



EFFECTS OF VARYING DIETARY LEVELS OF EDITAN (*Lasianthera africana*) LEAF MEAL ON BLOOD PROFILE OF FINISHER BROILER CHICKENS

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ABSTRACT

The study was conducted using 150 day-old Abor Acre broiler chicks to determine the effect of varying dietary levels of Editan (*Lasianthera africana*) leaf meal (ELM) on haematological and serum biochemical indices of finisher broiler chickens in a Completely Randomized Design. Each treatment consisted of 30 birds with 10 birds per replicate. The birds were fed ELM supplemented at 5, 6, 7 and 8% representing diets 2, 3, 4 and 5 respectively. Diet 1 without ELM (0%) serves as the control. The starter diets, finisher diets and water were given ad libitum for 56 days that the study lasted. At the end of the feeding trial, blood samples were collected for haematology and serum biochemical indices. Data collected were subjected to analysis of variance (ANOVA) using SPSS software. From the results it was recorded that the white blood cell, neutrophils, lymphocytes, red blood cell, haemoglobin and packed cell volume, total protein, globulin, urea, creatinine, triglyceride, cholesterol, platelets, alkaline phosphate, low density lipoprotein, very low density lipoprotein and high density lipoprotein were significantly ($P < 0.05$) influenced by the inclusion of ELM up to 8% in the diets while the mean corpuscular volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration, albumin and high density lipoprotein were not affected significantly ($P > 0.05$) by the addition of ELM up to 8% inclusion in the diets. Therefore, 8% ELM inclusion in the diets of broiler chickens is recommended since it significantly increased haemoglobin, red blood cell, packed cell volume and white blood cell, while also improving cholesterol and high density lipoprotein levels.

Keywords: Broiler Chicken, Editan leaf meal, Haematology, Serum; Finisher

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INTRODUCTION

Poultry sector is now playing a significant role and contributing to the overall well-being of people, especially creating employment opportunities, improving food security, livelihood and nutrition, as well as contributing to the country's economic growth and reducing poverty in this country (Fasuyi *et al.*, 2006). In spite of its many advantages and the positive market outlook, the world broiler sector faces increasing challenges. Due to the high cost of conventional feedstuffs which has been one of the major challenges of intensive poultry production in developing countries it is essential to investigate the potentials and

risks associated with novel dietary components like editan leaf meal (*Lasianthera africana*) on blood parameters, and other relevant serum markers which is cheaper and mostly available for use in poultry diet for global food security. Compared to agro-industrial by-product, the crude protein content in leaf meal is much higher (Tesfaye *et al.*; 2013) and this may be beneficial in reducing the proportion of the conventional expensive protein-rich feed ingredients in broiler rations.

Investigating the use of Editan leaf meal in broiler diets can contribute to diversifying the nutritional resources available

in Editan like vitamin A and C, minerals etc. for poultry feed formulations. This diversification can enhance the sustainability and resilience of poultry production systems by reducing dependence on a limited range of feed ingredients.

The leaves are also rich in important phytochemicals, as reported by Ebana *et al.* (2016), which have both nutritional and therapeutic significance. Ekpo *et al.* (2022) found that extracts from *Lasianthera africana* provide protection against liver toxicity. Certain plant compounds found in leaf meals, such as polyphenols and flavonoids, may possess antioxidant properties. These antioxidants can help protect blood cells from oxidative stress, potentially influencing hematological health. Therefore, the present study was conducted to investigate the effect of varying levels of dietary Editan (*Lasianthera africana*) on hematological and serum parameters which are essential for assessing the health and welfare of broiler chickens.

MATERIALS AND METHODS

Experimental site

The study was carried out at the Poultry Unit of Teaching and Research Farm of the University of Uyo, Uyo, Akwa Ibom State, Nigeria. Uyo is located within the tropical rainforest zone of Nigeria, between latitude 5.32°N and longitude 7.54°E. The mean altitude is 38.1m above sea level. It has an average rainfall of about 2200mm to 3500mm and with the average temperature 22.5°C to 32.2°C. The area has two distinct seasons: wet season (March – November) and dry season (November – March). Sunshine is between 1400 to 1500 hours per year, relative humidity is from 71% to 80% annually (University of Uyo Meteorological Station, 2014).

