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Impact of Dietary *Vitex doniana* Leaf Meal on Blood Haematology and Serum Biochemistry of Finisher Broiler Chickens

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Abstract

The major constraint facing poultry farmers is the high cost of feed, which is driven by increasing competition between humans and livestock for conventional feed resources, especially protein-rich grains such as maize and soybean meal. This study evaluated the effect of Vitex doniana leaf meal (VDLM) on the haematological and serum biochemical indices of broiler chickens. A total of 120 unsexed day-old broiler chicks were randomly assigned to four dietary treatments: T1 (0.0% VDLM), T2 (2.5% VDLM), T3 (5.0% VDLM), and T4 (7.5% VDLM), with three replicates of ten birds each, in a Completely Randomised Design. The experiment lasted eight weeks, covering both starter and finisher phases. Data on haematological parameters (packed cell volume, red blood cells, haemoglobin, white blood cells, lymphocytes, neutrophils, mean corpuscular indices, platelet count) and serum biochemistry (AST, ALT, ALP, HDL, LDL, cholesterol, albumin, globulin, urea, glucose, total protein, creatinine) were collected and analysed using one-way ANOVA. Results showed significant differences (P<0.05) in most parameters, except haemoglobin and mean corpuscular haemoglobin concentration at the starter phase. At the finisher phase, mean corpuscular haemoglobin, platelet count, and LDL decreased progressively with increasing VDLM inclusion, whereas mean corpuscular volume, neutrophils, AST, ALT, and creatinine increased. Haemoglobin, packed cell volume, and glucose declined, while HDL rose with increasing VDLM levels. These findings suggest that VDLM inclusion exerts marked physiological effects, particularly at the finisher phase. However, the progressive rise in liver enzymes and decline in key haematological indices at higher inclusion levels indicate potential metabolic stress. It is concluded that VDLM should not be used as a major feed ingredient in broiler diets but may serve as a phytogenic additive to enhance immunity and lipid metabolism.

Keywords: Vitex doniana, *broiler chickens, haematology, serum biochemistry, phytogenic additives, dietary inclusion, blood parameters.*

Introduction

Poultry farming remains a critical component of global food systems, particularly in developing countries, where it serves as a rapid and sustainable means of addressing food and nutrition insecurity. Its short production cycle, quick turnover rate, and relatively low initial capital requirement make it one of the most accessible forms of animal agriculture (Smith, 2001; Ani & Okeke, 2011). In Nigeria, poultry production contributes significantly to household food supply and income generation. However, one of the most persistent challenges limiting productivity and profitability is the rising cost of feed.

Feed costs account for approximately 60–80% of total production expenses in poultry enterprises (Igboeli, 2000; Eseonu, 2006). Conventional feedstuffs such as maize and soybean meal, which dominate commercial poultry rations, are also staple foods for humans. This dual-purpose utilization creates stiff competition between human consumption and livestock production, thereby inflating market prices. The situation is compounded by rapid population growth, shrinking arable land, climate variability, and disruptions in the supply chain, which have caused feed prices in Nigeria to rise by more than 300% in recent years (Diarra & Devi, 2015). Consequently, many small- and medium-scale farmers

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are being forced out of production, threatening the supply of affordable animal protein to the populace.

To mitigate this challenge, researchers have increasingly turned to non-conventional feed ingredients that are cheap, locally available, and underutilized. Leaf meals and plant-based products from ethno-medicinal species are of particular interest because they not only offer nutritional benefits but also contain bioactive compounds with potential health-promoting effects (Okoli et al., 2001, 2002). One such promising plant is *Vitex doniana*, commonly referred to as Black Plum, a multipurpose tree in the family Verbenaceae widely distributed across tropical Africa.

Vitex doniana is a deciduous tree that grows up to 20 meters tall and is valued for its fruits, leaves, bark, and seeds. Its fruits are consumed fresh, cooked, or processed into products such as wine, jam, and syrup. The seeds may be roasted into a coffee-like beverage, while the leaves are eaten as vegetables or brewed into tea (FAO, 2002). Traditionally, different parts of the plant have been used to manage ailments such as dysentery, jaundice, anaemia, gonorrhoea, measles, headaches, and respiratory infections (Oni, 2010). Phytochemical analyses have revealed that its leaves contain proteins and a wide array of secondary metabolites with antioxidant and therapeutic properties, suggesting potential functional roles when incorporated into livestock diets.

