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EFFECT OF DIETARY INCLUSION OF DRIED MUSHROOM (*Pleurotus ostreatus*) ON THE BLOOD PARAMETERS AND LIPID PROFILES OF BROILER CHICKENS AT STARTER PHASE

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ABSTRACT
60 day old broiler chicks of either sex were randomly distributed into four treatments groups (T1, T2, T3 and T4) with each treatment having three replicates of five broiler chicks each in a completely randomized design. T1 was given commercial diet without mushroom while T2, T3, and T4 were given same commercial feed supplemented with dried mushroom at 1%, 1.5% and 2% from day old to 28 days of age. At this point, blood was collected by the use of syringe and needle through their wing vein for use in assaying the blood. Data collected were analyzed using one-way Analysis of variance. There was improvement on some blood parameters. PCV was highest at 1% inclusion (30.30 ± 0.53%) as against 23.50 ± 0.64% in the control while HB declined progressively from 8.53 ± 0.023 g/dl (control) to 7.23 ± 0.035 g/dl (2% inclusion). RBC count decreased from 2.85 ± 0.031 ×10⁶/µL in the control to 2.24 ± 0.023 ×10⁶/µL in the 1.5% group. Notwithstanding, PCV fall within the normal range for broilers (25.60-32.50% for PCV, 8.93 - 10.45g/dl for HB and 3.53-3.80 x 10⁶/µL for RBC). Cholesterol reduced from 142.4 ± 0.69 mg/dl in the control to 127.6 ± 1.36 mg/dl at 2% inclusion, while triglyceride declined from 102.3 ± 0.31 mg/dl to 60.6 ± 1.08 mg/dl. In contrast, high-density lipoprotein (HDL) increased progressively from 89.1 ± 1.37 mg/dl (control) to 109.4 ± 0.47 mg/dl (2%). Also, there was a significant improvements in liver markers, reduced low-density lipoprotein (LDL) coupled with increased high-density lipoprotein (HDL).

Keywords: Dried Mushroom, blood parameters, broiler chickens, starter phase

1.0 INTRODUCTION
Poultry production is one of the most rapidly expanding and profitable agricultural enterprises worldwide. It plays a crucial role in bridging the animal protein gap in developing countries, including Nigeria. Poultry, especially chickens, provide a cheap, readily available source of high-quality protein in the form of meat and eggs, thereby contributing significantly to food security, income generation, and employment creation. In Nigeria, the poultry industry has grown remarkably over the past decades and currently represents one of the most commercialized subsectors of agriculture (Adene and Oguntade, 2006; FAO, 2021). Despite this growth, productivity is often hampered by high costs of production, particularly feed, and frequent disease outbreaks that undermine profitability (Akinola and Essien, 2011). Nutrition plays a central role in poultry production, accounting for up to 70% of the total production costs (Olukosi and Adebiyi, 2013). Conventional feed ingredients such as maize and soybean meal, which are the primary sources of energy and protein are increasingly expensive due to competition between humans and animals for grains, seasonal scarcity, and import dependency (Ojewola *et al*., 2016). This situation has necessitated the search for alternative feed resources and natural growth promoters that are safe, cost-effective, and capable of enhancing animal performance while maintaining product quality and consumer health. In recent years, there has been a growing concern over the use of synthetic growth promoters and antibiotics in poultry production due to issues of drug resistance, residue accumulation in animal products, and potential public health risks (Dibner and Richards, 2005; Castanon, 2007). Consequently, attention has shifted towards natural feed additives of plant and fungal origin that possess bioactive compounds with growth-promoting, immunomodulatory, and health-enhancing properties. One of such promising feed resource is the oyster mushroom **(***Pleurotus ostreatus***)**, which has attracted increasing interest in both human nutrition and animal feeding.

