Journal of Agriculture and Food Sciences **V.N. Okonkwo, T.K.O. Obih & M.U. Mbachu**
Volume 14 Number2, October, 2016 pp. 34- 40 .

THE PERFORMANCE OF BROILER FINISHER BIRDS FED VARYING LEVELS OF FEATHER MEAL AS REPLACEMENT FOR SOYA BEAN MEAL

V.N.OKONKWO[1], T.K.O. OBIH[1], AND M.U. MBACHU[2]
[1.] *Department of Animal Science and Fisheries,*
Imo State University Owerri
[2.] *Department of Agricultural Science*
Alvan Ikoku Federal University of Education Owerri

ABSTRACT

This study focused on the performance of broiler finisher birds fed varying levels of feather meal as replacement for soya bean meal. The cost of livestock feeds had been on an upward trend more especially in developing countries due to competition between man and livestock for feed ingredients such as grains root crops, animal protein and fish products hence the search for alternative feed ingredients for non – ruminants like poultry has become rather imperative to save man and his livestock from starvation. This study is a contribution to that search. Sixty – four weeks old – unsexed Anak breed of broiler birds were used in a completely randomized designed experiment to determine the performance of the birds fed varying levels of feather meal, as a replacement for soya bean meal. The birds were randomly allotted to four treatment diets containing 0%, 2.5%, 5% and 7.5% feather meal represented by T1, T2, T3 and T4 respectively with 15 birds in each treatment which were in turn replicated three times with 5 birds in each replicate. The experiment lasted for 28 days. Parameters measured included initial body weight, final body weight, weight change, average daily feed intake, feed conversion ratio, feed cost/ kg, and weight gain. Results showed that feed intake, progressively increased and differed significantly (P< 0.05) between treatment means as inclusion levels of feather meal increased while feed cost/ kg decreased as inclusion level of feather meal increased, feed cost/ kg weight gain increased and both differed significantly (P<0.05) between treatment means, while the birds tolerated feather meal up to 7.5% inclusion level, 2.5% was the optimal. It is therefore recommended that 2.5% of feather meal be included in finisher broiler diets to reduce the cost of feed and also reduce the cost of broiler production.
Key words: Anak finisher broiler birds, feather meal and soya bean meal.
http://dx.doi.org/10.4314/jafs.v14i2.4

INTRODUCTION

Increase in human population in developing countries, Nigeria inclusive, demands increase food production, especially animal protein in order to overcome the danger of malnutrition. The livestock industry particularly the poultry sub-sector has witnessed a rapid decline in production due to high input cost. Madubuike (2000), Anyaehie (2006), Obidinma and Ekenyem (2010), have attributed the decline on the performance of the Nigerian livestock industry to the steady rise in the cost of intensively producing livestock.

Madubuike (2000), stated that the cost of livestock feeds had been on an upward trend more especially in the third world countries due to stiff competition between man and livestock for feed ingredients such as grains root crops, animal protein and fish products. Consequently, the search for alternative feed ingredients for non – ruminants like poultry has become rather imperative to save man and his livestock from starvation. Studies have been conducted on the use of hydrolyzed poultry feathers or feather meal as ingredients for poultry feeds to reduce cost of poultry feeding. Feather meal is produced by hydrolyzing clean and un-decomposed feathers from slaughtered birds. Hydrolysis is accomplished with steam and pressure to break keratinous bonds and increase digestibility of the protein in the feathers. The quality of feather meal is affected by the length of time that it is hydrolyzed. Feathers meal has an average protein content of about80-85% and not less than 75% of crude protein must be pepsin digestible. It has crude fat of 2.5%, crude fibre of 1.5%, phosphorus of 0.75% and ash of 3% (Ibiyo and Atteh, 2005). Feather meal has a high percentage of protein and nitrogen; and protein is a major ingredient in the broiler finisher diet for optimal performance. This study therefore is to evaluate the potentials of the chicken feather meal, FM, as a feed ingredient in broiler production with the ultimate aim of reducing cost of feed in broiler finisher production.

MATERIALS AND METHODS

The feather meal used for this experiment was sourced from freshly slaughter birds from commercial slaughter houses at relief market Owerri Imo State, Nigeria. The feathers were washed and steamed in a pressure cooker under internal pressure of 40-50n/m^2 for 30- 70 minutes until the resulting process of hydrolysis converted the feather into a more soluble form of protein meal at reduced microbial contamination. The feathers were sun dried and milled to produce feather meal. Fish meal and other ingredients were procured from a reputable dealer in Owerri, Imo State. Proximate analysis of the feather was carried out at Animal Science Laboratory, Imo State University, Owerri, Nigeria. The following were analyzed: (i) crude protein CP, (ii) crude fibre CF, (iii) Ether Extract2 (EE) (iv) Ash content (v) Nitrogen Free Extract (NFE).

