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Effect of *Moringa oleifera* and *Azardirachta indica* Leaf Meals as Antibiotic on the Performance and Blood Parameters of Broiler Chickens

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Abstract
An experiment was conducted to determine the effect of five different inclusion levels of *Moringa oleifera* leaf meals (MLM) and *Azadirachta indica* (NLM) as a substitute to antibiotics on the performance and blood parameters of broiler chickens. Two hundred and ten-day-old broiler chicks were randomized to seven dietary treatments of three replicates (10 chicks per replicate). The treatments were T1:25g (Oxytetracycline) /100kg feed, T2: 600g MLM/100Kg feed, T3: 600g NLM/100Kg feed, T4: 300g MLM + 300g NLM /100Kg feed, T5: 450g MLM + 150g NLM/100Kg feed, T6: 150g MLM + 450g NLM/100Kg feed and T7: control (no additive).The results shows that feed intake and weight gain was highest in broiler chicken fed dietary treatment 2 (5843.10g and 2256.80g) and lowest in broiler chicken fed dietary treatment 6 and (5431.20g and 2009.63g).Broiler chickens fed dietary treatment 3 had the best feed conversion ratio (2.55) and also recorded the lowest percentage of mortality (5.00%). The haematological and serum biochemical indices were not affected (p>0.05) by the dietary treatments. In conclusion, birds fed diets containing *Moringa oleifera* leaf meal compared well with those placed on antibiotic growth promoters.

Keywords: Antibiotics, *Azardirachta indica,* broiler, *Moringa oleifera*, Oxytetracycline,

Introduction

Broilers are heavy breed of chicken with high performance. They requirehigh energy diets which would enable them to express their genetic potential maximally (Sadeghi, 2005). To achieve this, poultry farmers make use of synthetic growth promoters to enhance feed utilization and growth of broilers. "Antibiotic growth promoter" is any medicine that destroys or inhibits bacteria growth. It is administered by injection and orally either through the feed or water. While many of the synthetic drugs and growth promoters are supplement added to broiler diets to effect rapid growth, their use has shown numerous disadvantages like high costs, adverse side effect on the health of birds and long residual properties and carcinogenic effect in humans (Butaye *et al*., 2003). In the light of the above, research efforts are now focused on the use of beneficial herbs and plants as an alternative to conventional growth promoters or antibiotic to increase production. Medicinal plants are cheap and renewable sources of pharmacologically-active substances and are known to produce certain chemicals that are naturally toxic to bacteria (Basile *et al.*, 1999).

The neem (*Azardirachta indica)* tree is one of the most researched trees that have attracted prominence due to its vast range of medicinal properties like antibacterial, antiviral, antifungal, antiprotozoal, and hepato-protective properties (Kale *et al.*, 2003). Similarly, Patell (2011) reported that *Moringa oleifera* extract has antibacterial properties.

Therefore, this study was designed to evaluate the effect of replacing antibioticswith *Moringa oleifera* and *Azadirachta indica* leaf meals (singly or combined) on the performance of broiler chickens.

Materials and Methods

Fresh leaves from neem and Moringa trees were harvested from a cultivated farm land. The leaves were air dried for 5 days and milled into powder using hammer mill. Ground leaves of neem and moringa were mixed with the experimental diet at varying inclusion levels as summarized below;

Treatment 1**:** Positive control [Diet with an antibiotic (oxytetracycline)].
Treatment 2**:** Diet with 600g of Moringa leaf meal (MLM)/100kg of feed.
Treatment 3**:** Diet with 600g of Neem leaf meal (NLM)/100kg of feed.
Treatment 4: Diet with 50% (300g) MLM and 50% (300g) NLM in 100kg of feed.
Treatment 5: Diet with 75% (450g) MLM and 25% (150g) NLM in 100kg of feed.

Treatment 6: Diet with 25% (150g) MLM and 75% (450g) NLM in 100kg of feed.
Treatment 7: Negative control (Diet without additive).

Two hundred and ten (210) day-old Arbor Acre broiler chicks were allotted to 7 dietary treatments (T) of 3 replicates containing 10 birds each in a completely randomized design. Birds were reared on deep litter system in a well-ventilated and illuminated pen. Experiment lasted for 8 weeks. Prior to the arrival of the birds the pen was washed and disinfected. The floor was covered with wood shaving up to 5cm depth. Thereafter, the pen was fumigated. Fresh feed, clean and cold water was offered *ad libitum*. All daily routine management practices werecarried out and vaccination against Infectious bursal and Newcastle diseases was administered.

Body weight was taken on the first day and then subsequently on a weekly basis till the end of the experiment. Feed intake was measured daily before serving of fresh feed. Body weight gain, feed intake and feed conversion ratio (FCR) were obtained by calculation. At the end of the experiment, 5 millimeters of blood was collected from 2 randomly selected birds from each replicate via the jugular vein into specimen bottles. The blood samples were used for haematology and serum analysis according to standard procedures.

All the data obtained were subjected to one-way Analysis of Variance (ANOVA) using the General linear model of SAS (version 8) (1999). The means were separated using the Duncan Multiple Range Test (Duncan, 1955).

