EVALUATION OF BROILER CHICKS FED BITTER LEAF (*Vernonia amygdalina*) AQUEOUS EXTRACT

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ABSTRACT

A study on the effect of bitter leaf (*Vernonia amygdalina*) extract on the growth performance, carcass quality and economics of production of broiler chicks was evaluated using sixty (60) seven- day old Oba-Marshall broiler chicks, in a 54 days water infusion feeding trial. Four (4) water infusion levels 0ml, 25ml, 50ml and 75ml of *V. amygdalina* per litre of (clean) drinking water designated as A, B, C and D respectively were used. Birds were randomly assigned to these infusion levels in completely randomized design (CRD) with each treatment replicated three times (5 birds per replicate) daily feed and water were offered *ad libitum*. Data were collected on feed intake and weekly body weight; these were used to calculate other growth parameters. The result shows that there were no significant ($p>0.05$) differences in weekly feed intake among the four treatment. Birds which were given bitter leaf aqueous extract had better final body weight, weekly weight gain and feed conversion ratio ($p<0.05$). Carcass weight and dressing percentage increased significantly ($p<0.05$) in response to treatment with bitter leaf aqueous extract. No variations ($p>0.05$) were observed in the abdominal fat. Although birds on treatment D gave the highest revenue, the best cost-benefit ratio was obtained from birds on treatment C. it was concluded that broiler birds can be given bitter leaf aqueous extract to improve performance and well as economic gains.

INTRODUCTION

In Nigeria, the effect of inadequate animal protein intake is felt more by a large proportion of the population especially in the rural areas. Poultry meat is a good source of animal protein and could serve as a bridge in boosting the consumption level of animal protein. Incidentally, the poultry industry in Nigeria is characterized by high production costs and low profit margins particularly due to high feed bills (Nwambe *et al.*, 2008). Owen and Amakiri (2011) suggested that any significant reduction in the cost of feeds will significantly reduce the overall cost of production and increase the profit margin of the farm. One way to achieve this is by the use of feed additives. Feed additives, such as probiotics, prebiotics, antibiotics, antioxidants, emulsifiers, enzymes, binders, and PH control agents, are ingredients added to poultry diets to enhance production efficiency, improve health and reduce morbidity (FAO, 1998). Over the years, antibiotics had become one of the major feed additives used in livestock production (Ogle, 2013). However, their use in animal feed has shown several side effects such as resistance towards the drug and evidence of resistant strains that become zoonotic (Wegener *et al.*, 1999). Consequently, the use of natural alternatives has been advocated. An example of such alternative is bitter leaf. Bitter leaf is one of the edible vegetables in Nigeria (Igbakin, 2009) which performs both medicinal and nutritive functions (Adaramoye *et al.*, 2008). The present study was designed to evaluate the efficacy of different levels of bitter leaf aqueous extract on growth performance, carcass quality and economics of production of broiler chickens.

MATERIALS AND METHODS

This study was carried out at the Poultry Unit of Teaching and Research Farm in Department of Animal Science, Faculty of Agriculture and Natural Resources Management, Ebonyi State University, Abakaliki for 54 days. Sixty (60) day-old Oba-Marshal broiler birds purchased from a reputable distributor in Abakaliki were used for the study. The birds were assigned randomly to four treatments designated A - 0ml, B - 25ml, C - 50ml, and D - 75ml of bitter leaf extract per litre of drinking water. Each of the treatment was replicated three times, with five birds per replicate in a completely randomized design (CRD). The birds were weighed and allowed to acclimatize for seven days before the experiment commenced. They were fed *ad libitum* on

commercial broiler starter and finisher diets. Fresh bitter leaves were purchased from Abakaliki main market in Ebonyi State. The leaves were dried under room temperature and then ground into meal. 50g of the ground bitter leaf meal was infused in 1litre of boiled hot water overnight (12 hours). This was filtered in the morning and the measured quantity of filtrate according to the experimental treatment added to one liter of pure drinking water and served to the birds *ad libitum*. Daily feed intake and weekly body weight were measured. These were used to calculate the feed conversion ratio. At the end of the experiment, one bird was selected from each replicate, i.e., three birds per treatment. The selected birds were fasted for 12 hours and weighed prior to slaughtering. The carcass weight, dressing percentage and abdominal fat weight were obtained. A cost-benefit analysis was carried out for the four treatments. Data collected on growth performance and carcass quality traits were subjected to one way ANOVA using SPSS 13 software and significant means were compared using F-LSD at 5% significance level. The statistical model used was: $X_{ij} = \mu + T_i + E_{ij}$; Where, X_{ij} = Any observation, μ = Population mean, T_i =Treatment effect of diets, E_{ij} =Experimental Error, i = Number of treatment, j = Number of replicate. A cost-benefit analysis was done to evaluate the economic efficiency of including bitter leaf extract in the diet of broiler chickens.

