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RESPONSE OF BROILERS TO VARYING LEVELS OF ROASTED BAOBAB (*Adansonia digitata* L.) SEED MEAL

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ABSTRACT

This Study was carried out to evaluate inclusion of Roasted Baobab Seed Meal (RBSM) on the performance of broiler chickens. One hundred and eighty day old Oba Marshall broiler chicks were divided into 4 groups, each group consisting of 45 birds divided into 3 replicates of 15 birds each in a completely randomized design (CRD). The RBSM was included at 0 (control) 4, 8 and 12 % designated as treatments A, B, C and D, respectively. The experiment was carried out for eight weeks. Feed and water were provided adlibitum. Weight gain, feed intake, feed to gain ratio and mortality were recorded weekly. Hematological studies and carcass evaluation were carried out at the end of the experiment. Results showed significant difference among treatments on the performance of the birds on all the performance parameters. Significant differences were also observed in some of the carcass traits. Higher body and carcass weight, dressing percent and intestinal length increased as the level of RBSM increased ($P<0.05$). However, no significant ($P>0.05$) difference was observed in Gizzard, Abdominal fat, Heat, Lungs, Spleen, intestine full and empty. It was concluded that RBSM inclusion has beneficial effects on the performance and carcass yield of broiler chickens.

Keywords: Baobab; broilers; seed meal

INTRODUCTION

Poultry industry in the 21st century is faced with numerous problematic fronts. Among these problems is poultry nutrition technology (Robert *et al.*, 1996). This results from competition between man and livestock for conventional feeding stuff. In order to meet increasing consumers need for poultry products, nutritionists are forced to source for alternative feed sources which are cheap with less competition with humans. Thus, researchers now direct their efforts at exploring new and non – conventional sources (Magdi, 2004). Among identified non – conventional tree plants are baobab. This plant is widely distributed in Africa, Nigeria inclusive. The parts (leaves, pulp, bark and seeds) are in abundant supply and are underutilized. Recent works indicated its immense importance in the diet of livestock (Adeosun *et al*, 2014; Saulawa *et al*, 2015; Ezeagu, 2005 and

Yazzid, 1994). The nutritional value of the plant as indicated by Saka *et al* (1994) showed that it contained 29.6% fat, 28.7% crude protein and 7.3% crude fibre and 32 – 36% crude protein, 32 – 34% ether extract and 20 – 30% carbohydrate as reported by Obzoba and Amaechi (1993) and Adeosun *et al.* (2014). It was further reported that the seed kernel contains 12 – 15% edible oil, more protein than groundnut, lysine and thiamine. Although reports on baobab seeds nutritional values are available, its use as alternative protein source in the diets of broiler chicken is limited. This study evaluated roasted baobab seed meal on the performance of broiler chickens.

MATERIALS AND METHODS

Experimental Site

The experiment was carried out at the research and teaching livestock farm, Department of Animal Production and Health, Federal University Dutsin-Ma, Katsina State – Nigeria. Dutsinma is located at the Latitude of 12°27'56"N and longitude 07°30'04"E.

Sources of Feed and Feed Formulation

Table 1: Composition of experimental diets for broiler starter with graded levels of roasted Baobab Seed Meal (23% CP)

Ingredient	A	B	C	D
Maize	54.31	53.40	52.47	51.55
Groundnut cake	26.31	23.51	20.69	17.91
Soyabean cake	10.00	10.00	10.00	10.00
Fish meal	3.50	3.50	3.50	3.50
Limestone	0.05	0.05	0.05	0.05
Salt	6.35	0.35	0.35	0.35
Bone meal	3.60	3.60	3.60	3.60
Vit. Premix	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.18	0.18	0.18	0.18
Oil	1.20	0.79	0.38	0.00
RBSM	0.00	412	8.24	12.36
Total	100.00	100.00	100.00	100.00
		Calculated analysis		
Energy (kcal kg)	2970.66	2970.54	2970.56	2971.12
Crude protein (%)	23.00	23.00	23.00	23.00
Crude fiber (%)	3.17	3.22	3.08	3.05
Ether extract (%)	5.20	5.17	5.15	5.11
Lysine (%)	1.27	1.22	1.17	1.11
Methionine (%)	0.93	0.88	0.84	0.81
Avail.phosphorus (%)	0.77	0.75	0.79	0.81
Calcium (%)	1.42	1.44	1.44	1.44

