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RESPONSE OF STARTER CHICKS TO DIETARY LEVELS OF GROUNDNUT CAKE AS REPLACEMENT FOR SOYA BEAN CAKE

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ABSTRACT

A feeding trial was carried out to investigate the effects of graded levels of groundnut cake (GNC) as replacement for soya bean cake (SBC) in broiler starter diets at 0%, 25%, 50%, 75% and 100%. Two hundred and forty (240) day old Cobb-500 strains of broiler chicks were used in this experiment in a Complete Randomized Design. Parameters assessed were daily feed intake (DFI), daily weight gain (DWG), final weight gain (FWG), feed conversion ratio (FCR) and mortality as it occurred. The result obtained from this research revealed that there were significant (P<0.05) differences in daily feed intake, daily weight gain and final weight while no significant (P>0.05) difference was observed in initial weight and feed conversion ratio. The highest feed consumption was recorded in treatment three (52.87g) while the least was obtained at 100% level of inclusion of GNC. The result also showed that chickens in the control group had the highest final weight of (816.55g). Daily weight gain was higher in chickens fed the control diet (27.21g) while those in treatment five showed the least daily weight gain. Furthermore, the best feed conversion ratio was obtained from chickens fed the control diet (1.9) while the poorest result was obtained among those in treatment three. It was concluded that broiler chickens fed SBC at 100% level of inclusion produced highest FWG of (816.55g/b) and therefore performed better than the GNC based diet.

Key words: Broiler, chickens, performance, Diet, Groundnut Cake.

INTRODUCTION

Proper and adequate feeding still remains the primary objective of nutritionists in programmes on food security. Nutrition has the highest consideration inmost livestock enterprises(Banjo *et al.*,2020). Poultry feeds constitute more than 75% of the total cost of production in Africa. Thecost of feeding has been computed by nutritionists andfarmers, toaccount for about 60 – 70% of the total costof animalproduction, with the energy sources such as maize, wheat offal and maize bran accounting for 50 –55% (Akinfala , 2019). Management of broiler chickens cannot be successful without skilled manipulation of their feeds, which involve understanding animal nutrient requirements as well as proper utilization of the right quantity and quality of feed ingredients. Broiler chickens supply the protein needs of man in short time due to their fast growth rate of 4 to 7 weeks to meet the table size. Groundnut cake and soya bean cake are generally considered as the best plant protein sources in the diet of broiler chickens and other monogastric animals. Groundnut cake in particular is generally cultivated in West Africa as it require loamy soil and moderate rainfall. Soya bean (*Glyciine max*) and Groundnut (*Arachishypogaea L*) are the most common and expensive conventional feed materials used by feed millers in Nigeria; their cakes are among the major plant protein sources used for chicken diets (Shehu *et al.,*2021). Poultry production results in relatively high nutrient needs, especially protein sources. Today's system of animal production pushed man and animals in competition for protein, (Dikko *et al*., 2019).The objective of this study was to determine the growthperformance of broiler chickens fed diets containing GNC and SBC as the major plant protein sources.

MATERIALS AND METHOD

Study Area:This study was conducted at Gombe State metropolis. Gombe State lies between latitude 9^0 to 12^0North and longitude 8^0 to 11^0East and an altitude of 407 meters above sea level. It has mean maximum and mean minimum temperature of 32.80C and 18.30C respectively. The coldest months are from November to January while March to May is the hottest period. Gombe metropolis has a rainfall distribution which ranges from 970.7 mm to 1,142 mm annually, with a mean of 1,009.4 mm. The rain falls from the month of April to October. The vegetation of the area is savannah grassland (Gombe State Government, 2009).

***Experimental Design*:** The birds were randomly weighed and allotted to five (5) treatment groups of 48 birds each. Each treatment was replicated four times with 12 birds per replicate in a completely randomized design (CRD). The diets were tagged $T_{1(0\%)}$, $T_{2(25\%)}$, $T_{3(50\%)}$, $T_{4(75\%)}$ and $T_{5(100\%)}$ levelsat which GNC replaced SBC in the diets. The experiment lasted for 4 weeks.

***Experimental Stock and Management*:**A total of two hundred and forty (240) unsexed day old Cobb-500strain of Broiler chicks were use for this experiment. The chicks were obtained at day-old from Sovet International Nig LTD, Kano State Nigeria. Before arrival of the chicks, the room was thoroughly swept, washed with detergent and then disinfected with (IZAL) to eliminate any disease causing organism that may be a source of infection to the chicks. After three days when the room was dried, wood shavings were spread on the cemented floor to a depth of about two centimetres (2cm) to serve as an insulator and also absorb moisture from droppings.It was then covered with newspaper to avoid it been eaten by the chicks.

***Experimental Diets*:**The experimental diets were compounded using the following ingredients: Maize, wheat offal, and soy bean cake, groundnut cake, fishmeal, bone meal, min-vit premix, methionine and NaCl (common salt).Five broiler starter diets were formulated with different graded levels at which GNC replaced SBC i.e. 0%, 25%, 50%, 75%, and 100% for T1-T5 respectively as presented in Table 1. Water and Feeding were provided *ad libitum* throughout the period of the practical.