Processing of the Test Material (Editan Leaf meal)

Mature fresh editan (*Lasianthera africana*) leaves were separated from the stalk

by hand plucking, washed with clean water to remove the dirt and then sundried for three (3) days to reduce the moisture content. The dried leaves were ground using hammer mill and stored in polyethene bags at room temperature. The ground editan leaves (now editan leaf meal), were used with other feed ingredients (maize, soybean, palm kernel cake, fishmeal and bone meal) to formulate a concentrate diet as shown on Table 1 and Table 2.

Experimental Animals, Management and Design

An aggregate of one hundred and fifty (150) day old Abor Acre (Agried) broiler chicks, consisting of both sexes were sourced from Unfailing Veterinary and Pest Control Services, a major day old chick's distribution agent located at 75 Aka Road, Uyo, Akwa Ibom State, Nigeria. At the start of the experiment, the chicks were weighed using a precision weighing balance (SF-400 model) to determine their initial weights. They were then distributed into five (5) dietary treatment groups, with thirty (30) birds assigned to each group. Each treatment was replicated three (3) times, with ten (10) birds per replicate following a Completely Randomized Design (CRD). The broiler chicks were brooded for one (1) week. During the brooding stage, heat was provided to the chicks using kerosene lanterns, stove and 200 watt bulbs. Additionally, tarpaulin was used to cover the netted sections of the building to protect the chicks from cold during brooding. The birds were given experimental diets throughout the study, starting from the starter phase, which lasted for 28days, followed by the finisher phase, which also lasted 28 days, resulting in a total duration of 56days (8 weeks).

Five (5) test diets were composed for both the starter and finisher phases. Diet without ELM (0%) served as the control (T₁), while (5%)ELM, (6%)ELM, (7%)ELM and (8%)ELM represented Treatments 2, 3, 4 and 5 respectively as shown in Tables 1 and 2.

Table 1: Composition of Experimental Starter Diets (%)

Treatments	T₁	T₂	T₃	T₄	T₅
Levels of ELM (%)	0	5	6	7	8
<i>Ingredients:</i>					
Maize	52.00	52.00	52.00	52.00	52.00
Soybean meal	30.00	30.00	30.00	30.00	30.00
Palm Kernel Cake	10.00	5.00	4.00	3.00	2.00
Editan Leaf Meal	-	5.00	6.00	7.00	8.00
Fishmeal	4.00	4.00	4.00	4.00	4.00
Bone Meal	3.00	3.00	3.00	3.00	3.00
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Premix *	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
<i>Calculated Nutrient Content (%):</i>					
ME (Kcal/Kg)	2959.68	2959.46	2959.42	2959.37	2959.33
Crude Protein	23.00	23.09	23.10	23.12	23.14
Crude Fibre	3.83	3.87	3.87	3.88	3.89
Ether Extract	3.81	3.55	3.50	3.45	3.39
Phosphorus	0.91	4.65	5.40	6.14	6.89
Calcium	1.17	4.94	5.68	6.45	7.21

*To provide the following per kilogram of feed: Vit. A 10,000iu, Vit.D₃; 2000iu, Vit E; 5iu, Vit K 2mg, Riboflavin 4.20mg; Vit B12 0.01mg, Pantothenic acid 5mg; Nicotinic acid 20mg; Folic acid 0.5mg; Choline 3mg; Magnesium 56mg; Fe 20mg; Cu 10mg; Zn 50mg; Co 125Mg.

