International Journal of Innovation Scientific Research and Review
Vol. 06, Issue, 01, pp.5733-5735, January 2024
Available online at http://www.journalijisr.com
SJIF Impact Factor 2023: 6.599

Research Article

ISSN: 2582-6131

HEMATOLOGICAL QUALITY OF BROILER CHICKEN GIVEN ETHANOL EXTRACT OF WILD COLOCYNTH FRUIT (LAGENARIA BREVIFLORA) IN REPLACEMENT FOR ANTIBIOTIC

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Received 13th November 2023; Accepted 14th December 2023; Published online 30th January 2024

ABSTRACT

An Eight-week experiment was conducted to investigate the hematological quality of broiler chicken given ethanol extract of wild colocynth fruit (Lagenaria breviflora) in replacement for antibiotics. Four medication treatments were used in the experiment. (T1), water was used as the negative control, (T2) 2g of synthetic antibiotic(keproceryl), (T3)0.5ml of ethanol extract of wild colocynth fruit, (T4)1ml of ethanol extract of wild colocynth respectively. One hundred- and twenty-day-old (120) broiler chickens (Ross 308 breed) were randomly divided into 4 groups and the groups were allocated into four (4) treatments replicated three times to give ten (10) birds per replicate in a completely randomized design experiment. Data were collected on hematological parameters (PCV, RBC, Hb, MCV, WBC, MCHC and Platelets). Data collected were subjected to Analysis of Variance (ANOVA). Results showed that there were significant differences ($P<0.05$) between WBC and MCHC while other parameters PCV, RBC, HGB, MCV, and platelets were not affected by the treatment effect and MCHC were depressed by the addition of 1ml ethanol extract of wild colocynth into the water, but the values were within the range for the normal bird. It was concluded that ethanol extract of wild colocynth can be used to replace antibiotics as medication for broiler chicken.

Keywords: Wild colocynth, hematology, antibiotics, broiler chicken.

INTRODUCTION

Humans and livestock need antibiotics for cure and prevention of disease, also to help farmed animals thrive. Antibiotics usage is becoming less common and is now banned in many nations to avoid the residues from building up in the edible portion of the meat and being transferred to the final consumers. The emergence of resistant strains of pathogenic organisms, which make existing medicines ineffective against them, is the outcome of the buildup of antibiotics in human food chains. To delay the issue of microbiological resistance to available antibiotics, research efforts have focused on looking for alternatives to synthetic antibiotics in recent years (Stanton, 2013). Ethno-veterinary medicine uses traditional medical knowledge, theory, and practice to prevent, control, and treat animal illnesses. Phyto biotics, or natural growth boosters created from herbs and spices, are plants like Lagenaria breviflora (Robert spotted pumpkin), which have been useful in ethno-veterinary care (rural chicken health management). These plants may be used as an alternative to conventional treatments for poultry health issues. (Ekunseitan *et al.,* 2017). The anti-microbial qualities of wild colocynth (Lageneriabreviflora) make it vital for animal husbandry, but it can also be used to cure human measles (Onasanwo, 2011). According to Oridupa (2011), broiler chicks' defense against illness is enhanced when they utilize wild colocynth. Fruit extract exhibits anti-microbial qualities in a broad-spectrum leaf extract of wild colocynth (Adedapo, 2013). The gourd-bearing plant Lagenaria breviflora originated in tropical Africa, it is known for its antiviral and antibacterial properties, wild colocynth is a phytogenic plant that is widely utilized in West Africa. It flowers in the rainy season and bears fruit in the dry. It is used as a natural remedy by both people and animals. Although its extract has been haphazardly used by rural poultry farmers to cure a range of ailments, no substantial research has established its efficacy or capacity to treat any ailments. Thus, the objective of this study was to evaluate the effect of using ethanolic extract of Lageneriabreviflora (wild colocynth) as an organic antibiotic in a substitute for synthetic antibiotics (keproceryl) on the hematological quality of broiler chicken.

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MATERIALS AND METHODS

Experimental Site

The experiment was conducted at the Poultry Unit of Teaching and Research Farm, Ladoke Akintola University of Technology, Ogbomosho, Oyo State, Nigeria between November, and December 2020.

Source and Processing of the Test Ingredients

Fresh fruits of wild Colocynth (Lagenaria breviflora) were collected from Ladoke Akintola Teaching and Research Farm, Ogbomosho, Oyo state, Nigeria. The synthetic antibiotics that were used (Keproceryl) were purchased from a veterinary shop located in Ogbomosho, Oyo State, Nigeria.