EXPERMENTAL ANIMAL

One hundred (100) day old, Anak broiler chicks were procured from a reputable hatchery and were brooded for four weeks with commercial broiler starter diet under deep litter system. Thereafter sixty (60) out of the hundred were selected based on visual appraisal for fitness, and used for the experiment. The birds were randomly divided into four treatment groups of 15 birds per group. Each group was fed one of the treatment diets respectively. The treatment or groups were replicated three times in a completely randomized design CDR of 5 five birds per replicate. Feed and water were given *ad-libitum.* Adequate vaccinations were given during and after brooding. The experiment was carried out at Imo State University Teaching and Research Farm, Owerri Imo State and the trial lasted for 28days. Parameters measured included, initial body Weight, feed intake, weight gain and feed conversion ratio. On the 28th day of the experiment, two birds were randomly selected from each of the replicates, starved

of feed for twelve hours but supplied with water. The birds were slaughtered and were made to bleed thoroughly. They were eviscerated after plucking their feathers in hot water. Carcass and organ weights were determined using electronic scale and each value obtained were subjected to one way analysis of variance (ANOVA) and significant differences were separated using Duncans Multiple Range Test as outlined by Obi (2000), and Onuh and Igwemma (2000).

RESULTS

DISCUSSION

It was observed that feed intake increased as the percentage inclusion level of feather meal increased from 0% in T1 to 7.5% in T4 (129.0g, 131.0g, 138.0g and 146.0g). This could be attributed to increase in feather meal fibre which Ziggers (2001), stated could reduce the digestibility of nutrient for productivity purposes. The birds had to consume more feed (meal) as the inclusion level of feather meal increased to satisfy their nutrient requirements. This agrees with the earlier findings of Ekenyem (2006), and Ekenyem and Madubuike (2006), that higher levels of fibre in monogastric animal diets increased feed intake and depressed weight gain. Significant differences ($P<0.05$) were observed between treatment means as the birds on 2.5% FM, 5% FM, and 7.5% FM consumed higher amounts of feed with increasing level of feather meal (FM). This agrees with Isikwenu *et al,* (2000), who observed that feed intake increased with increase in fibre level. Average weight gain did not differ significantly ($P<0.05$) between 0% FM and 2.5% FM but differ significantly ($P<0.05$) between 5% and 7.5% FM diets. Feed conversion ratios did not differ significantly ($P<0.05$) between diets 0% FM and 2.5% FM but dropped significantly ($P<0.05$) as the levels increased. Feed cost per kilogram dropped appreciably as the inclusion level of FM increased from 0% to 7.5% and differ significantly ($P<0.05$) between treatment means. This is attributable to the wide margin between the price of soya bean meal and FM as at the time this work was carried out. Feed cost/ kilogram weight gain progressively increased and differed significantly ($P<0.05$) between treatment means as the inclusion level of FM increased from 0% to 7.5%. This is understandable since this is a product of feed cost/ kilogram and (FCR) feed conversion ratio.

CONCLUSION

The experimental birds tolerated up to 7.5% FM however, the results showed that 2.5% is optimal especially when parameters like feed conversion ratio (FCR), average daily weight gain and feed cost per kilogram are given priority consideration. The inclusion of feather meal in finisher broiler diets reduced the cost of feed though reduced the cost of broiler production.

Average daily weight gain did not differ significantly between 0% FM and 2.5% FM but differed from 5% and 7.5% FM diets. Feed conversion ratio did not differ significantly between diets 0% FM and 2.5% FM but dropped significantly as the FM increased. Feed cost

per kilogram dropped appreciably as the inclusion level of FM increased from 0% to 7.5% and differed significantly between treatment means. This is attributable to the wide margin between the prices of soya bean meal and FM as at the time this work was carried out. Feed cost / kg weight gain progressively increased and differed significantly between treatment means as the inclusion level of FM increased from 0% to 7.5%. This is understandable since this is a product of feed cost / kg and FCR. It is therefore recommended that 2.5% of feather meal be included in finisher broiler diets to reduce the cost of feed and ultimately reduce the cost of broiler production.

REFERENCES:

Anyaehie, A.A. (2006). Studies on Exogenous enzyme supplementation of high fibre (maize-cob) soya bean based poultry diets, PhD Thesis, Imo State University Owerri.

Ekenyem, B.U. & Onyeagoro, C.P. (2006). Replacement value of bambara nut seviate for soya bean meal on the performance of finisher broiler chicks. *International Journal of Poultry Science*. London.

