

EFFECT OF *Calopogonium mucunoides* LEAF MEAL ON THE HAEMATOLOGICAL INDICES OF BROILER CHICKEN

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ABSTRACT

A feeding trial was conducted to ascertain the effect of dietary inclusion of *Calopogonium mucunoides* leaf meal on the haematological profile of broiler chicken. A total of sixty (60) broiler birds of 3 weeks old were used for the experiment. Four diets which contained 0.0, 0.2, 0.4 and 0.6 % levels of the forage meal were formulated. The trial was in a completely randomized design of four treatments replicated into three with 5 birds per replicate. At the end of the feeding trial, three birds were randomly selected from each treatment and blood sample collected through the wing vein using a sterile and syringe into a sterile bottle that contains di amine tetraacetic acid (ETDA). The collected blood sample was taken to haematology laboratory for analysis. Results obtained showed no significant ($P > 0.05$) difference among haematological parameters such as Hemoglobin, white blood cell, Red blood cells, Packed Cell Volume, Mean Corpuscular Volume, Mean Corpuscular Hemoglobin, Mean Corpuscular Hemoglobin Concentration, Neutrophil, Eosinophil across all dietary treatment group, while significant ($P < 0.05$) difference were observed in Lymphocyte and Monocytes in favour of birds fed on *Calopogonium mucunoides* Forage meal diets. It is recommended that inclusion of *C. mucunoides* leave meal at the range of 0.4 – 0.6% can improve haematological profile of broiler chicken.

Keywords: *Calopogonium mucunoides*, Leaf meal, Broiler chicken, Inclusion levels, Haematology

INTRODUCTION

The importance of green forage in the diets of monogastric farm animals cannot be overemphasized due to its significance in the digestion of most nutrients in their gastro intestinal tracts (GIT) (Dung *et al.*, 2000). Dietary fibre in forages is essentially important because it helps in maintaining mucosa functionality and serves as substrates for microbiota (Luefahre *et al.*, 2004). Nitrogen intake during feeding in poultry has been reported to be influenced by forage type, but was lowest for the basal diet, but nitrogen retention and nitrogen retained as a proportion of nitrogen intake were higher in forage legume when compared to the basal diets (Ogle, 2006). *Calopogonium mucunoides* plant is originally being used to check erosion, reduce soil temperature, improve soil fertility and weed control (Heuze *et al.*, 2016), like many other legume forages, the nurtured value of *Calopogonium mucunoides* lies on its protein content (Evitayani *et al.*, 2004). It has been observed to contain some phytochemicals such as Alkanoides, Tanins, Saponin, Cardiac glycosides and Flavonoides which has ethnomedical uses in the treatment of diarrhea and other health challenges (Omotaya 2012 and Uzegbu 2024). However, the high demand for animal protein in Africa and beyond continues to increase due to the rise in population and the major constraint in a successful production of animal protein has been high cost of feed which is over 70% of total cost of production (Sanwo *et al.*, 2006), farmers can leverage on the potentials of *Calopogonium mucunoides* due to its rich in essential amino acids, mineral and vitamins which the body requires to achieve their goal in meeting the fast-growing demand of poultry products. This study therefore, is aimed at investigating effect of *Calopogonium mucunoides* on the haematological profile of broiler chicken at the finisher phase.

MATERIALS AND METHODS

Experimental location

The experiment was conducted at the Teaching and Research Farm of Department of Animal Science and Fisheries, Abia State University Umuahia Campus. The area is located in the rain forest zone on latitude 05° 27' North and longitude 07° 52' East with an attitude of 122 meters above sea level with average rainfall of 2,177mm and relative humidity of about 50-90% (NRCRI, 2006).

Procurement and processing of experimental materials

The forage for the study was obtained from the university environment, dried at room temperature, with constant turning to avert fungi growth. After drying, the leaves were milled and incorporated into the broiler ration at different proportion in the mixture at 0.0, 0.2, 0.4 and 0.6% in diets T₁, T₂, T₃ and T₄ respectively as shown in table 1.

Experimental design and management of birds

The experiment was carried out on completely randomized design (CRD) with 60-three weeks old broiler chicks. There were four dietary treatments (T₁, T₂, T₃, and T₄) each having 15 birds per treatment, and each treatment replicated three times with 5 birds per replicates.

A week before the arrival of the birds, the poultry house was washed, disinfected, fumigated and allowed to dry, then the floor was covered with litter materials made of dry wood shaving. On arrival, the birds were given anti-stress medication to enable them recover from shock they may have passed through during transportation. Feed and water were offered *ad libitum* throughout the experimental period which lasted for 35 days.

