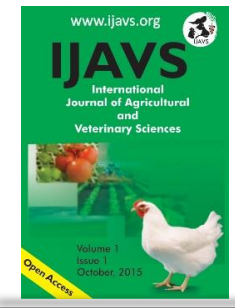

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RESEARCH ARTICLE

Performance and Carcass Characteristics of Finisher Broilers Fed Yellow or White Maize Fortified with Baobab *(Adansonia digitata)* Leaf Meal

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ABSTRACT:

One hundred and twenty (120) unsexed 5-week old broilers were used for 21-day feeding trial to evaluate performance and carcass characteristics. The birds were allotted to five (5) dietary groups designated; T_1 (control), T_2, T_3, T_4 and T_5. T_1 was compounded with yellow maize without addition of baobab leaf meal (BLM). Diets T_2, T_3, T_4 and T_5 were compounded with white maize. Diet T_2 did not contain BLM, but diets T_3, T_4 and T_5 contained 0.1%, 0.2% and 0.3%, respectively of BLM. Performance parameters that were measured indicated that, daily weight gain, feed intake and feed conversion ratio were not significantly ($P>0.05$) different across the treatments. Observed daily weight gain (DWG) values were between 57.21g to 62.48g, daily feed intake (DFI) ranged from 119.68g to 128.30g and FCR ranged from 2.02 (T_2) to 2.17 (T_4 and T_5). Feed cost/kg, feed consumed/bird and feed cost/kg gain were significantly ($P<0.05$) affected by the treatments. The weight of the heart, liver, breast muscle, legs, drumsticks, neck, gizzard, wings, thighs, kidneys and back were significantly influenced by the treatments ($P<0.05$). The mean weights of the heart were similar. White maize can favourably compete with yellow maize even without the inclusion of BLM. Birds can be fed with up to 0.3% BLM at the finisher phase without adverse effects on performance, organs and carcass of the birds. Baobab leaf meal may be used to supplement white maize in order to save feed cost.

Keywords: *Broiler finisher, carcass characteristics, baobab leaf meal*

INTRODUCTION

The production of meat birds especially broilers is on the increase due to increased demand for animal protein of poultry origin especially in Nigeria. According to Sola – Ojo *et al.* (2013), poultry has high return over a short period, requires low capital for investment and has high acceptability in many culinary traditions. Production of broilers is expected to increase due to the current sensitization on the health implication of consuming red meat. If the current production level is to be sustained and perhaps increased, besides providing broiler products at affordable prices to the populace, the problem of high feed cost must be addressed. Sola – Ojo *et al.* (2013) opined that the major problem facing poultry industry in the developing countries, including Nigeria is high cost of

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conventional feedstuffs, and competition between human and livestock.

Lawrence *et al.* (2008) had attributed the high cost of animal products in Nigeria and most African countries to high cost of livestock feed which generally accounts for 60 – 70 percent of the total cost of production. Maize, which forms the bulk of most poultry diets, continues to attract attention of animal nutritionists in terms of search for substitute, due to its competitive uses and escalating price. In Nigeria, yellow maize attracts higher pricing due to the perceived advantage it has over white maize probably due to the possession of higher carotenoid content because of high xanthophyll as reported by Hasin *et al.* (2006).

Hasin *et al.* (2006) reported that yellow maize, besides being a source of energy supplies xanthophyll pigment for chicken. The price difference between yellow maize and white maize is at least N10 per kg. Consequently, the use of yellow maize in broiler production is capable of decreasing profitability, if it does not result in better performance than when white maize is used. This study was therefore conceived to compare the performance of broilers fed yellow maize with those fed white maize.

Boabab **(***Adansonia digitata***)** leaf meal (BLM) is inexpensive, locally available and nutritionally non-toxic. Its incorporation in layer diet at 1 or 2% did not have adverse effect on feed intake and egg quality but rather promoted better yolk coloration (Bosch *et al.,* 2004). The utilization of BLM to fortify white maize based diet may encourage a shift to white maize; such that farmers may not be constrained to use the more expensive yellow maize, thereby reducing the cost of feed and maximize the returns from poultry production. The objectives of this trial were therefore to compare the performance and carcass characteristics of finisher broilers fed yellow maize or white maize fortified with graded levels of baobab leaf meal.

