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HAEMATOLOGICAL RESPONSE OF BROILER CHICKENS FED VARYING DIETARY LEVELS OF PAWPAP (*Carica papaya*) LEAF MEAL

Okpe, A. A.* and Ibrahim, S. V.

Department of Animal Production, Kogi State University, Anyigba, Nigeria.

*Author for Correspondence: amelfaokpe@yahoo.com.hk

This study was conducted to examine the haematological response of broiler chickens fed diets mixed with Pawpaw leaf meal (PLM). Ninety six day old broiler chicks were divided into four treatment with three replicates, each of eight birds in a completely randomized design. Treatment 1 was control, treatments 2, 3 and 4 were fed diets mixed with Pawpaw leaf meal at levels 3g/kg, 5g/kg and 7g/kg of feed respectively. Among the haematological parameters evaluated, Pack cell volume (PCV), Red blood cell (RBC) and Mean corpuscular volume (MCV) were significantly ($P < 0.05$) affected by the inclusion of PLM. Mean corpuscular haemoglobin concentration (MCHC), Haemoglobin (Hb), White blood cell (WBC), Mean corpuscular haemoglobin (MCH), Lymphocytes, Neutrophils, Eosinophils, Monocytes, were not significantly ($P > 0.05$) affected by treatments. It was concluded that Pawpaw leaf meal could be added to boiler bird's diet up to 7g/kg of feed as it shows beneficial effects on the blood profile of the birds.

key words: haematology, chickens, pawpaw, haemoglobin, lymphocytes, neutrophils

Introduction

Poultry production in Nigeria has been challenged with several problems, among which high cost of feed is most prominent (Alagbe, 2017). In the bid to ameliorate this protein intake deficiency and reduce cost of production, poultry farmers have been compelled to seek for cost-friendly feed alternatives. Attention has been given to some tropical fruits that are of economic importance among which pawpaw (*Carica papaya*) is inclusive. Pawpaw is native to the tropics of America but is widely spread throughout Africa. Pawpaw fruit has juicy taste, rich in antioxidants, folate, pantothenic acids and minerals such as potassium and magnesium, the fruit is also a good source of fibre all these are reported to promote the function of cardiovascular system and provide protection against colon cancer (Fischer, 1998). Pawpaw leaf meal could be a good protein source because of its amino acid profile. Adeola and Olukosi (2008) stated that in order to fully understand the possible impact of the use of unconventional feedstuffs, there may be need for additional studies on the haematology, growth performance, carcass composition and nutrient utilization of the feedstuff incorporated. The purpose of investigating the blood composition is to be able to distinguish the normal state of the bird from the state of stress (Olajide and Akinsoyinu, 2015).

Considerable investigations have been made on other unconventional feedstuff like brewers dried grain, cowpea leaves, Moringa leaf meal etc., but little is known about the suitability of pawpaw leaf in poultry production. This investigation is driven to investigate the potential of PLM as poultry feed additive. The objective of the study is to determine the haematological response of broiler chickens fed varying dietary levels of pawpaw leaf meal.

Materials and Methods

This experiment was carried out at the poultry unit of Kogi State University Livestock Teaching and Research farm, Anyigba, Kogi State. The pawpaw leaves (*Carica papaya*) used for this experiment were harvested from the pawpaw trees around the School farm. The leaves were harvested, washed and dried under shade for 10 days until it became crispy while still retaining its greenish coloration. The dried leaves were ground to produce pawpaw leaf meal (PLM).

A total of ninety six day-old broiler birds were used for the study. The birds were brooded together for a period of three weeks using commercial feed. At the end of the third week, the birds were weighed and



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randomly allotted to four dietary treatment groups. The treatments contained 0g, 3g, 5g and 7g PLM per kg of feed in treatments 1, 2, 3 and 4 respectively in a Completely Randomized Design. Each treatment was replicated three times. There were eight birds per replicate. The feeding trial lasted five weeks. Feed and water were served *ad-libitum*. Routine management practices adequate for broilers at this phase of growth were strictly adhered to.

Haematological Determination

At the end of the eight (8th) week, six birds from each treatment (two per replicate) were randomly selected and blood samples collected from their wing veins with sterile needles into Ethylene-diamine-tetracetic acid (EDTA) coated bottles. Samples were immediately taken to the laboratory for analysis in the Biochemistry laboratory of Kogi State University, Anyigba. The blood samples collected were subjected to laboratory analysis using the method described by Baker and Silvertown (1985).