Table 2: Composition of Experimental Finisher Diets (%)

Treatments	T₁	T₂	T₃	T₄	T₅
Levels of ELM (%)	0	5	6	7	8
<i>Ingredients:</i>					
Maize	56.00	56.00	56.00	56.00	56.00
Soybean meal	24.00	24.00	24.00	24.00	24.00
Palm Kernel Cake	14.00	9.00	8.00	7.00	6.00
Editan Leaf Meal	-	5.00	6.00	7.00	8.00
Fishmeal	2.00	2.00	2.00	2.00	2.00
Bone Meal	3.00	3.00	3.00	3.00	3.00
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Premix *	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
<i>Calculated Nutrient Content (%):</i>					
ME (Kcal/Kg)	2978.04	2977.82	2977.78	2977.73	2977.69
Crude Protein	20.26	20.35	20.36	20.38	20.40
Crude Fibre	4.30	4.34	4.34	4.35	4.36
Ether Extract	4.07	3.81	3.76	3.71	3.66
Phosphorus	0.86	4.61	5.38	6.12	6.87
Calcium	0.98	4.75	5.51	6.26	6.99

* To provide the following per kilogram of feed: Vit. A 10,000iu, Vit.D₃; 2000iu, Vit E; 5iu, Vit K 2mg, Riboflavin 4.20mg; Vit B12 0.01mg, Pantothenic acid 5mg; Nicotinic acid 20mg; Folic acid 0.5mg; Choline 3mg; Magnesium 56mg; Fe 20mg; Cu 10mg; Zn 50mg; Co 125mg

Haematological and Serum Parameters

On day 56 of the feeding trial, in the morning before feeding, 5mls of blood sample was collected from one bird in each of the three (3) replicates per treatment from the wing veins and placed into labeled sterile universal bottles containing Ethylene Diamine Tetra Acetic Acid (EDTA) as an anticoagulant. These samples were used to determine haematological indices such as: haemoglobin, red blood cells, packed cell volume, white blood cell and platelets. The obtained values were used to calculate MCH, MCV and MCHC (Coles, 1986). Another 5mls blood sample from each replicate was collected into labeled sterile bottles without anti-coagulant to determine serum biochemical components (Total protein, Globulin, Albumin, Urea, Creatinine, Cholesterol, Triglyceride and Alanine phosphate) as described by Coles, (1986).

Data Analysis

Data obtained from the study were subjected to a one-way analysis of variance (ANOVA) and their means were separated by Duncan Multiple Range Test using SPSS version 20.0.

Data (Statistical) Model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where: Y_{ij} = Single observation; μ = Overall mean; T_i = Effect of treatment; e_{ij} = Error term.

RESULTS

The haematological indices of broiler chickens fed varying levels of dietary editan (*Lasianthera africana*) leaf meal (ELM) is shown in Table 3. The white blood cell (WBC), neutrophils, lymphocytes, packed cell volume (PCV), Haemoglobin (Hb), Red blood cell (RBC) and Platelets were significantly ($P < 0.05$) influenced by the inclusion of editan leaf meal up to 8% in the diets while the Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were not significantly ($P > 0.05$) influenced by the inclusion levels.

The WBC values obtained in this study showed significant ($P < 0.05$) differences across the treatment means. Birds fed the

control diet and 5% ELM had significantly higher values of $11.67 \times 10^9/L$ and $11.33 \times 10^9/L$ while the lowest value was recorded for birds fed 8%ELM ($8.85 \times 10^9/L$). The values for white blood cell (WBC) ranged from $11.69 \times 10^9/L$ to $8.85 \times 10^9/L$ for treatments 1 to 5. Birds fed the control diets and 5% ELM had significantly ($P < 0.05$) higher values than birds fed 6%ELM, 7%ELM and 8%ELM which were statistically ($P > 0.05$) similar. Neutrophils of birds fed T_1 (0%ELM) and T_2 (5%ELM) were significantly ($P < 0.05$) higher than those that were receiving T_3 (6%ELM) and T_4 (7%ELM), which were not significantly ($P > 0.05$) different from T_5 (8%ELM). For the lymphocytes, birds fed T_3 (6%ELM) and T_4 (7%ELM) recorded significantly ($P < 0.05$) higher values than those fed T_1 (0%ELM) and T_5 (8%ELM), which were statistically similar ($P > 0.05$) to T_2 (5%ELM).

