

HAEMATOLOGY AND SERUM PROFILE OF BROILER STARTER FED GRADED LEVELS OF ROASTED PRIDE OF BARBADOS SEEDMEAL

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ABSTRACT

A study was conducted to evaluate the haematological and serum biochemical indices of broiler starter fed grade levels of pride of Barbados seed meal. Seventy-two (72) day old broiler starter were randomly assigned into four treatments. Each treatment was replicated in a completely randomized design. Four diets were formulated containing roasted pride of barbados seed meal at 0, 5, 10, and 15% respectively. Blood samples were collected from two birds per replicate for haematological and serum study. Results showed significant ($P<0.05$) differences for haematological and serum indices.

INTRODUCTION

Blood is used as a means of assessing clinical and nutritional health status of animals in feeding trials and the haematological and serological parameters most commonly used in nutritional studies include Packed Cell Volume (PCV), Red Blood Cell (RBC), White Blood Cell (WBC), Haemoglobin concentration (HB), Mean Corpuscular Volume (MCV), clotting time, serum globulin, serum creatinine and cholesterol. (Agbede and Aletor, 2003). Measurement of blood parameters provides valuable information for diagnosis of infectious and non infectious disease. The ultimate goal of livestock production is the attainment of sustainable production with minimum cost of production and maximum returns. The urgent need to arrest the skyrocketing cost of feed ingredient has prompted nutritionists, farmers and other players in the industry to shift research focus to alternative feedstuffs, which are locally available, cheap, and within the reach of farmers. Pride of Barbados is in the genus of tropical green shrubs which belongs to the fabaceae bean family. Its common names include dwarf poinciana, bird of paradise and it is also known as Waken Bature among the Hausa speaking people of West Africa. It grows between 10 feet to 12 feet in height and 6 feet to 12 feet in width. Pride of Barbados which is a highly medicinal plant like other legumes contains considerable nutrients and phytochemicals (Proph *et al*; 2006)

MATERIALS AND METHODS

The experiment was conducted at the poultry unit of the Teaching and Research Farm located on latitude $7^{\circ} 15$ North and longitude $3^{\circ} 30$ East of equator with average rainfall of 1278mm and

average annual temperature of 27°C (Sanusi, 2011) Seventy-two day old marshal broiler chicks were obtained from Obasanjo farm, Nigeria limited. The birds were divided into four groups with three replicate per treatment of six birds per replicate birds. The groups were randomly allotted to dietary treatment T_1 , T_2 , T_3 , and T_4 containing 0%, 5%, 10% and 15% roasted pride of barbados seed meal respectively, in a completely randomized design. Ripened pods of pride of Barbados were collected within Igboora metropolis between the months of February and March, 2013. The matured pods were processed to remove the seeds in lateral arrangements. Over 100kg seeds were collected and roasted at $100-110^{\circ}\text{C}$ using open flame for up to 17minutes in an open pan. During roasting about 1.5-2.0kg of the seeds were added intermittently into the pan set over the burning firewood. A small quantity of sand was added and stirred repeatedly to prevent charring. The seeds were considered roasted when about 75-80% of the seeds cracked. The seeds were then spread out to cool after which they were milled into roasted pride of barbados seed meal using a hammer mill with a sieve size of 3mm. The meal produced was used to formulate four isocaloric and isonitrogenous experimental diets. Prior to the blood collection, experimental birds were fasted for twenty-four hours. At fourth weeks of feeding trial, six birds per treatment were randomly selected for haematological and serological parameters blood sample. Two blood samples (3ml each) were collected per bird by puncturing brachial vein. One of the blood samples with (EDTA) was for haematological evaluation while the other sample was for serum biochemical determination. All blood parameters

were determined by conventional laboratory methods described by Dacie and Lewis (1991). Results were subjected to one-way analysis of

variance and means separated using Duncan multiple range test (Steel and Torrie, 1980).

Table 1. Gross composition of roasted experimental diet (starter phase) replacement levels

Percentage Ingredient	0% T1	5% T2	10% T3	15% T4
Maize	48.00	48.00	48.00	48.00
Soybean meal	33.00	31.35	29.70	28.05
Roasted PBSM	0.00	1.65	3.30	4.95
Fish meal	3.00	3.00	3.00	3.00
Wheat offal	11.30	11.30	11.30	11.30
Bone meal	2.00	2.00	2.00	2.00
Limestone	2.00	2.00	2.00	2.00
Broiler Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10
TOTAL	100.00	100.00	100.00	100.00
DETERMINED ANALYSIS				
Dry matter (%)	90.82	90.69	90.85	90.83
Crude protein (%)	20.97	23.28	23.15	23.37
Crude fiber (%)	3.76	3.79	3.88	3.83
Ether extract (%)	3.58	3.65	3.62	3.71
Ash (%)	7.15	6.96	7.24	7.36
M.E K cal/kg	3034.01	3041.79	3032.75	3043.86
NFE	55.36	53.01	52.96	52.56

