GROWTH PERFORMANCE OF BROILER CHICKENS FED DIETS WITH GRADED LEVELS OF BITTER LEAF (*VERNONIA AMYGDALINA*) MEAL

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Abstract
This study evaluate the growth performance of broiler chickens fed diet with graded levels of Vernonia amygdalina leaf meal. One hundred and twenty 2 weeks-old Arbo acre broiler chicks were weighed at the beginning of the experiment to obtain the initial weight and randomly allotted in a completely randomized design to 4 dietary treatments of 0% (T1), 5% (T2), 7.5% (T3) and 10% (T4) graded levels of Vernonia amygdalina leaf meal (VALM). Each dietary treatment had 30 chicks with 3 replicates of 10 birds. The duration of the experiment was six weeks. Data collected are initial weight, final weight, feed intake, weight gained and feed conversion ratio. Data obtained from the experiment were analysed using the statistical analysis of variance (ANOVA) procedure of SAS (2010) and significant level of p=0.05 was used. The treatment means were compared using the New Duncan multiple range test of the same software. The initial weight of the birds was significantly the same. Significant different was observed in final weight, feed intake, weight gained and feed conversion ratio. Treatment 4 containing 10% graded levels of Vernonia amygdalina leaf meal (VALM) was significantly higher in final weight compared to other treatments. Similar, trend was observed for feed intake and weight gained with least feed conversion ratio. In conclusion Vernonia amygdalina leaf meal (VALM) could be added to broiler chickens diet up to 10% inclusion level.

Keywords: *Vernonia amygdalina* leaf meal (VALM), growth performance, broiler chickens, feed conversion ratio.

Introduction

One of the profitable agro industries which can effectively tackle the problem of unemployment in the rural areas is the poultry sector (sings 2010). Poultry can be adopted under a wide range of climatic conditions and can generally combine conveniently with other farm enterprises. It is a common knowledge that feed constitute the greatest and most costly input in livestock production especially poultry. Thus, any significant reduction in the cost of feeds will definitely reduce the overall cost of production and increase the profit margin (Owen and Amakiri, 2011). Due to high cost of conventional protein ingredient like fish meal, groundnut cake and soya bean, the trust of nutritional research is toward identifying non-conventional sources that are locally available with low human demands (owen et al 2009). One of such non-conventional feed sources in livestock diet is bitter leaf (*Vernonia amygdalina*) meal. *Vernonia amygdalina* is a shrub or small tree that grows throughout tropical Africa. The leaves contain a considerable amount of anti-nutritive factors like tunic acid and saponin and according to Akwaowo *et al.*, (2000), the young leaves contain higher cyanide (60.1 mg 100^{-1}g DM) and tannin (40.6mg 100^{-1} g DM) than older ones. The Proximate composition of *Vernonia amygdalina* (V.A.) leaf showed a chemical composition of 527.83 ME Kcal/kg, 86.40% DM, 21.50%CP, 13.10% CF, 6.80% EE,11.05% Ash, and the result on mineral calcium, 0.40% magnesium, 0.03% phosphorus 0.06, 6% iron,0.33% potassium, and 0.05% sodium (Owen,2011). Furthermore, *Vernonia amygdalina* has also been fed to broilers, where it was able to replace 300g/kg^{-1} of maize-based diet without negative effect on feed intake, body weight gain and feed efficiency (Bonsi et al, 1995). Research also showed that *V. amygdalina* had some beneficial effects in disease management of poultry (Dakpogan, 2006) such as anti-coccidiosis, anti-bacterial and anti-parasitic (Gbolade, 2009; Tadesse et al,1993), anti- oxidant (Erasto et al, 2007) and as a growth promoter by enhancing the gastro intestinal enzymes thus increasing feed conversions efficiency (Huffman et al,1996; Olobatoke and Oloniruha,2009). This study therefore evaluate the growth performance of broiler chickens fed diet with graded levels of *Vernonia amygdalina* leaf meal.