In poultry nutrition research, blood indices are widely recognized as reliable markers of the physiological and health status of birds. Haematological parameters such as packed cell volume (PCV), haemoglobin concentration, red blood cell (RBC) count, and white blood cell (WBC) count reflect the oxygen-carrying capacity of blood, immune competence, and overall well-being (Waugh et al., 2001; Bamishaiye & Muhammad, 2009). Similarly, serum biochemical indices including enzymes such as aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALP), as well as metabolites such as glucose, cholesterol, and creatinine—are indicative of organ function, metabolic activity, and nutritional balance (Aderemi, 2004; Doyle, 2006; Merck Manual, 2012). Evaluating these parameters is, therefore, essential in determining the safety and efficacy of novel feed resources.

The incorporation of *Vitex doniana* leaf meal into broiler diets presents dual opportunities: reducing feed costs while providing phytogenic compounds that may enhance immunity, metabolic resilience, and overall productivity. Given the central role of nutrition in poultry production and the urgent need for sustainable alternatives, examining the haematological and serum biochemical responses of broilers to *Vitex doniana* supplementation will generate evidence on its nutritional value and potential as a functional feed additive in Nigeria and similar production systems.

Materials and Methods

Experimental Site

This study was carried out at the Experimental Poultry Farm of Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. Awka is situated within the humid tropical rainforest zone of southeastern Nigeria. The area lies at latitude 6.24°N and longitude 7.00–7.08°E, with an altitude of approximately 137 m above sea level. The climate is typically tropical, characterised by a bimodal rainfall pattern (April–July and September–November), with an annual mean rainfall of about 1600 mm and an average annual temperature of 27°C. Relative humidity fluctuates between 70% and 80%, with the highest values recorded at dawn (Ezenwaji, Otti, & Phil-Eze, 2013). These environmental conditions are considered favourable for poultry production but may also predispose birds to stress-related challenges such as heat stress and high disease prevalence (Adene & Oguntade, 2006).

Collection and Preparation of Experimental Material

Fresh, mature leaves of **Vitex doniana** (Black Plum) were harvested within the premises of Nnamdi Azikiwe University. Leaves were hand-picked, sorted to eliminate diseased or damaged ones, and subjected to shade-drying for 3–4 days to prevent the loss of heat-sensitive phytochemicals (Okoli, Anunobi, Obidoa, & Igwe, 2002). Shade-drying has been reported to be superior to direct sun-drying in preserving nutritional integrity and bioactive compounds (D'Mello, 2000). After drying, the leaves were milled into a fine powder using a hammer mill to obtain Vitex doniana Leaf Meal (VDLM)**,** which was packed in airtight polythene bags and stored in a cool, dry environment until use.

Experimental Diets

The experimental diets were formulated based on the proximate composition of the VDLM, analyzed using the standard procedures of the Association of Official Analytical Chemists (AOAC, 2001)**.** Other ingredients were sourced from local feed markets.

Four dietary treatments were prepared for the finisher phase. The diets were designed to be isonitrogenous and isocaloric, ensuring that the only source of variation was the level of VDLM inclusion. Treatments consisted of:

- **T1**: Control diet (0.0% VDLM)
- **T2**: 2.5% VDLM inclusion
- **T3**: 5.0% VDLM inclusion
- **T4**: 7.5% VDLM inclusion

Feed mixing was conducted manually to ensure homogeneity.

Broiler Finisher Diet (29–56 days)

The finisher diets are presented in **Table 1**.

Table 1: Percentage composition of broiler finisher diets with varying levels of VDLM

Ingredient	T1 (%)	T2 (%)	T3 (%)	T4 (%)
Maize	50.0	47.5	46.0	44.0
Full-fat soya	5.0	5.0	5.0	5.0
Soybean meal	16.0	16.0	16.0	15.5
Palm kernel cake	10.0	10.0	9.0	9.0

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Ingredient	T1 (%)	T2 (%)	T3 (%)	T4 (%)
Groundnut cake	7.0	7.0	7.0	7.0
Fish meal	3.0	3.0	3.0	3.0
VDLM	0.0	2.5	5.0	7.5
Bone meal	3.0	3.0	3.0	3.0
Limestone	3.0	3.0	3.0	3.0
Premix	0.5	0.5	0.5	0.5
Lysine	0.5	0.5	0.5	0.5
Methionine	0.5	0.5	0.5	0.5
Salt	0.5	0.5	0.5	0.5
Toxin binder	1.0	1.0	1.0	1.0
Total	100.0	100.0	100.0	100.0
CP (%)	19.93	19.83	19.88	19.86

Experimental Design

A total of 120 unsexed day-old broiler chicks (Agrited strain) were randomly distributed into the four dietary treatments (T1–T4). Each treatment was replicated three times with 10 birds per replicate in a Completely Randomised Design (CRD). Data were analysed using Analysis of Variance (ANOVA) with SPSS statistical software. Significant differences among means were separated using Duncan's Multiple Range Test (DMRT) at 5% probability level (Duncan, 1955).

