

HAEMATOLOGY AND SERUM BIOCHEMISTRY OF BROILER CHICKENS FED COOKED FLAMBOYANT (*Delonix regia*) SEED MEAL AS A REPLACEMENT FOR GROUNDNUT CAKE

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Abstract

A 56 days experiment was conducted to evaluate the effect of cooked flamboyant seed meal as a replacement for groundnut cake on haematology and serum biochemistry of broiler chickens. A total of 160-day old broiler chickens of similar live weight were utilized in four treatments namely T1 (0%) serves as the control diet, T2 (15%), T3 (30%), and T4 (45%). Broiler chicken diets were compounded to be iso-caloric and iso-nitrogenous (3000kcal/ME and 23%CP) with cooked flamboyant seed meal replacing groundnut cake at 0, 15, 30 and 45%. The experiment was arranged in a Completely Randomized Design. Each treatment was replicated 4 times having 10 birds per replicate. Feed and water were provided to the birds daily and all standard routine management practices were strictly observed throughout the experimental period. At the end of the feeding trial, Blood samples were collected after slaughtering the birds at the 56 day of the experiment and evaluated for their haematological and serum biochemical indices. The result showed no significant ($p>0.05$) variations in both haematology and serum biochemical parameters measured for broiler chickens under cooked flamboyant seed meal included diets. It was concluded that cooked flamboyant seed meal should be included in the diets of broiler chickens without any negative effect in their blood functions.

Keywords: Flamboyant Seeds, Blood, Groundnut cake and broiler chickens

Description of Problem

Haematology and serum biochemical profiles are important parameters in animal production. They are used in defining the health status, metabolic diseases, nutritional deficiencies and welfare of animal (1). Disease Incidence and malnutrition are analyzed from the normal reference values of various serum biochemical indices and haematological parameters measured, depending on the case being investigated. High cost of feeding in animal production has resulted to poor nutrition in the poultry sector today. The emergence of the use of non-conventional feed resources has been attributed to so many side effects in physiological performance of birds. Among these effects are; presence of anti-nutritional factors, high fibrous nature of the ingredients (2). On this note, this paper was aimed to evaluate the effect of cooked flamboyant seed meal as a replacement for groundnut cake on haematology and serum biochemistry of broiler chickens.

Materials and Methods

Location of the Study

The research was conducted in the Poultry Unit of the Teaching and Research Farm, Department of Animal Science, Faculty of Agriculture, Nasarawa State University, Keffi, Shabu-Lafia Campus, Nasarawa, Nigeria. It is in the Guinea savanna zone of North Central Nigeria and found on latitude (08 0 35' N and longitude 08 0 33' E). The mean monthly environmental temperature during the study which lasted for 3 weeks was 32.750C. While the monthly relative humidity, rainfall and evaporation were 79.00%, 207.45mm, and 2.5ml, respectively (3).

Sources of Test Ingredient and Processing

About 100kg of flamboyant (*Delonix regia*) seed was pluck from the premises of College of Agriculture Science and Technology Lafia and its environs. The pods were crush to get the seeds and thereafter, divided into four equal parts and process by means of cooking at 0, 15, 30, and 45minutes durations, sun dried, milled and coded

CFSM0, CFSM15, CFSM30, and CFSM45, in that order to obtain cook flamboyant seed meal at different cooking durations.

