EFFECT OF VARYING LEVELS OF CASHEW LEAF MEAL (ANACARDIUM OCCIDENTALE) ON THE HAEMATOLOGICAL INDICES OF BROILER CHICKEN

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ABSTRACT

The low nutrient utilization which is combatant to soaring cost of raising poultry has made the animal nutritionist to explore avenues to use natural feed additives to maximize the utilization of nutrients in the available feed for cost reduction. Some of these natural feed additives may impact negatively on blood parameters of broilers thereby negating their use. This study was therefore undertaken to evaluate the dietary supplementation of cashew leaf Anarcadium occidentale meal (CLM) on haematological indices of finisher broiler chicken. One hundred and twenty Anak-2000 breed of finisher broilers were distributed randomly in a completely randomized design (CRD) of four treatments replicated three times. The experimental diets consist of CLM added at levels of 0%, 1.5%, 2.5% and 3.5% in treatment 1 (control), 2, 3 and 4 respectively. The diets were fed for 28 days after which blood samples were collected for haematological analysis. The result showed a progressive significantly ($p<0.05$) increase in red blood cell (RBC), packed cell volume (PCV), Haemoglobin (Hb), and white blood cell (WBC) as the inclusion level of CLM increased. The mean cell haemoglobin (MCH), mean cell haemoglobin concentration (MCHC) and neutrophils, lymphocytes, platelets, and mean cell value (MCV) ($p>0.05$) reduced in diets 2, 3, and 4 compared to the control. It was concluded that CLM up to 3.5% inclusion has the potential to impact positively on haematological parameters of finisher broiler chicken and therefore should be included in the formulation of finisher broilers diets at up to 3.5%.

Keywords: **Blood, cashew leaf meal, diet, haematology**

INTRODUCTION

The demand for broiler chickens is relatively high because the meat is safe and tender, the body size is large, the chest shape is wide, dense and filled, the efficiency of the feed is relatively high and the body weight gain is very fast (Juniarti and Ngitung, 2019). Poultry industry however, has been unable to meet up with these demand due to numerous challenges facing it, prominent among which is low nutrient utilization of the limited feed ingredients leading to high production cost. Various attempts are continuously being carried out to improve the utilization of the existing feed ingredients. One of them is the use of antibiotics as feed additive in commercial broiler diets (Murwani and Bayuardhi, 2007). Presently there is growing concern on the use of antibiotics as feed additives (Gadde *et al*., 2017) and a great quest for poultry product raised without antibiotics.

Variety of plants has shown to have great beneficial potentials to serve as alternatives to antibiotics (Lillehoj *et al*., 2018). One of these plants is cashew *Anarcadium occidentale* (Sinlapapanya et al., 2022). Cashew leaves have a high concentration of important polyphenolic compounds and other beneficial secondary metabolites with antimicrobial, antioxidant, anti-inflammatory and anti-diarrheal activities (Sunetiram, 2019). Cashews have a total carbohydrate of 30g out of which there are a 3.3g of dietary fiber and 6g of sugar. It has 18g of protein and 3% of the recommended daily intake of calcium, 37% of iron, 20% of vitamin B6, 73% of magnesium and 0% of vitamin A, C,D and B12 (Oliveira, 2015). Although the beneficial effects of many of these plants have been well demonstrated, there is a lack of information on their mechanism of action, efficacy, advantages and disadvantages of

their applications in the field (Lillehoj *et al*., 2018). There is also a general belief that their actions may be location specific. Valuable information can be obtained from the study of blood parameters of an animal as blood serves as an important index in monitoring feed toxicity as well as the health status of farm animals (Etim *et al.*, 2014).

This research therefore explored the effect of varying dietary inclusion of cashew leaf meal on the haematological indices of finisher broiler chickens.

MATERIALS AND METHODS

The research was conducted at the Teaching and Research Farm, Department of Animal Health and Production Technology, Akanu Ibiam Federal Polytechnic, Unwana, Afikpo, Ebonyi State. Unwana is in the tropical rain forest zone of Nigeria. The climate data showed that Unwana is within latitude of $5^{0}53^{1}35^{11}$N and longitude $7^{0}56^{1}14^{11}$E, with a temperature of 33^{0}C (Meteologix, 2023).

Collection and preparation of the cashew leaf

Mature and greenish cashew leaves were harvested from cashew tree located within the farm premises. The leaves were air dried under room temperature till they were crispy and malleable, milled in a hammer mill to obtain the cashew leaf meal (CLM), sample of which was analyzed for chemical composition according to AOAC (2016) and then used to formulate the experimental diets.

Experimental Birds and Design

The total of 120 Anak 2000 breeds of finisher broiler of 28 days post hatch with average weight of 1237.5g was used for the research. The broilers were randomly assigned to four (4) treatment group in a complete randomized design (CRD). Each treatment group was replicated 3 times to obtain a total of 12 groups of 10 broilers each. The groups were B_1 which is the control group, B_2, B_3 and B_4. The groups were assigned to an experimental unit of 1m by 1m each partitioning and raised in a deep liter system. Feed and water were given *ad-libitum* and proper biosecurity measures were strictly followed. The feeding trail lasted for 28 days.

Experimental Diets

Four experimental diets were formulated for this research. Diet B_1 was the control which contained 0% CLM, diets B_2, B_3 and B_4 contained CLM at 1.5%, 2.5% and 3.5% inclusion rates respectively. The percentage ingredient and the calculated nutrient composition of the experimental diets are shown in the Table 1.