The baobab seeds used for this study were sourced locally in Dutsin-ma environment of Katsina State. The obtained seeds which were cooked with whitish powdery pulp were washed, sun – dried, roasted and then grounded into meal. Four dietary

treatments were formulated in accordance to NRC (1994) requirements for broiler starter and finisher phases (Tables 1 and 2). These four dietary treatments groups were designated as A, B, C and D where A is the control diet and had no RBMS. Groups B, C and D contained RBSM at the rates of 4.12, 8.24 and 12.36% respectively.

Table 2: Composition of experimental diets of Broiler finisher with graded levels of RBSM (21 % CP)

Ingredient	T_1	T_2	T_3	T_4
Maize	60.32	59.36	58.32	57.34
Groundnut cake	21.30	18.50	15.71	12.95
Soyabean cake	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00
Limestone	0.05	0.05	0.05	0.05
Salt	3.50	3.50	3.50	3.50
Bone meal	0.25	0.25	0.25	0.25
Vit. Premix	0.25	0.25	0.25	0.25
Lysine	0.18	0.18	0.18	0.18
Methionine	0.35	0.35	0.35	0.35
Oil	1.20	0.84	0.51	0.17
RBSM	0.00	4.12	8.24	12.36
Total	100.00	100.00	100.00	100.00

Experimental Animals, Feeding and Management

A total of 180 day old Oba Marshall broiler chicks purchased from a commercial supplier were used in this experiment. On day 2 the birds were weighed on equal basis with average initial weight of 46.67g per bird. The chicks were divided into four dietary treatment groups and replicated 3 times with each replicate consisting of 15 birds per replicate in a complete randomized design. Birds were assigned to their dietary treatments accordingly. Drinking water was supplied throughout the period of 8-weeks duration. Routine management, vaccination schedule and medication were administered appropriately.

Data collection and Analysis

Weekly data collection included feed intake body weight gain feed to gain ratio and percent morality. At the end of the experiment, 6 birds from each treatment were randomly selected for carcass evaluation. Birds were slaughtered manually by severing the head from the neck using a sharp knife. Blood drained out and the birds scalded in hot water (about 70^{o}c), feathers were plucked manually. The birds were then eviscerated, carcass weighed and the dressing percentages calculated. The internal organs such as gizzard, heart, liver, lung, and spleen, abdominal pad, intestine (full and empty) weighed and intestinal length measured. Data collected were summarized and subjected to analysis of variance. Where significant differences occurred, Duncan multiple range test (Steel and Torrie, 1980) was used to separate the means.

RESULTS

Feed intake and feed conversion ratio

A significant difference (P<0.05) in feed intake (g/b/d) among treatment means was observed (Tables 3). Birds on dietary on control diet had significantly (P<0.05) higher feed intake. However, feed intake of the birds increased as the level RBSM increased from zero (0) to 12.36%. . The feed conversion ratio of the animals followed the same pattern.. The FCR was better for the the birds fed RBSM than the control irrespective of the inclusion level.

