

Hematological Response of Broiler Chickens Fed Diet Containing Varying Level of Fermented Baobab Seed Meal at Starter Phase

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Abstract: Currently, research effort in most developing countries are geared towards identifying potential feed sources that have little or no demand by human. These feed resources could be cheap and available for compounding livestock ration as it will reduce competition between livestock and man. One hundred (100) day old Broiler chicks were purchased from a reputable farm in Zartech Jos plateau State. Birds were managed intensively using animal welfare guide. Four (4) broiler starter experimental diets were formulated such that the fermented baobab seed meal (FBSM) 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 hematological indices of broiler chicks at starter phase. (FBSM) showed significant ($P < 0.05$) effect meal on mean corpuscular volume (MCV) Birds fed diet with 15% FBSM showed higher significant ($P < 0.05$) value of 93.53f1 for mean corpuscular volume. Similarly, values recorded for birds fed control diet (T1) and diet with 7.5% FBSM (T2) were statistically similar 1.47 mg/dl and 1.50 mg/dl. The result of FBSM from this study shows no significant ($P > 0.05$) influence on PCV, Hb, WBC, RBC, MCHC, MCH, total protein, cholesterol and creatinine. Similarly, no significance differences ($P > 0.05$) were recorded for PCV, However, a better PCV range of 22.33% - 25.00% were recorded. From the result of this study, it was concluded that fermented baobab seed meal (FBSM) had on significant influence on most of the hematological parameters observed except MCV However, the inclusion level of 7.5 and 15% may be safe for improved hematological characteristics in broiler chickens at a starter phase.

Keywords: Graded levels, baobab seed, meal, hematological, broilers chicks.

I. INTRODUCTION

Currently research effort in most developing countries including Nigeria, are geared towards identifying potential feed sources that have little or no demand by human. These feed resources could be cheap and available for compounding livestock ration as it will reduce or remove the competition between livestock and man. Some of these potential feed materials that are being investigated include leaf meal made from fodder shrubs, leguminous crops, and trees (Glew, *et al.*, 1997).

Baobab tree is an indigenous of tropical plant predominant in Nigeria. Baobab tree (*Adansonia digitata*) 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). Therefore, it is capable of complementing the protein of maize (8%) in poultry diets. This study was carried out to investigate the effect of varying levels of fermented baobab seed on hematological indices of broiler chicks at starter phase.

II. MATERIALS AND METHOD

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's 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)

Ingredients	Treatments			
	T1 (Control 0%)	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
Calcium (%)	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 D₃ 888, 000iu; Vitamin E, 12, 000mg; Vitamin K₃ 15, 000mg; Vitamin B₁, 1000mg; B₂ 2000mg; Vitamin B₆ 1500mg; Niacin, 1200mg; Pantothenic acid, 2000mg; Biotin, 1000mg; Vitamin B₁₂ 3000mg; Folic acid, 1500mg; Chlorine Chloride, 60, 000mg; Maganese, 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 litres of clean water. After 24 the Baobab seeds were tied up into a clean sack for 72 hours in order to 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.

Data Collection

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. Five 5ml of blood sample for hematological analysis were also collected in bottles containing Ethylene Diamine Tetra Acetic Acid (EDTA).

Hematological indices measured included: Red Blood Cells (RBC $\times 10^{12}/L$), White Blood Cell (WBC $\times 10^9/L$), Packed Cell Volume (PCV %), Hemoglobin (Hb g/dl) concentration, mean corpuscular Hemoglobin Concentration (MCHC g/100ml), Mean corpuscular volume (MCV fl). blood sample analysis were carried out at Federal Medical Centre (FMC) Jalingo. data collected where analyzed using ANOVA in Statistical Analysis System (SAS, 2008). Means across the treatments were separated using Duncan Multiple Range Test (Duncan, 1955).