Table 1: Proximate composition of the commercial feed (%)

Nutrient	Feed
Moisture	15.55
Crude Protein	17.41
Crude Fibre	6.90
Ash Content	5.50
Ether Extract	7.65
Nitrogen Free Extract	46.99

Standard methods of AOAC (2005) were used to determine the proximate composition

Table 2. Proximate composition of PLM (%)

Nutrient	PLM
Moisture	14.19
Crude Protein	27.58
Crude Fibre	13.15
Ash Content	10.25
Ether Extract	8.32
Nitrogen Free Extract	26.51

Standard methods of AOAC (2005) were used to determine the proximate compositions.

Data obtained on all parameters were subjected to one-way analysis of variance (ANOVA) using the Statistical Package for the Social Sciences (SPSS) version 20. Least significant difference (LSD) was used to separate significant treatment means at 5% level of significance.

Results and Discussion

The haematological response of broilers fed varying dietary levels of pawpaw leaf meal is presented in Table 3. The PCV value of 31.83-36.37% obtained is higher than 26.9-27.4% reported by Fasuyi and Nonyerem (2007) and lower than 28.0-41.5% recorded by Nworgu and Fasogbon (2007) for broiler birds. Hb value of 10.5-11.64 obtained compares favourably with 6.0-13 value reported by Iheukwumere *et al.* (2002). Haemoglobin (Hb), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC) were not significantly ($P>0.05$) affected by treatments. However all the values fall within the range reported by Kecici and Col (2011) and Abdi-Hachesoo *et al.* (2011) for healthy chickens. According to Togun *et al.* (2007) physiological and nutritional status of animals



could cause differences in haematological parameters. White blood cells (WBC), lymphocytes, neutrophils, monocytes and eosinophils were not significantly ($P>0.05$) influenced by treatments but fall within the normal range reported by Albokhadaim (2012) for the haematological values of healthy chickens. The values for monocytes and eosinophils were constant across treatments. The inclusion of PLM in the diet of broilers tended to improve their haematological competence especially at T3 (5g/kg of feed) and T4 (7g/kg of feed). Kecceci *et al.* (1998) stated that haematological values are indirect pointers to the health of livestock and are influenced by several factors including diets (Talebi *et al.*, 2005).

Table 3: Haematological response of broiler chickens fed varying dietary levels of PLM

Parameters	T1 (0)	T2 (3)	T3 (5)	T4 (7)	SEM	LOS
PCV (%)	34.33 ^b	31.83 ^c	36.07 ^a	36.37 ^a	0.62	*
HB (g/dL)	11.27	10.5	11.42	11.64	0.37	NS
WBC ($\times 10^3/\text{mm}^3$)	227.15	227.60	230.03	236.10	4.18	NS
RBC ($\times 10^6/\text{mm}^3$)	2.59 ^b	2.58 ^b	2.68 ^a	2.73 ^a	0.51	*
MCV (fl)	127.13 ^b	126.37 ^b	131.96 ^a	135.74 ^a	4.0	*
MC (pg)	42.07	41.55	41.77	43.43	1.5	NS
MCHC (%)	32.80	32.85	31.65	32.14	0.54	NS
Lymphocytes (%)	96.5	96.17	96.67	96.50	0.72	NS
Neutrophils (%)	3.17	3.50	31.7	3.17	0.5	NS
Monocytes	0.00	0.00	0.00	0.00	0.00	NS
Basophils	0.00	0.00	0.00	0.00	0.00	NS
Eosinophils	0.00	0.00	0.00	0.00	0.00	NS

a, b, c= Means in the same row with different superscripts are significantly different ($p<0.05$), SEM= Standard error of means, LOS= Level of significance, PCV= Packed cell volume; HB= Haemoglobin; WBC= White blood cell; RBC= Red blood cell; MCV= Mean corpuscular volume; MCH= Mean corpuscular Haemoglobin; MCHC= Mean corpuscular haemoglobin concentration.

Conclusions and Recommendations

Conclusions

From the data obtained from this experiment, it is evident that the inclusion of PLM to poultry diet improved the haematological parameters of the chickens. The potentiality of PLM in poultry production is revealed as birds fed 5gpplm/kg and 7gpplm/kg of diet respectively performed better than the control.

Recommendation

From the result obtained, it may be recommended that pawpaw leaf meal be incorporated into broiler feed at 7g/kg to improve their performance and increase profitability

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