The mean percentage Packed Cell Volume (PCV) for T_1 (0%ELM), T_2 (5%ELM), T_3 (6%ELM), T_4 (7%ELM), and T_5 (8%ELM) ranged from 16.67%, to 30.93%. Birds fed 7% and 8% ELM had significantly ($P < 0.05$) higher values than birds fed 0%ELM, 5%ELM, and 6%ELM, which were not significantly ($P > 0.05$) different from each other.

The haemoglobin values of birds fed 7 and 8% ELM diets were significantly ($P < 0.05$) higher than birds fed 0, 5 and 6% ELM diets which showed no significant ($P > 0.05$) variations from each other. For Platelet, birds fed T_3 (6%ELM) showed a significantly ($P < 0.05$) higher value from birds fed T_5 (8%ELM), but similar ($P > 0.05$) to T_1 (0%ELM), T_2 (5%ELM) and T_4 (8%ELM).

The triglycerides showed significant ($P < 0.05$) difference among the treatment means. T_2 (5%ELM), T_4 (7%ELM) and T_5 (8%ELM) were significantly ($P > 0.05$) different from those fed T_1 (0%ELM) and T_3 (6%ELM), which were statistically similar ($P > 0.05$).

The values for red blood cells (RBC) of birds fed 7 and 8% ELM were significantly ($P < 0.05$) higher than birds that were fed 0, 5, and 6% ELM, which did not show any significant ($P > 0.05$) differences. Significant ($P > 0.05$) differences were not observed

among the treatment means for Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Volume (MCV), and Mean Corpuscular Hemoglobin Concentration

(MCHC). The values ranged from 130.00fl to 134.33fl for MCV, 50.33Pg to 49.00Pg for MCH and 39.67g/dl to 37.17g/dl for MCHC.

Table 3: Effect of varying dietary levels Editan (*Lasianthera africana*) leaf meal on haematological indices of broiler chickens

Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	SEM
Levels of ELM (%)	0	5	6	7	8	
<i>Parameters:</i>						
White Blood Cell (x10 ⁹ /L)	11.67 ^a	11.33 ^a	9.15 ^b	8.98 ^b	8.85 ^b	1.19
Neutrophils (%)	58.00 ^a	46.00 ^a	26.00 ^{bc}	24.00 ^c	43.33 ^{ab}	4.08
Lymphocyte (%)	36.00 ^b	51.00 ^{ab}	68.00 ^a	69.67 ^a	44.67 ^b	4.31
Red Blood Cell (x10 ¹² /L)	1.43 ^b	1.13 ^b	1.47 ^b	2.73 ^a	2.52 ^a	0.15
Platelet x 10 ⁹ /L	37.67 ^{ab}	39.00 ^{ab}	56.00 ^a	48.00 ^{ab}	22.67 ^b	4.65
Haemoglobin (g/dl)	6.87 ^b	5.77 ^b	6.83 ^b	12.70 ^a	11.37 ^a	0.80
Packed Cell Volume (%)	16.67 ^b	15.33 ^b	18.67 ^b	33.33 ^a	30.93 ^a	2.16
MCV (fl)	130.00	132.00	132.67	135.00	134.33	1.68
MCH (Pg)	50.33	50.00	49.00	50.67	49.00	0.68
MCHC (g/dl)	39.67	38.00	37.00	37.33	37.17	0.49

^{a-c}Means on the same row with different superscripts are significantly (P<0.05) different; ELM= Editan Leaf Meal; SEM = Standard Error of Mean; MCV = Mean Corpuscular Volume (fl); MCH = Mean Corpuscular Hemoglobin (Pg); MCHC = Mean Corpuscular Hemoglobin Concentration (g/dl)

The serum biochemical indices of broiler chickens fed varying levels of dietary editan (*Lasianthera africana*) leaf meal (ELM) is shown in Table 4. Significantly (P<0.05) differences existed among the parameters measured except albumin and high-density lipoprotein which were similar (p>0.05). For the glucose, the values for birds fed T₁(0%ELM) and T₂(5%ELM) were significantly (P<0.05) different from T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM) which did not differ significantly (P>0.05) from each other. Total protein for birds that were fed 0%ELM recorded a significantly (P<0.05) higher value from those fed T₂(5%ELM), T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM), which did not differ significantly (P>0.05) from each other.