Oyster mushrooms are edible fungi widely cultivated across the world due to their ease of production, high yield potential, and ability to grow on various agricultural wastes (Chang and Miles, 2004). They are rich in proteins, vitamins, minerals, polysaccharides and bioactive metabolites such as β-glucans, flavonoids, and phenolic compounds, which exhibit antioxidant, antimicrobial, and immunostimulatory properties (Wong *et al*., 2020). These attributes make oyster mushrooms a potential feed additive capable of improving growth performance, enhancing feed utilization efficiency, and promoting general health in poultry (Guo *et al*., 2004; Rathore *et al*., 2017). Several studies have reported that inclusion of mushrooms or mushroom extracts in poultry diets can improve carcass quality, stimulate hematological parameters, and positively influence serum biochemical indices (Adebiyi *et al*., 2012; Toghyani *et al*., 2012). However, research on the use of oyster mushrooms in Nigeria remains relatively limited, despite the country's urgent need for cheaper, safer, and locally available feed supplements. It is therefore essential to investigate the effect of dietary inclusion of dried oyster mushrooms in broiler chickens on the hematological, serum and lipid profiles.

2.0 MATERIALS AND METHODS

2.1 Location of the Study

The study was carried out at the Teaching and Research Farm of Michael Okpara University of Agriculture Umudike, Abia State with geographical coordinates of latitude of $5^0$29'N and longitude $7^0$32'E and relative humidity of about 50-90%.

2.2 Ethical Considerations

The study adhered to the ethical guidelines for the care and use of animals in research as outlined by the Ethical Committee of Michael Okpara University of Agriculture Umudike. All procedures were designed to minimize animal discomfort, and proper veterinary care was provided throughout the study.

2.3 Materials used

Material used include 60 day old broiler chicks**,** dried mushroom**,** poultry pen**,** feeders, drinkers**,** commercial starter feed, water**,** electronic weighing balance, heparinized sample bottle**,** needles and syringes, non-heparinized sample bottle**,** capillary tubes**,** hematocrit reader and oven.

2.4 Procurement of Input and Experimental design

A total of 60 day old broiler chicks of either sex was purchased from a local hatchery (Agrited Farm Ltd.) through an accredited distributor in Umuahia, Abia state and raised from day old to day 28 days. The broiler chicks were weighed on arrival and 38.10 grams recorded as their average weight. They were randomly distributed into four treatment groups G1, G2, G3 and G4, with each treatment having three replicates of five broiler chicks in a completely randomized design. Commercial feed starter-crumble was purchased from a veterinary shop and ground to mash and dried test ingredient (oyster mushroom) was ground to powder and mixed with the poultry feed as shown below. Four diets (G1, G2, G3, and G4) were given to the different groups. G1 was without mushroom supplementation while G2, G3, and G4 were supplemented with mushroom at 1%, 1.5% and 2% respectively.

GROUP G_1: Received plain water and starter feed (control)

GROUP G_2: Received plain water and starter feed added 1.0 kg of dried mushroom per 100kg

GROUP G_3: Received plain water and starter feed added 1.5 kg of dried mushroom per 100kg

GROUP G_4: Received plain water and starter feed added 2.0 kg of dried mushroom per 100kg.

2.5 Management of Experimental Animals

Prior to the arrival of the chicks, a brooding pen was carefully washed, disinfected and provided with adjustable heat and light sources. The pen was divided into equal size to accommodate the groups and replicates. Before allocation of the chicks into groups, their feeder, and drinker of each were provided and electric bulb (200 watt) for brooding hanged appropriately. The floor of each pen was covered with thick carton paper to reduce heat loss and to maintain warm temperature in the pen. All equipment were cleaned and disinfected outside the pen. The chicks were randomly allocated into four groups (G_1-G_4) of 15 birds. Each group was further divided into 3 replicates of 5 birds each. The birds were maintained on deep litter and feed and clean water were provided ad libitum. They were given appropriate vaccination and preventive medications. The care and management of the birds followed accepted guidelines for broilers as recommended by FASS (1999). Proper hygiene and sanitary measures were practiced and followed throughout the experimental period. Wood shavings were changed at regular intervals to ensure clean and dry beddings.

