SERUM BIOCHEMISTRY OF TWO BROILER STRAINS FED FOUR DIFFERENT SOURCES OF FEEDS

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ABSTRACT
This study was conducted to determine the effect of interaction between four feed sources on the Serum Biochemistry of two broiler strains. A total of 128-day old broiler chicks (64 A and 64 B strains) were randomly allotted to Eight (8) experimental treatments designated as T1 (A diet + A strain), T2 (A diet + B strain), T3 (B feed + A strain), T4 (B feed + B strain),T5 (C feed + A stain), T6 (C feed + B strain), T7 (D feed + A strain), T8(D feed + B stain) in a 4x2 Factorial design (four feed factors and two breed factors) arranged in a completely randomized design (CRD). Blood samples were collected and analysed to determine the Serum Biochemistry of the two broiler strains fed four sources of feed. The study showed that there were significant difference (P <0.05) in all the serum biochemical indices except in Alanine aminotransferase (ALT) that was not significant (P> 0.05). The result also shows that Glucose in T4 was the highest (158.45±0.05) while T3 was the highest in Protein, Triglyceride, cholesterol and Urea respectively (39.58±0.05, 79.71±0.18, 124.85±0.05 and 4.35±0.15). It was therefore concluded that the T3 can be safely used for improved poultry production and health promoting cells of the broiler birds as a result of high protein, triglyceride and urea.
Keywords: serum biochemistry, broiler strains and feed sources

INTRODUCTION

Broiler chickens are a substantial source of protein worldwide, and their growth performance is closely connected to dietary arrangement. Different strains exhibit varying responses to feed types, which can affect their health status as reflected in serum biochemistry (Hagan *et al*., 2022). This pattern is expected to continue because of costs associated with intensive poultry production and such production efficiency is particularly beneficial to developing countries, which tend to have limited agricultural resources (Hui-Shung, 2007). Garcia (2024) noted that Poultry meat is the most widely eaten meat in the world due to its affordability and availability.

In Nigeria, different poultry species contribute to the animal protein supply of the populace in terms of eggs laid and meat produced (NPC, 2010). Feeding poultry for optimum growth production requires that the birds consume appropriate balanced diets for their health and productivity. Nse Abasi *et al*. (2014) noted that dietary components affect the blood profile of healthy birds. The blood transports or conveys nutrients and materials to different parts of the body. Therefore, whatever affects the blood, either nutrition or drugs will certainly affect the entire body adversely or moderately in terms of health, growth, maintenance and reproduction. High cost of ingredients used to compound livestock feeds is contributing to cutting corners by some commercial feed millers (Edache *et al.,* 2018). Serum analysis in poultry may be considered a good indicator when checking for changes in their physiological systems (Batina, 2005).

MATERIALS AND METHODS

Study location

This experiment was conducted at the Poultry Unit of the Department of Animal Science, Teaching and Research Farm, University of Nigeria, Nsukka.

Experimental Animals, Design and Management

Four different feeds, A, B, C, and D) were procured. The two broiler strains (day old chicks, A and B) were procured also from a reputable dealer in Nsukka. The birds were randomly assigned to eight (8) treatment groups of 128 birds. Each treatment group was replicated two (2) times with eight (8) birds per replicates. The pens floor was covered with fresh wood shavings as litters. General flock prophylactic management and routine vaccination protocol was administered. At the end of the 8 weeks experiment, 2.5 ml of blood was collected with syringe from the wing vein of two birds per replicate into tubes containing Ethylenediaminetetraacetic (EDTA) as anti-coagulant because haematological analysis was also involved. The Serum Biochemical indices screened include Total protein, Triglyceride, Creatinine, Cholesterol, glucose, urea, alkaline phosphate (ALP), Aspartate aminotransferase (AST), and Alanine aminotransferase (ALT). Data collected were subjected to analysis of variance (ANOVA) as appropriate for a 4 x 2 factorial arrangement implemented with a completely randomized design (CRD) using Statistical Package for Social Sciences (SPSS version 25). Significant means were separated using Duncan's New Range Test (DNMRT) at 5% level of significance.

Proximate analysis .

Table 1: The proximate analysis % of the four experimental feeds (feed A-D) for broiler chicks at starter phase (0-4 and 5-8 weeks).

Composition	Feed A	Feed B	Feed C	Feed D
Moisture	10.60%	10.00%	10.60%	11.00%
Crude protein	19.89%	18.00%	19.89%	16.57%
Ash	2.50%	2.20%	2.50%	2.50%
Ether extract	3.50%	4.50%	3.50%	4.00%
Crude fibre	1.65%	1.80%	1.65%	2.50%
Nitrogen free extract NFE	61.91%	63.50%	61.91%	63.93%

Finisher

Composition	Feed A	Feed B	Feed C	Feed D
Moisture	10.60%	10.00%	10.60%	11.00%
Crude protein	16.59%	17.50%	17.90%	14.50%
Ash	2.50%	2.20%	2.50%	2.50%
Ether extract	4.90%	4.70%	4.50%	4.00%
Crude fibre	4.70%	4.50%	4.00%	7.30%
Nitrogen free extract NFE	65.51%	63.10%	64.46%	63.50%