For the globulin, T₁(0%ELM) recorded a significantly (P>0.05) higher value than those fed T₂ (5%ELM), T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM), which were not significantly different (P>0.05) from each other. There was no significant (P>0.05) difference in albumin levels among all the different treatment groups. The values ranged from 1.36 mg/dl, to 1.32mg/dl. For the urea birds fed T₁(0%ELM) had a significantly (P<0.05) higher value than birds fed T₂(5%ELM),

T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM), which were statistically similar (P>0.05) to each other.

For creatinine, birds fed T₁(0%ELM) was significantly (P<0.05) different from birds fed T₃(6%ELM), but statistically similar (P>0.05) to T₂(5% ELM), T₄(7% ELM) and T₅(8% ELM).

The cholesterol values of birds fed T₁(0%ELM) and T₂(5%ELM) were significantly (P<0.05) different from T₄(7%ELM), but statistically similar (P>0.05) to T₃(6%ELM) and T₅(5%ELM). However, T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM) showed no significant (p>0.05) difference. For the low-density lipoprotein (LDL), birds fed T₁(0%ELM) were significantly (p<0.05) higher than those on T₂(5%ELM), T₃(6%ELM), T₄(7%ELM) and T₅(8%ELM), which were statistically similar (P>0.05).

The results for very low density lipoprotein (VLDL) shows that T₂(5%ELM) and T₅(8%ELM) were significantly (p<.05) different from T₁(0%ELM) and T₃(6%ELM), but similar (p>0.05) to T₄(7%ELM) while T₁(0%ELM) was significantly (P<0.05) lower than T₂(5%ELM), T₄(7%ELM) and T₅(8%ELM) but similar (P>0.05) to

T₃(6%ELM), No significant (P>0.05) effect was observed for high-density lipoprotein (HDL) among the treatment means, but

T₃(6%ELM) recorded the highest HDL mean value (58.03mg/dl).

Table 4.6: Effect of varying Levels of Dietary Editan (*Lasianthera africana*) Leaf Meal on Serum Biochemistry of Broiler Chickens

Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	SEM
Levels of ELM (%)	0	5	6	7	8	
<i>Parameters:</i>						
Glucose (Mg/dl)	262.67 ^a	268.33 ^a	176.67 ^b	188.00 ^b	183.67 ^b	11.96
Total Protein (Mg/dl)	7.31 ^a	4.65 ^b	3.90 ^b	4.20 ^b	5.01 ^b	0.36
Globulin (Mg/dl)	5.95 ^a	3.48 ^b	2.78 ^b	3.00 ^b	3.69 ^b	0.36
ALB (Mg/dl)	1.36	1.17	1.12	1.20	1.32	0.04
Urea (Mg/dl)	14.63 ^a	4.60 ^b	6.87 ^b	4.63 ^b	3.83 ^b	1.21
Creatinine (Mg/dl)	0.37 ^a	0.32 ^{ab}	0.26 ^b	0.30 ^{ab}	0.33 ^{ab}	0.01
Triglyceride(mg/dl)	55.40 ^a	53.47 ^a	50.73 ^a	36.23 ^b	32.20 ^b	2.93
Cholesterol(mg/dl)	132.00 ^a	120.53 ^a	113.93 ^{ab}	77.17 ^b	107.53 ^{ab}	6.50
LDL(mg/dl)	59.11 ^a	26.54 ^b	35.34 ^b	14.62 ^b	23.20 ^b	4.78
VLDL(mg/dl)	23.84 ^a	23.73 ^a	22.17 ^{ab}	16.85 ^{bc}	14.73 ^c	1.22
HDL(mg/dl)	44.20	57.50	58.03	54.50	54.60	2.87

^{a-c}Means on the same row with different superscripts are significantly (P<0.05) different; ELM = Editan Leaf Meal; EM = Standard Error of Mean; LDL= Low Density Lipoprotein; VLDL= Very Low Density Lipoprotein; HDL=High Density Lipoprotein

