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Growth and Performance as affected by inclusion of *Moringa oleifera* leaf meal in Broiler chicks diet

Banjo, O.S.
Department of Agricultural Production and Management Science,
Tai Solarin University of Education, P.M.B. 2118, Ijagun, Ogun State, Nigeria.
*E-mail for correspondence: banjowolepolo@yahoo.com

Abstract

The experiment was carried out to investigate the inclusion of *Moringa oleifera* leaf as feed additive in broiler chicks. Eighty Anak 2000 Strains of two weeks old were allotted to four treatments with five replicates of four birds each in a completely randomized design. Four different diets with metabolizable energy levels ranging from 2800 to 2900kcal/kg diet were formulated and fed to the chicks for a period of four weeks. The level of inclusion of *Moringa oleifera* leaf meal ranged from 0% which served as the control, 1%, 2% and 3% in the diet. Inclusion of *Moringa* significantly ($P < 0.05$) enhanced weight gain of birds at 2% level of inclusion. The inclusion of *Moringa* did not significantly ($P < 0.05$) enhance feed intake and feed conversion.

Keywords: Broiler chicks, *Moringa oleifera*, growth, feed intake, feed conversion

1. Introduction

One of the practical solutions to some of the problems of poultry in the tropics is to pay attention to the areas of nutrient requirements of birds for maintenance and production and the nutrient composition of the available feed stuffs. The most logical step to take in solving the shortage and dwindling raw material supply is to direct efforts towards utilizing plants by-products and wastes for feeding poultry birds.

Moringa oleifera is one of the plants that can be utilized in the preparation of poultry feeds. The plant apart from being a good source of vitamins and amino acids, it has medicinal uses (Makkar and Bekker 1999; Francis *et al* , 2005). *Moringa oleifera*, otherwise regarded as a "miracle tree" has been used in the treatment of numerous diseases (Pal et al, 1995; Makomen *et al*, 1997; Gbasi *et al*, 2000 and Matthew et al, 2001) including heart disease and obesity due to its hypocholesterolemic property (Gbasi *et al*, 2001; Olugbemi *et al* 2010) also reported this quality. *Moringa oleifera* leaves have the calcium equivalent of 4 glasses of milk, 3 times the iron of spinach, 4 times the amount of vit A in carrot, and 2 times protein in milk (Loren, 2007). The leaves of *Moringa* are good source of protein, vitamins A, B and C and minerals such as calcium and iron (Dahot, 1988). The leaves of *Moringa* has high protein content which is between 20 – 33% on a dry weight basis, the protein is of high quality having significant qualities of all the essential amino acid as reported by Foidl and Paull (2008). Murro *et al* (2003) reported that the leaves contains a high level of vitamins A, B, C and calciuim.

Kakengi *et al* (2003) reported that *Moringa oleifera* leaf meal was substituted for sunflower seed meal as a protein source for layers. The effects of substitution on feed intake, dry matter intake, weight, laying percentage and feed conversion ratio were investigated and they suggested that *Moringa* leaves could completely replace SSM up to 20% without detrimental effect on layers. However the crude fibre content if high can impair nutrient digestion and absorption (Aderemi, 2003; Omu 2011).

This study therefore considers the utilization of *Moringa oleifera* for improving the nutritional value of broilers and also to investigate the level of inclusion that will yield optimum performance of birds (broilers).

2. Materials and methods

The experiment was carried out at the Teaching and Research Farm of Tai Solarin University of Education, Ijagun, Ogun State, Nigeria. Feed ingredients were purchased from F.A feed (Nig) Limited, Ijebu – Ode, while *moringa oleifera* leaves were harvested from a farm in Ijebu – Oru, Ogun State. The *moringa oleifera* leaves were harvested and air dried under shade for 4 days and milled, after which the leaf meal was added into the diets at 0% to 3% level. A total of eighty unsexed two weeks old Anak 2000 strain of broiler chickens were allotted to four treatments with five (5) replicates of four birds each. The birds were assigned in a completely randomized design (CRD). Each

treatment group was fed one of four experimental diets containing 0, 1, 2 and 3% Moringa Oleifera leaf meal. The experimental birds were raised using deep litter systems, which was divided into experimental units. The records of growth rate and feed intake were taken weekly four a period of six weeks. The data collected were subjected to analysis of variance (ANOVA). Durcans's multiple range (DMR) Test was used to separate means where significant different were observed.