RESULTS AND DISCUSSION

Table 2 represents the interaction of broiler strain and feeds on the Serum Biochemistry of broiler birds. There was significant difference ($p<0.05$) amongst all parameters tested except ALT that was not significant ($P>0.05$). Glucose was higher in T4 (158.45±0.05) than all the other treatments while T1 was the least (84.55±0.05). T3 however was the highest total Protein, Triglyceride, Cholesterol and Urea respectively (39.58±0.05, 79.71±0.18, 124.85±0.05 and 4.35±0.15). T8 was the highest in Ast (334.40±0.0) while T4 was the least (169.85±1.15). Alp shows that T5 was the highest (5019.00±8.00) while T1 (250±0016.00) was the least. The normal range of most biochemical indices studied agrees with Oyeagu et al. (2019) that observed that the blood biochemical trait reflects the physiological state of the body of such animal that has it.

Table 2: Means and standard error of the interaction of strain and feed on the Serum Biochemistry of broiler birds.

Treatment Parameters	T1	T2	T3	T4	T5	T6	T7	T8	P.V (%)
Glucose (Mg/dl)	84.55±0.05^{f}	83.39±0.**05**^{g}	154.10±0.02^{b}	158.45±0.05^{a}	108.50±0.50^{d}	58.20±0.60^{h}	88.30±0.10^{e}	133.35±0.15^{c}	0.000*
Protein (G/dl)	33.62±0.42^{cd}	36.07±0.38^{b}	39.58±0.05^{a}	34.94±0.19^{bc}	33.34±0.52^{d}	30.96±0.60^{e}	35.65±0.25^{b}	32.90±0.51^{d}	0.000*
Triglyceride (Mg/dl)	45.75±0.35^{g}	45.60±0.10^{g}	79.71±0.18^{a}	76.57±0.12^{e}	117.90±0.53^{a}	75.00±0.60^{f}	100.80±0.20^{c}	102.50±0.50^{b}	0.000*
Cholesterol (Mg/dl)	81.95±0.35^{d}	79.85±0.35^{e}	124.85±0.05^{a}	78.75±0.25^{e}	72.90±0.10^{f}	69.15±0.45^{g}	92.30±0.10^{c}	123.00±0.70^{b}	0.000*
Urea (Mg/dl)	2.75±0.05^{de}	3.40±0.10^{b}	4.35±0.15^{a}	3.25±0.25^{bc}	2.90±0.20^{cd}	2.35±0.05^{ef}	2.40±0.10^{ef}	2.00±0^{f}	0.000*
Creatinine (Mg/dl)	0.40±0.05^{a}	0.35±0.01^{a}	0.30±0.01^{ab}	0.22±0.01^{b}	0.37±0.08^{a}	0.34±0.03^{ab}	0.38±0.01^{a}	0.30±0.01^{ab}	0.004*
Alt (Iu/l)	7.55±0.05	9.40±0.10	11.00±1.00	58.10±46.90	11.55±0.35	10.50±0.50	13.20±0.30	9.80±0	0.472^{NS}
Ast (Iu/l)	265.55±1.05^{d}	214.00±0.50^{f}	297.05±0.55^{b}	169.85±1.15^{g}	272.8±5.255^{cd}	253.90±1.10^{c}	273.20±0.30^{c}	334.40±0^{a}	0.000*
Alp (Iu/l)	1250.00±16.00^{d}	2457.50±3.50^{b}	2370.00±299.00^{b}	1544.00±46.00^{cd}	5019.00±8.00^{a}	1874.50±1.50^{c}	891.00±4.00^{e}	1800.00±10.00^{c}	0.000*

Means on the same row with different superscripts ^{a,b,c,d,e,f,g} are statistically different at ($P<0.05$) while means of the same superscript are not significant ($P>0.05$), NS: Non-significant. T1= A diet+A strain, T2= A diet+ B strain, T3= B diet+A stain, T4= B diet+B strain, T5=C diet+A strain, T6=C diet+B strain, T7= D diet+A strain, T8= D diet+D stain, ALT= Alanine aminotransferase, AST= Aspartate aminotransferase, ALP =Alkaline phospha

The observed decrease in the glucose level below the range reported by (Adele et al, 1992) is not in contrast view with (Platel et al, 2004) who shared the thought attributed to the fact that blood glucose level is maintained by critical homeostatic mechanisms that depend on the stage of growth, feed consumption, productivity, and

environmental changes. The serum total protein increased greatly above the normal reference range as reported by (Hagan et al, 2022). This study agrees with Ingweye et al. (2020) who showed that the observed increase could be as a result of dehydration because of hot season at the time of this research. The high level of cholesterol in this present study is in agreement with the result of (Hagan et al, 2022) who reported the high value in the dietary feeding trial, but however below the normal reference range by (Adele et al, 1992). A high cholesterol level can cause fatty liver disease and reduced growth rate.

CONCLUSION AND RECOMMENDATION

The result of the interaction of broiler strains and feeds on the serum biochemistry of broiler birds showed that the T3 whose values were within the normal range of reference values can be safely used for improved production and health performance for protein intensification in Nigeria.

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