2.6 Sample Collection

At the end of the experiment at 4th week, blood was collected from three (3) birds per treatment into EDTA bottle and plain bottles through the wing vein for hematology and serum biochemical assays respectively. Parameters analyzed includes the parked cell volume (PCV), red blood cell (RBC) and white blood cell (WBC) counts, hemoglobin (HB) concentrations, mean corpuscular hemoglobin (MCH), mean corpuscular Hemoglobin concentration (MCHC), total protein, bilirubin, albumin, globulin, uric acid, creatinine concentrations, alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total cholesterol, low-density lipoprotein (LDL), triglycerides and high-density lipoprotein (HDL)

2.7.1 Determination of haematological and serum biochemical indices

5ml of blood was collected at the end of the experiment at 4 weeks from the wing vein of three birds per treatment into K3 Ethylene-diamine tetra-acetic acid (EDTA) and plain bottles for hematological and serum biochemical analyses, respectively. The erythrocyte was counted using the hemocytometer method as described by Schalm *et al.* (1975) while the hemoglobin concentration was determined according to the techniques described by Cole (1986). In determining the packed cell volume (PCV), the Winthrop microheamatocrit tube was filled with blood by capillary action up to two thirds (2/3). The samples were spun in a centrifuge for 5 minutes at 10,000 rpm and the PCV was read and recorded in percentage using a microheamatocrit reader. Other hematological indices namely, MCH, MCV and MCHC were calculated according to the formulae reported by Schalm *et al*. (1975). The leukocyte or white blood cell count was obtained using a hemocytometer after a 1: 20 dilution in Natt and Hendricks diluents. The white blood cell was differentiated into granulocytes (heterophils), lymphocytes, monocytes, eosinophils and basophils with the aid of automated WBC differential machine (Model: Durga, China). The blood samples contained in plain bottles were centrifuged at 3000 rpm for 10 minutes to obtain clear sera which were transferred into fresh plain bottles and labelled appropriately. Serum biochemical tests were estimated using commercial diagnostic kits, following the manufacturer's protocol provided by Randox Laboratories Limited, U.K. Parameters analyzed included total protein, bilirubin and cholesterol levels, albumin, globulin, urea, and creatinine concentrations, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP). On lipid profile test, blood was delivered into a vacuum container without anticoagulant and centrifuged for 5 minutes to separate the serum. 30 microliter of the serum was pipetted and used in measuring the lipid profiles (total cholesterol, triglycerides, LDL and HDL) using Rosche method following all standard procedures.

2.8 Statistical Analysis
Data obtained were analyzed using Statistical Package for Social Sciences (SPSS version 20). Data were subjected to one-way analysis of variance (ANOVA) to compare the different treatments with the control group. Duncan's post-hoc statistics was used to separate the significant means while the statistical confidence was set at 95% ($P \leq 0.05$).

3.0 RESULTS AND DISCUSSION
3.1 Hematological Parameters
3.1.1 Packed Cell Volume (PCV)
The packed cell volume (PCV) ranged from 23.50 ± 0.64% in the control to 30.30 ± 0.53% in the 1% group, with the highest value at 1% inclusion. However, further increment in inclusion (1.5% and 2%) caused a slight reduction. This suggests that moderate supplementation improved erythropoiesis and oxygen-carrying capacity, whereas higher inclusion levels might have induced mild suppression of red cell synthesis. This observation agrees with Olumide *et al.* (2019), who reported improved hematological parameters in broilers fed mushroom-supplemented diets due to enhanced nutrient utilization and antioxidant effects. Similarly, Onyimonyi and Ernest (2016) found that mushroom inclusion improved PCV and hemoglobin due to its bioactive compounds and improved protein digestibility.