3. Results and discussion

The result of the performance characteristics is shown in Table 3. The inclusion of *Moringa oleifera* leaf meal in the diet of the broilers significantly ($P<0.05$) enhanced their weight gain at 1% level which was significantly higher than the control.

The birds fed T2 recorded significant, ($P<0.05$) higher weight gain then T1 while those fed T3 diet recorded significantly ($P<0.05$) the highest body weight gain. The reason for the improved weight gain can be attributed to high protein content of *Moringa* leaf meal as claimed by (Danol, 1986) (Kakengi *et al* 2003) and (Olugbemi *et al.,* 2010).

The decrease in weight gain of birds fed T4 diet as compared to T2 and T3 despite the higher crude protein content may be due to higher crude fibre content which may impair nutrient digestion and absorption as claimed by (Otuma and Onu, 2008), while the reduced weight gain of broilers fed the control diet (T1) may be ascribed to low crude protein content of the diet compared to other diets.

The feed intake significantly ($P<0.05$) varied among the treatments. The reduced intake of diet T4 may be due to high crude fibre content which may invariably reduce palatability (Kakengi *et a*l 2008).

The feed conversion ratio of the birds was significantly improved in all the treatments, while the diets produced no significant ($p>0.05$) impact on the protein efficiency ratio of the broiler birds.

4. Conclusion

The effect of *Moringa Oleifera* leaf meal used in this study was pronounced in the weight gain of the birds and it is also concluded that broilers can tolerate *Moringa oleifera* leaf meal up to 3% birds of inclusion without adverse effect on their growth.

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Table 1: Composition of experimental diets (%)

Ingredients	Treatments			
	T1	T2	T3	T4
Maize	40	40	40	40
Soya meal	25	25	24	23
Groundnut cake	5	5	5	5
Moringa oleifera	-	1.0	2.0	3.0
Wheat offal	5	5	5	5
Orzel shell	5	5	5	5
Bone meal	2.0	2.0	2.0	2.0
Corn bran	14	13	13	13
Fish meal	2.5	2.5	2.5	2.5
L. lysine	0.25	0.25	0.25	0.25
Dl. Methionine	0.35	0.35	0.35	0.35
Salt	0.4	0.4	0.4	0.4
Broiler premix	0.25	0.25	0.25	0.25
Mycofix	0.25	0.25	0.25	0.25
Total	100	100	100	100

Table 2: Calculated nutrient

	Diet 1	Diet 2	Diet 3	Diet 4
	Control Moringa	Moringa oleifera (1%)	Moringa oleifera (2%)	Moringa oleifera (3%)
Me (kal/kg)	2680.2	2506	2506.562	2506.563
Crude protein (%)	18.61	18.66	18.82	18.85
Crude fibre (%)	5.14	5.16	5.17	5.20
Calcium (%)	3.50	3.43	3.45	3.47
Phosphorus (%)	0.05	0.82	0.83	0.85
Methionine (%)	0.40	0.50	0.50	0.50
Lyshe (%)	0.75	0.80	0.80	0.80

Table 3: Performance of broiler chicks fed *Moringa* leaf meal

	T1	T2	T3	T4	S.E
Mean initial body weight (g)	145.25	140.60	150.20	148.50	1.36
Mean final body weight (g)	110.23^{c}	1415.124^{ab}	1521.56^{a}	1255.76^{b}	48.32
Mean body weight gain (g)	954.98^{c}	1274.52^{a}	1371.36^{a}	1107.46^{b}	46.55
Mean daily weight gain (g)	51.63^{c}	62.45^{a}	65.14^{a}	53.92$^{b1.92}$	
Mean total feed intake	2415.20^{c}	2822.40^{a}	28.73^{a}	22.046^{b}	45.73
Feed conversion ration	2.26^{b}	1.90^{a}	1.85^{a}	1.86^{a}	0.61
Protein efficiency ratio	2.08	2.58	2.46	2.57	0.14

Means having the same letter(s) in a column are not significantly ($p<0.05$) different

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