

**NSAP****47th Annual Conference**
(JOS 2022)**CONFERENCE PROCEEDINGS**THEME
SECURING ANIMAL
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GLOBAL CHALLENGES**EFFECT OF BRIMSTONE TREE (*Morinda lucida*) LEAF EXTRACT ON HAEMATO-SERUM OF BROILER CHICKENS**

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*Corresponding author's e-mail: adetutuoi@fcaishiagu.edu.ng (08136869695)**ABSTRACT**

The experiment evaluated the effect of *Morinda lucida* leaf extract on haemato-serum of broiler chickens. One hundred grams (100 g) of *Morinda* (*Morinda lucida*) was soaked in non-metallic jar that contained one litter (1 L) of hot boiling water and allowed to cool overnight at room temperature. In this process 10% *Morinda* solution was prepared and properly filtered. Treatment 1 (T1) was the control with synthetic antibiotics, T2, T3, T4 and T5 contained 25%, 50%, 75% and 100% *Morinda lucida* leaf extract concentrations. One hundred and twenty (120) day old broiler chicks (Cobb 500 strain) were used for this trial viz 8 birds per replicates and 24 per treatments. Highest ($P < 0.05$) WBC value (189.00) was recorded from T2, least value from T5 (150.00) while ($P < 0.05$) highest platelets value was recorded from T2 and least value of 24.50 from T5 (100). Highest total protein value of 4.71g/dl was recorded from Control (T1) while least value was recorded from T3 and T4. Albumin, globulin, serum enzymes (Alkaline phosphatase, Serum aspartate aminotransferase and alanine aminotransferase), creatinine and urea values were all significantly ($P > 0.05$) influenced by inclusion levels of *Morinda lucida* leaf extract and were all within the range reported for broiler birds. Highest cholesterol values of 133.83mg/dl were recorded from T4 (75%) while least value was recorded from T3 (50%). The results of this experiment concluded that varied inclusion levels of *Morinda lucida* leaf extract did not have any detrimental effect(s) on haematology and serum biochemistry of broiler chickens when compared to the control groups.

Key words: Brimstone tree, Serum, Haematology, Extract, Broiler.

INTRODUCTION

Poultry health is affected by the surrounding environment infectious pathogens such as bacteria, viruses, parasites, and fungi. Bacteria, viruses, parasites and fungi can easily infect poultry when their immune system is suppressed, which lead to different complicated infections (Paliwal *et al.*, 2011a). Herbal substitute for conventional antibiotics could be used to enhance health status and performance (Single and Gupta 2012). The benefits of herbs raised the hope of using them instead of antibiotics (Panagasa *et al.*, 2007). Herbs were recommended to enhance metabolic processes and the health condition of livestock (Panagasa *et al.*, 2012). Some herbs can support the digestive enzymes action; improve feed intake, feed conversion ratio (FCR) and carcass yields. *Morinda lucida* has beneficial anti-inflammatory and antioxidants properties, it has also been reported to contain vitamins A, E, B2, B5, B6, folic acid and mineral; Ca and Fe (Bello *et al.*, 2009). *Morinda* has strong fungicidal and antimicrobial activities (Adeneye and Agbaje, 2008). It also has an anti-blood cholesterol effect. Yang *et al.* (2006) mentioned that *Morinda lucida* improves FCR and enhance immune response and soluble protein.

MATERIALS AND METHODS

The trial was carried out at the Poultry Unit of the Teaching and Research Farm, Federal College of Agriculture Ishiagu, Ebonyi State. *Morinda lucida* plant used for this experiment was selected based on its ethno-medicinal use. Fresh leaf of *Morinda* was harvested (without stock) from middle aged green trees, washed in running water and then air dried (to prevent bleaching) until crispy and still retaining the greenish tint. The dried leaves were hammer milled into ground form. Aqueous solution was prepared 12 hours before usage. One hundred grams (100g) of *Morinda* was soaked in non-metallic jar that contained one litter of hot boiling water and allowed to cool overnight at room temperature and thereafter properly filtered with cheese cloth to make *Morinda lucida* extract. T1 was the control with synthetic antibiotics (Enrofloxacin 20%), T2 contained 25% aqueous extract and 75% portable water to make 25%