RESULTS AND DISCUSSION:

The result of haematological and serum biochemical characteristics of broiler started fed graded level of roasted pride of barbados seed meal are presented in table 2 and 3 respectively. All blood parameters (haematology and serum biochemistry) considered in this study record significant difference ($p < 0.05$) across dietary treatments. Haematological parameters such as WBC ranged from ($12.25-23.35 \times 10^3/u/l$); RBC ($2.42-3.67 \times 10^6/u/l$); PCV (25.00-30.50%) and Hb (8.15-9.95%) while serum biochemical indices include the following ranges: Total protein (4.50-5.00g/dl); Albumin (2.65-3.20g/dl); Globulin (1.50-1.90g/dl) and creatinine (0.50-0.70g/dl). The haematological and serum biochemical values are within normal ranges for broilers as reported

by Mitruka and Rawnsley (1977). The control group diet T1 had the highest values ($23.35 \times 10^3/u/l$) while the least value of (12.25×10^3) were recorded in diet T2. The WBC was not affected by the dietary treatment thereby indicating that no pathological effect was induced by the roasted pride of Barbados seed meal inclusion in the diets, hence the health status of the birds was good.

All the parameters evaluated had values that fall within the normal range and mean values of chicken as reported by Tuleun *et al.*, 2007. There were significant ($P < 0.05$) differences in the value of haemoglobin and PCV despite increasing level of inclusion of the test feedstuff suggest good quality nature of the protein in the test ingredient.

Table 2: Effect of roasted pride of barbados seed meal on haematological indices of broiler

Parameters	0% T1	5% T2	10% T3	15% T4	SEM
WBC (10^3 /l)	23.35 ^a	12.25 ^c	18.95 ^b	12.45 ^c	2.52
RBC (10^6 /l)	3.67 ^a	3.23 ^b	3.46 ^a	2.42 ^c	0.06
PCV (%)	27.00 ^b	29.00 ^a	30.50 ^a	25.00 ^b	1.80
HB (%)	8.75 ^b	9.55 ^a	9.95 ^a	8.15 ^b	0.46

abcd=mean on the same row but with different superscripts are statistically ($p < 0.05$) significant.

WBC=White blood cell, PCV=Packed cell volume, RBC=Red blood cell, HB=Haemoglobin

Table 3: Serum biochemistry of broiler starter fed roasted pride of barbados seedmeal

Parameters	0% T1	5% T2	10% T3	15% T4	SEM
Total protein (g/dl)	5.00 ^a	4.55 ^b	4.50 ^b	4.60 ^b	0.36
Albumin (g/dl)	3.20 ^a	2.65 ^d	3.00 ^b	2.80 ^b	0.39
Globulin (g/dl)	1.85 ^a	1.90 ^a	1.50 ^c	1.80 ^{ab}	0.04
Creatinine (g/dl)	0.50 ^b	0.50 ^b	0.65 ^a	0.70 ^a	0.07

abcd=mean on the same row with different superscripts are statistically ($p < 0.05$) significant.

For serum, there were no significant difference ($p < 0.05$) in all the parameters measured except globulin. The total protein content of the blood of broiler starter fed diets were not significantly different from one another. Similarly the albumin values of broiler starter fed the experimental diets did not differ significantly ($p < 0.05$) from one another. Creatinine was highest in birds fed the pride of barbados based diets (diet T4, 0.70g/dl) and lowest in those fed control diet (0.50g/dl). The observed total protein values were within the range of 4.02-8.36g/dl reported by Mitruka and Rawnsley, (1977) and 3.27-7.61g/dl by (Rajurker *et al*; 2009) for broiler birds. The serum total protein were influenced ($p < 0.05$) by the dietary treatments and this is an indication that the quality of protein in the diet was adequate as a result of the processing methods employed and the consumption by birds did not induce stress. Albumin was highest in birds fed the control diet (3.20g/dl) and lowest in those fed diet T2 (2.65g/dl). Serum albumin will increase when protein intake exceeds the amount required for growth and maintenance compared with the control diet (1.85g/dl). The consequences of increased globulin are observed in chronic infections, liver damage and kidney dysfunction (Seinchez-Monge *et al*, 2004). The significant values of Creatinine notices in this study is an indication that the kidney was not adversely

affected by the exposure arising from intake of roasted pride of Barbados seed meal.

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