Table 1: Chemical Compositions of Experimental Diets for Broiler

Ingredients	T1 (0%CFSM)	T2 (15%CFSM)	T3 (30%CFSM)	T4 (45%CFSM)
*CFSM	0.00	4.28	8.55	12.83
GNC	28.50	24.23	19.95	15.68
Maize	40.00	39.70	37.50	35.20
Rice offal	17.00	9.50	9.45	9.25
Fish meal	1.50	1.50	1.50	1.50
Blood meal	1.50	1.50	1.50	1.50
Bone meal	2.00	1.20	1.20	1.20
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
**Premix	0.25	0.25	0.25	0.25
Common Salt	0.25	0.25	0.25	0.25
Palm oil	0.25	0.25	0.25	0.25
Probiotica	3.50	0.25	0.25	0.25
Toxin binderb	2.50	2.50	2.50	2.50
Acidifierc	0.25	0.25	0.25	0.25
	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
Energy (kcal/kg, ME)	2834.53	2801.71	2787.51	2777.43
Crude protein (%)	23.25	23.43	23.52	23.61

*CFSM= cooked flamboyant seed meal.**Premix supplied the following per 100kg of diet: vitamin A15,000 I.U, vitamin D3 300,000 I.U.,vitamin E 3,000 I.U., vitamin K 2.50mg, vitamin B1 (thiamin) 200mg, Riboflavin (B2) 600mg, pyridoxine (B6), Niacin 40.0mg, vitamin B12 2mg, Pantothenic acid 10.0mg, folic acid 100mg, Biotin 8mg, choline chloride 50mg, anti-oxidant 12.5mg, manganese 96mg, zinc 6mg, Iron 24mg, Copper 0.6mg, Iodine 0.14mg, Selenium 24mg, cobalt 214mg.

Biochemical Analysis of flamboyant (*Delonix regia*) seed meal

Using the methodology described b), proximate analysis of flamboyant (*Delonix regia*) seed was carried out at the Faculty of Agriculture Laboratory of the Department of Agronomy, Nasarawa State University, Keffi. The results are presented in Table 2.

Table 2: Proximate analysis of Flamboyant (*Delonix regia*) seed meal

Parameters (%)	
Dry Matter	91.33
Crude protein (%)	16.18
Crude fat	7.17
Crude fiber	11.06
Ash	1.41
NFE	389.47

NFE= Nitrogen Free Extract

Experimental Design and Management of the Birds

A total of 160 old broiler chickens were meted out to the four treatment sets such that each treatment had 40 birds. Each treatment was imitated 4 times with each imitation having 10 birds. The scheme was done to fit into a Completely Randomized Design (CRD). The trial lasted for 56 days. All trial birds were proffered, weighed quantity of feed, and water was provided *ad libitum*. Accustomed management practices for tendering of broiler chicks were promulgated as defined by (5).

Data Collection

At day 56 of the birds feeding trial, blood samples (2.0 ml each) were collected from two

slaughtered chickens per replicate into EDTA containing bottles and plain bottles (2 mls per bottle) for the determination of haematological and serum biochemical indices using standard procedures, as described by (6). All data collected were subjected to one (1) way analysis of variance (ANOVA) using the general linear Model of (7). Significantly different means were considered and separated at 5% levels of significance ($P < 0.05$) using Duncan's Multiple Range Test (DMRT) (8).

RESULTS AND DISCUSSION

The result for the effect of cooked flamboyant seed meal on haematology of broiler chickens is presented in Table 3. The result indicated no significant ($p > 0.05$) variation in the haematological parameters measured. Higher ($p > 0.05$) non-significant values were found at 0% for PCV (31.00%), 30% for RBC ($3.10/L$), 45% for WBC ($77.00/L$) while 0% for HB

($10.50g/dl$), MCV ($97.50fl$), MCH ($32.00pg$), MCHC and ($33.00g/dl$). The non-significant increase in packed cell volume (26.50%), red blood cell ($3.00/L$) and white blood cell ($51.00/L$) were due to the inclusion of cooked flamboyant seed meal in diets. This indicates that cooked flamboyant seed meal has required nutritional values to supply more nutrients to the chickens to developed immunity against diseases. The obtained values were within the reference range of PCV: (34.5-52.7%), HB: (7.40- 12 12 $13.10g/dl$), RBC: ($1.58 \times 10^6/L$ - $3.8 \times 10^6/L$), for healthy chicken reported by (9). However, the observed WBC values among birds placed on flamboyant seed meal diet in this study were within the reported range of $9 - 28.6 \times 10^3/L$. Also (10) documented that decrease in the count of WBC indicates suppression of leucocytes and their production from bone marrow which suggests presence of infection or a regenerative anaemia.