Ekenyem, B.U.& Madubuike, F.N. (2006). An assessment of *Ipomea asarifolia* leaf meal as feed ingredients in broiler chick production. *Pakistan Jn. Of Nutrition* 5(1): 46-50

Ibiyo, L.M.O. & Atteh, J.O. (2005). Response of starter broilers to diets containing graded levels of rice bran with or without palmoil. *Nig. J. of Animal Prod*. 32 (1): 39.

Madubuike, F.N. & Ekenyem, B.U. (2000). *Ruminant animal production and handling in the tropics*. Alphabet Nigeria Publishers, Owerri.

Madubuike, F.N. & Ekenyem, B.U. (2000). *Non ruminant livestock production in the tropics*. Gust Chuks Graphic Center, Owerri, Nigeria.

Obidinma, V.N. (2009). Brewers dried grain as energy source in poultry production. PhD, Thesis, Imo State University, Owerri, Nigeria.

Obidinma, V.N. & B.U. Ekenyem, 2010. Effects of brewers dried grain consumption on haematological indices of laying birds. International Journal of Natural and Applied Sciences, 6(3): 311-316 www.tapasinstitute.org/journal/jonas

Obidinma, V.N. & Mbachu (2010). The performance of broiler finisher birds fed varying levels of goat dung supplemented with brewer's yeast as replacement for soyabean. *Journal of Agric. Biology and food* (1)(1) 107-111.

Olum, M.J. (1997). Optimum protein and energy levels for finishing broiler chicks in a tropical environment. *Nigerian Journal of Animal production.* vol. 1 No. 1 pp 240.

0nuh, M.O.& A.A. Igwemma, (2000). *Applied statistical techniques for business and basic Sciences* 3rd Ed. Skill Mark Media Ltd Owerri, Nigeria.

Smith, A.J. (2001). *Poultry.* Macmillian Edu. Ltd (2nd Ed.) London.

Zigger,D. (2001) Feed formulation; managing the nutritional quality of stock feed ingredients. *Feed Tech. 5(6):30-32.*

Table 1: proximate composition of feather Meal:

Sample	%CP	%EE	%Fibre	%Ash
Feather meal	85.0	2.5	1.5	1.2

TABLE 2: Ingredients composition of the experimental diets

Ingredients%	**diet1**	**diet 2**	**diet3**	**diet4**
Maize	50.0	50.0	50.0	50.0
Soyabean	7.5	5.0	2.5	0.0
Feather meal	0.0	2.5	5.0	7.5
PKC meal	14.50	14.50	14.50	14.50
Fish meal	4.30	4.30	4.30	4.30
GNC cake	13.0	13.0	13.0	13.0
Bone meal	4.00	4.00	4.00	4.00
Common salt	0.30	0.30	0.30	0.30
(B/F) Premix	0.25	0.25	0.25	0.25
L-lysine	0.09	0.09	0.09	0.09
Dlmethionine	0.06	0.06	0.06	0.06
Brewers spent grain	8.00	8.00	8.00	8.00
TOTAL	100	100	100	100

- PCK = Palm Kernel Cake Meal
- GCN = Groundnut Cake Meal
- BSG = Brewers Spent Grain

Table 3: calculated nutrient Composition of the Experimental Diet

	Diet 1	**Diet 2**	**Diet 3**	**Diet 4**
Crude fibre	3.86	3.72	3.59	3.46
Ether Extract	4.38	4.36	4.34	4.31

Crude Protein	20.38	20.83	21.90	22.98
ME/Kcal/kg	2901.4	2896.2	2880.2	2872.2

TABLE 4: Performance characteristics of finisher broiler birds fed varying level of feather meal as replacement for soya bean meal

	Diet 1	Diet 2	Diet 3	Diet 4	SEM
Parameters	0%	2.5%	5%	7.5%	
Initial body weight (g)	676.7[a]	676.7[a]	693.3	660.0[a]	3.19
Final body weight (g)	1933.0[a]	1750.0[a]	1633.0[a]	1453.0[b]	6.30
Weight change (g)	1256.3[a]	1073.3[b]	937.3[b]	803.0[c]	4.00
Av daily wt gain (g)	44.87[a]	38.33[a]	33.48[a]	28.68[b]	1.43
Feed intake (g)	129.0[b]	131.0[b]	138.0[a]	146.0[a]	1.04
Feed Conv. Ratio	2.87[a]	3.42[a]	4.12[b]	5.09[c]	0.19
Feed cost per kg (N)	74.8[a]	72.0[a]	60.1[b]	55.6[c]	0.65
Feed cost/kg wt gain (N)	214.68[c]	246.24[b]	247.71[b]	283.00[a]	13.66

[abcd:] = Means in the same row having the same superscripts are not significantly different ($P<0.05$)

The result of the feed trial indicated that with the exception of the initial body weight all other parameters differed significantly ($P<0.05$) between treatment means.