Preparation of Test Ingredient

The fruit of wild colocynth was properly rinsed and chopped with knives into smaller pieces, and sun-dried until moisture content was reduced to about 10%. The dried product was ground into fine powder form and taken to the laboratory for extraction with ethanol at a ratio of 50g: 250ml, stirred, tightly covered, and left for 48 hours. The mixture was sieved with a sieving cloth to collect the filtrate/solvent. The filtrate was poured into a clean conical flask and placed on an electrical heating mantle to make ethanol escape as vapor during boiling and condensed back to liquid in a separate tube. The heating process continued until most of the ethanol used was

recovered from the filtrate. The filtrate was stored in the refrigerator until used.

Feed Formulation

The broiler starter diet was formulated to contain 22.52% crude protein and 2915.48Kcal/kg metabolizable energy while the broiler finisher diet contained19.50% crude protein and 2879.34kcal/kg metabolizable energy. The ingredient composition of the diets is shown in Table 1.

Table 1: Gross Composition of Starter and Finisher Diets

Ingredients (%)	Starter	Finisher
Maize	52.00	52.00
Soya bean meal	9.00	9.00
Wheat offal	8.00	8.50
Groundnut cake	19.50	5.00
Palm kernel cake	4.50	10.00
Blood meal	2.00	2.00
Fish meal	2.00	2.50
Limestone	2.00	2.00
Lysine	0.25	0.25
Salt	0.25	0.25
Methionine	0.25	0.25
Broiler premix	0.25	0.25
Total	100.00	100.00
Calculated Analysis		
ME (Kcal/kg)	2915.48	2879.34
Crude protein (%)	22.52	19.50
Crude fiber (%)	3.71	4.11
Ether extract (%)	4.27	4.00

* premix composition: Vitamin A, 200,000,00IU, Vit, D3, 40,000,00 IU, Vitamin E (Mg) 460, Vitamin K3(kg) 40, Vitamin B1 (Mg) 60, Vitamin B2 (Mg) 120, Niacin (Mg) 1,000, Calcium pantothenate (Mg) 200, Vitamin B6 (Mg) 100, Vitamin B12 (Mg) 05, Folic acid (Mg), 20, Biotin (Mg) 1, Chlorine chloride (Mg) 8,00Antioxidant (Mg) 2,400, Iron (Mg) 2,000, Zinc (Mg) 1,600 Copper (Mg) 170, Iodine (Mg) 30, Cobalt (Mg) 6, Selenium (Mg) 24, Anti-oxidant (Mg) 2,400.

** Calculated value ME = Metabolizable Energy

Experimental birds and management

One hundred and twenty birds (120) were used. Day-old broiler chickens of the Ross 308 breed were obtained from a reputable and reliable commercial hatchery: and were randomly divided into four (4) groups of thirty birds. The four groups were randomly assigned to four medication treatments in a Completely Randomized Design (CRD). Each treatment was divided into 3 replicates consisting of ten (10) birds per replicate. The birds were housed in a deep litter pen of 1×3m and the floor was covered with wood shavings. Brooding temperatures were 32 – 350C, 28 – 310C and 25-270C for the 1st, 2nd, and 3rd weeks, respectively. The study was conducted for 56 days. Treatments used were (i) No Medication/Ordinary Water (ii) Antibiotics/keproceryl(T2) (iii) 0.5ml of extract(T3) (iv) 1ml of extract(T4). Medication treatments were applied five days (5 days) in weeks two, four, six, and seven. Keproceryl was administered at the rate of 2g/4 liters of water as recommended by the manufacturer while 0.5ml and 1ml of each extract was added to 4 liters of the ordinary water.

Data Collection

At the end of the 56 days of the trial, blood samples (5ml/bird) were collected from two birds per replicate by puncturing the brachial vein. Blood samples were collected into tubes containing ethylene diamine tetra-acetate for the determination of hematological indices: Hemoglobin concentration (Hb) was estimated using the cyanmethemoglobin method (Kelly, 1979). The Packed Cell Volume (PCV) was determined using microhematocrit methods described by Dacie and Lewis (1991). Red Blood cell (RBC) and White Bloodcell (WBC) counts were determined using the improved Neubauer hemocytometer method as described by Jain (1986) Differential leucocyte counts (heterophils, lymphocytes, eosinophils, basophils, and monocytes) were conducted on blood smears stained with May-Grunwald–Giemsa stain. MCV was determined using automatic analyzers while MCHC and MCH were determined multichannel analyzers.

Laboratory Analysis

Proximate analysis of the test ingredients (Wild colocynth and experimental diets)was conducted using methods of AOAC (1990).

