MON -42

Growth Performance and Economics of Production of Finisher Broiler Fed Lizard Meal as Replacement for Fishmeal at Graded Levels of Inclusion

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Abstract
The research work was conducted to determine the growth performance and cost benefits of broiler finisher birds fed graded levels of lizard meal to replace fish meal at finisher phase. A total number of two hundred and twenty-five (225), four weeks old "Anak 2000" broiler chicks were used for the research work. The birds were assigned to five treatment groups of forty fivebirds each been replicated thrice with fifteen 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 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: Growth performance, finisher broiler, lizard meal, fishmeal, cost benefit

Introduction

The cost of conventional feedstuffs which are the major sources of energy and protein in poultry diets has continued to increase due to their low supply. Also, there is a stiff competition between human and industries for these conventional feedstuffs, such .as maize, sorghum, soyabean, groundnut cake etc (Olabode, 2015). This has thus resulted in the high cost of broiler production in Nigeria as a whole. There is therefore, the need to continue to look for alternative sources of energy and protein that are not likely to face such competition and demand as the conventional feedstuffs, such feedstuff should not be the ideal food for man and should also have limited or no industrial use. The consumption of animal protein has reduced drastically over the period of years due to the fact that majority of the populace cannot afford them, hence an alternative must be sourced. *Agama,*is a specie of lizard from the family of *Agamidae*, found mostly in sub-Saharan Africa. Its size varies from 13-30cm in total length. They are usually distinguished from amphibians by their dry, scaly skin that limits water loss, 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 different types and occur in different sizes. They usually live in groups or colonies.

This study was conducted to determine the growth performance and cost benefits of broiler finisher birds fed graded levels of lizard meal to replace fish meal at finisher phase

Materials and Methods

The experiment was conducted 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*lizard carcass was later ground 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 (Table 1) 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. Two hundred and twenty-five (225) unsexed "Anak2000"four weeks old birds were used for the research work. Each treatment had forty five birds with three replicates consisting of fifteen birds each. Feed and water were given *ad-libitum* and vaccinations were given as at when due according to standard practices.

The initial weight of the birds was taken at the beginning of the study and then subsequently on a weekly basis. Feed intake was also recorded as the difference between the quantity of feed given the previous day and the quantity that was left the next day. Feed conversion ratio was obtained as the ratio of feed intake divided by the body 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).

Table 1:Composition of finisher broiler diet fed lizard meal as replacement for fishmeal

	Treatments				
Ingredients	T1 (0%)	T2(25%)	T3 (50%)	T4 (75%)	T5(100%)
Fish meal	1.00	0.75	0.50	0.25	0.00
Lizard meal	0.00	0.25	0.50	0.75	1.00
Total100	100	100	100	100	

Other feed ingredient had same value across treatment group: Maize-54.00; Wheat offal-7.00; Soybean meal-3.05; Full fat soya-3.00; Groundnut cake-16.80; PKC-7.55; Blood meal-2.50; Bonemeal-2.50; Limestone-1.50; Salt-0.25; Finisher premix-0.35; Lysine-0.15; Methionine-0.35.

Results and Discussion

Chemical analysis of *Agama agama* meal was shown in table 2. Results showed that the *Agama agama* lizard had a high crude protein content of 54.8%, the 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 those 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, silkworm caterpillar meal and maggot meal (Ogunji, 2004 and Olabode, 2008).

Table 2: Performance characteristics and economic analysis table

	Treatments					
Parameters	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)	SEM
Initial body weight (g)	1268	1267	1268	1267	1268	-
Final body weight (g)	2755.67	2619.34	2431.33	2987.33	2870.00	67.01
Average feed intake (g)	3887.67	4116.42	3558.53	3740.00	3839.00	25.19
Average body Wt. gain (g)	1487.67	1352.34	1163.33	1720.33	1602.00	60.53
Feed conversion ratio	2.61	3.04	3.06	2.17	2.40	0.12
Cost per Kg of feed (N)	89.40	89.10	88.80	88.50	88.20	0.18
Cost per Kg of feed consumed (N)	347.56	359.00	315.98	330.99	338.62	6.05
Total variable cost of production (N)	1192.18	1203.45	1159.21	1174.61	1172.49	7.79
Cost of sales of bird (N)	1905.58	1766.50	1633.67	2110.33	1865.50	43.52
Gross margin (N)	714.43	563.05	474.36	935.75	693.01	59.49