Materials and Methods

The study was carried out at the Poultry Department of the National Veterinary Research Institute (N.V.R.I.), Vom, Plateau State. One hundred and twenty 2 weeks-old Arbo acre broiler chicks were weighed at the beginning of the experiment to obtain the initial weight and randomly allotted in a completely randomized design to 4 dietary treatments of 0% (T1), 5% (T2), 7.5% (T3) and 10% (T4) graded levels of *Vernonia amygdalina* leaf meal (VALM). Each dietary treatment had 30 chicks with 3 replicates of 10 birds. The composition and calculated analysis of the experimental diets are presented in Table 1. The diets were isonitrogenous and isocaloric to meet the recommended crude protein and Metabolisable energy requirements as stated by NRC (1994). Feeds were provided in the various troughs daily and water were given *ad libitum.* The parameters were measured weekly: the performance data taken include feed intake, initial and final weight, body weight gain while the feed conversion ratio (FCR) was calculated weekly. Daily feed consumption was recorded as the difference between feed offered and the left over. The birds were raised on deep litter standard management and hygiene, the recommended vaccines for broilers were administered accordingly. The duration of the experiment was six weeks.

Statistical Analysis

Data obtained from the experiment were analysed using the statistical analysis of variance (ANOVA) procedure of SAS (2010) and significant level of p=0.05 was used. The treatment means were compared using the New Duncan multiple range test of the same software.

Table 1: Composition of the experimental diet

Ingredient	T1	T2	T3	T4
Maize	50	48	45.0	47.3
Wheat offal	6.3	6.3	6.8	4.0
Soya beans meal	20	18.0	18.0	17.0
Groundnut cake	19	18.0	18.0	17.0
Vegetable oil	2.0	2.0	2.0	2.0
Bitter leaves	__	5	7.5	10
Bone meal	2.0	2.0	2.0	2.0
Premix*	0.15	0.15	0.15	0.15
Methionine	0.2	0.2	0.2	0.2
Lysine	0.1	0.1	0.1	0.1
Salt	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated Nutrient Analysis				
Crude Protein	22.95	21.45	21.25	20.16
Energy(M.E.Kcal/kg)	3011.81	2863.81	2771.16	2744.00
Calcium	0.80	0.79	0.79	0.78
Available Phosphorus	0.57	0.55	0.56	0.52
Lysine	1.13	1.45	1.04	0.99
Methionine	0.53	0.50	0.50	0.49
Fibre	3.79	3.57	3.50	3.24

ME = Metabolisable energy *Composition of premix per kg of diet: vitamin A:(12,000,000 i.u) ; vitamin D3 (2,500,000 i.u) ; vitamin E (30,000 mg); vitamin K3 (2,000 mg); vitamin B1 (2250 mg); vitamin B2 (6000 mg); vitamin B6 (4,500 mg); vitamin B12 (15 mcg); niacin (40,000 mg); pantothenic acid (15,000 mg); folic acid (1,500 mg); biotin (50 mcg); choline chloride (300,000 mcg); manganese (80,000 mg); zinc (50,000 mg); iron (20,000 mg); copper (5,000 mg); iodine (1,000 mg); selenium (200 mg); cobalt (500 mg); antioxidant (125,000 mg)

(T1)= 0% graded levels of *Vernonia amygdalina* leaf meal (VALM)

(T2)= 5% graded levels of *Vernonia amygdalina* leaf meal (VALM)

(T3) =7.5% graded levels of *Vernonia amygdalina* leaf meal (VALM)

(T4) 10% graded levels of *Vernonia amygdalina* leaf meal (VALM)

Results and Discussion

The results of the initial weight and performance of the broiler chickens fed diets with *Vernonia amygdalina* leaf meal is shown in Figure 1 and Table 2. The initial weight of the birds was significantly the same. It was observed that the weight gain and the final weight of the birds fed with VALM increased significantly ($p<0.05$) across the treatments from 1924.50g (T1) to 2175.00g (T4) and 1924.50g (T1) to 2175.00g (T4) while the weight gains are 253.50g (T1), 254.00g (T2), 268.g (T3) and 319.50g (T4), respectively. The feed intake and the feed conversion ratio also increased significantly ($p<0.05$) across the treatments. The values for the feed intake are 949.5g (T1), 918.0g (T2), 962.5g (T3), and 979.0g (T4) while the FCR are 3.75 (T1), 3.70 (T2), 3.60 (T3), and 3.15 (T4), respectively.

