

# Growth Performance and Economic Evaluation of Broiler Chickens Fed Graded Levels of Roasted Baobab Seed Meal

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**Abstract** – A 55-days feeding trial involving one hundred and eighty one day old Oba Marshal was conducted to determine the performance and economic effectiveness of broiler chickens fed dietary levels of roasted baobab seed meal (RBSM). The birds were randomly allocated to four dietary treatment groups A, B, C and D at the levels of O (Control), 4.12, 8. 24 and 12.36%, respectively. The parameters considered were initial weight, final weight, body weight gain, feed intake, feed to gain ratio, feed cost per kg, feed cost per kg body weight gain, income above feed expenses (IAFE) and Mortality rate. The result from this study revealed that all the birds on RBSM dietary treatments performed better than those on control diet. The performance improved with increased dietary levels of RBSM. The cost analysis indicated that the control diet had higher feed cost/kg and feed cost/kg body weight gain than those on the RBSM diets. The control diet had lower IAFE than those on treatments. The lower feed cost/ kg, feed cost /kg body weight gain and higher IAFE observed in birds fed diets containing RBSM in this study is due to low cost price of baobab seed and which justify the inclusion of baobab seed meal in broiler chickens' diets. In conclusion, dietary inclusion of RBSM at 12.36% both reduced cost of production and did not impair the performance of birds.

**Keywords** – Performance, Evaluation, Broiler, Meal, Roasted

## I. INTRODUCTION

There has been an unprecedented demand for meat and other animal products in recent times. According to FAO (2004), the increase in demand for animal products will likely be at the rate of 3.3% per year. Poultry production has the highest turnover rate and quickest returns to investment outlay (Ogundipe and Sanni, 2002), thus leading to the rapid growth in the poultry enterprise in Nigeria. However, the sudden decline noticed in the industry is attributed to lack of feed. Esonu *et al* (2001) reported that about 50% of Nigeria poultry farms have been closed down and another 30% will likely reduce their production capacity due to lack of feeds. While poultry producers want to maximize profit, consumers on the other hand desire quality products. The cost of producing poultry products using conventional feedstuffs that are in high competition with human is on the increase. Therefore, to bridge the gap between poultry products prices and consumer purchasing power, the nutritionists and researchers have resorted to alternative feedstuffs which has little or no competition between man

and livestock (Adeosun *et al.*, 2004; Adeosun *et al.*, 2013; Sola-Ojo *et al.*, 2013) and yet without compromising quality for low cost. Ominisi *et al.*; (2009) working on quality protein maize (QPM) opined that the rapid demand in feed stuff for livestock could only be met by cereals which have potential for increasing productivity and improve nutritional value through better feed efficiency. However, these cereals are equally in demand for human consumption. As researchers therefore explore new and non-conventional crops, it is important to sort out tree crops grown in such region where poultry production is situated. Baobab is a well-adapted deciduous tree crops found in most part of Africa (FAO, 1980). These plants are indigenous in Katsina State and are in abundant supply.

The baobab seed being rich in protein and fats will play a dual role in meeting both energy and protein requirements of broiler birds. Saka *et al* (1994) reported that baobab seed contains 29.6% fat, 28.7% crude proteins and 7.3% crude fibre. Saulawa *et al* (2014) worked on different methods of processing baobab seed, and reported ranges of nutrient composition as 18.68 to 28.85% CP, 2.19 to 4.44 ether extract and 8.29 to 10.78% Cf. The aim of this study therefore was to evaluate the growth performance and cost implication of feeding roasted baobab seed meal to broiler chickens.

## II. MATERIALS AND METHODS

### *Experimental Site*

The experiment was carried out at Livestock Research and Teaching farm, Animal Science Department, Federal University Dutsinma, Katsina State. The farm is located at latitude 12°27'18" and longitude 07°29'29"E and an altitude of 542m above sea level ([www.maplandia.com/nigeria/katsina/dutsinma](http://www.maplandia.com/nigeria/katsina/dutsinma)). The climate of the area is the tropical wet and dry season with an average annual rainfall of about 700mm. The mean annual temperature ranges between 29° – 30°C.

### *Source and Processing of Baobab Seeds*

The baobab seeds used for this research were purchased at the local markets in Dutsinma town. The seeds were sorted, washed, sun-dried, roasted to golden colour and ground into meal and referred to as roasted baobab seed meal (RBSM).

### *Experimental Design, Diet and Birds Management*

The roasted baobab seed meal (RBSM) was used to for-

-mulate four dietary treatment groups A, B, C and D at the rate of O (control), 4.12, 8.24 and 12.36% respectively. This formulation was done in accordance with NRC (1994) nutrient requirements for both starter and finisher phases (Tables 1 and 2). The experiment which was laid out in a completely randomized design (CRD). They were four treatments replicated thrice with each replicate consisting of 15 birds. The experiment ran continuously for a period of 8 weeks. Feeds and water were served to the experimental birds *ad libitum*. All the necessary routine management practices with vaccination schedule were observed.

#### Data Collection and Analysis

The parameter measured included initial weigh (g/bird) t, final weight (g/bird), body weight gain (g/bird), feed intake (g/bird), feed cost per kilogram (₦), feed cost per kilogram body weight gain (₦), income above feed expensis (IAFE) and the mortality rate (%) when it occurred. All data collected were summarized and subjected to analysis of variance using steel and Torrie (1980) and significant mean differences separated using Duncan Multiple Range Test.