III. RESULTS AND DISCUSSION

Hematological Parameters of Broiler Chicks Fed Varying Levels of Baobab Seed Meal

The result of effect of varying levels of fermented baobab seed meal (FBSM) on hematological parameters of starter broiler chickens were presented in Table 2. Varying levels of fermented baobab seed meal showed significant ($P < 0.05$) effect on Mean corpuscular volume (MCV) .Birds fed diet with 15% FBSM showed higher significant ($P < 0.05$) value of 93.53fl for mean corpuscular volume.

Similarly, least statistical values 87.83fl and 87.07fl were obtained for birds fed control diet (T1) and birds fed diet T2 (7.5% FBSM). High level of MCV indicated negative interaction of energy and protein in the diet. High inclusion level of FBSM suggested nutritional imbalance which may be due to impairment in bioavailable trapped nutrient in the seed. This observation could also be attributed to cumulative effect of anti-nutritional factor to toxic level since baobab seed contains some anti-nutritional factor such as oxalate, phytate, saponin and tannin (Nkafamiya, et al., 2007). 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.

Hematological Parameters of broilers chicks fed varying levels of Baobab Seed Meal

Parameters	T1 0%	T2 7.5%	T3 15%	T4 22.5%	SEM
PCV (%)	25	22.33	24.67	24.67	0.94
HB (g/dl)	7.27	6.43	7.1	7	0.36
WBC ($\times 10^6/mm^3$)	11.2	9.47	8.87	9.2	0.68
RBC ($\times 10^6/mm^3$)	2.87	2.57	2.63	2.77	0.11
MCV (fl)	87.83 ^b	87.07 ^b	93.53 ^a	89.17 ^{ab}	0.98
MCHC (g/dl)	28.97	8.9	28.4	28.3	0.78
MCH (pg)	25.43	25.17	26.83	25.2	0.69

PCV – Paced Cell Volume; WBC – White Blood Cell; HB – Haemoglobin Concentration; MCV – Mean Corpuscular; MCH – Mean Corpuscular Haemoglobin; MCHC – Mean – Mean Corpuscular Haemoglobin Count

As revealed from the results of this current study, varying levels of FBSM as partial replacement for SBM had no significant ($P > 0.05$) influence on PCV, Hb, WBC, RB MCHC, MCH, The non-significant ($P > 0.05$) values PCV (22.33

25.00%) were recorded. However, these values were within the normal physiological range of 24.00 % - 28.00 % reported for healthy broiler chicken (Onimisi, *et al.*, 2017).

Similar trend was observed for hemoglobin, birds revealed close ranged values of 6.43 g/dl - 7.27 g/dl across the dietary treatments. The close range values obtained in this study were within normal range 6.50 g/dl 7.05 g/dl reported in the literature for broiler chickens (Oguntoye, *et al.*, 2018). Improved values obtained for PCV and Hb could be an indication that the bone marrow of the birds were functioning properly and suggested the absence of microcytic and hypochromic anemia. PCV and hemoglobin are descriptors of the function and concentration of red blood cell (kenedy, 2011). The values obtained for RBC in this current study indicated sufficient iron supply and efficient oxygen carrying capacity for proper oxidation.

IV. CONCLUSION

The study was carried out to investigate the effect of varying levels of fermented baobab seed hematological (FBSM) showed significant ($P < 0.05$) effect meal on mean corpuscular volume (MCV) Birds fed diet with 15% FBSM showed higher significant ($P < 0.05$) value of 93.53f1 for mean corpuscular volume.

Similarly, values recorded for birds fed control diet (T1) and diet with 7.5% FBSM (T2) were statistically similar 1.47 mg/dl and 1.50 mg/dl. As revealed from this study, varying levels of FBSM as partial replacement for SBM has no significant ($P > 0.05$) influence on PCV, Hb, WBC, RBC, MCHC, MCH, total protein, cholesterol and creatinine. Although no significant ($P > 0.05$) difference were recorded for PCV. However, PCV of 22.33% - 25.00% were recorded, which is within the normal physiological range. From the result of this study, it was concluded that fermented baobab seed meal (FBSM) had no significant influence on most of the hematological parameters observed except MCV However, the inclusion level of 7.5 and 15% may be safe for improved growth hematological characteristics in broiler chickens at a starter phase.

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