DISCUSSION

The haematological parameters of broiler chickens fed graded levels of dietary editan (*Lasianthera africana*) leaf meal is as presented in Table 3. From the results obtained, significant (P<0.05) differences were observed for PCV, Hb, WBC, RBC, Neutrophils and Lymphocyte except for MCV, MCH and MCH. White Blood Cell Total (WBCT) The WBC values obtained were above the normal range of 4.07-4.32x10⁹/l for broiler chickens as reported by Wikivet (2012). The lymphocytes were higher in birds fed ELM than the control diet. This could be due to the presence of phytochemical compounds, adequate nutrients and minerals in editan leaf, which could influence WBC production, thereby enhancing the immune response of finisher broiler chickens against infections and indicating that editan leaf meal (ELM) was able to support the transportation of antibodies as reported by (Soetan and Oyewale, 2013). According to Andy and Ebana (2019) editan leaf contains vitamins C and A, which are useful for the immune system. It fights off infections, and has some compounds called cardiac glycosides which

help increase the production of white blood cells and antibodies, which are essential for fighting germs. The result from this study is also in line with the findings of Adebomi *et al.*, 2025 who reported increased levels of lymphocytes for birds fed higher levels of neem leaf.

The increase in the values of PCV of birds fed higher levels ELM (7 and 8%) indicates that high absorption rate of nutrients and transportation of oxygen as low PCV values is suggestive of low protein intake or anaemia in the animal, while high values are indicators of dehydration and that there is a higher number of RBC production (Bot *et al.*, 2004). The result of this study agrees with the report of Unigwe *et al* (2016) who recorded a significant higher PCV values of 28.18%, 28.97% and 27.14% for birds fed 5%, 10% and 15% sweet potato leaf meal respectively. The increase in the PCV of birds fed higher levels of ELM in this study resulted in an increase in the RBC as high level of PCV values indicates either an increase in a number of RBCs or a reduction in circulating plasma volume (Chineke *et al.*, 2006). From the results obtained, birds fed 7% and 8% ELM)

recorded significantly higher values of Hb than those fed other levels. Leaf meals contained nutrients such as iron and folate, which are essential for hemoglobin production. Feeding broiler chickens with leaf meals rich in these nutrients may lead to increased hemoglobin levels, contributing to better oxygen-carrying capacity in the blood. This is in line with the Peters *et al.*, (2011) who stated that PCV and HB are major indices for evaluating circulatory erythrocytes, diagnosis of anaemia and also serve as useful indices of the bone marrow capacity to produce red blood cells.

The result of the serum biochemical profile of broiler chickens fed varying levels of dietary ELM showed significant differences ($P < 0.05$) in all the parameters measured except albumin which did not differ significantly ($P > 0.05$) across the treatment means as presented in Table 4. The values for glucose decreases as the level of ELM increases in the diets. Birds fed the control diet and 5% ELM recorded the highest levels. The result is in line with the findings of Adebomi *et al.* (2025) who reported a higher glucose level for birds fed the control diet. This may be due to the bitterness in the ELM which can reduce the blood glucose level.

For the total protein, albumin, and globulin, a significant higher value was obtained from birds fed the control diets for the total protein, albumin, and globulin which was followed by birds fed 8% ELM. These are the major proteins found in the blood and their concentration can drop in cases of malnutrition and infection. Low albumin levels can be a sign of liver or kidney problems while abnormal globulin levels can indicate immune system issues therefore, birds fed the control diet and 8% ELM had normal liver functioning.

The urea level of birds that received editan leaf meal were not significantly different from each other, however, the values falls within the normal physiological range in poultry reflecting that inclusion of editan leaf meal in the diet did not affect protein metabolism and kidney function of the birds since urea in the blood is often used to assess protein utilization and kidney function. The