Routine Husbandry Practices.:The birds were vaccinated strictly based on the vaccination programme recommended for the North East zones (Kamani, 2003). At the age of one week, the birds were prevented from drinking water overnight before vaccination, a dose of infectious bursal disease (IBD) vaccine was administered in drinking water. At two weeks, dose of Newcastle disease vaccine (lasota) was also given and at the age of three weeks a 2^{nd} dose of Gumboro disease vaccine (booster) was administered.

Statistical Analysis:All data collected were subjected to one way analysis of variance (ANOVA) using the method described by Steel and (Torrie*et al.*,1980) where significant difference were found among the treatment means Significance differences among treatment means were compared using Duncan multiple range test (DMRT).

RESULTS AND DISCUSSION

The performance of broiler starter chicks fed diets in which GNC replaced SBC at varied levels is presented in Table 2.The results showed that there was no significant difference ($P>0.05$) With respect to initial weight and feed conversion ratio. Meanwhile significant difference ($P<0.05$) was recorded in final weight gain and daily feed intake which was contrary to the findings of (Chioma *et al.,* 2017) and (Gyang *et al.,* 2021) whom reported no significant difference ($P>0.05$) when broiler chicks were fed GNC and SBC based diets. Furthermore, from the result above, treatment three recorded the maximum daily feed intake while the least was obtained from treatment five. Final weight gain was higher in the birds fed SBC than those fed GNC and this agrees with the work of (Shehu *et al.*,2021) that reported higher final weight gain in the birds fed SBC than the birds fed GNC, furthermore, they also reported significant difference ($P<0.05$) in feed intake as obtained in this trial. While the lower final weight gain was recorded in treatment five, which may be

attributed to the presence of aflatoxin in the GNC. The trend of daily weight gain indicated that it decreased steadily from treatment one to treatment five and become more pronounced at treatment five. Best feed conversion ratio was recorded in treatment one where as treatment three performed the worst and showed no significant difference (P>0.05) across all the treatment means and this report deviated from what was obtained by (Usman *et al*.,2021). Mortality rate was higher in treatment two while the least was obtained in controlled treatment and treatment five, this is contrary to report of (Shehu *et al*.,2021) whom reported lower percentage of mortality rate.

Table 1: Ingredient composition of broiler starter diets in which GNC replaced SBC at varied levels (1-4weeks)

Ingredients	T1(0%)	T2(25%)	T3(50%)	T4(75%)	T5(100%)
Maize	50.50	50.50	50.50	50.50	50.50
SBC	28.49	21.37	14.23	7.12	0.00
GNC	0.00	7.12	14.26	21.37	28.49
Wheat offal	10.00	10.00	10.00	10.00	10.00
Palm oil	2.00	2.00	2.00	2.00	2.00
Fish meal	4.00	4.00	4.00	4.00	4.00
Lime stone	2.50	2.50	2.50	2.50	2.50
Bone meal	1.50	1.50	1.50	1.50	1.50
Salt	0.25	0.25	0.25	0.25	0.25
Min/Vit Prem*	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.30	0.30	0.30	0.30	0.30
Total	100	100	100	100	100
Calculated Composition					
ME(Kcal/kg)	3054.65	3014.78	2974.79	3014.35	2895.11
Crude protein (%)	22.99	23.35	23.71	23.35	22.99
Crude fibre (%)	3.50	3.51	3.51	3.51	3.50
Calcium (%)	1.30	1.25	1.20	1.30	1.20
Phosphorous (%)	0.60	0.60	0.63	0.60	0.66
Ether extract (%)	3.4	3.7	4.01	3.7	4.6
Methionine (%)	0.60	0.60	0.60	0.60	0.60
Lysine (%)	1.27	1.19	1.11	1.18	1.20

Table 2: Performance of broiler starter chicks fed diets in which GNC replaced SBC at varied levels

Parameters	Diets/Treatments					
	T1(0%)	T2(25%)	T3(50%)	T4(75%)	T5(100%)	SEM
Initial wgt (g/b)	124.26	124.66	125.27	126.22	127.95	0.02 ^{NS}
Final wgt (g/b)	816.55^{a}	733.29^{ab}	671.03^{ab}	593.75^{c}	452.32^{d}	30.42**
DFI (g/b)	51.90^{a}	50.61^{a}	52.87^{a}	39.71^{b}	33.46^{c}	2.37**
DWG (g/b)	27.21^{a}	22.36^{b}	22.36^{b}	19.79^{c}	15.07^{d}	1.01**
FCR	1.90^{b}	2.05^{b}	2.32^{a}	2.00^{b}	2.22^{ab}	0.01^{NS}
Mortality (%)	2.10	6.30	2.10	4.20	2.10	

abc means on the same row with different superscript are significantly different (P<0.05)*

KEY:

DFI = Daily Feed Intake in gram per bird

DWG = Daily weight gain in gram per bird
FCR = Feed Conversion Ratio
Wgt= weight
SEM= Standard Error of Means
**= Means are significantly different (P<0.05)
NS = statistically not significant (P>0.05)

CONCLUSION

From the result obtained in this experiment, it can be concluded that soya bean cake based formulated diet performed better than the local GNC based diet in the performance of broiler chicks. This is due to the fact that broiler chicks fed SBC recorded the highest final weight gain and better feed conversion ratio at 100% level of inclusion.

RECOMMENDATION

BASED ON the result obtained in this feeding trial, it is recommended that a combination of SBC and GNC in the diet of broiler chickens should be always sort for or whole SBC diet as protein sources than GNC based diet alone.

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