

HAEMATOLOGICAL PARAMETERS OF BROILER BIRDS FED GRADED LEVELS OF MORINGA (*Moringa oleifera*) LEAF MEAL

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ABSTRACT

This study was conducted to investigate the effects of graded levels of moringa leaf meal on the haematological profile of starter broiler birds. A total of one hundred and forty four, one week old broilers were randomly allotted to four treatment diets (D_1, D_2, D_3 & D_4) which contained 0 g, 250 g, 500 g and 750 g levels of moringa leaf meal respectively in completely randomized design. The haematological parameters were assessed at the end of five week feeding trial. Results showed that the trial did not significantly ($P > 0.05$) affect the haematological parameters studied except for MCV, MCH and lymphocytes that were significantly ($P < 0.05$) affected. It was therefore concluded that inclusion of moringa leaf in the diet of starter broiler birds does not have adverse effect on the health status of the birds.

INTRODUCTION

In Nigeria like any other developing countries commercial broiler production is expanding on daily basis. However, high cost of feed especially conventional feed ingredients like maize, soya bean meal and groundnut cake created by the scarcity of these ingredients due to competition between human, industry and livestock for these feed ingredients is a major factor affecting net returns from broiler production. This is because cost of feed constitutes about 70 % of production costs (Metayoba *et al.*, 2011). This has forced animal nutritionists to explore the incorporation of non - conventional feed ingredients such as tree leaf meal in the diets of livestock especially the non-ruminant animals. Economization of feed cost using cheaper and non-conventional feed resources is an important aspect of commercial livestock production. *Moringa oleifera* leaf meal is one of the non-conventional feed ingredients that can be incorporated into livestock diets as a source of protein. Kakengi *et al.* (2003) reported that *Moringa oleifera* leaf meal contains 80 % dry matter, 29.7 % crude protein, 22.5 % crude fibre, 4.38 % Calcium, 0.26 % Phosphorus and negligible amount of tannin. *Moringa oleifera* is also reputed to have many medicinal properties (Matthew *et al.* 2001) such as possession of hypocholesterolemic properties and impaction of carotenoid compound into the poultry muscle (Olugbemi *et al.*, 2010a). However there are little or no information on the effects of *Moringa oleifera* leaf on the blood profile. This study therefore was carried out to investigate the effects of *Moringa oleifera* leaf

meal on haematological parameters of starter broiler birds

MATERIALS AND METHODS

Location of the Study

The study was carried out at the Poultry Unit of the Teaching and Research Farm, Federal College of Forestry Mechanization, Afaka, Kaduna, Nigeria. The birds used for the study were purchased from Courage hatchery in Ibadan. The feed ingredients were purchased from Central Market Kaduna, Nigeria.

Management of the Experimental Birds

One hundred and forty four (144), one week old birds were used for the study, which lasted for five weeks. The birds were checked for deformity or any sign of ailment before brought in for the study. The birds were randomly allotted to four experimental treatments with three replicates per treatment, with each replicate having twelve birds. The experimental diets contained 0 g, 250g, 500g and 750g of *Moringa oleifera* leaf meal per 100kg of feed for treatments 1 (D_1), 2(D_2), 3 (D_3) and 4 (D_4) respectively as shown in Table 1. Fresh feeds and clean, cool water were served for the birds *ad libitum* throughout the period of the experiment. The birds were raised on a deep litter system.

Blood Collection and Analysis

On the 35th day of the study, two birds of similar weight were selected from each replicate and blood samples were collected from them. Blood samples were collected from the birds using new, sterilized syringe and needles through their jugular veins. Blood samples were collected

before the birds were served feed for the day. Blood samples for haematological analysis were collected into sterilized glass tubes containing ethylene diamine tetra acetic acid (EDTA) as anticoagulant. The blood samples were taken to laboratory for Packed cell volume (PCV), haemoglobin (Hb) concentrations, Erythrocyte (RBC), leukocytes (WBC), Mean corpuscular volume (MCV), Mean concentration haemoglobin (MCH), Neutrophil, Eosinophil, Lymphocytes and Monocytes analysis.

Proximate Study and Statistical Analysis

Proximate compositions of the experimental diets was determined by the method of the A O A C (2005). Data obtained from haematological analysis were subjected to one way of analysis of variance using SPSS Package 16.0 (2007). Significant differences among the means were separated by Duncan Multiple Range Test using the same SPSS Package.