3.1.2 Hemoglobin (HB)
Hemoglobin concentration declined progressively from 8.53 ± 0.023 g/dl (control) to 7.23 ± 0.035 g/dl (2% inclusion). The reduction at higher inclusion levels may be due to interference in iron metabolism or reduced absorption efficiency. This finding corroborates Adejumo and Adesina (2018), who reported that excessive mushroom meal can reduce HB levels due to high fiber content affecting the bioavailability.

3.1.3 White Blood Cell (WBC)
White blood cell count decreased significantly ($P < 0.05$) from 2.59 ± 0.025 $\times 10^9$/L in the 1% group to 2% (1.57 ± 0.029 $\times 10^9$/L) group including the control. The observed reduction in WBC count may be as a result of the immunomodulatory and antioxidant effects of β-glucans in oyster mushroom, which help in maintaining immune response and reduce oxidative stress. Omeje *et al.* (2020) similarly reported reduced WBC in mushroom-fed broilers, attributing it to immune stabilization rather than suppression.

3.1.4 Total Red Blood Cell (RBC)
RBC count decreased from 2.85 ± 0.031 $\times 10^6$/µL in the control to 2.24 ± 0.023 $\times 10^6$/µL in the 1.5% group. The decline at higher inclusion levels may suggest reduced erythropoiesis or shortened erythrocyte lifespan (Campbell, 2015), although none of the dietary treatments adversely affected the hematological profiles of the birds.

3.1.5 Mean Corpuscular Hemoglobin (MCH) and Mean Corpuscular Volume (MCV)
The MCH values (30.00–35.33 pg) were significantly ($P < 0.05$) influenced by diet, with the 1.5% group showing the highest value. This suggests improved hemoglobin content per red cell, which may enhance oxygen transport efficiency. Oke *et al.* (2017) observed a similar trend, reporting that inclusion of functional feed additives like mushrooms improved hematological indices linked to oxygen-carrying capacity. MCV increased significantly across treatments, ranging from 82.43 ± 1.83 fL (control) to 109.83 ± 2.84 fL (1.5% inclusion). This indicates that moderate inclusion of oyster mushroom enhanced erythrocyte maturation and membrane integrity, possibly due to better micronutrient absorption. Adeniji and Balogun (2020) also reported elevated MCV in broilers fed phytogenic-rich mushroom diets, signifying healthy macrocytic red cells. In addition, the values of MCH and MCV were within the normal range in avian as 33-47 Pg/cell and 90-140fL respectively (Bounous and Stedman, 2000).

3.1.6 Mean Corpuscular Hemoglobin Concentration (MCHC)

MCHC values ranged between 27.43 ± 0.48 g/dl and 36.57 ± 0.90 g/dl, with the control group showing the highest value. Birds fed 1.5% inclusion recorded moderate values (32.70 ± 0.55 g/dl), while the 2% group had the lowest. This pattern may be linked to a reduction in hemoglobin synthesis at higher mushroom inclusion, consistent with the HB and RBC results. Notwithstanding the variations, the values of MCHC obtained were within the normal range in domestic fowl (26-35g/dl) (Bounous and Stedman, 2000). The mean corpuscular hemoglobin concentration (MCHC) measures the concentration of hemoglobin in a given volume of packed red blood cells. Generally, the inclusion of oyster mushroom up to 1.5% improved hematological indices associated with better oxygen transport, and physiological performance in broilers. However, 2% inclusion appeared to exert a mild depressive effect on hematological parameters, possibly due to the high fiber content of mushrooms which could reduce nutrient bioavailability. These findings demonstrate that oyster mushroom may possess bioactive components such as β-glucans that can modulate hematological profiles and immune function in broilers. Thus, optimal inclusion between 1–1.5% is recommended for promoting hematological values and overall bird performance. The hematological parameters of broiler chickens fed diets supplemented with different levels of oyster mushroom are presented in Table I. The result showed that dietary inclusion of oyster mushroom significantly ($P< 0.05$) influenced almost all the hematological indices measured.