MATERIALS AND METHODS

This study was conducted at the Poultry Unit of Livestock Teaching and Research Farm of Kogi State University, Anyigba. The farm is located on latitude 7˚ 06' N and longitude 6˚43' E which is within the Guinea savannah zone of Nigeria. It receives 6 – 7 months annual rainfall of 1400mm – 1500mm and ambient temperature range of about 25˚ C – 35˚ C with the highest temperature in March and April (Ifatimehin *et al.,* 2006).

The experimental diets that were used for this study were compounded using some feed ingredients purchased from the open market. Five diets were compounded and designated T_1, T_2, T_3, T_4 and T_5 (Table 1). T_1 was compounded with yellow maize without addition of baobab leaf meal (BLM). Diets T_2, T_3, T_4 and T_5 were compounded with white maize. Diet T_2 did not contain BLM, while diets T_3, T_4 and T_5 contained 0.1%, 0.2% and 0.3%, respectively of BLM.

One hundred and twenty (120) unsexed 5-week old broilers were used for the feeding trial. The birds were allotted to the five (5) dietary groups. Each dietary group comprised of three (3) replicates, and each replicate had eights (8) birds. The birds were weighed at the beginning of the experiment and at the end. Feed and water were offered to the birds *ad libitum*. The feeding trial lasted for 21 days.

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Performance parameters that were measured were initial body weight, daily weight gain, daily feed intake, feed conversion ratio, mortality, cost of feed per kg, cost of feed consumed per bird and feed cost/kg gain. At the end of the experiment, one bird per replicate, with live weight close to the average weight for the replicate was selected and fasted overnight prior to slaughter. Carcass and organ parameters taken were live weight, slaughter weight, dressed weight and heart weight. Other weights taken include breast, drumstick, neck, proventriculus, gizzard, legs, wings, thighs, kidneys and back. All weights taken were related to the weight of the live bird and converted to percentage.

All the data obtained from the study were analyzed using Analysis of Variance (ANOVA) with the aid of SAS Statistical Analysis System program (SAS, 2002). Significant means were separated using Duncan's New Multiple Range Test as outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION

As shown in Table 2, observed results indicated that, daily weight gain, feed intake and feed conversion ratio were not significantly ($P>0.05$) different across the treatments. Observed values for daily weight gain (DWG) ranged from 57.21g (T_1) to 62.48g (T_2), daily feed intake (DFI) ranged from 119.68g (T_1) to 128.30g (T_4) and feed conversion ratio (FCR) ranged from 2.02 (T_2) to 2.17 (T_4 and T_5). The observed similar values for DWG, DFI and FCR indicate that yellow maize, white maize and white maize fortified with BLM had similar effects on these parameters. It may also indicate that feed intake was sufficient, suggesting that all the diets were palatable, hence acceptable to the birds. DWG was adequate, which may suggest adequate conversion of all the diets to weight gain by the birds, as can be seen in the observed FCR range. One bird died from T_1 group, while two birds died from T_2. The observed trend was not significantly ($P>0.05$) influenced by treatment, and cannot be attributed to treatment effect. This is because T_1, which is the control, lost one (1) bird. Furthermore, the pattern of mortality did not indicate toxicity of BLM, because higher levels of BLM in T_3, T_4 and T_5 did not result in mortality. More so, post mortem examination of the dead birds revealed that they died as a result of coccidiosis. It appeared that higher levels of BLM might have prevented mortality in the groups administered higher levels of BLM, perhaps due to better immune status of the birds due to vitamin A content in BLM.

Feed cost/kg, feed consumed/bird and feed cost/kg gain were significantly ($P<0.05$) affected by the treatments. The cheapest feed to produce was T_2 while the costliest was T_1 (control). Supplementation of white maize with BLM still resulted in cheaper feed than T_1. The most economic production was achieved with T_2 birds, because of the lowest feed cost/kg gain, while the costliest was with birds on T_1. From the foregoing, the highest profitability could be achieved with feeding white maize rather than yellow maize.