Table 3: Feed intake of broiler chicken fed graded levels of RBSM (g/birds/day)

	Dietary treatment levels				
Week	0	4.12	8.28	12.36	SEM
1	37.99^{c}	40.42^{b}	40.49^{b}	41.71^{a}	0.27
2	57.00^{c}	60.23^{b}	61.16^{ab}	63.00^{a}	0.57
3	70.54^{b}	70.77^{b}	71.09^{ab}	71.92^{a}	0.29
4	74.67^{c}	75.90^{bc}	77.04^{ab}	78.08^{a}	0.41
5	87.38^{c}	90.15^{b}	91.15^{ab}	91.59^{a}	0.34
6	93.27^{b}	93.45^{b}	93.97^{b}	94.93^{a}	0.25
7	94.05^{b}	96.11^{a}	96.98^{a}	97.62^{a}	0.49
8	97.36^{c}	99.11^{b}	99.24^{b}	100.97^{a}	0.36

Means with different superscripts on the same row are significantly different (P<005), SEM = Standard error of means

Table 4: Feed conversion ratio of broiler chicken fed graded levels of RBSM

	Dietary treatment				
Week	0	4.12	8.24	12.36	SEM
1	2.44^{c}	2.39^{c}	2.16^{b}	1.67^{a}	0.04
2	2.39^{c}	2.32^{c}	2.19^{b}	1.68^{a}	0.01
3	2.26^{c}	2.35a	1.97^{b}	1.73^{a}	0.02
4	2.05^{c}	2.10^{c}	1.86^{b}	1.56^{a}	0.02
5	2.33^{d}	2.03^{c}	1.93^{b}	1.77^{a}	0.02
6	2.20^{c}	1.98^{b}	1.82^{a}	1.78^{a}	0.01
7	1.97^{c}	1.94^{c}	1.76^{b}	1.70^{a}	0.03
8	2.09^{c}	1.94^{b}	1.72^{a}	1.70^{a}	0.01

Means with different superscripts on the same row are significantly different (P<005), SEM = Standard error of means

Growth Rate

The growth rate of the animals is shown in figure 1. Birds on the highest level of RSBM (Treatment D) showed better growth rate compared to other treatments. The growth follows the order of inclusion level of the RBSM with the control having the lowest response. Thus, the growth rate pattern showed that the higher the % inclusion of RBSM the better the performance.

