PERFORMANCE OF FINISHER BROILER CHICKEN FED ENZYME SUPPLEMENTED CORN COB MEAL BASED DIETS

Ikpe, J. N.*, Oko, E. C.*, Abdullahi, J.*, Okonkwo, V. N. and Ahaotu, E.O.*****
* Department of Agricultural Technology, Akanu Ibiam Federal Polytechnic, Unwana, Ebonyi State.
**Department of Animal Science and Fisheries, Imo State University, Owerri.
***Department of Animal Production Technology, Imo State Polytechnic Umuagwo, Ohaji, Imo State.
Corresponding Author: Ikpe, J. N. jnikpe@akanuibiampoly.edu.ng +234 803 492 8358

ABSTRACT
The soaring cost of producing poultry feed due to high competition in the conventional feed ingredients calls for action into discovery of avenues to harness the efficiency of agricultural "waste" products to fit in as ingredient in feeding poultry. This, will broaden the ingredient base for poultry feed production. This study therefore, investigated the effect of enzyme supplemented Corn Cob Meal (ECCM) diet on the performance of finisher broiler chicken. The ECCM was used, in a feeding trial with 120 finisher broiler chickens of 28days old. The broilers were randomly assigned to 4 experimental diets in a complete randomized design of 10 broilers each replicated 3 times. The control, T_I contained no ECCM, while T_2, T_3 and T_4 contained 5, 10 and 15% ECCM respectively. The birds were managed under deep litter system and fed *adli-bitum* for 28 days. The result of the performance data collected showed that there was no significant difference ($P > 0.05$) when the average final weight, average weight gain and feed conversion ratio of the control was compared to T2 and T3 but significantly higher ($p<0.05$) when compared to T4. The feed intake was similar ($P > 0.05$) among all the treatment groups. It was concluded that ECCM can be used in broiler diet at up to 10% inclusion rate without deleterious effect on the broilers.

Key words: Corn Cob, Diet, Enzyme, Finisher Broiler chicken, Performance

INTRODUCTION

The looming hunger likely to follow the present COVID -19 pandemic will no doubt pose an immense problem over an already dwindling condition of poultry subsector. FAO 2020 has warned that COVID-19 will exacerbate the impact of hunger which will result to an atmosphere of economic uncertainty for producers and consumers while (RPCA, 2020) reiterated that the expected effects of the COVID-19 pandemic on food and nutrition security will aggravate the already difficult situation. Urgent need therefore, is necessary for radical development in animal agriculture in order to abate the ugly situation. For age long, poultry sector has been at the forefront of supplying animal protein to Nigerian citizenry and contributes a reasonable percentage to the economy and GDP of the Nigeria. The greatest problem facing the industry presently is feed which takes a whooping 65-75% of cost of producing poultry (Madubuike, 2012).

To solve this problem and to achieve the country's economic growth in the post pandemic era, nutritionist believe that attention should be geared into the discovery of avenues to utilize agricultural waste products which are usually abundant, thrown away and are not in use by humans, in compounding poultry feed. The use of these, will broaden the ingredient base for poultry production and will not only enhance productivity of poultry sector but will also avert the risk of environmental pollution hazards posed by these agro waste products.

Corn cob, which is a waste product of maize grain shelling, is one of these waste products that can fit in as feed ingredient in poultry production. Corn cob has been seen to litter the surroundings, street, markets and constitute public nuisance during season of harvest. They can block drainage canals and cause flooding (Ndubuisi, Iheukwumere and Onyekwere, 2008). The chemical composition of corn cob (Oke,

Oke and Adeyemi, 2007) showed that the material has some reasonable quantity of nutrients but also high in fibre – a factor that negates its use as feed ingredient in poultry production. Several avenues have been propagated as a possible avenue for reducing the fibre content of ingredients. Among these avenues is inclusion of exogenous enzyme which have been shown to improve poultry performance through improved digestibility (Gracia et al., 2007).
Our research therefore, is aimed at investigating the effect of dietary levels of enzyme supplemented corn cob meal diet on the performance of finisher broiler chicken.

MATERIALS AND METHODS

The research was conducted at the Teaching and Research Farm, Department of Agricultural Technology, Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State in tropical rain forest zone of Nigeria.
The corn cob used for the experiment was collected from corn sheller at Eke Market and milled in a hammer mill.The chemical composition of the CCM was analyzed according to (7). Nutri-Zyme TM was the enzyme used for the research and according to manufacturer's instruction the enzyme contains: Hemicellulase, Pectosanase, Xylcanase, Arabinase, B-glucanase, Cellulase, Pectinase, Protease, Amylase, Lipase and wheat starch as the carrier. The potency of the enzyme was ascertained using cellulose acetate before being used for the research. The enzyme was added at1gm of the enzyme to 1kg of the diet.
A total of 4 experimental diets were formulated such that, the control diet contained no CCM while in T_2, $T_3$and T_4 diets, CCM was added at 5, 10 and 15% inclusion rates on weight-to-weight basis. The ingredient composition of the diets is presented in Table 1.

