

HAEMO-BIOCHEMICAL RESPONSES OF BROILER CHICKENS FED GRADED LEVELS OF *KALGOPOD* MEAL (*Piliostigma thonningii*)

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Abstract

An experiment was conducted to determine the effect of *Kalgopod* meal (KPM) on Haemo-biochemical indices of broiler finisher. Completely randomized design was used with four treatment groups replicated four times for four weeks designated as: 0. control, 5, 7.5 and 10% KPM. Feed and water were supplied *ad libitum*. The results were analysed using GraphPad InStat Statistical Package (GraphPad InStat®, version 3.05, 32 bits for Win 95/NT, GraphPad Software Inc., 2000). Result indicated there were no significant ($P>0.05$) differences across haemo-biochemical parameters considered PCV (28.66-34.00 %), Hb (7.73-10.00 g/dL), RBC ($2.33-3.46 \times 10^{12}$), WBC ($20.00-25.00 \times 10^9$), MCV (110.33-133.33 fL), MCH (24.46-43.56 pg), ALT (13.35-21.00 U/L), AST (157.33-168.67/UL), ALP (33.33-55.66), Glucose (17.33-21.33 mmol/L), Total protein (26.33-36.00 mmol/L), Creatinine (0.12-0.23 $\mu\text{mol/L}$) and Cholesterol ($P<0.05$) (156.00-170.00 mmol/L) differences. Altogether within the normal range. Thus, implied that inclusion of *Kalgopod* meal in broiler diet had no antagonistic effect on broiler haemo-biochemical indices therefore, health status may not be impaired.

Keywords: Broiler, Haemo-biochemical, *Kalgopod* meal

INTRODUCTION

Information's on blood parameters are greater assets in determining the responses of the animal to physiological changes due to environmental variations. They also provide vital information on prognostic for pathological conditions (Ciesla, 2007). Aderemi (2004) highlighted that, study on haematological indices provides the opportunity to clinically examine the presence of several metabolites and other constituents in the body of animals and it plays a vital role in the physiological, nutritional and pathological status of an animal. Therefore, Assays of haematology and serum biochemicals of livestock is imperative as the physiological disposition of the animals to their nutrition and it has been found that various feed stuffs including unconventional sources may have effect on the Haematology and serum biochemistry of livestock and hence the need of careful investigation on any new feed ingredient as it may affect animals (Madubuike & Ekenyem, 2006) and finding of the new feed material is common practice (Ahmed *et al.*, 2024) due to, reduce in production of convectional feed stuff inclined to competition between humans and animals and unpredictable climatic conditions (Oladimije *et al.*, 2020). The specific objective of the study was to determine changes in serum Haemo-biochemical of broiler finisher fed graded levels of *Kalgopod* meal.

MATERIALS AND METHODS

Experimental site, experimental birds and their management

The experiment was conducted at the Department of Biology, Faculty of Natural and Applied Sciences, Umaru Musa Yar'adua University, Katsina. Located on (GPS Coordinates: 12° 59' 52''N, 7° 35' 58''E) (KTSG, 2013). A total of twenty-four Cobb500 broiler chicks (from Olam Hatcheries) of 2-weeks old were purchased from Danhassan Livestock and Poultry Services, Katsina. Adopted for eleven days and manage on deep litter system. They were fed commercial diet during acclimatization and experimental diet (Table 1) during the experiment. Three days to commencement of the experiment commercial diet was gradually withdrawn at the rate of: 25+75%, 50+50% and 75+25% experimental and commercial diets respectively. Feed and water were provided *ad libitum* throughout acclimatization and experimental periods. The experiment lasted for four weeks all other management practices were strictly observed

Experimental design, meal preparation and gross composition of experimental diets

The experimental treatments were arranged in a completely randomized design with four treatment groups as 0-control, 5, 7.5 and 10% KPM corresponding to treatments T1, T2, T3 and T4 respectively. Meal was prepared from harvested, air dried and pulverized with pestle and mortar *Piliostigma thonningii* pods. Anti-nutritional factors in the pods were chelated by heating using frying pan.

Table 1: Gross composition of the experimental diets

Feed Ingredients	Treatments			
	T1(0%KPM)	T2(5%KPM)	T3(7.5%KPM)	T4(10%KPM)
Maize	51.80	52.30	52.05	48.809
Maize offal	15.00	5.00	0.00	0.00
Wheat offal	12.00	12.50	15.25	16.00
Kalgopod meal	0.00	5.00	7.50	10.00
Groundnut cake	10.00	10.00	10.00	10.00
Soybean meal	6.00	10	10	10
Blood meal	2.00	2.00	2.00	2.00
Bone meal	2.00	2.00	2.00	2.00
Salt	0.30	0.30	0.30	0.30
Methionine	0.20	0.20	0.20	0.20
Lysine	0.20	0.20	0.20	0.20
Vitamin premix	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00
Proximate Analysis				
ME (Kcal/kg)	2817.05	2810.21	2816.98	2817.00
Crude protein (%)	19.00	19.19	19.29	19.39