A replacement level of lizard meal to fish meal on the growth performance of the birds is shown in table 2. The results showed that birds fed diet 2 had the highest value of feed intake (4116.42g), which was significantly ($p < 0.05$) higher than for birds fed diets 1,3, 4 and 5 with values of 3887.67g, 3558.53g, 3740.00g and 3839.00g. This was similar to the work of Ojewole and Annah (2005) that compared the utilization of three animal protein sources by broiler chicken. Results for average body weight gain showed that birds fed diet 4 hada value of 1720.33g which was relatively higher than values of average weight gain obtained for those on diets 1, 2, 3 and 5 with values of 1487.67, 1352.34, 1163.33 and 1602.00g 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 significantly ($p < 0.05$) better effect when silkworm caterpillar meal was used to replace fishmeal in the diet of broiler birds.

Feed conversion ratio for birds on diet 4 (2.17) was superior, but statistically similar to those of birds on treatment 5 (2.40) and 1 (2.61). Also, birds on treatment 2 (3.04) were similar to those on treatment 3 (3.06). Cost-benefit analysis showed that treatment 4 (75%LM) had a better net profit margin of #935.75, which was significantly ($p < 0.05$) different from the rest of the treatments, namely T1 (#714.43), T2 (#563.05),T3 (#474.36) and T5 (#693.01) respectively.

Conclusion

From the results obtained from the present 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.

References

Abulude, F.O., Adesanya, W.O., Ogunkoya, V.O. and Ajayi, E. (2007). Compositional studies on tropical species of *Agama agama* lizards. *International Journal of Zoological Research,*3 (4): 218-222.

AOAC (2005).Official methods of analysis, 18th edition. Association of Official Analytical Chemists,Inc. Arlingon, Virginia, USA.

Ijaiya, A.T. and Eko, E.O. (2009). Effect of replacing dietary fishmeal with silk meal caterpillar meal (*Anaphe infracta*) on the performance, carcass characteristics and haematological parameters of finisher broiler chickens. *Pakistan Journal of Nutrition,*8(6): 850-855.

Miller, S.A. and Harey, J.P.(1996). *Zoology* 3rdEdn. WCB/ McGraw Hill Company Inc., New York, USA.

Obi, I.U. (2002). *Statistical methods of detecting differences between treatment means and research methodology issue in laboratory and field experiments*. A.P. Company ltd, Enugu, Nigeria.

Ogunji, J.O. (2004). Alternative protein sources in diet for farmed tilapia. *Animal Science.com Review. No 13, Nutrition Abstract and Review,* 74(8): 23-32.

Ojewola, G.S. and Annah, S.I. (2005). Nutritive and economic value of Danish fishmeal, crayfish dust meal and shrimp meal in finishing broiler diet. *African Journal; Biotech.,*5: 19-25.

Olabode, A.D. (2008). The effect of supplemental neem (*Azadirachta indica*) leaf meal on the performance of broiler birds. An Msc. Thesis, University of Nigeria, Nsukka, Nigeria.

Olabode, A.D. (2015). Performance, egg quality characteristics and serum biochemistry of laying birds fed diet containing neem leaf meal. Ph.D Thesis, University of Nigeria, Nsukka, Enugu State, Nigeria.

Tiamiyu, L.O. (2014). Proximate analysis of *Agama agama* lizard meal; Implication for fish nutrient. *Octa. Journal of Bioscience,*2(1): 28-31.

Steel, R.G.D. and Torrie, J.H. (1990). *Principles and practice of statistics, a biometric approach,* 2nd edition. McGraw Hill Book Company Inc., New York.