Data Analysis

All data obtained were subjected to One-way analysis of Variance (ANOVA) using the statistical software of SAS (1990). Where treatment means show significant differences, they were separated using Duncan`s multiple range test option of the same statistical software. Significance was determined at a 5% probability level.

RESULTS

The Hematological parameters of the blood of broiler chicken are given ethanol extract of wild colocynth fruit as shown in Table 2. White Blood Cell (WBC) and Mean Corpuscular Hemoglobin Count (MCHC) were however significantly affected by the treatment. The WBC and MCHC of birds given water, antibiotics, and 0.5ml of ethanol extract were similar but the group that was given 1ml had lower($P<0.05$) values compared to other treatments. No significant effect of the medication treatment was observed on Packed Cell Volume (PCV), Red Blood Cell (RBC), Hemoglobin (Hb), Mean Corpuscular Volume (MCV), and Platelets.

Table 2: Hematological parameter of Broiler Chicken given Ethanol extract of Wild Colocynth in replacement for antibiotic (keoproceryl)

Parameters	Ordinary Water(T1)	Keproceryl (T2)	0.5ml Extract (T3)	1ml Extract (T4)	SEM	P-value
PCV (%)	25.87	24.15	24.53	28.87	1.41	0.69
WBC($x10^3/mm^3$)	219.30^a	208.75^{ab}	215.50^{ab}	207.75^b	1.96	0.03
RBC ($10^6/mm^3$)	1.96	1.61	1.77	1.93	0.11	0.71
HGB(g/dl)	10.00	9.10	8.63	9.00	0.38	0.68
MCV (fl)	135.00	150.10	139.97	149.20	3.02	0.21
MCH (pg)	52.50	56.75	49.77	46.47	1.75	0.22
MCHC(g/dl)	39.50^a	37.85^{ab}	35.63^{ab}	31.30^b	1.31	0.04
PLATELET (ul)	130.67	129.00	113.33	126.33l	3.56	0.33

ab Means bearing different superscripts along the same row are significantly different($P<0.05$).
RBC = Red blood cell; WBC = White blood cell; PCV = Packed cell volume; HGB =Hemoglobin; MCV = Mean Corpuscular Volume; MCHC = Mean Corpuscular Hemoglobin Concentration.

DISCUSSION

The PCV, RBC, HGB, and MCH in this experiment were similar which shows that the treatment does not have any effects on these parameters is an indication that the oxygen capacity of the animal's blood would not be affected by these treatments. The Major function of RBC is to transport hemoglobin, which in turn carries oxygen from the lungs to the tissues (Waugh *et al.,* 2001). Observation from this research shows there was a significant reduction in WBC of broiler chicken given 1ml of ethanol extract of broiler chicken(T4) and the highest was recorded in those given water(T1). The reduction in the WBC could predispose the animals to reduced immunological responses to infections. This is because the main function of WBC is to combat and prevent infection. A high WBC means that the body is fighting an infection. A very low WBC can be caused by problems with the bone marrow. This condition, called cytopenia or leucopenia, means that the body is less able to fight off infections, (Robert,1976). It had been reported that a significant decrease in the WBC of the blood indicates a decrease in the production of defensive mechanisms to combat infections, a situation which will make animals not build immunity to various physiological stresses resulting in diseases. This shows that birds in T4 do not have any infections to fight with. This may be due to the ethanol extract of wild colocynth fruit given. Observation from this study shows that the Mean Corpuscular Hemoglobin Concentration (MCHC) was significantly reduced in T4 and was high in T1. Although the MCHC was low compared to that of T1, it's between the normal range for a Ross 308 broiler chicken which is 21.48-34.84. The hematological parameters of the present findings corroborate the findings of Ekunsetan *et al.,* (2017) who reported that the PCV, Hemoglobin (Hb), and RBC is not significantly different. However, the PCV and HB in this study were within the range by Jain (1993) whose values were 22-35% for PCV and 7-13% for Hemoglobin (Hb) for birds. Furthermore, there was no significant difference between the platelets which shows that the platelets were unaffected by the treatments, however, the platelets were within range for a normal chicken.

CONCLUSION

It can be concluded from the study that oral administration using 0.5 ml and 1 ml of ethanol extract of Lagenaria breviflora fruits in 4 liters of water in replacement of synthetic antibiotics had no deleterious effect on RBC, PCV, HB, MCV, MCHC, and platelets. Though WBC and MCHC were depressed. They were within range for the birds, which suggests that this extract can be used to replace antibiotics for broiler chicken.

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