Table.1 Ingredients and Calculated Nutrient Composition of the Experimental Diets

Ingredients	**Dietary levels (%)**			
	T_1 (0CLM)	**T_2(1.5 CLM)**	**T_3 (2.5CLM)**	**T_4 (3.5 CLM)**
Maize (yellow 9% CP)	54.00	54.00	54.00	54.00
Cashew leaf meal (14.54%CP)	0.00	1.50	2.50	3.50
Full fat SBM (38% CP)	15.00	13.50	12.50	11.50
Groundnut cake (45% CP)	12.00	12.00	12.00	12.00
Palm kernel cake (18%)	10.00	10.00	10.00	10.00
Fish meal (65%)	4.00	4.00	4.00	4.00
Lime stones	1.00	1.00	1.00	1.00
Bone meal	3.00	3.00	3.00	3.00
L-lysine	0.25	0.25	0.25	0.25
Di melthionine	0.25	0.25	0.25	0.25
**Vitamin & Min premix	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**
Calculated nutrient composition of the diets				
Crude Protein (%)	20.36	20.01	19.77	19.54
Crude fibre (%)	4.06	4.01	3.97	3.94
Calcium (%)	1.70	1.69	1.69	1.69
Crude fat (%)	4.80	4.81	4.83	4.83
*Metabolizable energy (kcal/kg)	3093.26	3084.99	3079.48	3073.97

**To provide the following per kilogram of feed; vit A 10,000IU; vit. D3 1,500 IU; vit. E 2 mg; riboflavin 3 mg; pantothenic acid 10 mg; actinic acid, 2.5 mg; choline 3.5 mg; folic acid 1 mg; magnesium 56 mg; lysine 1 mg; iron 20 mg; zinc 50 mg; cobalt 1.25 mg. * M.E of Cashew leaf meal was calculated according to (Paunzega, 2007) ME = 35 × % CP + 81.8 × % E.E + 35.5 × % NFE, where, M.E = metabolizable energy, CP = crude protein, EE = ether extract, NFE = nitrogen free extract.

Data collection

At the end of the 28-day feeding period, two birds were randomly selected per replicate for blood collection (a total of 24 samples were collected). The blood samples were collected from the wing vein using a new needle and syringe of about 5mls size into a labeled sample bottle treated with Ethylene diamine tetra-acetic acid (EDTA) anticoagulant. The samples were analyzed using Sysmex 784 Auto analyser.

Data Analysis

Data collected were subjected to analysis of variance (ANOVA) and where significant differences between means were obtained, such means were separated using Duncan's New Multiple Range Test (DNMRT) as recommended by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The result of the proximate composition of the CLM as presented in table 2 showed that the crude protein value was close to the value reported by Oloruntola (2021) who reported the following as the proximate composition of the cashew leaf meal: Nitrogen free extract (49.58 %), crude fibre (16.95 %), crude protein (14.65 %), crude fat (10.81 %), and ash (3.70 %).

Table 2. Proximate composition of Cashew Leaf Meal

Nutrients	Composition (%DM)
Moisture Content	7.40
Crude protein	14.53
Fat	4.62
Ash	3.77
Crude fibre	3.06
Carbohydrate	66.48

Source: Field report of Ikpe et al, 2023

Haematological Indices of Finisher Broilers fed Cashew Leaf Meal

The result of the haematological indices of the finisher broiler chickens as presented in Table 3 showed a progressive significant ($p<0.05$) increase in RBC, PCV, HB and WBC as the inclusion rate of CLM increased. The diets did not have any significant ($p>0.05$) effect on neutrophils, lymphocytes. Eosinophil, basophil, platelet and mean cell volume (MCV) but the mean cell haemoglobin (MCH) and mean cell haemoglobin concentration (MCHC) of the broilers in B_1 were significantly higher ($P<0.05$) than B_3 and B_4. Despite the variations obtained from some of the parameters, the values were within the range reported by Onunkwo *et al.* (2018).

Table 2. Haematological indices of finisher broilers fed graded levels of cashew leaf meal

Parameters	Treatment levels (%)				SEM
	T_1(0.00CLM)	T_2(1.50CLM)	T_3(2.50CLM)	T_4(3.50CLM)	
RBC ($X10^6/mm^3$)	3.50^d	3.72^c	4.03^b	4.19^a	0.06
PCV (%)	29.33^d	31.67^c	33.33^b	36.00^a	0.71
Hb (g/dL)	11.47^d	12.23^c	12.73^b	13.33^a	0.20
WBC ($X10^3/mm^3$)	19.03^d	20.36^c	20.25^{bc}	21.84^a	0.54
WBC differentials (%):					
Neutrophils	37.67	37.33	38.33	39.00	1.22
Lymphocytes	56.67	56.67	56.67	55.00	1.16
Monocytes	3.67	3.67	3.00	3.33	0.41
Eosinophil	2.00	2.33	2.00	2.67	0.33
Basophils	0.00	0.00	0.00	0.00	
Platelet ($X10^3/mm^3$)	245.00	248.33	243.33	245.67	5.66
MCV (pg)	83.71	85.22	82.65	85.98	1.35
MCH (fl)	32.74^a	32.90^a	31.57^b	31.61^b	0.34
MCHC (g/dL)	39.10^a	38.63^a	38.20^b	36.76^b	0.56

Note: Without superscript = not significant. Means on the same row with different super script differ significantly ($p<0.05$). SEM = Standard Error Means. RBC = Red Blood Cell, PCV = Packed Cell Volume, Hb = Hemoglobin, WBC = White Blood Cell, MCV = Mean Cell Volume, MCH = Mean Cell Hemoglobin, MCHC = Mean Cell Hemoglobin Concentration

CONCLUSION

The findings from the present research showed that inclusion of cashew leaf meal at up to 3.5% improved the haematological indices of broiler chicken and therefore could be incorporated into the diet of broiler chickens

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