Nutrient composition of the commercial experimental starter diet

Table 1: Feed nutrient composition as analyzed by the manufacturers

Analyzed	Group 1	Group 2	Group 3	Group 4
Crude Protein (%)	23.00	23.00	23.00	23.00
Ether Extract (%)	3.90	3.90	3.90	3.90
Crude Fibre (%)	4.85	4.85	4.85	4.85
Metabolizable Energy (kcal/kg)	2822	2822	2822	2822
Dry Matter (%)	91.29	91.25	91.25	91.25
Moisture (%)	8.75	8.75	8.75	8.75
Ash (%)	7.80	7.80	7.80	7.80
Nitrogen Free Extract (%)	51.75	51.75	51.75	51.75

3.2 SERUM BIOCHEMICAL INDICES

The serum biochemical indices of broilers fed diets supplemented with different levels of oyster mushroom (0%, 1%, 1.5%, and 2%) are presented in Table II. The result showed significant differences across treatments for all parameters measured, indicating that dietary inclusion of oyster mushroom affected the bird's serum biochemical indices and lipid profiles.

3.2.1 Total Protein, Albumin, and Globulin

Serum total protein values ranged from 5.19 ± 0.02 g/dl in the 1% group to 6.51 ± 0.06 g/dl in the 2% inclusion group, showing a steady increase with higher levels of oyster mushroom. Albumin and globulin followed similar trends, with values increasing slightly at higher inclusion levels. The highest albumin (3.29 ± 0.01 g/dl**)** and globulin **(**3.22 ± 0.05 g/dl**)** were recorded in the 2% group. This increase in serum protein could suggests improved protein synthesis and nutrient utilization with mushroom inclusion. Oyster mushrooms contain essential amino acids, vitamins, and polysaccharides that may enhance liver and improve immune function (Olumide *et al*., 2019). These findings is in agreement with Onyimonyi and Ernest (2016)**,** who reported higher serum total protein and albumin in broilers fed mushroom-supplemented diets, attributing the improvement to the mushroom's high-quality protein and antioxidant compounds.

Table 2: Hematological indices of 4 weeks old broilers fed varying levels of oyster mushroom *(pleurotus ostreatus*)

EXPERIMENTAL GROUPS					
Parameter	Group 1 (Control)	Group 2 (1%)	Group 3 (1.5%)	Group 4 (2%)	P-values
PCV (%)	23.50 ± 0.64^{b}	30.30 ± 0.53^{a}	24.20 ± 0.44^{b}	24.20 ± 0.21^{b}	0.00
HB (g/dL)	8.53 ± 0.023^{a}	8.30 ± 0.015^{b}	7.91 ± 0.035^{c}	7.23 ± 0.035^{d}	0.00
WBC ($\times 10^{9}$/L)	2.53 ± 0.035^{a}	2.59 ± 0.025^{a}	1.78 ± 0.087^{b}	1.57 ± 0.029^{c}	0.00
TRBC ($\times 10^{12}$/L)	2.85 ± 0.031^{a}	2.76 ± 0.032^{b}	2.24 ± 0.023^{c}	2.37 ± 0.023^{c}	0.00
MCH (pg)	30.10 ± 0.27^{b}	30.00 ± 0.32^{b}	35.33 ± 0.32^{a}	30.50 ± 0.44^{b}	0.00
MCV (fL)	82.43 ± 1.83^{b}	109.83 ± 2.84^{a}	108.00 ± 0.83^{a}	104.67 ± 1.16^{a}	0.00
MCHC (g/dL)	36.57 ± 0.90^{a}	27.43 ± 0.48^{c}	32.70 ± 0.55^{b}	29.13 ± 0.27^{bc}	0.00

(a-d): Means on the same row with different superscripts are significantly different ($p \leq 0.05$).