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concentration, T3 contained 50% aqueous extract and 50% water to make 50% concentration, T4 contained 75% aqueous extract and 25% water to make 75% concentration and T5 contained 100% aqueous extract and 0% water to make 100% concentration. Diets were prepared for each growth stages; starter (1 – 28 days) and finisher (29 – 48 days) to meet the nutritional requirements of the birds (Table 1). One hundred and twenty (120) day (post-hatch) old broiler chicks (Cobb500 strain) from a reputable commercial hatchery were used for this trial. The birds were weighed (initial weight) and randomly grouped into five (5) treatments of three (3) replicates with eight (8) birds per replicate to make a total of twenty-four (24) birds per treatment. The extract concentrations and antibiotics were administered only on the same days which was at the first and fourth week respectively. Fresh feed and clean water were offered *ad libitum* to the birds.

Table 1: Composition of experimental broiler diets

Parameters	Starter	Finisher
Maize	48	54
Corn bran	-	11
Soybean	18	15.2
Groundnut cake	16.2	15
Wheat offal	12	-
Fishmeal	2	1
Bone meal	2	2
Oyster shell	1	1
Salt	0.20	0.20
Premix	0.20	0.20
Methionine	0.20	0.20
Lysine	0.20	0.20
Total	100	100
Calculated values (%)		
ME (Kcal/kg)	2844	2964
Crude protein	23.10	20.60
Ether extract	4.03	3.95
Crude fibre	3.98	4.15
Lysine	1.27	1.06
Methionine	0.53	0.49
Calcium	1.16	1.08
Phosphorus	0.64	0.57

ME = Metabolizable energy

At the end of the experiment, blood samples were collected from one bird per replicate for the evaluation of blood parameters. The blood samples for evaluation of haematological parameters were collected into the bottle containing ethylene diamine tetra-acetic acid (EDTA) as anti-coagulants. Parameters evaluated were; Haemoglobin concentration (Hb), Red Blood Cell counts (RBC), White Blood Cell counts (WBC), Packed Cell Volume (PCV), Platelets, Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC). While sample for serum biochemistry were collected into EDTA free tubes and allowed to clot for the separation of the serum from the clot. Total serum protein, serum albumin, globulin concentrations, cholesterol, creatinine, Urea, Alkaline phosphatase (ALP), Serum aspartate amino transferase (AST) and alanine amino transferase (ALT) were analyzed. The experiment was laid down in a Completely Randomized Design (CRD). Data collected were analyzed by One Way Analysis of Variance using SPSS (23) software and means were compared using Duncan's Multiple Range Test of the same package and considered significant when $P < 0.05$.



RESULTS AND DISCUSSION

Morinda lucida leaf extract significantly ($P < 0.05$) influenced the haematological parameters across the treatments (Table 2). Significantly highest red blood cell value of 2.59 was recorded from T2 (25%) while least value was recorded from T5 (100%). Packed cell volume (PCV) values obtained for birds that received T1, T2, T3 and T4 were not significantly ($P > 0.05$) different but higher ($P < 0.05$) than value recorded for T5 (100%). Significant influence of *Morinda lucida* leaf extract was noticed from globulin values across the treatments with the control groups having the highest value (2.96g/dl) while T2 (25%) has 1.18g/dl. Values recorded for white blood cell (WBC) and platelets across the treatments did not follow any definite sequence. However, highest ($P < 0.05$) WBC value (189.00) was recorded from T2 and least value from T5 (150.00) while ($P < 0.05$) highest platelets value was recorded from T2 and least value of 24.50 from T5 (100%). The result recorded from the haematological parameters disagreed with the findings of (George *et al.*, 2015) who had reported that varied and or increased inclusion levels of ginger did not affect haematological parameters; packed cell volume, haemoglobin, white blood cell etc. However, all the haematological parameters recorded from this result fell within the normal range and mean of healthy broiler chickens as reported by Mitruka and Rawnsley, 1977 and Banerjee, 2008. It can therefore be inferred that the haematological indices were within safety limits for broilers in this experiment. These normal haematological values portray the nutritional and good health status of the broiler chicken and thus indicating adequate nourishment and wellbeing of the birds (Church *et al.*, 1984). This also implies that the immune system of the birds was active and was not impaired by the inclusion levels of *Morinda lucida* leaf extract. The result of this experiment agreed with the haemoglobin report of Obikaonu *et al.* (2011) who worked on Neem leaf meal but disagreed with the values recorded for PCV where values lower than the result of this experiment were recorded.

