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Research Article

Performance of Broiler Starter Fed Baobab *(Adansonia digitata)* and Moringa *(Moringa oleifera)* Leaf Meal as Source of Premix

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Abstract

A feed trial was conducted to study the performance of broilers fed baobab and moringa leaf meal as source of premix. One hundred and eighty day old chicks were randomly allocated to six dietary treatments (T_1, T_2, T_3, T_4, T_5 and T_6), with thirty birds per each treatment. The experiment lasted for four weeks. The starter birds diets were prepared T_1 (CMP 0.50), T_2, (CMP/BB 0.25), T_3 (CMP/MG 0.25), T_4 (0.50BB), T_5 (MGO.50) and T_6, (BB/MG 0.25). Feed and water were offered to birds ad libitum. Result at the end of the experiment showed that Feed intake per bird, Feed intake per bird per day, and mortality showed no significant difference at the starter phase ($P<0.05$). Initial Body Weight, Final Body Weight, Weight gain per bird and feed conversion ratio were significantly different ($P<0.05$) across the treatments. It was concluded that Moringa and Baobab leaf meal can be used in broiler ration as premix without any adverse effect on performance of birds.

Keywords: *Performance, Broiler Starter, Fed, Baobab, Moringa Leaf, Premix.*

Introduction

The general objective of poultry nutrition is to maximize the economic production performance of broilers diets are formulated to provide specific level of nutrients that are needed for optimum performance (Whitehead, 2002; Oyediji 2001) reported that feed accounts for not less than 70% of the cost of production in livestock enterprises. Therefore, these is the need to focus on efficient feed utilization, in order to maximize profits and avoid loses. Giving the increasing number of people venturing into poultry business, there is no doubt, that there is a high demand for commercial feeds. There is now the tendency for feed manufacturers to produce substandard feeds especially as the quality control agencies in Nigeria are non-existent or non-functional (Okoli *et al.,* 2007; Omede, 2008; Okoli *et al.,* 2009).

Baobab leaves contain about 11% DM with a crude protein content of 5-179% (Feedipedia, 2013; Belewe *et al.,* 2007). The leaves are rich in calcium and are particularly rich in tannins. The high tannin content of baobab leaves prevents them from being used as a major ingredient in poultry diets However, baobab leaf meal has been used in with success as a source of pigments in diets for laying hens, The yolk colour increased with an inclusion rate of 1-2% baobab loaf meal, with no adverse effect of feed intake, egg production and egg quality (Butswat *et al.,* 1997).

The leaves of baobab tree are stable for many populations in Africa, especially the central region of the continent. Leaves are alternate at the ends of branches or occur on short spurs on the trunk (Williams 2002), during the rainy season when the baobab leaves are tender, people harvest a fresh batch of leaves. During the last month of the rainy season leaves are harvested in great abundance and are dried for domestic use and for marketing during the dry season. The leaves are typically sun-dried and either stored as whole leaved or pounded and sieved into a fine powder (J Gebauer and G Ebert *et al.,* 2002).

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In terms of mineral content baobab leaf is an excellent source of calcium, iron, potassium, magnesium, phosphorus, manganese and zinc. These data indicate that in terms of both quality and quantity baobab leaf can serve as a significant protein and mineral source for those populations for whom it is a staple food (Belewu *et al.,* 2007).

M oleifera (family: moringaceae) is nature to subhimalayan regions of North West India, It is commonly known as horse radish tree, drumstick tree and highly recognized for its nutritional properties with some useful minerals, Vitamins and amino acids in broiler diet (Yang *et al.,* 2006).

MATERIALS AND METHODS

Experimental Site

The research work was conducted in the Poultry Unit of Federal University of Agriculture Zuru, Zuru Local Government Area of Kebbi State. The area is geographically locate is latitude 11.35 and 1155 N and longitude 445 and 5.25 E of the equator approximately, Zuru local government area is characterized by a single rain season with a long dry season, between many to October the climatic condition the area is characterized by hot and wet season, while the month of November February is the harrmatan period (Baba *et al.,* 2015).

Experimental Birds

A total of one hundred and eighty (180) broiler chicks were used for the research, the broiler chicks were sourced from "Top Most Links" Ibadan.

Housing

One week before the arrival of the birds, the pen was thoroughly washed pen disinfected to get rid of pathogens or micro-organisms that may likely be harboring in the pen from previous stocking Proper hygiene and sanitary measures were taken during the experimental period. Vaccination scheduled was maintained properly and adequate feeders and drinkers were provided to the birds.

Management of Experimental Birds

The birds were managed on a deep litter system while water and feed were provided *ad-libitum;* all the birds received the same treatment in terms of feeding throughout the trial.

Experimental Diet

Six (6) experimental diets were formulated. Diet one (Dl) the control diet contained feed base on only commercial premix. Diet two (D2) contained both Baobab and commercial premix in the ratio 1:1l. Diet three (D3) contained Moringa leaves powder and commercial premix in a ratio 1:1. Diet four (D4) contained Baobab leaves powder only as premix, diet five (D5) contained Moringa leaves powder as premix. While diet six (D6) contained Baobab and Moringa leaves powder as premix in a ratio 1:1.