Management of Experimental Birds

Feeding

Experimental diets (finisher) were fed ad libitum. Fresh water was supplied daily. Feeds were adjusted weekly according to NRC (1994) broiler nutrient requirements.

Vaccination and Medication

A strict vaccination program was adopted (Table 2). Routine antibiotics and multivitamins were administered as preventive measures against stress and disease outbreaks, consistent with Nworgu (2007).

Table 2: Vaccination schedule for broilers

Age (days)	Vaccine/Medication	Route/Remarks
1	Marek's, Newcastle disease vaccine (intra-ocular) + glucose, vitamins	Eye drop + oral
8–9	Coccidiostat + antibiotics	Oral
14	Gumboro vaccine (1st)	Oral
15–21	Newcastle (Lasota) + vitamins	Oral
22–28	Gumboro (2nd)	Oral
29–33	Newcastle booster + vitamins	Oral
37–39	Coccidiostat + antibiotics	Oral

Hygiene and Sanitation

Strict hygiene was maintained, bedding changed weekly (2×/week from week 5–8). Drinkers washed daily with detergent. Feeders are cleaned with a dry cloth, and a disinfectant footbath is provided at the entry to the poultry house.

Data Collection

Blood Sampling

At week 8, blood was collected from three randomly selected birds per replicate (12 per treatment) via the brachial vein. About 5 ml of blood was drawn using sterile syringes. Samples for haematology were placed in EDTA tubes, while samples for serum biochemistry were placed in plain tubes. Samples were transported in icepacks to the laboratory.

Haematological Analysis

Parameters analysed included: Packed Cell Volume (PCV), Haemoglobin concentration (Hb), Red Blood Cell (RBC) count, White Blood Cell (WBC) count, and differentials (lymphocytes, neutrophils, monocytes, eosinophils). PCV: microhematocrit centrifugation at 2500 rpm for 5 min (Schalm, Jain, & Carroll, 1975). Hb: Cyanmethemoglobin method (Coles, 1986). RBC and WBC: Neubauer hemocytometer method. Erythrocyte indices (MCV, MCH, MCHC) were calculated from Hb, PCV, and RBC values.

Serum Biochemistry

Blood in plain tubes was allowed to clot at room temperature, then centrifuged at 3000 rpm for 10 min to obtain serum. Serum was analysed for AST, ALT, ALP, cholesterol, HDL, LDL, glucose, urea, total protein, albumin, globulin, and creatinine using an automated clinical chemistry analyser (Reitman & Frankel, 1957).

Data Analysis

All collected data were subjected to one-way ANOVA. Significant means were separated using Duncan's Multiple Range Test (DMRT) at $p < 0.05$ (Duncan, 1955). Results were expressed as mean ± standard error of mean (SEM).

Results and Discussion

At the finisher phase, haematological results (Table 3) revealed that haemoglobin levels did not differ significantly ($P>0.05$) across treatments, although numerical decreases were observed at higher VDLM levels. RBC and PCV decreased significantly with higher VDLM inclusion, further supporting the hypothesis that excessive intake of phytochemicals such as tannins and alkaloids may interfere with nutrient utilisation and blood formation (Onyeyili et al., 1992).

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MCV and MCH values increased significantly in birds fed higher VDLM diets, which may indicate the development of macrocytic anaemia, a condition often associated with impaired DNA synthesis and abnormal erythrocyte maturation (Bamishaiye & Muhammad, 2009). Neutrophil counts increased progressively with VDLM levels, while lymphocyte counts declined, suggesting stress-related leucocytosis, which can occur when birds are exposed to dietary toxins or oxidative stress (Doyle, 2006). Platelet counts were lowest at 7.5% inclusion, indicating possible interference of phytochemicals with platelet production or survival.

The serum biochemical profile of finisher broilers (Table 4) revealed significant differences (P<0.05) across all parameters. ALT, AST, and ALP activities increased at higher VDLM inclusion levels, indicating liver enzyme induction and possible hepatic stress. Similar trends have been reported with other phytogenic feed additives containing high levels of saponins and tannins (Aderemi, 2004). Elevated serum urea and creatinine levels at higher inclusion also suggest compromised kidney function, possibly due to increased metabolic load from anti-nutritional factors (Eseonu, 2006).