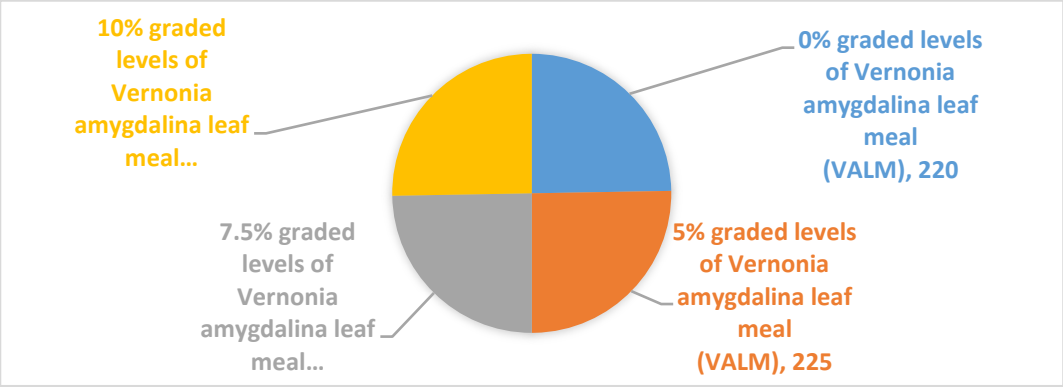

Figure 1: Initial weight of the experimental birds in grams

Table 2: Growth performance of broiler chickens fed Bitter leaf meal

Parameters	T1	T2	T3	T4	SEM
Final weight (g)	1924.50^{ab}	1897.00^{b}	1930.00^{ab}	2175.00^{a}	45.5
Feed intake (g)	949.50^{b}	918.00^{c}	962.50^{ab}	979.00^{a}	10.68
Weight gain (g)	253.50^{b}	254.00^{b}	268.50^{b}	319.50^{a}	9.59
Feed conversion ratio	3.75^{a}	3.70^{a}	3.60^{a}	3.15^{b}	2.12

^{abc} Means on the same row with different superscripts are significantly different ($p<0.05$)
(T1)= 0% graded levels of *Vernonia amygdalina* leaf meal (VALM)
(T2)= 5% graded levels of *Vernonia amygdalina* leaf meal (VALM)
(T3) =7.5% graded levels of *Vernonia amygdalina* leaf meal (VALM)
(T4)= 10% graded levels of *Vernonia amygdalina* leaf meal (VALM)
SEM= Standard error mean

Similar result was obtained by Chiemela *et al.* (2016). The result for FCR in this study is in line with the findings of Olobotoke and Oloniruha (2009) who reported that inclusion of *VA* powder in cockerels feed significantly improved FCR. This could be associated with its effect on enhancing the gastro intestinal enzyme thereby improving digestion and assimilation of nutrients (Adaramoye *et al.*, 2008). The findings by Windisch (2007) also reported improved growth performance of animals fed *VA*. Furthermore, the report of Mohammed and Zakariya (2012) supported the observations made by Abubakar *et al*., (2010) that phytogenic feed additives are often associated to the improvement of flavor and palatability of feed, thus bitter leaf extract enhances production performance of birds. However, the observations made by Mohammed and Zakariya (2012) pertaining improvement of weight gain and FCR in broilers are in contrary with the present result.

Conclusion

In conclusion *Vernonia amygdalina* leaf meal (VALM) could be added to broiler chickens diet up to 10% inclusion level.

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