Ingredients	T_1	T_2	T_3	T_4	T_5	T_6
Maize	50.00	50.00	50.00	50.00	50.00	50.00
S/Beans	38.70	38.70	38.70	38.70	38.70	38.70
W/Offal	5.00	5.00	5.00	5.00	5.00	5.00
Blood Meal	2.50	2.50	2.50	2.50	2.50	2.50
Bone Meal	2.50	2.50	2.50	2.50	2.50	2.50
Premix	0.50	0.25	0.25	0.00	0.00	0.00
Baobab	0.00	0.25	0.00	0.50	0.00	0.25
Moringa	0.00	0.00	0.25	0.00	0.50	0.25
Methionine	0.25	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25	0.25

Experimental Grouping

The birds were randomly divided into six (6) treatment groups, each consisting of thirty (30) birds and was labeled as T_1, T_2, T_3, T_4, T_5, and T_6. T_1 was maintained as the control and place in commercial premix. T_2 were place on Baobab leaf and commercial premix T_3 were placed on Moringa leaf as premix, T4 were placed on baobab leaf and commercial premix, T_5 were placed on Moringa and commercial premix T6 were placed on baobab and Moringa leaf as premix.

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Data Collection

Data were collected on body weight gain daily and feed intake weekly. Data of an intake and weight gain was used to calculate feed conversion ratio, (FCR).

Data Analysis

Data collected were subjected to analysis of variance (ANOVA) using the Stat View statistical package (SAS 2003). The means was separated using Ducan Multiple Range Test.

Results and Discussion

Performance of birds fed diets containing Baobab and Moringa leaf meal at the starter phase is presented in Table 3: Feed intake per bird Feed intake per bird per Any and mortalıty showed no significant difference at the starter phase.

Initial body weight differs significantly between the treatment ($P < 0.05$) as birds in T_1, (0.50 CMP) has more body weight (63.33±4.62) while there is no significant difference on the Initial body weight among other treatments ($P > 0.05$). T_2: (0.25 CMP/BB) bas an Initial body weight of 53.33+1 53, T_3, (0.25CMPMG) and T_4, (0.50BB) has recorded the same Initial body weight of 5833+1.15, T_5, (0.50MG) has an Initial body weight of 57.00+0.00 and T_6 (0.25BBMG) has an Initial body weight of 57,00+2,65.

There is significant difference on the final body weight between birds in T_1, (0.50 CMP) 451.00±106.93, T_2; (0.25 CMP/BB) 466.67±120.51, T_3 (0.25CMPMG) 503.33±46.00, T_4. (0.50BB) 506.67±60.28, T_5(0.50MG) 492.33±40.27 and T_6 (0.25BB/MG) 462.67±17.79 can be seen that birds in T_4 have more final body weight compared to birds in T_1 T_2, T_3, T_5 and T_6.

Feed intake per bird did not differ significantly between the treatments ($P>0.05$) even though birds on T_5 (0.50MG) consume more feed as against birds on the other treatments The feed intake of the birds per day is not differ significantly ($P<0.05$) as birds on T_6 (0.25BBMG) perform more better with a daily feed intake of 59.49±8.71 followed by birds on T_4, (0.50BB) 5650±3.28, then T_5 (0.50MG) 55.95±4.26, T_1 (0.05 CMP) 54.75±1.03, T_3 (0.25CMP/MG) 52.44±15.82, birds on T_2 (0.25CMP/BB) has the least daily feed intake of 51.33±5.07.

Weight gain per bird differs significantly between the treatment ($P<0.05$) s binds in T_3, (0.25CMPMG) and T_4 (0.50BB) recorded the highest similar weight of 447.00±46.18^a and 447.67±60.28^a respectively. Feed Conversion Ratio differs as birds in T_1, (0.50 CMP) has the highest feed conversion ratio 4.22±0.98 followed by birds on T_6 (0.25BBMG) 4.13±0.78, FCR did not differ significantly between T_2 (0.25 CMP/BB)) T_3 (0.25CMP/MG), T_4 (0.50BB) and T_5 (0.50MG) which have a FCR of (37.11±1.4, 3.77±0.90, 3.83±0.42 and 3.63±0.40 respectively) The incidence of mortality did not differ significantly between the treatments ($P> 0.05$) as birds in T_1, T_2, and T_5 did not experience the incidence of mortality while birds in 55951426, T_4, (0.50BB) has a mortality of 0.504±0.71 and the highest rate of mortality can be seen in T_6 (0.25BBMG) with a mortality of t67±15.

Table 2: Performance of Birds Fed Diets containing Baobab and Moringa Leaf Meal st the starter phase.