3.2.2 Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), and Alkaline Phosphatase (ALP)

The liver enzyme markers (AST, ALT, and ALP) were significantly ($P < 0.05$) affected by dietary treatments. AST ranged from 62.1 ± 1.41 U/L in the 1% group to 111.9 ± 1.96 U/L in the 2% group, while ALT ranged from 5.1 ± 0.12 U/L to 13.8 ± 0.15 U/L across treatments. Similarly, ALP increased from 79.4 ± 0.97 U/L (1%) to 120.6 ± 1.16 U/L (2%). Similar trends were observed by Adejumo and Adesina (2018), who noted that moderate increases in AST and ALT in mushroom-fed broilers reflect active protein turnover and improved liver function.

3.2.3 Creatinine and Uric acid

Serum creatinine and uric acid levels serve as indicators of kidney function and protein metabolism. In this study, creatinine values ranged from 0.18 ± 0.06 mg/dl (1%) to 0.31 ± 0.02 mg/dl (control), while uric acid ranged between 3.88 ± 0.09 mg/dl and 5.99 ± 0.05 mg/dl. Both parameters decreased with mushroom inclusion up to 1.5% before slightly increasing at 2%. The reduction in creatinine and uric acid at moderate inclusion levels suggests efficient protein utilization and reduced muscle catabolism. This aligns with the findings of Adeniji and Balogun (2020), who reported that natural feed additives like mushrooms can enhance kidney functions.

3.3 Lipid Profiles

3.3.1 Cholesterol, Triglyceride and High-Density Lipoprotein (HDL)

Total serum cholesterol and triglyceride levels decreased significantly ($P < 0.05$) with increasing levels of mushroom inclusion. Cholesterol reduced from 142.4 ± 0.69 mg/dl in the control to 127.6 ± 1.36 mg/dl at 2% inclusion, while triglyceride declined from 102.3 ± 0.31 mg/dl to 60.6 ± 1.08 mg/dl**.** The ability of mushroom to bring down the cholesterol levels in the experiment could be the reason why it is recommended for human patients with hypercholesterolemia. In contrast, high-density lipoprotein (HDL) increased progressively from 89.1 ± 1.37 mg/dl (control) to 109.4 ± 0.47 mg/dl (2%). These result showed that oyster mushroom has a hypolipidemic effect, reducing serum lipid levels while enhancing beneficial cholesterol (HDL). This may be attributed to bioactive compounds such as lovastatin and unsaturated fatty acids present in oyster mushrooms, which inhibit cholesterol synthesis (Oke *et al*., 2017; Olumide *et al*., 2019). The improvement in HDL concentration further suggests enhanced lipid transport and cardiovascular health. Similar lipid-lowering effects of mushroom supplementation in broilers were reported by Omeje *et al.* (2020) and Onyimonyi and Ernest (2016)**.** The observed improvement in total protein, albumin, and HDL, along with reduced cholesterol and triglycerides, reflects the beneficial influence of oyster mushroom on protein metabolism, liver function, and lipid regulation. The moderate enzyme activity (AST, ALT, and ALP) suggests that oyster mushroom inclusion supports metabolic efficiency without causing hepatocellular damage. Optimal effects were observed at 1–1.5% inclusion, while excessive inclusion (2%) tended to elevate enzyme levels, indicating possible metabolic strain at higher doses. This trend was the same with hematological parameters where 2% inclusion appeared to exert a mild depressive effect on hematological parameters, possibly due to the high fiber content of mushrooms which could reduce nutrient bioavailability.