The effect of treatments on carcass characteristics of finisher broilers is presented in Table 3. The weight of the heart, liver, breast muscle, legs, drum sticks, neck, gizzard, wings, thighs, kidneys and back were significantly influenced by

the treatments (P<0.05). The results showed no observable trend, however, the weight of the proventriculus were statistically similar in the five diets. The mean weight of gizzard for the control T_2 was statistically similar to diets T_4 and T_5 which suggests that the gizzard was not over worked as a result of the inclusion of the baobab leaf meal. The mean weights of the heart were 0.49, 0.58, 0.48, 0.50 and 0.45 for T_1, T_2, T_3, T_4 and T_5, respectively with higher value being observed with the white maize variety with no BLM.

The breast muscle was significant (P<0.05) across the treatment. BLM, however, seemed to have influenced development of breast muscle and back. This also applies to the development of drumstick and the dressed percent. Though not statistically significant, numerically, higher values were also observed for weights of proventriculus of all the groups on BLM based diets. The observed values for the heart, liver, kidney, proventriculous and gizzard did not indicate hypertrophy of these organs due to BLM.

CONCLUSION AND RECOMMENDATIONS

White maize can favourably compete with yellow maize even without the inclusion of BLM. Birds can be fed with up to 0.3% BLM at the finisher phase without adverse effects on performance, organs and carcass of the birds. Baobab leaf meal seemed to possess anticoccidial properties. Baobab leaf meal may be used to supplement white maize in order to save feed cost, besides improving profitability even when yellow carcass pigmentation is desired. Further research should be conducted to ascertain anticoccidial properties of baobab leaf meal.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

CONTRIBUTION OF AUTHORS

OBO was responsible for experimental design, supervision of the experiment and write up. OOI and IL collected and collated the data in the cost of the study. While AD compiled and typed the write up for this article. All authors read and approved of the final manuscript.

REFERENCES

1. Bosch CH, Sié K and Asafa BA. (2004). Adansonia digitata L. Record from Protabase. Grubben, GJH and Denton OA (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands
2. Ifatimehin OO, Musa SD and Adeyemi JO. (2006). Analysis of the changing land use and its impacts on the environment of Anyigba town. *Nigeria Journal of Sustainable Development in Africa*, 10 (4). 321-325.
3. Hasin BM, Ferdaus AJM, Islam MA, Uddin MJ and Islam MS. (2006). Marigold and Orange Skin as Egg Yolk Color Promoting Agents. *International Journal of Poultry Science* 5(10): 979-987. http://dx.doi.org/10.3923/ijps.2006.979.987

4. Lawrence JD, Mintert J and Anderson DP. (2008). Feed grains and livestock impacts on meat supplies and prices. *Choice Magazine*, 2nd Quarter 23(2): 11 – 15.

5. SAS (2002). Statistical Analysis System Institute Inc. User's Guide: Statistics, Version 6 Edition Statistical Analysis System Inc, Cary, NC USA. CD Rom.

6. Sola–Ojo FE, Adeyemi KD, Toye AA, Bolu SA, Fayeye TR, Annongu AA, Garba SO and Karim RO. (2013). Performance, Carcass Profile and Oxidative Stability of Broiler chickens fed Processed Baobab Seed Meal. *Bulletin of Environmental Pharmacology and Life Science,* 2(11) 94-99.

7. Steel RG and Torrie JH. (1980). Principles and Procedure of Statistics – A Biometrical Approach. (2nd ed.), McGraw- Hill Book Company Inc., New York. p481.

Table 1: Gross Composition of Experimental Diets for Finisher Broiler (%)

Ingredients	T_1	T_2	T_3	T_4	T_5
Yellow maize	37.10	-	-	-	-
While maize	-	37.10	37.00	36.90	36.80
FFSB	37.84	37.84	37.84	37.84	37.84
Maize offal	21.26	21.26	21.26	21.26	21.26
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.30	0.30	0.30	0.30	0.30
Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Baobab Leaf Meal	0	0	0.10	0.20	0.30
Total	100	100	100	100	100
Calculated proximate composition/Energy					
Crude protein	20.31	20.31	20.29	20.29	20.28
Crude fibre	3.74	3.74	3.74	3.74	3.74
Ether extracts	8.65	8.65	8.65	8.65	8.65
ME (Kcal/kg)	2947.19	2947.19	2943.76	2940.33	2936.90