RESULT AND DISCUSSION

The result of the effect of bitter leaf extract on the growth performance, carcass quality and cost-benefit ratio of broiler chickens is presented in table 1. There were no significant ($p > 0.05$) differences observed in weekly feed intake among the four treatments. Significant ($p < 0.05$) differences were observed in the final body weight, weekly weight gain and feed conversion ratio between treatment A and the other treatments (B, C and D). There were significant variations ($p<0.05$) between the experimental treatments in carcass weight and dressing percentage, especially, between treatment A and other treatments. A better performance was observed in birds on treatment D. No significant variations were observed in the abdominal fat weight among the treatments. The result of the present study is in line with the findings of Tangka (2003) who reported improved growth performance of animals fed bitter leaf. Olobotoke and Oloniruha (2009) reported that inclusion of bitter leaf 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). Though no significant variations ($p<0.05$) existed in the live weight of birds in all treatments, there were significant variations ($p<0.05$) between the experimental treatments in carcass weight, and dressing percentage, particularly, between treatment A and other treatments. Birds on treatment D had a better performance. Their carcass weight was 32.11% heavier than those on treatment A and their dressing percentage 9.48, 4.85, and 4.59% better than those on treatments A, B and C respectively. Isika et al. (2012) observed that dressed weight, eviscerated weight and abdominal fats were significantly higher ($p < 0.05$) in the control diet than in the test diet when 0.25% bitter leaf, ginger and a mixture of the two herbs were included the diets of broiler chicks. Javed *et al.* (2009) observed a significant increase in dressing percentage in broiler chicks in response to an aqueous extract of plant mixture. Table 1 also reveals that the cost /kg feed consumed/ bird as well as cost of production increased with increase in the quantity of bitter leaf in the drinking water. However, the cost of feed /kg live weight gain was least for birds on C while those on control had the highest cost (a difference of up to ₦38.57). Although D gave the highest revenue, the best profit was obtained from birds on C (a margin of ₦0.28 between C and D). The present result is in consonance with the findings of Kyvsgard (2002) which noted that broilers fed bitter leaf performed better in terms of cost of feed per kg gain than those on control.

Conclusion

The inclusion of bitter leaf aqueous extract in the diets of broiler chickens had no detrimental effect on the growth performance and carcass quality of the birds. However, the best supplementation level with respect to growth performance, and economics of production was 50ml/litre of drinking water.

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Table 1. Performance traits of broiler chicks fed bitter leaf aqueous extract

Treatment / Parameter	A	B	C	D	SEM
Final Body Weight(g)	1966.43^{b}	2235.15^{a}	2352.31^{a}	2380.00^{a}	120.12
Weekly Weight Gain(g)	232.87^{b}	268.20^{a}	282.19^{a}	288.67^{a}	15.17
Weekly Feed Intake(g)	659.83	680.43	703.75	728.55	51.60
FCR	2.84^{b}	2.54^{a}	2.49^{a}	2.53^{a}	0.10
Live weight before slaughter(g)	1633.33	1900.00	2216.67	2166.07	278.39
Carcass weight(g)	1233.33^{b}	1516.67^{a,b}	1777.33^{a}	1816.67^{a}	204.18
Dressing percentage	75.92^{c}	79.80^{b}	80.02^{b}	83.87^{a}	1.16
Abdominal fat(g)	58.00	54.67	71.33	72.33	13.19
Cost/kg feed consumed/bird	559.91	577.39	597.18	618.23	
Cost/ kg live weight gain	311.80	278.96	273.23	279.32	
Cost of prod.(₦)^{c}	822.91	840.39	860.18	881.23	
Revenue (₦)^{d}	1474.82	1676.36	1764.23	1785.00	
Cost-Benefit Ratio	1.26	1.01	0.95	0.98	

^{a,b}Means on the same row followed by different superscript are significantly different ($P<0.05$), FCR – Feed Conversion Ratio, ^{c}Cost of production = Cost of feed + Cost of medication + Cost of day old chick. ^{d}Revenue based on ₦ 750/kg live weight.