Table 1. Ingredient Composition of the Experimental Diets

Ingredients	Treatment levels (%)			
	T_1 (0.00)	T_2 (5.00)	T_3 (10.00)	T_4 (15.00)
Maize (8.9% CP)	55.00	55.00	55.00	55.00
Soyabean meal (44.0%CP)	5.00	5.00	5.00	5.00
Groundnut cake (45% CP)	13.00	13.00	13.00	13.00
Corn Cob meal (2.3% CP)	0.00	5.00	10.00	15.00
Brewer's dried grain (27.9% CP)	15.00	10.00	5.00	0.00
Fish meal (63.11% CP)	3.00	3.00	3.00	3.00
Blood meal (77.35% CP)	3.00	3.00	3.00	3.00
Bone meal (nil)	5.00	5.00	5.00	5.00
*Premix	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
TOTAL	**100**	**100**	**100**	**100**
Calculated nutrient composition of the experimental diets				
Crude protein %	21.34	20.06	18.78	17.50
Crude fibre %	4.14	5.31	6.47	7.64
Crude fat %	4.92	4.57	4.22	3.87
Metabolizable energy (kcal/kg)	2886.26	2868.63	2801.63	2733.76

*Note:*to provide the following per kilogram of feed; vit A 10,000IU, vit D_3 1, 500 IU; vit E 2mg; riboflavin 3mg; pentothenic acid 10mg; nicotinic acid 2.5mg chlorine 3.5mg; folic acid 1mg; magnesium 56mg; lysine 1mg; iron 20mg; zinc 50mg; cobalt 1.25mg. M.E = 35 × % cp + 81.8 × % E.E + 35.5 × % NFE, where, M.E = metabolizable energy, CP = crude protein, EE = ether extract, NFE = nitrogen free extract (Pauzenga, 1985).*

A total of 120 Marshal breed of broiler chicken of 28 days of age with an average weight of 965.50g were used for the experiment. The chickens were randomly assigned to four treatment groups in a Completely Randomized Design (CRD). Each treatment group was replicated 3times to obtain a total of 12 groups of

10 broilers each. The broilers were randomly assigned to an experimental unit of 1m by 1m each partitioning and assigned to the four treatment diets. Deep liter system of management was adopted. Feed and water were given *ad-libitum* and proper routine management practices and medications strictly adhered to. The feeding trial lasted for 28 days.

Data were collected on the performance of the finisher broiler chicken. Data obtained from the study were subjected to statistical analysis using one way analysis of variance procedure at 0.05% significant level. Significant means were separated using Duncan Multiple Range Test (Duncan, 1995). The data were computed with IBM SPSS statistical 22 of 2013 software.

RESULTS AND DISCUSSION

Proximate composition

The result of proximate composition of the corn cob meal as presented in Table 2 showed that the corn cob meal contains a crude protein of 3.50%, crude fibre of 44.8%, no ether extract, ash of 1.6% and calculated nitrogen free extract of 38.7%. The crude protein obtained from the present research is a little lower than that of (Akinfemi, 2010), who reported a crude protein of 3.89%. Also, (Akinfemi, 2010) reported an ash content of 7.67% and ether extract of 5.7%. The changes in values could be attributed to difference in climate, production methods, harvesting time, soils, stage of maturity, variety of maize cultivar and possibly drying methods that were adopted (Szyskowska, Sowinsk and Wierzbicki, 2007).

Table 2 Proximate Composition of Corn Cob Meal

Parameters	Values (%DM)
Dry matter	88.60
Moisture	11.40
Crude Protein	3.50
Crude Fibre	44.80
Ash	1.60
Ether Extract	0.00
Nitrogen free Extract	38.70

Source: Field study (2019). DM = Dry Matter

Performance of the Broilers

The result of the performance of the finisher broilers as presented in Table 3 showed that the performance of the finisher broiler fed dietary levels of exogenous enzyme supplemented corn cob meal were favorable when the average final weight, average weight gain and feed conversion ratio of the control were compared to T2 and T3 as the results were similar ($p>0.05$), but significantly higher ($p<0.05$) when compared to T4. A liner decrease in weight was observed as the level of inclusion increased but not significantly different with the control until at 15% inclusion (T4). This is an indication that the finisher broilers can utilize exogenous supplemented corn cob meal up to 10% inclusion (T3) without compromising these parameters. The poor performance of T4 could be attributed to high level of fibre present in the diet. This is in line with (Ajai et al., 2018) who argued in their research that high level of fibre reduces the acceptability of feed hence, feed intake is reduced which in turn affect the general performance of the birds.

There was no significant difference when the control ($p>0.05$) was compared to T2 and T3. The value recorded for T4 was significant ($p<0.05$) when compared to the control. The total feed intake and the average daily feed intake however, had no significant difference ($P > 0.05$) among the treatment groups.

Table 4.2 Performance of finisher broiler chickens fed different levels of exogenous enzyme supplemented corn cob meal

Parameters	Treatment levels (%)				SEM
	T_1(0.00)	T_2(5.00)	T_3(10.00)	T_4(15.00)	
Av. Initial wt.	786.67	800.00	786.67	813.33	6.89
Av. Final wt	2920.00^{a}	2836.70^{ab}	2793.30^{ab}	2686.70^{b}	33.92
Wt. Gain	2133.30^{a}	2036.70^{ab}	2013.30^{ab}	1873.30^{b}	36.52
Av. Daily wt. Gain	73.33^{a}	66.61^{ab}	70.00^{b}	60.00^{b}	1.79
Av. Total feed Intake	5880.30	5960.00	5873.30	5706.70	54.50
Av. Daily feed Intake	210.00	210.00	210.00	200.00	2.78
FCR	2.85^{b}	3.16^{ab}	2.99^{ab}	3.33^{a}	0.75

Note: without superscript = not significant. Means with different superscript in the same row differ significantly (P0.05). SEM = standard error mean, Av. = Average, FCR = feed conversion Ratio, DWG = daily weight gain

CONCLUSION AND APPLICATION

Based on the results of this research, it was concluded that

1. Inclusion of enzyme supplemented CCM at up to 10% inclusion level in the finisher broiler diet did not cause an adverse effect on their weight gain, feed intake and feed conversion ratio.
2. Corn cob meal can fit in as feed ingredient in finisher broiler's diet if exogenous enzyme is added in the formulation.

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