PERFORMANCE AND COST BENEFITS OF BROILER STARTER BIRDS FED REPLACEMENT LEVELS OF LIZARD MEAL (A CASE STUDY IN ISHIAGU, IVO LOCAL GOVERNMENT AREA, EBONYI STATE)

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ABSTRACT

The research work was carried out to ascertain the performance and cost benefits of broiler starter birds fed replacement levels of lizard meal to fish meal at starter phase. A total number of ninety (90) day old Anak 2000 broiler chicks were used for the experiment. The birds were assigned to five treatment group of eighteen birds each been replicated thrice with six birds per replicate. Lizard meal was included to replace fish meal at levels of 0, 25, 50, 75 and 100% respectively. The completely randomized design (CRD) was used. Feed and water were given *ad-libitum*. Birds fed 75% inclusion levels of lizard meal (treatment 4) to replace fish meal was superior to birds in other treatments in terms of average final body weight, average daily feed intake, average weight gain and feed conversion ratio. Cost benefit analysis also showed that birds in treatment 4 (75% lizard meal inclusion) was better than the rest of the treatment group under review.

Keywords: Performance, cost benefit, broiler starter, lizard meal, fish meal.

INTRODUCTION

It is a known fact that human population in Nigeria is on the increase, while food production is declining. This had led to food shortage especially animal protein (Olabode, 2015), which has resulted in serious malnutrition mostly among children and adolescents. An average Nigerian consumes about 7% of animal protein daily as against the minimum requirement of 28g per short fall of 75% (Ahaotu and Ekanem, 2009).

A very urgent task facing the world is that of providing sufficient food of adequate quantity and quality for the rapidly increasing human population. The food deficiency situation is more serious with protein deficiency of calories and micro-elements (Olabode, 2008). However, it has been stated that poultry production holds the key for bridging the gap of animal protein consumption in the Nigerian population. Poultry as a source of protein supply white meat and eggs which is high in protein and nutrient values. Although the high cost of poultry feed has been traced to the competition between human and poultry for the use of conventional feed ingredients such as fish meal, hence the need to substitute this high cost conventional feed ingredient with a low cost potential feed ingredient like lizard meal.

Agama agama is a specie of lizard from the *Agamidae*, mostly found in the sub-saharan Africa region. They are usually distinguished from amphibians by their dry, scarly skin that limits water lose, more powerful jaws, internally fertilize, and advanced circulatory, respiratory, excretory, nerves system and considerable behavioral control over their body temperature (Miller and Harley, 1996). *Agama* lizards are of different types and occur in different sizes. They usually live in groups or colonies. The lizard has a head and a trunk that are joined by a definite neck with a long tapering tail. They live in walls and ceiling of buildings and feed on small insects by picking them on tips of their sticky tongues.

MATERIALS AND METHOD

The research work was carried out at the poultry unit of the Animal Production Department, Federal College of Agriculture, Ishiagu, Ebonyi State. Mature male and female *Agama agama* lizards were caught at the Federal College of Agriculture, Ishiagu campus with catapults. Care

was taken to avoid much damage to the carcass. The lizards were slaughtered and the internal organs removed. The carcass was boiled at 100o^{C} for five minutes and thereafter sundried to appreciable moisture content. The sundried *Agama agama* lizard carcass was later grinded into meal using the hammer mill and then incorporated into the diets of the birds according to the replacement levels appropriated to each treatment group.

Five experimental diets were formulated using replacement levels at 25%, 50%, 75% and 100% of lizard meal with fishmeal in treatments 2, 3, 4 and 5 respectively. Treatment 1 served as the control with 0% level of lizard meal. The completely randomized design (CRD) was used. Ninety (90) unsexed Anak 2000, four weeks old birds were used for the research work. Each treatment had eighteen birds with three replicates consisting of six birds per replicate. Feed and water were given *ad-libitum* and vaccinations were given as at when due.

Initial weight of the birds were taken at the beginning of the study and then subsequently on a weekly basis as the difference between the quantity of feed given the previous day and the quantity that is left the next day. Feed conversion ratio was obtained as the ratio of feed intake divided by the weight gain. Data collected were subjected to analysis of variance (ANOVA) according to the procedure of Steel and Torrie (1990).Significantly different means were separated according to the method of Duncan multiple range test as outlined by Obi (2002). Proximate analysis of the lizard meal and the diets were carried out using the procedure of AOAC (2005).