Glucose concentrations declined at higher VDLM inclusion, while total protein, albumin, and globulin levels increased significantly. This pattern suggests that VDLM may stimulate protein synthesis or immune protein production at moderate levels, but excessive inclusion impairs carbohydrate metabolism. Elevated globulin at the highest inclusion could indicate immune stimulation, aligning with earlier observations on WBC counts.

Cholesterol and LDL levels decreased significantly with VDLM, while HDL increased progressively. This finding supports earlier evidence at the starter phase that VDLM may have lipid-lowering properties. Similar hypocholesterolemic effects of plant-based diets rich in saponins and flavonoids have been reported in poultry by Fasuyi (2007) and Olorunnisola et al. (2011).

Table 3: Haematological indices of finisher broilers fed diets containing *Vitex doniana* leaf meal (VDLM).

Parameters	T 1	T 2	T 3	T 4	SEM	P value
HB(g/dl)	9.67^{b}	9.30^{ab}	8.97^{ab}	8.27^{a}	0.21	0.076
RBC($\times10^{12}$/L)	3.67^{d}	1.47^{a}	2.47^{c}	1.63^{b}	0.26	0.000
WBC($\times10^{9}$/L)	2.85×10^{9b}	1.03×10^{9a}	2.67×10^{9b}	3.83×10^{9c}	3.05×10^{9}	0.000
PCV(%)	29.67^{c}	28.67^{bc}	27.67^{b}	25.67^{a}	0.47	0.000
MCV(fl)	81.33^{a}	192.77^{d}	122.33^{b}	152.63^{c}	12.31	0.000
MCH(pg)	27.33^{a}	63.67^{d}	36.73^{b}	51.17^{c}	4.18	0.000
MCHC(g/dl)	33.15	33.07	33.20	33.04	0.03	0.201
LYMPH($\times10^{9}$/L)	41.00^{b}	29.67^{a}	48.67^{c}	25.33^{a}	2.90	0.000
Neutrophils($\times10^{9}$/L)	60.67^{b}	71.00^{c}	50.67^{a}	78.33^{d}	3.16	0.000
Platelet($\times10^{9}$/L)	2.50×10^{11c}	2.71×10^{11d}	2.41×10^{11b}	1.38×10^{11a}	1.55×10^{11}	0.000

abc: means on the same row with different superscripts are significantly different (P<0.05); HB – Haemoglobin, RBC - Red blood cell, WBC - White blood cell, PCV - Packed cell volume, MCV - Mean corpuscular volume, MCH - Mean corpuscular heamoglobin, MCHC - Mean corpuscular heamoglobin concentration, LYMPH – Lymphocytes

Table 4: Serum biochemical indices of finisher broilers fed diets containing *Vitex doniana* leaf meal (VDLM).

Parameters	T 1	T 2	T 3	T 4	SEM	P value
Urea(mg/dl)	9.33^{a}	19.67^{c}	15.67^{b}	19.67^{c}	1.28	0.000
AST(u/l)	127.67^{b}	170.67^{d}	119.67^{a}	166.67^{c}	6.25	0.000
ALT(u/l)	35.67^{a}	65.67^{d}	40.67^{b}	49.67^{c}	3.44	0.000
ALP(u/l)	2123.67^{a}	2205.67^{c}	2150.67^{b}	2575.67^{d}	54.10	0.000
Globulin(g/l)	16.67^{b}	14.33^{a}	15.33^{a}	27.67^{c}	1.62	0.000
Glucose(mg/dl)	79.67^{d}	64.67^{b}	69.67^{c}	58.67^{a}	2.33	0.000
Total protein(g/l)	41.67^{b}	60.67^{d}	38.67^{a}	50.33^{c}	2.58	0.000
Albumin(g/l)	16.83^{b}	24.33^{d}	18.33^{c}	14.67^{a}	1.09	0.000
Creatinine(mg/dl)	0.47^{a}	0.67^{b}	0.43^{a}	0.67^{b}	0.04	0.001

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Cholesterol(mg/dl)	120.33[b]	127.67[c]	100.67[a]	140.67[d]	4.37	0.000
HDL(mg/dl)	40.67[a]	69.67[b]	99.67[c]	120.33[d]	9.10	0.000
LDL(mg/dl)	24.67[d]	8.67[a]	14.67[c]	11.67[b]	1.82	0.000

abc: means on the same row with different superscripts are significantly different (P<0.05); AST - Aspartate transaminase, ALT - Alanine transaminase, ALP - Alkaline phosphatase, HDL - High density lipid, LDL - Low density lipid

The proximate composition results demonstrate that VDLM provides moderate protein and energy but high fibre content. High fibre levels may reduce nutrient digestibility, especially in monogastrics such as poultry (Jimoh et al., 2017). Thus, while VDLM is not an ideal major feed ingredient, it can serve as a supplementary feed additive.