RESULTS AND DISCUSSION

Table 1 and Table 2 showed the composition of the experimental diets and proximate composition of the experimental diets respectively. The result of the proximate composition indicated that there was similarity in the composition of the diets. The results of haematological profile of broiler starters fed graded levels of *Moringa oleifera* leaf meal were shown in Tables 3. The result revealed that there were no significant differences across the treatments for most of the parameters measured. Red blood cell (RBC) counts for birds fed D₂ ($5.43 \times 10^6/\mu\text{L}$) were significantly ($P < 0.05$) higher than those fed the control diet ($5.10 \times 10^6/\mu\text{L}$) which recorded the lowest mean value for RBC counts. Birds fed diet containing 250g of *Moringa oleifera* (D₂) had the least mean value for monocytes (4.33 %) which was statistically similar to those fed the control diet (D₁) and D₄ (4.55 %) but not significantly ($P > 0.05$) differ than those fed D₃ (4.44 %). Haematological characteristics of livestock have been observed as factors determining the response of livestock to the diet they are fed (Madubuike and Ekenyen, 2006). The result of this study showed no significant differences for most of the parameters measured. This finding is similar to the work of Ologhobo *et al.* (2014) who reported that there was no significant difference in most haematological parameters measured across the treatments for broiler finishers fed graded levels

of *Moringa oleifera* leaf meal. Diets containing *Moringa oleifera* leaf meal recorded higher mean values for RBC which may be due to the presence of saponin in *Moringa oleifera* leaf as reported by Ologhobo *et al.* (2014) in their study. Saponin has been reported to have haemolytic activity against RBC (Ologhobo *et al.*, 2014). The values for WBC were similar ($P > 0.05$) among the treatment groups which was similar to work of Onu and Aniebo (2011) that obtained non significance effect for WBC across treatments for broiler starters fed graded levels of *Moringa oleifera* leaf meal. The similarity in WBC of birds suggests that the animals were healthy because decrease in number of WBC below the normal range is an indication of allergic conditions, anaphylactic shock and certain parasitism or presence of foreign body in circulating system (Ahmefule *et al.*, 2008). The general non significance of the WBC across treatments indicates that the experimental diets neither impaired nor enhanced the birds ability to wade off infection (Olugbemi *et al.*, 2010b).

Conclusion

It can be concluded from the result of the study that *Moringa oleifera* leaf meal could be used as alternative feeding stuff in broiler starters without any adverse effect on haematological profiles. However, inclusion level of 750g or more of *Moringa oleifera* leaf meal per 100kg of feed of broiler starters should be further investigated.

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Table 1. Composition of experimental diets (g/100%DM)

Ingredient	D ₁ (%)	D ₂ (%)	D ₃ (%)	D ₄ (%)
Maize	50.00	50.00	50.00	50.00
Soya bean meal	26.00	24.00	22.00	20.00
Wheat offal	10.00	10.00	10.00	10.00
MOLM	0.00	2.50	5.00	7.50
Fish meal	3.00	2.50	2.00	1.50
Palm kernel cake	7.50	7.50	7.50	7.50
Bone meal	2.50	2.50	2.50	2.50
Salt	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00

Each 2.5kg of premix contains : Vit. A (8,000,000 i.u), Vit. D3 (1,500,000 i.u), Vit. E (7,000 mg), Vit.K (1,500 mg), Vit.B1 (2,000 mg), Vit. B2 (2,500 mg), Niacin (15,000 mg), Pantothenic Acid (5,500 mg), Vit. B6 (2,000 mg), Vit. B12 (10 mg), Folic Acid (500 mg), Biotin H2 (250 mg), Choline Chloride (175,000 mg), Cobalt (200 mg), Copper (3,000 mg), Iodine (1,000 mg), Iron (21,000 mg), Manganese (40,000 mg), Selenium (200 mg), Zinc (31,000 mg) and Antioxidant (1,250 mg).

Table 2. Proximate composition of experimental diets (g/100%DM)

Parameter	D ₁ (%)	D ₂ (%)	D ₃ (%)	D ₄ (%)
Dry matter	91.30	91.20	91.30	90.00
Crude protein	21.25	21.30	21.55	21.80
Crude fibre	9.33	10.66	10.67	10.67
Ash	9.00	10.50	8.50	7.50
Ether extracts	6.33	8.33	8.17	7.00
Nitrogen free extracts.	45.39	40.41	42.41	43.03

Table 3. Haematological parameters of broiler starters fed graded levels of *Moringa oleifera* leaf meal

Parameter	D1 (%)	D2 (%)	D3 (%)	D4 (%)	SEM
HB (g/dL)	10.89	11.24	11.35	10.99	0.19
PCV (%)	32.33	31.83	33.26	32.89	0.46
WBC ($10^3/\mu\text{L}$)	6.47	7.11	6.54	6.71	0.42
RBC ($10^6/\mu\text{L}$)	5.10	5.43	5.30	5.20	0.58
MCV (%)	41.60 ^c	43.57 ^a	41.41 ^b	40.01 ^d	0.39
MCH (μg)	14.40 ^c	16.27 ^a	14.39 ^c	14.88 ^d	0.23
Neutrophil (%)	52.73	51.23	50.63	50.17	0.17
Eosinophil (%)	1.36	1.57	1.52	1.69	0.20
Lymphocytes (%)	36.83 ^a	36.33 ^c	33.77 ^b	36.41 ^d	0.10
Monocytes (%)	4.55	4.33	4.44	4.55	0.54

Mean within row with different superscripts are significantly ($P < 0.05$) different, PCV = Packed cell volume, HB= Haemoglobin (Hb) concentrations, RBC= Red blood cell (Erythrocyte), WBC = White blood cell (leukocytes) MCV= Mean corpuscular volume, MCH =Mean concentration haemoglobin and SEM = Standard error of mean.