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Effects of Varying Levels of Fermented Baobab Seed Meal on Serum Biochemical Components of Broiler Chickens at Starter Phase

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Abstract: **Baobab tree (*Adansonia digitata)* is an indigenous of tropical plant predominant in Nigeria. Baobab tree produces seeds that are not only rich in protein (20%- 36% CP) and energy (1,898 - 4,465kCal/kg) but also provides some necessary fiber, vitamins, minerals and amino acids, particularly, lysine and methionine which is capable of complementing the protein of maize (8%) in poultry diets. One hundred (100) day old Broiler chicks were purchased from a reputable farm (Zartech) Jos plateau State. Birds were managed intensively using animal welfare guide 2006. Four (4) broiler starter experimental diets were formulated such that the fermented baobab seed meal replaced soybeans at 0%, 7.5%, 15% and 22.5% dietary levels respectively. The study was carried out to investigate the effect of varying levels of fermented baobab seed on biochemical indices. Birds on Fermented baobab seed meal (FBSM) showed significant (P <0.05) effect on uric acid with a significantly increased in value of 4.27 mg/d on birds fed diet T3. High inclusion rate of FBSM (15% and 22.5%) revealed higher numerical value of 59.97mg/dl and 47.90 mg/dl for creatinine. From the result of this study, it was concluded that fermented baobab seed meal (FBSM) had no significant influence on most of the serum biochemical parameters observed except uric acid. However, the inclusion level of 15% may be safe for improved growth and serum biochemical characteristics in broiler chickens at starter phase.**

Keywords: **Serum-biochemical, broilers, graded levels, baobab, meal.**

I. INTRODUCTION

Baobab tree is an indigenous plant found in tropical region predominantly in Nigeria. The seed of baobab (*Adansonia digitata)* it produces seeds that are not only rich in protein (20% - 36% CP) and energy (1,898 - 4,465kCal/kg) but also provides some necessary fiber, vitamins, minerals and amino acids, particularly, lysine and methionine which are limited in most cereals but essential for livestock growth and development (Glew *et al.,* 1997; Murray *et al.,* 2001).

Leakey (1999) estimated a proximate crude protein content of baobab seed as 21.4%, while that of the pulp and husks to be 10.90% and 2.41%, respectively. Etejere and Osatmehin (1984) analyzed the seed, powdery pulp and hard husk of the baobab fruit. The proximate moisture content of the seed, pulp and hard husk were 6.12%o, 6.21 % and 3.1% respectively (Odetokun, 1996). The husk had a proximate ash content of 4.2% and crude fiber of content of 35%. These were higher than those of seed and pulp. The seed kernels contain 12.15% edible oil, more protein than groundnuts and are also rich in lysine, thiamine, and calcium and iron (Booth and Wickens, 1988). Although, A. digitata seed cake contains some anti-nutritional factors (such as oxalate, phytate, saponins, and tannins) but their levels are generally below the toxic levels for most livestock species, including poultry (D'Mello, 1995; Nkafamiya *et al.*, 2007). The aim of this study is to determine the effect of varying levels of fermented baobab seed meal on serum biochemical component of broiler chicks at starter phase.

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II. MATERIALS AND METHODS

Experimental Site

The research was conducted at the poultry unit of the Teaching and Research Farm, Department of Animal Health and production, Federal Polytechnic Bali. Bali has a temperature ranging from 32oc to 34oc and annual rainfall of 1000-1200mm for seven months. The mean monthly rainfall at peak it is recorded in August and September. (Taraba State Diary, 2008).

Experimental Birds, Design and Management

One hundred (100) day old Broiler chicks were purchased from a reputable farm (Zartech) in Jos plateau State. Birds were managed intensively using 2006 animal welfare guide. Four experimental diets were formulated to contain varying levels of fermented baobab (*Adansonia digitata*) seed meal at levels of 0%, 7.5%, 15% and 22.5% and designated as T1, T2, T3 and T4, respectfully. T1 served as control as presented in Table 1.

TABLE 1. COMPOSITION OF EXPERIMENTAL DIETS FOR STARTER BROILER CHICKS (0-4WEEKS)

	Treatment			
Ingredients	**T1 0% (Control)**	**T2 7.5%**	**T3 15%**	**T4 22.5%**
Maize	46.00	46.00	46.00	46.00
FFSB	46.00	38.5	31.00	24.00
FBSM	0.00	7.5	15	22.5
Rice Offal	4.00	4.00	4.00	3.5
Bone meal	3.00	3.00	3.00	3.00
Salt	0.30	0.30	0.30	0.30
Methionine	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20
Premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
ME (Kcal/kg)	2994.162	968.84	2943.52	2909.76
Crude protein (%)	22.10	22.86	22.62	22.30
Crude Fibre (%)	3.10	3.65	3.48	3.26
Fat (%)	10.04	9.50	8.96	8.24
Calcuim (%)	1.00	0.99	0.99	0.98
Phosphorus (%)	0.60	0.60	0.59	0.58
Lysine (%)	1.61	1.52	1.44	1.33
Methionine	0.66	0.65	0.63	0.60

*Vitamin – Mineral Premix (Bio-Mix) provided per kg the following: Vitamin A 500iu; Vitamin D_3 888, 000iu; Vitamin E, 12, 000mg; Vitamin K_3 15, 000mg; Vitamin B_1 , 1000mg; B_2 2000mg; Vitamin B_6 1500mg; Niacin, 1200mg; Pantothenic acid, 2000mg; Biotin, 1000mg; Vitamin B_{12} 3000mg; Folic acid, 1500mg; Chlorine Chloride, 60, 000mg; Manganese, 10,000mg; Iron, 1500mg Zinc, 800mg; Copper, 400mg; Iodine; Cobalt 40mg; Selenium, 8000mg.