highest urea value recorded in the control diet which was above the normal range of 2.5-8.1mg/dl recommended by Aiello and Mays (1998) which according to Eggum (1970) and Ologhobo *et al* (1993) is an indication of poor quality of protein in the diet as high levels indicates low protein metabolism and kidney problems. Inclusion of ELM in the diet up to 8% suggest efficient protein metabolism and normal functioning of the kidney and liver. The creatinine levels decreased with the inclusion of ELM in the diets indicating that the use of editan leaf meal maintained the liver and health status of the birds. The liver and the kidney play a significant role in metabolic processes, while the liver detoxifies substances that are detrimental to the body; the kidney helps in maintenance of homeostasis by reabsorbing vital substances and excretion of waste products (Greaves and Lane, 2007). The present study is in agreement with the findings of Adebomi *et al.*, 2025 and Oleforuh-Okoleh *et al.*, (2015) that neem leaf meal and banana leaves significantly reduced the creatinine level of the blood. Therefore, based on the results obtained, ELM was not toxic to the birds.

The cholesterol level was reduced with increasing level of ELM, as birds fed (0%) and (5%) ELM had a significantly higher cholesterol level than birds fed (6%), (7%) and (8%) ELM. High cholesterol levels are associated with oxidative stress which can lead to deterioration of stored muscle food as reported by Essien *et al.* (2022). The result is in line with the findings of Egu (2019) and Animashahun *et al.*, (2022) who found lowered cholesterol level of birds with increased concentration of moringa and *Parkia biglobosa* leaf meals respectively. Abbas (2013) and Daramola (2022) also recorded lower cholesterol level with increased levels of Moringa and *Tectonia grandis* leaf meal respectively. The cholesterol level of birds obtained across all the treatments fell within the level recommended by Aiello and Mays (1998), except for T₄ whose value was below the range. This may be attributed to the presence of bioactive compounds in ELM with the potential to reduce blood cholesterol level in

broiler chickens. The values obtained from T₁(0%ELM) and T₃(6%ELM) were significantly (P<0.05) lower than other treatment groups.

Values obtained for triglycerides fell within the normal range of 22-130mg/dl reported by Basmacioglu and Mustafa (2005) for broiler chickens. Significant reduction was recorded in the value of triglyceride with increased level of ELM in the diet. Editan (*Lasianthera africana*) did not have any effect on HDL of broiler chickens.

The HDL values across all treatment groups fell below the normal range reported by Basmacioglu and Mustafa, (2005). The values increased with increased levels of ELM across treatment. High density lipoprotein is a type of lipoprotein that carries cholesterol from the blood stream to the liver for removal and is also referred to as 'good cholesterol' (Rajagopal *et al.*, 2012). The result may be associated with poor lipid metabolism, which is evident in the poor FCR recorded in this study.

The low density lipoprotein values obtained for birds fed ELM fell within the normal range of 15 to 35mg/dl reported by Miralimi and Julian (1993) for broiler chickens except for the control diet. The reduced LDL observed in birds that were receiving ELM suggests low cholesterol deposition in the tissues while birds on the control diet could result in excess fat deposition and poor artery health (Goldstein and Brown, 2009). According to Obodo *et al.*,(2013), LDL has been reported to be the major transporter of cholesterol in the bloodstream and is considered 'bad cholesterol' because it carries fat out of the liver to the blood vessels and thus encourages arterial cholesterol deposition.

The VLDL also decreased significantly as the birds fed the control diet had the highest value (23.84). The very Low density lipoprotein (VLDL) is responsible for transporting triglycerides from the liver to peripheral tissues. The reason for the decrease in LDL, VLDL, TC and TG and increase in HDL when compared with the control may be as the result that ELM contain significant levels of vitamin c phenols and flavonoids

(Shodehinde *et al.*, 2017). Similarly, Aikpitanyi and Egweh (2022) recorded a significantly higher values for LDL from birds served the control diets than other treatment groups that received the test ingredients. The result of this study is also in line with Essien *et al.* (2022) who reported a significant decrease in LDL of broilers chickens fed moringa leaf meal and with increase in HDL when compared with the control diet.

CONCLUSION

- The inclusion of 8% Editan leaf meal in the diets of finishing broiler chickens had no adverse effect on the haematological parameters and serum biochemical indices. It is therefore recommended that 8% editan leaf meal be incorporated into broiler finisher diet for optimum support in the production of WBCs and antibodies essential for diseases resistance.

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