Parameters	T_1	T_2	T_3	T_4	T_5	T_6
IBW	63.33±4.62^b	58.33±1.53^a	58.33±1.53^a	58. ±1.53^a	57.00±0.00^a	57.00±2.65^a
FBW	451.00±106.93^a	466.67±120.51^a	503.33±46.00^b	506.67±60.28^b	492.33±40.27^a	462.67±17.79^a
FIB	1570.33±63.17	1437.33±141.99	1655.00±276.49	1525.00±19.97	1709.00±230.06	1580.33±99.67
FIBD	54.75±1.03	51.33±5.07	52.44±15.82	56.50±3.28	55.95±4.26	59.49±8.71
WGB	387.67±103.68^b	413.33±120.66^a	447.00±46.18^a	447.67±60.28^a	435.33±40.27^a	405.67±19.14^a
WGBD	13.85±3.70	14.77±4.31	15.98±1.64	16.02±2.18	15.55±1.44	14.15±1.23
FCR	4.22±0.98^a	3.71±1.14^b	3.77±0.90^b	3.83±0.42^b	3.63±0.40^b	4.13±0.78^a
MTLY	-	-	2.00	0.50±0.71	-	1.67±1.15

a, b treatment means in the same row with different superscripts are significantly ($P<0.05$) different.

Key:

IBW: Initial Body Weight

FBW: Final Body Weight

FIB: Feed Intake per Bird

FIBD: Feed Intake per Bird per Day

WGB: Weight Gain per Bird

WGBD: Weight Gain per Bird per Day

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FCR: Feed d Conversion Ratio

MTLY: Mortality

T: Treatment

Results from Table 2 showed that birds fed diet with T_1 (0.50 CMP) gained significantly ($P < 0.05$) higher Initial body weight than birds fed T_2 (0.25 CMP/BB) based diets. Birds on T_3, T_4, T_5 and T_6 were observed to be analogous in average Initial body weight gain but its value decreased as inclusion of Moringa oleifrea leaf meal increased. This confirmed the observations made by Ash and Petaia (1992) and (Olugbemi et al., 2010) that increasing inclusion level of leaf meals in broiler diets results in depressed growth performance.

This observation could be generally traced to increasing fiber content of the diet which may have impaired nutrient digestibility and absorption (lge et al., 2006) and Onu, (2010). It could also be attributed to the crude protein content or palatability of the control feed which enhances its acceptability and utilization. The negative effect of the anti-nutritional factors and phytochemical compounds present in Moringa oleifrea leaves meal on the birds could be responsible for decreasing performance. Moringa oleifera leaves contain tannin at 1-23g/kg (Kakengi. 2003). Leaf meals are generally bitter in taste, therefore, the inclusion of moringa and baobab leaf meal in the diets could have resulted in reduced palatabılity and thus reduce feed intake of the broiler diets, Omekam (1994) observed that unpalatability nature of a feedstuff will consequently prevent chicks from consuming adequate quantity of the feed.

There was a significant decrease in the feed conversion ratio of the birds fed *Moringa oleifrea* leaf meal based diets than birds that are fed without *Moringa oleifrea* leaf meal. This suggests that birds fed *Moringa oleifrea* leaf meal based diets had poor utilization potential of the nutrients probably because of the increased bulkiness as inclusion level increased.

Broilers fed T_2, (0.25 CMP/BB) and T_1 (0.50 CMP) diets had significantly lower feed intake compared to broilers fed T_3, (0.25CMP/MG), T_4, (0.50BB). T_5, (0.50MG) and T_6 (0.25BB/MG). This can be attributed to high fat content of Baobab and Moringa leaf meal. Baobab leaf contains high energy (3000 - 4500 Kcal/kg (Murray et al., 2001; Nkafamiya et al., 2007). These findings agree with Lesson. (2000), Veldkamp et al., (2005) and Nahashon et al., (2005) who found out that birds consume feed to primarily meet their energy requirement.

Summary, Conclusion and Recommendations

The experiment was conducted to assess the performance of broiler fed with Baobab and Moringa leaf meal as source of premix. One hundred and eighty (180) birds were used in the experiment. The birds were divided into six (6) groups or treatments with thirty (30) birds per replicate. The starter birds diets were prepared T_1, (CMP 0.50), T_2, (CMPBB 0.25), T_3, (CMP/MG 0 25), T_4, (0.50BB), T_5 (MGO.50) and T_6, (BBMG 0.25). The result show that Initial body weight differ significantly between the treatments ($P < 0.05$). There is significant difference on the final body weight between birds in T_1, (0.50 CMP) 451.00±106.93, T_2, (0.25 CMP/BB) 466.67±120.51, T_3, (0.25CMPIMG) 503.33±46 00, T_4, (0.50BB) 506.67±60.28, T_5, 0.50MG) 492.33±40.27 and T_6, (0.25BBMG) 462.67±17.79. Weight gain per bird differs significantly between the treatments ($P < 0.05$). FCR did not differ significantly between T_2, (0.25 CMP/BB), T_3, (0.25CMPMG), T_4, 0.5OBB) and T_5 (0.50MG) which have a FCR of (3.7l±l.14, 3.77±0.90, 3.83±0.42 and 3.63±0.40 respectively).

It was very clear from the result obtained that Moringa and Baobab leaf meal can be used in broiler ration without adverse effect on performance. It has the potential of reducing the feeding cost of broilers. Based on the findings of these studies, it was recommended that commercial premix can be completely replaced with Baobab and Moringa leaf meal in broilers diets without any nutritional defects on the bird's growth performance.

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