FFSB=Full Fat Soya Bean, ME = Metabolizable energy

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Table 2: Performance of Broilers Fed Graded Levels of Baobab Leaf Meal

Parameters	T_1	T_2	T_3	T_4	T_5	SEM	LOS
Final weight (g)	2210.67	2372.00	2245.33	2271.67	2228.67	27.07	NS
Initial weight (g)	608.67	622.67	616.33	620.33	600.33	11.18	NS
Total weight gain (g)	1602.00	1749.33	1629.00	1651.33	1628.33	27.56	NS
Daily weight gain (g)	57.21	62.48	58.18	58.98	58.15	0.98	NS
Daily feed intake (g)	119.68	125.42	120.58	128.30	125.71	3.02	NS
Feed conversion ratio	2.09	2.02	2.07	2.17	2.17	0.78	NS
Mortality (%)	4.17	8.33	0.00	0.00	0.00	1.86	NS
Cost of feed consumed(₦)	303.66^{a}	278.28^{c}	269.02^{d}	287.88^{b}	283.61^{bc}	1.75	*
Feed cost/kg (₦)	90.63^{a}	79.25^{e}	79.69^{d}	80.14^{c}	80.58^{b}	0.10	*
Feed cost/kg gain(₦)	189.72^{ab}	159.56^{a}	164.69^{b}	174.17^{ab}	174.59^{ab}	0.94	*

^{abcde} = means in the same row with different superscripts differ significantly (P<0.05);SEM = Standard Error of Means; LOS = Level of Significance;
*= Significant at P<0.05; NS = Not Significant at P<0.05.

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Table 3: Carcass Characteristics of Broilers Fed Graded Levels of Baobab Leaf Meal

Parameters	T_1	T_2	T_3	T_4	T_5	SEM	LOS
Live weight (g)	2286.67	2330.00	2453.33	2413.33	2363.33	52.79	NS
Slaughtered weight (g)	2216.67	2253.33	2360.00	2340.00	2273.33	50.12	NS
Dressed weight (g)	1825.00	1876.00	1850.00	1933.00	2032.00	47.09	NS
Dressed (%)	79.85^{b}	80.44^{b}	75.29^{c}	80.20^{b}	85.98^{a}	0.95	*
Heart (%)	0.49^{b}	0.58^{a}	0.48^{b}	0.50^{b}	0.45^{c}	0.01	*
Liver (%)	2.24^{a}	2.36^{a}	1.49^{c}	2.37^{a}	1.84^{b}	0.10	*
Breast Muscle (%)	21.36^{c}	21.59^{c}	21.38^{c}	23.83^{b}	24.60^{a}	0.38	*
Legs (%)	3.60^{b}	3.91^{a}	3.37^{c}	2.98^{d}	3.52^{bc}	0.08	*
Drumstick (%)	9.02^{d}	10.22^{ab}	9.94^{bc}	9.74^{c}	10.46^{a}	0.12	*
Neck (%)	4.77^{b}	4.72^{b}	4.94^{a}	4.74^{b}	4.02^{c}	0.02	*
Proventriculus (%)	0.83	0.77	3.10	0.85	1.19	0.46	NS
Gizzard (%)	2.85^{a}	2.59^{b}	2.38^{c}	2.59^{b}	2.59^{b}	0.04	*
Wing (%)	7.4^{b}	7.34^{b}	7.95^{a}	7.04^{c}	7.92^{a}	0.10	*
Thigh (%)	10.98^{a}	10.49^{b}	11.26^{a}	10.13^{c}	10.40^{c}	0.13	*
Kidney (%)	0.40^{d}	0.48^{b}	0.43^{c}	0.38^{d}	0.59^{a}	0.02	*
Back (%)	15.92^{b}	15.14^{c}	14.66^{d}	15.17^{c}	18.77^{a}	0.03	*

^{ab} = means in the same row with different superscripts differ significantly (P<0.05); SEM = Standard Error of Mean; LOS = Level of Significance;
*= Significant at P<0.05; NS = Not Significant.