Table 3. Effect of Cooked Flamboyant Seed Meal on haematology of broiler chickens

Parameters	T1(0%CFSM)	T2(15%CFSM)	T3(30%CFSM)	T4(45%CFSM)	SEM	LOS
PCV (%)	31.00	26.50	29.50	24.50	1.09	NS
Hb (g/dl)	10.50	8.50	9.50	7.50	0.53	NS
RBC ($\times 10^6/ml$)	3.00	3.05	3.10	3.00	0.03	NS
WBC ($\times 10^3/ml$)	67.50	67.00	51.00	77.00	5.99	NS
MCV (fl)	97.50	89.00	95.00	88.00	2.43	NS
MCH (pg)	32.00	28.50	30.00	27.50	0.93	NS
MCHC	33.00	32.00	32.50	31.50	0.56	NS

PCV= packed cell volume, HB= haemoglobin; RBC=red blood cell; WBC= white blood cell; MCV= meal cell volume; MCH= mean cell haemoglobin;; %= percentage, CFSM= Cooked flamboyant seed meal, SEM= Standard error means, NS= No significant ($P > 0.05$), LOS= Level of significant.

The result for the effect of cooked flamboyant seed meal on serum biochemistry of broiler chickens is shown in Table 4. The result also indicate no significant ($p > 0.0$) differences across the serum biochemical parameters of broiler chickens. Higher ($p > 0.05$) non-significant values for Total protein ($38.50g/L$), Albumin ($19.50g/L$) were at 30% and 15% cooked flamboyant seed meal chickens. Creatinine ($51.50mmol/L$) at 30%, urea ($2.00mmol/L$) and cholesterol ($3.50mmol/L$). The non-significant variation found in cooked flamboyant seed meal included birds as compared to the control birds in terms of serum biochemical parameters were also due to the nutritional potentialities of the cooked flamboyant seed meal to replaced groundnut cake

in diets of broiler chickens. This corroborates the findings of (10), who stated that high protein in serum is an indicative of protein adequacy this is in line (11), Also a high concentration of albumin usually denotes dehydration while a low concentration may be due to inadequate function of the liver due to malnutrition and infection (12). Creatinine is excreted by the kidney as a by-product of creatinine phosphate metabolism which is produced as a result of energy production by the skeletal muscles. Uric-acid in the blood is produced as a result of protein metabolism. Increased protein metabolism, stress and dehydration influence the concentration of Uric acid in the blood (13). However, total blood

cholesterol was within the reported range value as reported by (6).

Table 4 Effect of Cooked of Flamboyant seed meal on Serum Biochemistry of broiler chickens

Parameters	T1 (0%)	T2 (15%)	T3 (30%)	T4 (45%)	SEM	LOS
Cholesterol (mmol/L)	3.50	3.00	3.00	2.50	0.19	NS
Urea (mmol/L)	2.00	2.00	2.00	2.00	0.00	NS
Creatinine (mmol/L)	48.00	43.50	51.50	47.00	2.17	NS
Total Protein (g/l)	36.50	38.00	38.50	35.00	1.39	NS
Albumin (g/l)	18.50	19.50	15.00	13.50	1.28	NS
GOT (u/l)	207.50	227.50	200.00	207.50	6.63	NS
GPT (u/l)	13.50	28.50	23.00	28.50	3.89	NS

SEM= standard error of mean; LOS= level of significance; ns= not significantly different (P>0.05)

Conclusion and Application

Based on the results obtained, cooked flamboyant seed meal - based diets had no effect on the blood profile of broiler chickens; therefore, up to 30% should be included in the diets for normal physiological functions of broiler chickens.

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