Table 1: Composition of experimental diets

Ingredients	T ₁	T ₂	T ₃	T ₄
Maize	50	50	50	50
Soyabean	19.3	19.3	19.3	19.3
Wheat offal	20	19.8	19.6	19.4
CMLM	0.00	0.2	0.4	0.6
Fish meal	7.0	7.0	7.0	7.0
Bone meal	3.0	3.0	3.0	3.0
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
*Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated analysis				
Ingredients				
Crude protein %	20.30	20.27	20.24	20.21
Ether extract	5.50	5.30	5.20	5.10
Crude fibre	4.7	5.0	5.2	5.10
Calcium	1.30	1.20	1.20	1.20
Phosphorus	0.6	0.5	0.65	0.65
Metalolizable Energy (kcal/kg)	2634.46	2631.95	2629.44	2625.7

T₁ = 0%, T₂ = 0.2% T₃ = 0.4% T₄ = 0.6%

*Premix provides per kg diet; vit. A 10000iu, vit. D31500iu, vit.E 4.8iu, vit. K 2.86iu, riboflavin 3mg, panthionate 6mg, niacin 15mg, choline 3mg, vit. B12 0.08mg, folic acid 4mg, Mn64mg, Zn 0.5, iodine 1.0mg cobalt 125mg cu 10mg Fe 20mg flavomycin, 5mg, DL-methionine 50mg Se 0.16mg L-Lysine120mg and BHT5mg.

Collection of data for haematological profile

At the end of the feeding trial experiment, three birds each were randomly selected from each treatment and blood samples were collected from wing vein, using sterile needle and syringe into a well sterilized bottle that contains diaminetetraacetic acid (ETDA). The collected blood sample was taken to laboratory for haematological profile analysis to evaluate the packed cell volume (PCV), Red Blood Cell (RBC), Haemoglobin concentration (Hb), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular volume (MCV), mean haemoglobin concentration (MHC) according to Jain (1986), while neutrophil, monocytes, Eosinophil and Lymphocytes are determined by chilling method of leucocyte count (Mitruka and Rawnsley, 1977).

Data Analysis

Data collected were subjected to Analysis of Variance (ANOVA). Where significant effect was observed from analysis of variance, treatment means were compared using Duncan's Multiple Range Test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The effect of supplementing *Calopogonium mucunoides* leaf meal on finisher broiler chicken is shown in Table 2. Observations showed that varying inclusion levels of *Calopogonium mucunoides* leaf meal did not significantly ($P > 0.05$) affect Hb, PCV, RBC, WBC, MCV, MCH, MCHC, Neutrophils and Eosinophils across all dietary treatment groups, and are within the normal range for a healthy physiological responsiveness of broiler chicken to its internal and external environment (Banerjee *et al.*, 2002). According to Nse *et al.* (2014), a decrease in the quantity of RBC and Hb are indication of poor nutrition especially dietary deficiencies of iron, copper, vitamins and minerals. The similarity of the values of these parameters with that of the control diet (0% CMLM) reflects adequacy of the nutrients in the diet and the effectiveness of the processing method in improving the utilization of CMLM by the chicken. There are significant ($P < 0.05$) differences in monocytes and lymphocytes, an indication that treatments that contain CMLM have higher values. This therefore, implies that animals fed with the material will have a greater chance to fight against foreign invaders as well as the destruction of germs.

Table 2: Haematological Profiles of Broiler Finisher fed Diets Containing Varying Levels of CMLM.

Parameters	Treatments				SEM
	T ₁	T ₂	T ₃	T ₄	
Hb (g/dl)	13.10	12.30	13.40	13.70	0.19
PCV (%)	26.50	24.00	27.50	28.00	0.56
WBC(10 ⁹ /ml)	18.90	20.03	20.13	20.53	0.31
RBC ()	3.00	2.73	3.14	3.22	0.67
MCV (%)	88.34	88.35	88.23	87.80	0.17
MCH (%)	43.68	45.15	42.72	42.66	0.35
MCHC (%)	49.44	51.29	48.79	48.95	0.36
Lymphocyte (%)	56.50 ^b	56.00 ^b	57.50 ^{ab}	59.00 ^a	0.45
Neutrophils (%)	35.00	35.00	35.00	32.00	0.46
Monocyte (%)	5.00 ^c	6.50 ^a	5.50 ^{bc}	6.00 ^{ab}	0.19
Eosinophil (%)	3.5	2.00	2.00	3.00	0.27

^{abc} Means on the same row with different superscript are statically different (p<0.05)

SEM: Standard error of the mean

CONCLUSION AND RECOMMENDATION

This study shows that dietary inclusion of *Colopogonium mucnoides* Leaf meal in the diet of broiler ration does not have any deleterious effect on the haematological profile of broiler chicken and therefore is encouraged to be included in broilers ration.

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