulated such that BGS were included at 0, 35, 45 and 55 percent inclusion levels for treatments T₁, T₂, T₃ and T₄ respectively. The ingredient and nutrient composition of the experimental diets are shown in Table 1.

Data was collected on feed intake on daily basis by obtaining the difference between quantity of feed given and that remaining the following morning. Live weights of the birds were taken at the beginning of the experiment and subsequently on weekly bases. The feed conversion ratio calculated as mean daily feed intake divided average daily weight gain.

Table 1: Chemical composition of the experimental diet Ingredients

Ingredients (%)	T ₁	T ₂	T ₃	T ₄
Maize	55.00	20.00	10.00	0.00
Bambara groundnut sievete	0.00	35.00	45.00	55.00
Nutria	0.00	0.20	0.20	0.20
Soybean meal	15.00	15.00	15.00	15.00
Groundnut cake	5.00	5.00	5.00	5.00
Palm kernel cake	6.30	6.30	6.30	6.30
Wheat bran	6.00	6.00	6.00	6.00
Fish meal	4.00	4.00	4.00	4.00
Blood meal	3.00	3.00	3.00	3.00
Bone meal	3.00	3.00	3.00	3.00
Oyster shell	2.00	2.00	2.00	2.00
Common salt	0.30	0.30	0.30	0.30
Vitamin/mineral premix	0.25	0.25	0.25	0.25
DL methionine	0.06	0.06	0.06	0.06
Lysine	0.09	0.09	0.09	0.09
Total	100.00	100.00	100.00	100.00
Calculated nutrient composition (%)				
Crude protein	20.65	24.83	27.02	27.21
Crude fibre	3.74	6.32	7.06	7.80
Ether extract	3.80	4.02	4.10	4.15
Metabolizable energy (Kcal/kg)	2657.10	2700.07	2655.27	2610.45

Results and Discussion

The performance of the broilers chickens fed varying dietary levels of BGs fortified with exogenous enzyme, Nutrizyme® is represented on Table 2. The effect of BGs diets on the performance of broiler chicks was significant ($p < 0.05$) for all the parameters measured. There were no significant difference ($p < 0.05$) between the broiler chicks fed control (0% BGs) and 35% BGs diets in all the parameters measured. This could be attributed to the similarities in the nutrient composition of the two diet and suggest that the inclusion of 35% BGs which replace 20% maize in the broiler chicks diets was lower to have affected the performance of the birds.

Table 2: Performance of Finisher Broiler Chicks fed varying dietary levels of Bambara nut Sievate fortified with exogenous enzyme

Parameters	T ₁ (0 %)	T ₂ (35 %)	T ₃ (45 %)	T ₄ (55 %)	SEM
Initial live weight (g)	610.00	590.00	590.00	570.00	90.00
Final Live Weight	2130.00 ^a	1970.00 ^a	1600.00 ^b	1600.00 ^b	60.01
Weight gain (g)	1500.00 ^a	1360.00 ^a	1040.00 ^b	1020.00 ^b	52.07
Average daily feed intake	181.00 ^b	182.00 ^b	185.00 ^a	172.00 ^c	2.00
Average daily wt gain (g)	52.00 ^a	47.00 ^a	36.00 ^b	34.00 ^b	2.00
Feed Conversion ratio	3.50 ^b	3.91 ^b	5.22 ^a	4.96 ^a	0.23
Feed cost/kg feed N	81.7	71.20	68.21	65.23	-
Feed cost/kg Weight gain	285.95	277.68	354.6	323.4	-
Mortality (%)	0.00	0.00	0.00	0.00	0.00

^{abcd} Means in the same row followed by different superscripts are significantly different ($P < 0.05$)

SEM= Standard error of mean.

The average daily weight gain and final live weight of broilers fed 0 and 35% BGs diets were significantly ($p < 0.05$) higher than those of broilers fed 45% and 55% BGs diets. The higher values in average daily weight gain, average weight gain and average final weight of the broiler chicks fed 35% BGs and control

diets could be attributed to higher metabolized energy (ME) of the diets. The calculated metabolizable energy (ME) content of diets decreased with increasing level of BGs in the diets (Table 1) while crude fibre content was increasing. These variations may have negatively affected the performance of the chicks of T₃ and T₄. These result indicate that that inclusion of Nutrizyme® did not significantly improve nutrient utilization from BG beyond the inclusion level of 35%.

Conclusion and Recommendations

Based on the findings of this work, it can therefore be concluded fortifying BG with the enzyme complex Nutrizyme® will did not improve performance of the broilers beyond the inclusion level of 35%. It is therefore recommended that farmers should limit the inclusion of BG in broilers diets to 35 %.

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