Results and Discussion

Total Feed intake, total weight gain and feed conversion ratio of the broiler chicken were not significantly ($p>0.05$) different (Table 1). The feed intake and weight gain were highest in broiler chicken fed dietary treatment 2 (5843.10g and 2256.80g) and lowest in broiler chicken fed dietary treatment 6 and (5431.20g and 2009.63g). The lowest feed intake obtained for broiler chicken fed dietary treatment 2 could be due to the bitter taste of neem leaf as reported (Elangovan *et al.,* 2000), thus resulting to poor weight gain. However, broiler chickens fed dietary treatment 3 had the best feed conversion ratio (2.55) and also recorded the lowest percentage of mortality (5.00%) compared to other treatments. The highest percentage of mortality obtained for broiler chicken fed dietary treatment 7 (30%) in this study is in agreement with Bonsu*et al*. (2012) who reported reduced morbidity and mortality rates in chickens fedneem leaf at 2.0% inclusion level.

Table 1: Performance characteristics of broilers fed moringa and neem leaf meals

Parameters(g)	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Initial weight (g)	38.37	38.50	38.03	38.53	38.23	38.08	38.03
Final weight (g)	2160.70	2295.30	2258.50	2192.40	2191.00	2047.70	2107.00
Total Weight gain (g)	2122.33	2256.80	2220.47	2153.87	2152.77	2009.63	2068.97
Total Feed intake (g)	5776.8	5843.10	5652.20	5662.40	5655.70	5431.20	5748.50
FCR	2.72	2.59	2.55	2.63	2.63	2.70	2.78
Mortality(%)	20.00^{ab}	15.00^{ab}	5.00^{b}	10.00^{ab}	10.00^{ab}	10.00^{ab}	30.00^{a}

^{a,b}Means within the same row with different superscript letters are different ($p<0.05$).FCR= Feed conversion ratio.

The haematological and serum biochemical indices were not affected ($p>0.05$) by the dietary treatments (Table 2). The results obtained in this study is similar to the findings of Ewuola *et al*. (2012) who reported no significant difference for growing rabbits fed graded levels of *Moringa oleifera* leaf meal. The values obtained in this study fell within the normal range for healthy chickens as described (Animashahun *et al.* (2006). White blood cell indicates infections and levels of immunity of an animal. The white blood cell (WBC) counts did not differ($p>0.05$) across the treatments but it falls within the normal range for a healthy animal, which implies that the leaf meals conferred higher immunity as reported (Olugbemi *et al*., 2010). Similarly, the non-significance of dietary treatment on serum albumin, globulin, Alanine transaminase and Aspartate Transaminasein his study suggests adequate dietary proteins for the growth phases and normal liver function of the birds fed diets containing MLM and NLM. *Moringa oleifera* leaves have a beneficial effect on the immune responses of broilers (Olugbemi *et al*., 2010).

Table 2: Haematological and serum Indices of broilers fed moringa and neem leaf meal

Parameters	T_1	T_2	T_3	T_4	T_5	T_6	T_7	SEM	p-value
PCV(%)	28.33[a]	29.00[a]	29.17[a]	29.50[a]	31.17[a]	28.17[a]	27.83[a]	0.44	0.53
Hb(g/dl)	8.87[a]	9.55[ab]	9.35[ab]	9.47[ab]	10.32[a]	8.92[ab]	8.73[b]	0.22	0.21
RBC (x10^6mm^3)	3.26[a]	3.24[a]	3.24[a]	3.38[a]	3.54[a]	3.36[a]	3.16[a]	0.06	0.68
WBC (x10^6mm^3)	21.61[a]	19.29[ab]	19.17[ab]	18.33[ab]	18.01[ab]	18.96[ab]	23.10[a]	0.60	0.38
Lymph (10^3/L)	59.00[b]	63.50[ab]	71.33[a]	61.83[ab]	62.83[ab]	61.83[ab]	65.83[ab]	1.16	0.19
Glucose (mg/dL)	245.67[ab]	182.57[b]	191.09[ab]	288.04[a]	213.11[ab]	256.24[ab]	229.27[ab]	12.10	0.22
AST(u/L)	114.05[a]	110.82[a]	110.99[a]	105.15[a]	109.00[a]	106.02[a]	112.39[a]	1.56	0.77
ALT(u/L)	12.16[a]	10.43[a]	12.15[a]	11.91[a]	11.25[a]	11.00[a]	11.23[a]	0.38	0.91
Total Protein(g/dL)	3.53[a]	3.70[a]	3.95[a]	3.78[a]	3.66[a]	3.74[a]	3.50[a]	0.41	0.69

[ab] Means within the same row with different superscript letters are significantly different (P < 0.05).PCV=Packed Cell Volume; Hb=Haemoglobin; RBC=Red Blood Cell; WBC= White Blood Cell; Lymph=Lymphocyte; AST=Aspartate Transaminase; ALT=Alanine Transaminase.

CONCLUSION

The results of the study showed that most of all the parameters measured in birds fed diets containing *Moringa oleifera* leaf meal compared well with those placed on antibiotic growth promoters. Although *Moringa oleifera* and *Azadirachta indica* leaf meals are generally considered asa protein source in livestock nutrition, it could be a promising natural antimicrobial agent for controlling pathogenic bacteria in livestock production.

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