The phytochemical screening underscores the dual role of VDLM. While bioactive compounds such as flavonoids and saponins provide antioxidant and immunomodulatory benefits (Olorunnisola et al., 2011), tannins, alkaloids, and anthraquinones pose anti-nutritional risks at higher concentrations (Akinmoladun et al., 2019).

The haematological findings at the finisher phase reveal that moderate inclusion levels (2.5–5.0%) maintain haematological values within normal physiological ranges, whereas higher levels (7.5%) cause significant disruptions. This is consistent with previous studies where moderate phytogenic supplementation improved immune function without compromising erythropoiesis (Onu & Aniebo, 2011).

Serum biochemical responses show that moderate inclusion of VDLM improves lipid metabolism and protein utilisation, evidenced by increased HDL and globulin, and reduced cholesterol and LDL. However, higher inclusion levels adversely affect liver and kidney function, as shown by elevated ALT, AST, ALP, urea, and creatinine. These findings agree with the work of Aderemi (2004), who reported that excessive intake of phytogenic additives may overload hepatic metabolism.

Overall, the results suggest that VDLM can be incorporated into broiler diets at low to moderate inclusion levels (≤5.0%) to harness its immunomodulatory and lipid-lowering benefits. However, higher inclusion (7.5%) may pose health risks due to anti-nutritional effects on haematology and organ function.

Discussion

Proximate and Phytochemical Composition of *Vitex doniana* Leaf Meal

The proximate and phytochemical composition of *Vitex doniana* leaf meal (VDLM) obtained in this study closely aligns with earlier findings. Adeyina et al. (2017), in an experiment on cockerels, reported crude protein (11.10 ± 0.08%), crude fibre (7.20 ± 0.01%), and dry matter (88.99 ± 0.05%). The slight variations between studies may be attributed to processing techniques; Adeyina et al. (2017) employed sun-drying, while shade-drying was used in the present study. Shade-drying has been reported to preserve phytochemicals and certain nutrients more effectively, whereas sun-drying may reduce heat-sensitive compounds (Melesse et al., 2012). These differences emphasise the importance of processing methods in determining nutrient composition and, by extension, the physiological responses of poultry.

Haematological Profile of Finisher Broilers

Haematological results of finisher broilers fed diets containing graded levels of VDLM showed significant differences ($p < 0.05$) in most parameters, except haemoglobin (Hb) and mean corpuscular haemoglobin concentration (MCHC), which were not significantly different ($p > 0.05$). The Hb concentration remained within the accepted range of 7.0–13.0 g/dl for broilers (Anon, 1980; Swenson, 1999), suggesting that oxygen transport capacity was not compromised. Adequate Hb levels imply that broilers were not predisposed to hypoxic stress (Muhammad & Oloyede, 2009).

The red blood cell (RBC) counts, however, were consistently below the normal range across all treatments, with the lowest values recorded at 7.5% VDLM inclusion. This reduction suggests impaired erythropoiesis or possible interference of anti-nutritional factors such as tannins, which limit iron bioavailability (Esonu et al., 2001; Fasuyi, 2005). Such a decline in RBC count at higher VDLM inclusion could predispose birds to anaemia and reduced oxygen-carrying capacity.

White blood cell (WBC) counts in all treatments were below the normal reference range for avian species (Aengwanich et al., 2004), with the lowest counts observed at 2.5% VDLM inclusion. Reduced WBC counts may weaken immune competence, rendering birds more vulnerable to infections (Frandson, 1986; Adeyemo & Longe, 2007).

Packed cell volume (PCV) values in finisher broilers remained within the normal range of 25–45% (Ross et al., 1978; Aengwanich et al., 2004). This suggests that, despite reductions in RBC count, the diets provided adequate nutrients to sustain hematological stability, and none of the treatments predisposed the birds to anaemia.

Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), and MCHC exhibited variable responses across treatments. At the finisher phase, MCV values for the 5.0% and 7.5% VDLM diets were within the normal range, while MCH was within range across all inclusion levels except 2.5%. These results indicate partial maintenance of erythrocyte integrity at higher inclusion levels (Mitruka & Rawnsley, 1997).

Lymphocyte values were within normal limits, suggesting adequate immune competence across treatments. Neutrophil counts increased progressively with VDLM inclusion, with the highest values observed at 7.5%. Neutrophils play a critical role in non-specific immunity, particularly in bacterial and viral defence (Champe et al., 2008). Elevated neutrophil counts, therefore, suggest that higher VDLM inclusion may have stimulated immune responses, possibly due to dietary stress or the presence of phytochemicals acting as immunomodulators.

Serum Biochemistry of Finisher Broilers

Serum biochemistry revealed marked effects of VDLM inclusion on kidney and liver function indices. Urea values in all treatment groups were outside the normal range for broilers (WikiVet.net), with extremely high levels observed at 2.5% and 7.5% VDLM inclusion. Elevated urea indicates reduced kidney efficiency in excreting nitrogenous waste or poor protein quality in the diet (Eggum, 1970). Such values suggest a metabolic burden on renal function, which may negatively impact broiler health at the finisher stage.

Serum total protein (TP) and albumin concentrations were consistently above the normal ranges reported by Anon (1980), WikiVet.net, and Jain (1986). While elevated TP can reflect improved dietary protein availability, excessively high values may also indicate immunological stress (Peters et al., 1982). Globulin concentrations followed a similar trend, suggesting that VDLM inclusion may have stimulated antibody production, which could represent either improved immune modulation or a response to stressors in the diets (Melluzzi et al., 1991).

Blood glucose concentrations (59–80 mg/dl) in finisher broilers exceeded the standard physiological range (44.1–45.5 mg/dl; WikiVet.net). Elevated glucose may result from ad libitum feeding and represents high metabolic activity rather than fasting levels (Balogun, 1982; Melluzzi et al., 1991).

Creatinine values were lower than the reference range across treatments, possibly due to breed-specific differences. However, persistently high creatinine is usually associated with kidney damage (Champe et al., 2008).

Liver function enzymes were notably affected by VDLM. Alkaline phosphatase (ALP) levels in finisher broilers exceeded the normal range (Clinical Diagnostic Division, 1990) at all inclusion levels, suggesting potential liver or bone stress. Aspartate aminotransferase (AST) values were highest at 2.5% VDLM inclusion, while alanine aminotransferase (ALT) values peaked at the same level. Elevated AST and ALT indicate hepatocellular damage or impaired metabolism, which is consistent with dietary stress at higher VDLM inclusion levels (Champe et al., 2008).

Cholesterol profiles revealed inconsistent patterns. Total cholesterol was lowest at 5.0% VDLM inclusion and highest at 7.5%. High-density lipoprotein (HDL) increased progressively with VDLM inclusion, whereas low-density lipoprotein (LDL) was lowest at 2.5% and highest in the control (0%). While elevated HDL is beneficial in lipid metabolism, the concurrent rise in total cholesterol and LDL at higher inclusion levels suggests increased risk of metabolic complications in finisher broilers (Melluzzi et al., 1991).

Conclusion

The results from the finisher phase demonstrate that inclusion of *Vitex doniana* leaf meal significantly altered haematological and serum biochemical parameters of broiler chickens. Haemoglobin and MCHC values remained within acceptable limits, but RBC counts were consistently below normal ranges, raising concerns about oxygen-carrying capacity. Kidney function was impaired, as indicated by elevated urea levels, while liver function was compromised by high ALP, AST, and ALT activities. Lipid metabolism was also affected, with increased total cholesterol and LDL at higher inclusion levels. Collectively, these findings suggest that VDLM inclusion at the finisher phase negatively impacts hematopoietic processes, renal clearance, hepatic function, and metabolic stability.

Recommendation

Based on the findings of this study, *Vitex doniana* leaf meal should not be recommended in broiler finisher diets. Higher inclusion levels impaired vital organ functions, including the liver and kidneys, which are essential for nutrient metabolism and overall health. The progressive decline in RBC counts further highlights risks of anaemia and reduced productivity. If VDLM is to be explored further, future research should investigate detoxification methods (e.g., fermentation, boiling, or enzyme supplementation) to reduce anti-nutritional factors, and evaluate its role at minimal inclusion levels as a phytogenic additive rather than a direct dietary ingredient.

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