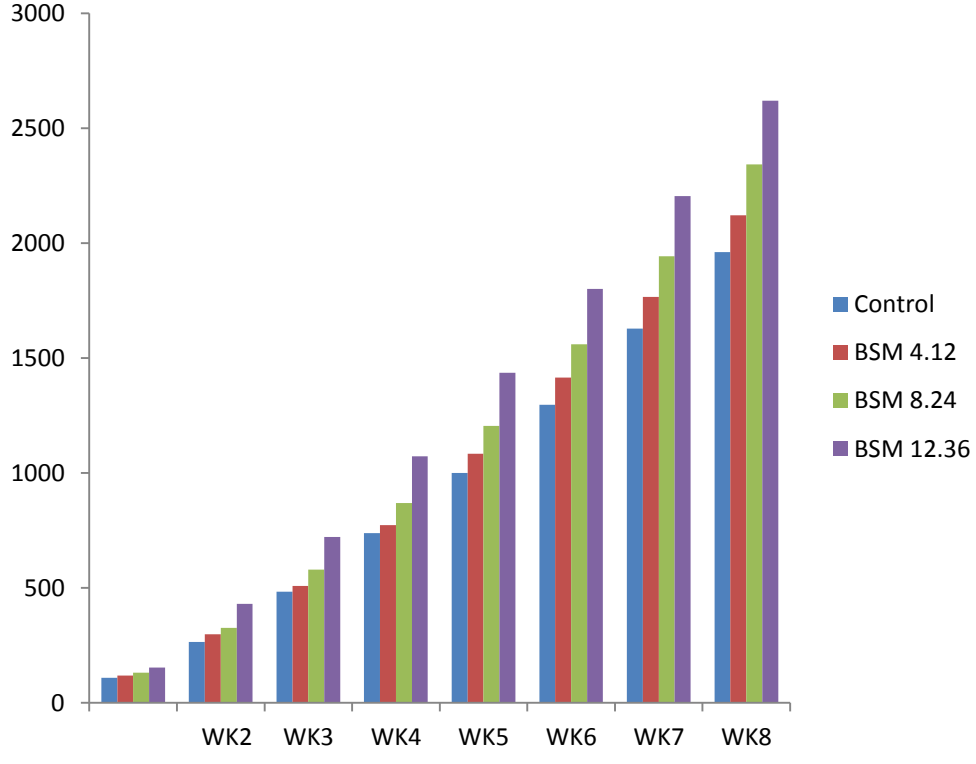

Fig.1: Growth rate of broiler chicken fed graded levels of RBSM

Carcass Yields

The carcass yield and organ weights of broilers fed RBSM meal are presented on Table 5. Significant effects ($P< 0.05$) were noticed in live weight, carcass weight and percentage dressing. Birds fed RBSM performed better compared to control in this result. Group treatment D appeared best. The internal organs showed no significant difference ($P> 0.05$) for gizzard, abdominal pad, heart, lung, spleen; intestine (full and empty) but there was in liver and intestinal length ($P<0.05$). Treatment D had the longest (cm) intestinal tract compared to other treatments ($P<0.05$). The liver weight (g) of the animals fed RBSM was heavier than those on control. However, animals on treatments B and D are the same ($P>0.05$) in terms of liver weight.

Table 5: Carcass Yields of Broiler Chicken fed graded levels of roasted baobab seed meal.

	Dietary Treatment				
Variables	0	4.12	8.28	12.36	SEM
Live weight (g)	2002.99	2109.8^{c}	2305.30^{b}	2605.13^{a}	36.15
Carcass weight (g)	1559.37^{d}	1752.11^{c}	1938.80^{b}	2319.82^{a}	28.14
Dressing (%)	77.85^{d}	83.07^{c}	84.01^{b}	89.05^{a}	2.31
Internal Organ					
Gizzard (g)	57.07	56.33	65.5	59.70	0.31
Abdominal pad (g)	50.50	41.20	53.43	35.97	0.18
Heart (g)	9.69	9.90	12.80	9.73	0.24
Liver (g)	49.27^{c}	57.13^{ab}	71.27^{a}	67.33^{ab}	0.11
Lung (g)	11.93	8.77	10.30	13.77	2.70
Spleen (g)	3.23	3.80	4.33	3.83	1.01
Intestine full (g)	110. 80	117.53	108.43	137	14.01
Intestinal Empty (g)	83.07	89.83	84.50	102.05	10.01
Intestinal length (cm)	170.67^{b}	169.67^{b}	171.00^{b}	203.67a	2.52

Means with different superscripts on the same row are significantly different (P<005), SEM = Standard error of means

DISCUSSION

The inclusion of RBSM in the diets of broiler birds led to better feed intake, efficient feed to gain ratio, improved carcass characteristics and rapid growth rate. This is an indication that RBSM is a potential quality protein for broiler birds. This is similar to the findings of Sola-Ojo *et al*. (2013) which indicated a better performance with broiler birds fed decorticated un-defatted baobab seed meal (DUBSM). A corresponding feed intake and efficient feed/gain ratio noticed in this study is reflected in better growth rate and carcass yield. The better growth rate in birds fed RBSM is a function of feed intake and efficient feed/gain ratio. This indicates that RSBM is acceptable, digestible and better utilized by the animals. No significant effects were noticed in intestinal organs except in liver and intestinal length. The weight of dietary liver is similar and heavier in birds fed dietary feeds than those on control. However, animals in treatment C had the highest liver weight. This difference in high weight of birds in group c is as a result of individual bird's factor. The higher value recorded in group D intestinal length might not be unconnected with high feed intake which might have resulted in the extension of the intestinal tract.

CONCLUSION

It was concluded that inclusion of Roasted Baobab Seed Meal can improve feed intake, feed/gain ratio, growth rate and carcass yields of broiler birds.

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