Haemo-biochemical profile

Blood samples of about 10 ml were collected from three (3) birds of each group at slaughter on termination of the experiment. 5 ml were kept in sample bottles containing Ethylene Diamine Tetraacetic Acid (EDTA). Packed Cell Volume (PCV), Haemoglobin (Hb), Red Blood Cell, (RBC), White Blood Cell (WBC), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) were assessed. Remaining 5 ml transferred into labeled plain tubes, allowed for clotting at room temperature for two hours. and then transported to the laboratory on ice pack in a Styrofoam box. The samples were centrifuged using (Centrifuge 800D[®], Techmel & Techmel, USA) for 30 minutes at 4000 revolutions per minute to recover the serum. The recovered serum samples were incubated using a laboratory incubator (DIGITAL TT9052[®], Techmel & Techmel, USA). The biochemical analysed are: ALT, AST, ALP, Glucose, Total Protein, Cholesterol and Creatinine using colourimeter (Colourimeter 257, CIBA CORNING[®]) at a wavelength of 546 nm using principles, methods and reagents based on the instructions of the manufacturers of the respective commercial kits.

Data analysis

Analysis of variance (ANOVA) were conducted with GraphPad InStat Statistical Package (GraphPad InStat[®], version 3.05, 32 Bit for Win 95/NT, GraphPad Software Inc., 2000) in data analysis.

RESULTS AND DISCUSSION**The result of haemo-biochemical response of broiler chickens fed graded levels of kalgopod meal (*Piliostigma thonningii*)**

The result of haemo-biochemical indices of broiler chicken fed graded level of kalgopod meal is presented in Table 2. The result showed that there were no significant ($P>0.05$) differences across all haemo-biochemical parameters considered except cholesterol (PCV), Haemoglobin (Hb), Red Blood Cell, (RBC), White Blood Cell (WBC), Mean Corpuscular Volume (MCV) and Mean Corpuscular Haemoglobin (MCH) are within the normal ranges reported by (Bounous & Stedman 2000; Campbell *et al.*, 2003), Oyewole *et al.* (2018) reported that healthy birds have PCV range between 23%-35%, Hb of 7-13 (g/dL), conventionally, chickens have RBC and WBC are $2.5-3.5 \times 10^{12}$ and $12-30 \times 10^9$ additionally, MCV and MCH (fl) are 90-140 and 33-35(pg) respectively. The result of the present study was consistent with the work of Ogutoye and Mafindi (2022). Slight disparity existed between current studies and that of Ahmed *et al.* 2022 attributed by differences in specie environment condition. Biochemical references of various species have been developed (Harr, 2022; Nanbol, *et al.*, 2016 & Barde *et al.*, 2022). Significant difference observed in cholesterol ($P<0.05$) kalgopod meal may have effect on delivery of low-density lipoprotein (LDL)-derived cholesterol to processing enzymes such as acetyl-coenzyme A acetyl transferase (ACAT) (Metherall *et al.*, 1996). Even though it is within the normal range likewise, liver enzymes as reported by (Bounous & Stedman 2000). By implication inclusion of Kalgopod meal in broiler chickens' diet have no any deterioration effect on their health

Table 2: Haemo-biochemical indices of broiler chickens fed graded levels of *kalgopod* meal (*Piliostigma thonningii*)

Parameters	Treatments				p-value	LS
	T1(0%KPM)	T2(5%KPM)	T3(7.5%KPM)	T4(10%KPM)		
PCV (%)	28.66±7.57	28.66±6.71	30.00±2.64	34.00±1.00	0.58	ns
Hb (g/dL)	10.00±2.10	9.33±1.33	7.73± 0.56	8.03±0.15	0.17	ns
RBC (×10 ¹²)	2.40±0.45	2.33±0.30	2.46±0.50	3.26±0.15	0.05	ns
WBC (×10 ⁹)	21.33±10.97	25.00±5.00	20.66±3.78	20.00±1.00	0.77	ns
MCV (fl)	118.00±11.79	121.33±14.22	123.33±15.30	110.33±15.56	0.70	ns
MCH (pg)	43.56±17.11	43.13± 9.33	32.10±6.50	24.46±0.55	0.14	ns
ALT (U/L)	14.00±5.56	21.00±11.53	19.66±4.04	13.35±4.93	0.48	ns
AST (U/L)	160.00±10.58	162.67±11.59	157.33±1.53	168.67±19.39	0.72	ns
ALP (U/L)	37.33±16.65	35.66±10.12	33.33±8.50	55.66±4.51	0.11	ns
Glucose (mmol/L)	17.33±4.73	19.33±4.12	18.66±5.85	21.33±7.23	0.84	ns
Protein (mmol/L)	31.33± 9.50	26.33±5.03	36.00± 4.35	32.33±8.62	0.47	ns
Cholesterol (mmol/L)	156.00±2.64	156.33±6.02	156.67±1.00	170.33±10.01	0.04	*
Creatinine (µmol/L)	0.12± 0.33	0.19±0.31	0.13± 0.41	0.23± 0.81	0.33	ns

ns = non significance, LS = Level of significance, * = significance (P<0.05) difference, PCV= Parked cell volume, Hb = Haemoglobin, RBC = Red blood cell, WBC = White blood cell, MCH = Mean corpuscular volume, ALT = Alanine aminotransferase, AST= Aspartate aminotransferase and ALP = Alkaline phosphatase

CONCLUSION

The findings showed that inclusion of *Kalgopod* meal had no negative impact on Haemo-biochemical indices of broiler chickens.

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