FFSB=Full Fat Soya bean, FBSM= Fermented Baobab seed meal

Source and processing of baobab seed

Baobab seed for these experiment was purchased at Zing Local Government Area, Taraba State. The seed was soaked in a basin containing 100 liters of clean water. After 24 the Baobab seeds were tied up into a clean sack for 72 hours in order to

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allow the water hours to drain. After the water has been fully drained, the seeds were sundried for 3-4 days before milling and were incorporated into the diets.

Blood sample collection and data analysis

At the end of the four weeks feeding trial, three birds were randomly selected from each replicate for hematological test. The birds were fasted overnight. 2ml of blood was collected over a labelled sterile sample bottles without anti-coagulant and was used to determine the biochemical indices such as Total protein (g/L), Cholesterol (mmol/L), Urea (mmol/L), Creatinine (umol/L).described by Tuleum, *et al.*, (2009). Blood sample were analyzed in Biochemistry laboratory of Federal Medical Centre (F.M.C) Jalingo. Data collected were subjected to analysis of variance (ANOVA) using Statistical Analysis System (SAS, 2008). Means across the treatments were separated using Duncan Multiple Range Test (Duncan, 1955).

III. RESULTS AND DISCUSION

Serum Biochemical Parameters of Broiler Chicks Fed varying Levels of Fermented Baobab Seed Meal at starter phase.

The result of effect of varying levels of fermented baobab seed meal (FBSM) serum biochemical indices of starter broiler chickens were presented in Table 2. Varying levels of fermented baobab seed meal showed significant (P<0.05) effect on uric acid. Birds fed diet with 22.5% FBSM

Uric acid showed higher significant (P <0.05) effects (4.27 mg/dl). Similarly, values recorded for birds fed control diet (TI) and diet T2 (7.5% FBSM) were statistically similar 1.47 mg/dl and 1.50 mg/dl respectively. This observation could be attributed to high interference of anti-nutritional factor with increased levels of BSM. This eventually resulted to increase uric acid excretion which is an indication of poor protein utilization (Adeyemo and Longe, 2007). Elevated values recorded for uric acid as observed in birds fed diets containing FBSM could be attributed to imbalance of amino acid in the diet and consequently energy wastage (Nworgu *et al*, 2007).

SERUM BIOCHEMICAL PARAMETERS OF BROILERS CHICKS FED VARYING LEVELS OF FERMENTED BAOBAB SEED MEAL AT STARTER PHASE.

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	T1 0%	T2 7.5%	T3 15%	T4 22.5%	SEM
_Protein (g/l)	50.43	42.83	46.1	37.96	2.34
Cholesterol (mg/dl)	6.23	6.57	6.73	4.37	0.45
Uric acd (mg/dl)	1.47^{b}	1.50^{b}	4.27^{a}	1.96^{ab}	0.48
Creatinine (mg/dl)	37.47	37.33	59.97	47.9	4.23

Total protein though not significant (P > 0.05), elevated numerical value of 50.43 g/dl was recorded for the birds fed control diet (TI). Lower numerical values were obtained for total protein in the birds fed with FBSM diets. Akinmutimin and Okwu (2006) reported that decreased in net total protein suggested hemaglutinizing property of the diets. Thus this suggested the trace of hemaglutinizing property in the FBSM dietary treatments. The non- Significantly (P>0.05) higher numerical value (50.43 g/c) recorded for total protein in the Control diet could be due to efficient utilization of nutrients in term of digestion, absorption and assimilation (Bamgbose and Nwokoro, 1997).

High inclusion level of FBSM (15% and 22.5%) revealed higher numerical value of 59.97 mg/dl and 47.90 mg/DL for respectively creatinine. Total protein and serum creatinine depend on quantity of protein supplied in the diet (Awosanya *et al.*, 1999). Thus elevated values observed with high inclusion level of FBSM in this study could be as a result of poor quality protein which might due to interference of anti-nutritional factor. Saulawa *et al.*, 2012) reported that inclusion of baobab seed meal above 10 % as plant sources of protein in Physiological and biochemical alterations.

IV. CONCLUSION

The study was carried out to investigate the effect of varying levels of fermented baobab seed on biochemical indices. Fermented Baobab seed meal (FBSM) showed significant (P <0.05) effect on uric acid. Birds fed diet with 15% FBSM showed higher significant (P<0.05) value of 4.27 mg/dl.

Birds revealed close ranged values of 6.43g/dl – 7.27 g/dl for hemoglobin across numerical values were obtain for total protein in the birds fed with FBSM inclusion diets. High inclusion rate of FBSM (15% and 22.5%) revealed higher numerical value of 59.97mg/dl and 47.90 mg/dl for creatinine.

From the result of this study, it was concluded that fermented baobab seed meal (FBSM) had no significant influence on most of the serum biochemical parameters observed except uric acid. However, the inclusion level of 15% may be safe for normal serum biochemical characteristics in broiler chickens

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