RESULTS AND DISCUSSION

The proximate analysis of the lizard (*Agama agama*) meal is obtained in table 2. The results showed that the *Agama agama* lizard has a high crude protein content of 54.8%, moderate crude fiber content of 11.32%, ether extract content of 4.84%, ash content of 10.16%, nitrogen free extract of 13.98% and a low moisture content of 4.90% respectively. The results obtained in this present study showed similarity to that of the fish meal which had 60.04% crude protein, 7.63% crude fiber, 10.26% ash content, 9.80% ether extract, 9.01% nitrogen free extract and 3.26% moisture content. Results obtained for proximate analysis of the lizard meal in the present study was in agreement with that reported by Abulude *et al.* (2007), where they obtained a range value of 54.05-57.69% level of crude protein, 2.56-3.01% ether extract, 1.11-3.18% ash content, 21.38-21.94% nitrogen free extract and a moisture content of 3.85-4.18% respectively. But was lower than the value of 59.06-60.16% crude protein reported by Tiamiyu *et al.* (2014). Thus, the gap in the results of the analysis obtained could be due to factors such as climatic differences in geographical location, available and type of feed materials available to the lizard itself. Also from the analysis of the lizard meal it can be derived that the lizard meal is superior when compared to other unconventional animal protein sources such as locust meal, grasshopper meal, silk worm caterpillar meal and maggot meal (Ogunji, 2004 and Olabode, 2008).

Effect of replacement levels of lizard meal to fish meal on the growth performance of the birds is shown in table 3. The results showed that birds fed diet 4 had the highest value of feed intake (106.76g), which was significantly ($p < 0.05$) higher than for birds fed diets 1, 3 and 5 with values of 103.94g, 98.19g and 103.84g, but similar to those fed diet 2 with value of 105.92g. This was similar to the work of Ojewole (2005), who compared the utilization of three animal protein sources by broiler chicken. Results for average daily weight gain showed that birds fed diet 4 and 5 with values of 56.17g and 51.76g had relatively higher values of average daily weight gain than those on diets 2, 3 and 5 with values of 47.68g, 48.51g and 44.16g respectively. This could be due to the absence of anti-nutritional factor in the lizard meal, thereby making the protein nutrient bio-available for the development of muscles and growth of the birds. This was similar to the report of Ijaiya and Eko (2009) who obtained a significant ($p < 0.05$) effect when silk worm caterpillar meal was used to replace fishmeal in the diet of broiler birds. Feed conversion ratio for birds on diet 4 (1.90) was superior compared to the rest of the birds in other treatment group. Birds fed diet 5 (2.35) and 2 (2.22) were similar statistically. Also birds fed diet 1 (2.01) and 3 (2.02) were similar ($p > 0.05$) to themselves. Cost benefit analysis showed that treatment 4 (75%LM) had better net profit

margin of #242.76, which was significantly ($p < 0.05$) different from the rest of the treatments, namely T1 (#194.75), T2 (#175.80). T3 (#158.33) and T5 (#145.03) respectively.

CONCLUSION

From the data obtained from the research work, it can be concluded that replacement of fishmeal with lizard meal at the level of 75% was positive in terms of the parameters studied with no negative impact in terms of mortality.

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Table 1. Composition of broiler starter diet on percentage dry matter basis.

	Treatments				
Ingredients	**T1 (0%)**	**T2 (25%)**	**T3 (50%)**	**T4 (75%)**	**T5 (100%)**
Fish meal	3.50	2.63	1.75	0.87	0.00
Lizard meal	0.00	0.87	1.75	2.63	3.50
TOTAL	**100**	**100**	**100**	**100**	**100**

Other feed ingredient had same value across treatment group: Maize-54.00; Wheat offal-5.00; Soybean meal-5.40; Groundnut cake-25.00; Blood meal-2.00; Bonemeal-2.50; Limestone-1.50; Salt-0.25; Starter premix-0.35; Lysine-0.15; Methionine-0.35.

Table 2: Proximate composition of Lizard meal (LM)

Components	Percentage
Dry matter	95.12
Moisture	4.88
Crude protein	53.62
Crude fiber	11.32
Ether extracts	1.84
Ash	10.16
Nitrogen free extracts	18.18

Table 3: Performance characteristics and economic analysis table

Parameters	Treatments					SEM
	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)	
Initial body weight (g/bird)	357	362	360	358	360	-
Final body weight (g/bird)	1444^{b}	1366^{c}	1350^{c}	1526^{a}	1268^{d}	29.35
Av.Daily feed intake (g/bird)	103.94^{b}	105.92^{a}	98.19^{c}	106.76^{a}	103.84^{b}	1.62
Av.Daily Wt. gain (g/bird)	51.76^{a}	47.68^{b}	48.51^{b}	56.17^{a}	44.16^{c}	1.41
Feed conversion ratio	2.01^{a}	2.22^{a}	2.02^{a}	1.90^{b}	2.35^{a}	0.05
Cost of DOC	200	200	200	200	200	-
Cost of feed	120.25	119.20	116.67	112.24	109.98	9.41
Miscellaneous Expenses	195	195	195	195	195	-
Total Expenditure	515.25	514.20	511.67	507.24	504.98	4.68
Income from sale of birds	710^{b}	690^{b}	670^{b}	750^{a}	650^{c}	2.90
Net profit	194.75^{b}	175.80^{b}	158.33^{c}	242.76^{a}	145.02^{c}	11.23