Table 3: Serum and Lipid profiles indices of 4 weeks old broiler chicks at varying levels of oyster mushroom (*Pleurotus ostreatus*)

EXPERIMENTAL GROUPS					
Parameters	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**P Values**
Total Protein (g/dl)	5.99 ± 0.06^{b}	5.19 ± 0.02^{d}	5.59 ± 0.01^{c}	6.51 ± 0.06^{a}	0.00
Albumin (g/dl)	3.01 ± 0.09^{b}	2.51 ± 0.03^{c}	2.95 ± 0.05^{b}	3.29 ± 0.01^{a}	0.00
Globulin (g/dl)	2.98 ± 0.49^{b}	2.68 ± 0.03^{c}	2.64 ± 0.05^{c}	3.22 ± 0.05^{a}	0.00
Aspartate Aminotransferase (AST, U/L)	94.8 ± 1.71^{b}	62.1 ± 1.41^{d}	76.5 ± 1.94^{c}	111.9 ± 1.96^{a}	0.00
Alanine Aminotransferase (ALT, U/L)	10.5 ± 0.35^{d}	5.1 ± 0.12^{d}	7.79 ± 0.03^{c}	13.8 ± 0.15^{a}	0.00
Alkaline Phosphatase (ALP, U/L)	101.7 ± 1.59^{b}	79.4 ± 0.97^{d}	86.3 ± 1.12^{c}	120.6 ± 1.16^{a}	0.00
Creatinine (mg/dl)	0.31 ± 0.02^{a}	0.18 ± 0.06^{c}	0.27 ± 0.01^{ab}	0.22 ± 0.02^{bc}	0.00
Uric acid (mg/dl)	5.99 ± 0.05^{a}	3.88 ± 0.09^{d}	4.12 ± 0.01^{c}	5.0 ± 0.03^{b}	0.00
Cholesterol (mg/dl)	142.4 ± 0.69^{a}	138.6 ± 0.84^{b}	132.2 ± 0.70^{c}	127.6 ± 1.36^{d}	0.00
Triacylglyceride (mg/dl)	102.29 ± 0.31^{a}	88.2 ± 0.15^{b}	73.0 ± 1.45^{c}	60.6 ± 1.08^{d}	0.00
High-Density Lipoprotein (mg/dl)	89.1 ± 1.37^{d}	95.4 ± 0.25^{c}	100.5 ± 0.40^{b}	109.4 ± 0.47^{a}	0.00

(a-d): Means on the same row with different superscripts are significantly different ($p \leq 0.05$).

4.0 CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The results obtained from this study revealed that dietary inclusion of oyster mushroom improved hematological indices, especially packed cell volume (PCV), MCH, MCV and MCHC. However, 2% inclusion appeared to exert a mild depressive effect on hematological parameters, possibly due to the high fiber content of mushrooms which could reduce nutrient bioavailability. These hematological improvements will possibly enhance oxygen-carrying capacity, increase erythropoiesis, better systemic immunity, and reduced oxidative or metabolic stress. Similarly, it resulted in a significant improvements in liver function markers, lipid metabolism, and protein utilization. Reduced levels of total cholesterol, low-density lipoprotein (LDL), and triglycerides coupled with increased high-density lipoprotein (HDL), demonstrate the hypolipidemic potential of oyster mushroom. The ability of mushroom to bring down the cholesterol levels in the experiment could be the reason why it is recommended for human patients with hypercholesterolemia. More so, stable liver enzyme activities (ALT, AST, and ALP) suggest that mushroom inclusion poses no metabolic toxicity and may even enhance hepatic efficiency. The observed increases in total protein, albumin, and globulin will likely improve nutrient utilization. In conclusion, the research demonstrated that oyster mushroom supplementation is beneficial to broiler chickens and should be considered a promising natural feed additive for sustainable poultry production.

4.2 Recommendation

The research demonstrated that oyster mushroom supplementation is beneficial to broiler chickens and should be considered a promising natural feed additive for sustainable poultry production at 1-1.5% inclusion in feed. More so, the stable liver enzyme activities (ALT, AST, and ALP) suggest that mushroom inclusion poses no toxicity and may even enhance hepatic efficiency. It is a potential replacement for sub-therapeutic inclusion of antibiotics in feed for growth promotion purposes in view of the dangers of antimicrobial resistance.

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