

EFFECT OF NEEM AND MORINGA LEAF MEALS (USED SINGLY AND COMBINED) AS SUBSTITUTE FOR ANTIBIOTICS ON THE PERFORMANCE OF BROILER CHICKENS

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ABSTRACT

An experiment was conducted to determine the effect of different levels of *Moringa oleifera* leaf meal (MLM) and Neem leaf meal (singly or combined) as substitute to antibiotics on the performance of broiler chickens. Two hundred and ten (210) day-old broiler chicks were randomly allotted to 7 dietary treatments of 3 replicates each. Each replicate had 10 birds. The treatments were 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% MLM and 50% NLM in 100kg of feed, Treatment 5- diet with 75% MLM and 25% NLM in 100kg of feed, Treatment 6- diet with 25% MLM and 75% NLM in 100kg of feed and Treatment 7- Negative control (diet without any additive). The parameters measured (feed intake, final weight, weight gain and feed conversion ratio) did not differ significantly among birds on the different dietary treatments. Birds on treatment 1 had the highest cost incurred per kilogramme weight gain while birds on treatment 3 had the lowest.

Key words: Moringa, neem, oxytetracycline, antibiotic.

INTRODUCTION

The production of meat and eggs from chickens is one of the most intensive types of animal agriculture. It is an industry that has achieved worldwide success in its primary objective of providing a source of affordable animal protein. This success is to several factors which include the prevention of disease. This is partly achieved by the use of antibiotics. Antibiotics are used in human and veterinary medicine to treat and prevent disease and for other purposes including growth promotion in food animals (Phillips *et al.*, 2004). The use of these substances offered possibilities to improve animal performance and increased economic output of livestock producing units. The increased productivity of those units played an important role especially in regions and continents where the availability of land is limited. This resulted in a higher output per livestock unit hence cheaper livestock produce without having to invest in additional land (Reimensperger, 2011). However, the use of synthetically produced substances especially antibiotic growth promoters was soon found to have objectionable side-effects. The high usage of antibiotics has led to an increased risk of bacteria developing antibiotic resistance. The increased concern about the potential for antibiotic resistant strains of bacteria has compelled researchers to explore the utility of

other non-therapeutic alternatives like enzymes, probiotics, prebiotics, immune stimulants, organic acids and phytobiotics (a wide range of plants and spices and their derivatives) as feed additives in animal production. Compared with antibiotics, phytobiotics have proven to be natural, less toxic, residue-free and are thought to be ideal feed additives in food animal production (Wang *et al.*, 1998). Antimicrobial activity and immune enhancement probably are the two major mechanisms by which phytobiotics exert positive effects on the growth performance and health of animals (Yang *et al.*, 2009). According to reports by Elangovan *et al.* (2000), neem (*Azadirachta indica*) contains chemicals which have antimicrobial, antihelminth, antioxidant, antifungal, insecticidal and spermicidal activities. The study evaluated the effect of replacing antibiotics with *Moringa oleifera* leaf meal and Neem leaf meal (singly or combined) on the performance of broiler starters.

MATERIALS AND METHODS

In a completely randomized design, two hundred and ten (210) day-old broiler Abor Acres broiler chicks were allotted to 7 dietary treatments of 3 replicates each. Each replicate had 10 birds. The birds were reared in a well ventilated and illuminated poultry house on deep litter. Routine

management procedures were followed while fresh feed was supplied *ad libitum* and the birds had access to cool clean water and the study lasted 28 days. The dietary treatments are as listed as follows:

- 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 any additive).

The diet was a corn/soya diet and was formulated to meet the NRC (1994) nutrient requirements for broiler starters. The birds were weighed at the beginning of the experiment and subsequently on a weekly basis. Data on feed intake were taken daily and pooled on a weekly basis. Weight gain, feed intake and feed conversion ratio were calculated from the data collected. All data were subjected to analysis of variance (ANOVA) using the general linear model (GLM of SAS 1999) and means, where significant, were separated using the Duncan Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Gross composition of the experimental starter diet is shown in table 1. The performance characteristics of broilers on the different treatments are shown in Table 2. No significant differences were observed in the parameters measured i.e. the feed intake, final weight, weight gain and feed conversion ratio. This could probably be due to the fact that the inclusion levels of the leaf meals were such that would not exert much effect on the performance of the birds since they replaced antibiotics and were not used as feed supplement. Juniar *et al.* (2008) reported that the inclusion of *Moringa oleifera* leaf meal at amounts up to 10% did not produce significant effects on feed consumption, body weight feed conversion ratio and carcass weight. Bonsu *et al.* (2012) also reported that the mean feed intake of broilers was not significantly influenced by the inclusion (1.5%, 2% and 2.5%) of Neem leaf meal in the diet. It was however observed in the present study that the mean feed intake and weight gain values

of birds on diet 3 (100% NLM) and diet 6 (75% NLM and 25% MLM) were lower than that of birds on the other diet although not significantly different. The cost analysis of producing broilers with *Moringa* leaf meal and Neem leaf meal (singly or combined) as alternatives to antibiotics is shown in Table 3. Cost incurred per kilogramme weight gain was highest for birds on diet 1 while it was lowest for birds on diet 3.

Conclusion

The results of the study showed that the performance parameters measured in birds fed diets containing the leaf meals compared well with those placed on the antibiotic. Replacing antibiotics with *Moringa* leaf meal (MLM) Neem leaf meal (NLM) reduced the cost incurred per kilogramme weight gain of producing broilers. Further studies (which include haematology and blood serum analysis, organ histology and gut pH) would be carried out in order to ascertain the antibiotic potential of the leaf meals.

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Table 1. Gross composition of the starter diet

Ingredients	Kg/100kg
Maize	53
Soyabean	18
Groundnut cake	15.3
Wheat bran	7
Fish meal (72%)	1
Limestone	1
Dicalcium phosphate	3
Lysine	0.85
Methionine	0.35
Salt	0.25
Broiler premix	0.25
Total	100
Calculated analysis	
Crude protein (%)	21.14
Metabolizable energy (Kcal/kg)	2.76
Crude fibre (%)	3.61

Table 2. Performance parameters of broilers fed Moringa leaf meal and Neem leaf meal as alternatives to antibiotics

Parameter	T1	T2	T3	T4	T5	T6	T7	SEM	p value
Initial weight (g)	38.37	38.50	38.07	38.53	38.20	38.07	38.03	0.12	0.9114
Final weight (g)	838.23	941.03	878.17	884.3	904.20	878.70	874.10	11.39	0.3980
Weight gain (g)	799.80	902.53	840.10	845.77	865.97	840.63	836.07	11.34	0.3939
Feed intake (g)	1446.13	1608.43	1464.90	1527.83	1546.70	1497.17	1526.77	15.31	0.0595
FCR	1.82	1.78	1.75	1.82	1.79	1.79	1.83	0.02	0.9199

Table 3. Cost analysis of producing broilers using Moringa and Neem leaf meals as alternatives to antibiotics

Parameter	T1	T2	T3	T4	T5	T6	T7
Cost of feed (₦/kg)	108.45	106.20	106.20	106.20	106.20	106.20	104.70
Feed intake/bird (kg)	1.45	1.61	1.46	1.52	1.55	1.50	1.53
Cost of feeding a bird (₦)	157.25	170.98	155.05	161.42	164.61	159.3	160.19
Weight gain (kg)	0.79	0.90	0.84	0.85	0.87	0.84	0.84
Cost/weight gain (₦/kg)	199.05	189.97	184.58	189.91	189.21	189.64	190.70