Table 2: Effect of *Morinda Lucida* Leaf Extract on Haematological Parameters of Broiler Chicken

Parameters	T1	T2	T3	T4	T5	SEM
Red Blood Cell ($\times 10^{12}/l$)	2.10 ^{cd}	2.59 ^a	2.31 ^{ab}	2.50 ^{ab}	1.91 ^d	0.05
Packed Cell Volume (%)	38.55 ^a	41.80 ^a	38.50 ^a	40.65 ^a	35.75 ^b	0.75
Haemoglobin (g/dl)	8.80 ^{ab}	9.55 ^a	8.70 ^b	9.35 ^{ab}	7.30 ^c	0.16
White Blood Cell ($\times 10^9/l$)	167.00 ^{ab}	189.00 ^a	187.00 ^a	186.00 ^a	150.00 ^b	3.88
Platelet ($\times 10^9/l$)	40.50 ^{ab}	57.50 ^a	23.00 ^b	34.50 ^b	24.50 ^b	3.23
Mean Corpuscular Volume (fl)	147.35 ^b	153.65 ^a	154.85 ^a	150.45 ^{ab}	150.30 ^{ab}	0.84
Mean Corpuscular Haemoglobin (pg)	32.15 ^b	35.20 ^a	34.15 ^a	34.50 ^a	33.75 ^{ab}	0.28
MCHC (g/l)	231.00 ^a	230.50 ^a	224.00 ^b	232.00 ^a	231.00 ^a	0.65

^{abcd} Means with similar superscripts along the same row are not significantly ($P > 0.05$) different

MCHC = Mean Corpuscular Haemoglobin Concentration

Table 3: Effect of *Morinda lucida* Leaf Extract on Serum Biochemistry of Broiler Chicken

Parameters	T1	T2	T3	T4	T5	SEM
Total Protein (g/dl)	4.71 ^a	3.18 ^c	3.06 ^c	3.06 ^c	3.71 ^b	0.10
Albumin (g/dl)	1.75 ^c	2.00 ^a	1.87 ^b	1.91 ^{ab}	2.00 ^a	0.01
Globulin (g/dl)	2.96 ^a	1.18 ^c	1.19 ^c	1.15 ^c	1.71 ^b	0.11
Serum aspartate aminotransferase (iu/l)	14.50 ^b	22.00 ^a	26.00 ^a	13.50 ^b	22.00 ^a	1.27
Alanine aminotransferase (u/l)	15.50 ^b	14.00 ^c	17.00 ^a	15.50 ^b	14.00 ^c	0.24
Alkaline phosphatase (u/l)	48.05 ^b	44.70 ^c	47.35 ^b	52.30 ^a	48.60 ^b	0.43
Cholesterol (mg/dl)	128.83 ^{ab}	129.56 ^{ab}	125.50 ^b	133.83 ^a	126.05 ^b	1.15
Creatinine (mg/dl)	0.39 ^{bc}	0.48 ^{ab}	0.40 ^{bc}	0.36 ^c	0.54 ^a	0.01
Urea (mg/dl)	7.43 ^b	7.56 ^b	8.48 ^a	7.35 ^b	8.30 ^a	0.13

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Table 3 shows the effect of *Morinda lucida* leaf extract on serum biochemistry of broiler chicken. Highest total protein value of 4.71g/dl was recorded from Control (T1) while least value was recorded from T3 and T4. Albumin, globulin, serum enzymes (Alkaline phosphatase, Serum aspartate amino transferase and alanine amino transferase), creatinine and urea values were all significantly ($P < 0.05$) influenced by inclusion levels of *Morinda lucida* leaf extract. However, the values were all within the range reported for broiler birds. Highest cholesterol values of 133.83mg/dl were recorded from T4 (75%) while least value was recorded from T3 (50%). The result of this experiment corroborates with the report of Obikaonu *et al.* (2011) except for Urea and Creatinine.

CONCLUSION AND RECOMMENDATION

The results of the varying experimental concentrations of *Morinda lucida* leaf extract did not pose any detrimental effect on haematology and serum biochemistry of broiler chickens when compared to the control group. However, birds in T5 that received 100% leaf extract had slightly lowered values of haematological parameters when compared to the other groups that received lower concentration of the extract.

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