### III. RESULTS

The results of the performance and economic evaluation of broiler chickens fed dietary levels of roasted baobab seed meal (RBSM) is shown on Table 3. Significant ( $p < 0.05$ ) differences were observed among treatment means in final weight (g/bird), body weight gain (g/bird), feed intake (g/bird), feed convention ratio (FCR), feed cost per bird (feed Cost/bird), feed cost per kilogram weight gain (feed cost/kg gain) and income above feed expenses (IAFE). The results of this study indicated that final weight, weight gain and feed intake increased with increment in dietary levels of RBSM. Feed cost/kg diet, feed cost per bird, feed cost per kg weight gain and percent mortality decreased as the inclusion levels of RBSM increased in the diet but income above feed expenses increased with increasing dietary treatment.

### IV. DISCUSSION

Reported the results of this study agrees with the findings of Sola-Ojo *et al.* (2013) who reported better performance in birds fed decorticated undefatted baobab seed meal (DUBSM) at 7.55% inclusion level, but disagreed with Ezeagu (2005) that discovered lowered weight gain in rats fed heat treated baobab seeds. Heat treatment enhances nutritive value of proteins by making sulfur containing amino acid readily available as reported by Hayward (1936) many years ago. The increment in the productive parameters : final weight, weight gain and better feed to gain ratio measured are indication that RBSM has nutritive value capable of meeting nutrient requirement of broiler chickens.

### V. CONCLUSION

In conclusion therefore, the inclusion of RBSM in the diets of broiler chickens resulted in low feed cost/kg, feed cost/kg weight gain and higher income above feed expenses. It is therefore less expensive and economical to include RBSM in broiler diets in place of expensive conventional feedstuff.

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Table 1. Composition of Experimental Diets for Starter Broiler Chickens Containing graded levels of Roasted Baobab Seed Meal (23% CP) Roasted Baobab Seed Meal (23% CP)

<b>Ingredient</b>	<b>T<sub>1</sub></b>	<b>T<sub>2</sub></b>	<b>T<sub>3</sub></b>	<b>T<sub>4</sub></b>
Maize	54.31	53.40	52.47	51.55
Groundnut cake	26.31	23.51	20.73	17.91
Soya bean cake	10.00	10.00	10.00	10.00
Fishmeal	3.50	3.50	3.50	3.50
Limestone	0.05	0.05	0.05	0.05
Salt	0.35	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	4.12	8.24	12.36
<b>TOTAL</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Calculated analysis</b>				
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
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Table 2. Composition of Experimental Diets for Finisher Broiler Chickens Containing graded levels of Roasted Baobab Seed Meal (21% CP).

<b>Ingredient</b>	<b>T<sub>1</sub></b>	<b>T<sub>2</sub></b>	<b>T<sub>3</sub></b>	<b>T<sub>4</sub></b>
Maize	59.92	58.96	57.96	56.94
Groundnut cake	21.30	18.50	15.71	12.95
Soya bean cake	10.00	10.00	10.00	10.00
Fishmeal	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	1.20	1.20	1.20
RBSM	0.00	4.12	8.24	12.36
<b>TOTAL</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Calculated analysis</b>				
ME	3045.53	3045.87	3045.69	3045.83
CP	21.00	21.00	21.00	21.00
EE	4.94	4.96	4.94	4.91
CF	3.13	3.19	3.04	3.01
Ca	1.32	1.48	1.48	1.48
N. Pho.	0.62	0.71	0.71	0.72
Lysine	1.18	1.12	1.07	1.01
Meth+cy	0.89	0.84	0.80	0.77
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Table 3. Performance and Economic Evaluation of Broiler Chicken Fed Graded Levels of Roasted Baobab seed meal (0-8 Week) Treatments

Parameter	A	B	C	D	SEM
Initial weight g(bird)	46.67	46.67	46.67	46.67	0.-010
Final weight (g/bird)	2008.16 <sup>d</sup>	2168.19 <sup>c</sup>	2388.32 <sup>b</sup>	2666.46 <sup>a</sup>	18.31
Weight gain (g/bird)	1961.49 <sup>d</sup>	2121.52 <sup>c</sup>	2341.65 <sup>b</sup>	2619.79 <sup>a</sup>	8.11
Feed intake(g/bird)	4284.78 <sup>b</sup>	4382.18 <sup>b</sup>	4419.24 <sup>b</sup>	4475.59 <sup>a</sup>	32.14
Feed conversion ratio	2.19 <sup>d</sup>	2.07 <sup>c</sup>	1.79 <sup>b</sup>	1.71 <sup>a</sup>	0.02
Feed cost/kg	101.64	98.46	96.78	91.98	41.51
Feed cost/bird	435.65 <sup>b</sup>	431.47 <sup>ab</sup>	425.69 <sup>ab</sup>	411.66 <sup>a</sup>	4.31
Feed cost/kg gain	229.24 <sup>d</sup>	204.15 <sup>c</sup>	182.59 <sup>b</sup>	162.80 <sup>a</sup>	0.75
IAFE(₦)	470.75 <sup>d</sup>	496.51 <sup>c</sup>	517.41 <sup>b</sup>	537.20 <sup>a</sup>	0.15
Mortality (%)	24.00 <sup>b</sup>	13.33 <sup>a</sup>	11.11 <sup>a</sup>	11.11 <sup>a</sup>	4.53

<sup>a,b,c,d</sup> Mean with different superscript in the same row are significantly (p>0.05) different

SEM: Standard Error of Mean

IAFE: Income above feed expenses at N700.00 per kg