

**NSAP****47th Annual
Conference
(JOS 2022)****CONFERENCE
PROCEEDINGS**THEME
**SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES****EFFECT OF CRUDE OR SYNTHETIC ENZYMES ON THE GROWTH
PERFORMANCE OF BROILER FINISHER CHICKENS FED GROUNDNUT-
COWPEA SHELL MEAL BASED DIETS*****¹OWUNA, I. K., ¹ALU, S. E., ¹ARI, M. M., ¹GAMBO, D. and ²MAIKASUWA, Z.**¹ *Department of Animal Science, Faculty of Agriculture, Nasarawa State University, Keffi,
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Education (Technical) Gusau, P.M.B. 1088, Gusau, Zamfara State, Nigeria***Corresponding Author: kokiowuna@gmail.com Phone NO: +2347066729019***Abstract**

A 28 days evaluation of the effect of crude or synthetic enzymes on the growth performance of broiler chickens (Cobb 500) fed groundnut-cowpea shells meal (GCSM) based diet was conducted using a total of two hundred and forty birds randomly allotted to five dietary treatments replicated four times with 12 birds each in a Completely Randomized Design (CRD). Diet T1 had 0% GCSM: 0% dried rumen content (DRC), 0% mushroom and 0ppm synthetic enzyme and served as the control; diet T2 had 25% GCSM, 0% DRC, 0% mushroom, and 0ppm enzyme; diet T3 contained 25% GCSM, 5% DRC, 0% mushroom and 0ppm synthetic enzyme; Diet T4 contained 25% GCSM, 5% mushroom 0% DRC and 0ppm synthetic enzyme and diet T5 had 25% inclusion of GCSM, 200ppm synthetic enzyme, 0% DRC and 0% mushroom. Feed and water were provided ad-libitum. Data were collected on body weight, body weight gain, feed intake, feed conversion ratio, energy and protein efficiency ratio. Data obtained were analyzed using SPSS statistical package version 21. The result indicated significant ($P < 0.05$) increase in final body weight and feed conversion ratio (FCR) in birds fed diet T5. Birds fed diet T4 recorded lower ($P < 0.05$) values in final body weight, total weight gain and daily weight gain due to inclusion of dietary treatments and crude enzyme (5% mushroom). The growth performance of broiler chickens was generally enhanced as the synthetic enzyme was been included in the diet. It is recommended that synthetic enzyme should be used to improve utilization of agricultural by-products by broiler chickens.

Keywords: Body Weight, Feed Intake, Feed Conversion Ratio, Protein Efficiency, proximate analysis

INTRODUCTION

Numerous efforts have been put in place to make food available for global populace particularly the utilization of farm by-products to feed livestock. It was observed that undernourishment is more pronounced in developing nations (FAO, 2008) and this has always led to re-appearance of interest in the sourcing of less expensive alternative feed ingredients as replacement for the more expensive conventional ones in livestock feed formulation. The aim is to increase the availability and affordability of animal products in order to alleviate universal food predicament. The importance of agro-industrial by-products and the so-called “wastes” in meeting the energy and protein needs of farm animals is best appreciated when it is realized that feeding alone accounts for about 60 to 85% of the cost of intensively reared mono-gastric animals (Ogundipe and Sani, 2005). Therefore, the aim of the research is to evaluate the effect of crude or synthetic enzymes on the growth performance of broiler finisher chickens fed groundnut-cowpea shell meal based diets



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Materials and Methods

Study Location

The experiment was carried out at **IBAS Poultry Farm Ltd** Keffi, Nasarawa State. Keffi is located on Latitude 8°51 and 8°50 north of the equator and Longitude 7°50 and 7°51 east of the Greenwich meridian. The town had an average altitude of 850m beyond the sea level. The minimum yearly rainfall of the area is 1100mm and maximum of about 2000mm. The temperature rises between January to March and the rainfall begin in April and reduce the temperature between 26.8°C and 27.9°C (Lyam, 20007).

Experimental diets

Five different experimental diets: T1, T2, T3, T4 and T5 were compounded to be iso-caloric (3000 kcal/kg ME) and iso-nitrogenous (18%CP) for broiler finisher chickens.

Table 1: Gross composition of experimental diets of broiler chicks (Finisher)

Ingredients	T1	T2	T3	T4	T5
	0G, 0D 0M+0S	25G, 0D, 0M+0S	25G, 5D, 0M+0S	25G, 0D, 5M+0S	0G, 0D, 0M+200S
Maize (%)	32.00	37.00	33.00	34.25	37.00
Soya bean (Full fat) (%)	17.00	20.00	23.00	23.00	20.00
Groundnut cake (%)	16.00	5.00	3.00	1.75	5.00
Maize bran (%)	16.00	0.00	0.00	0.00	0.00
Rice bran (%)	10.00	2.00	0.00	0.00	2.00
Groundnut shells (%)	0.00	15.00	15.00	15.00	15.00
Cowpeas shells (%)	0.00	10.00	10.00	10.00	10.00
Bone meal (%)	2.00	0.00	0.00	0.00	0.00
Blood meal (%)	1.00	5.00	5.00	5.00	5.00
Salt (%)	0.25	0.25	0.25	0.25	0.25
Palm oil (%)	5.00	5.00	5.00	5.00	5.00
Lysine (%)	0.25	0.25	0.25	0.25	0.25
Methionine (%)	0.25	0.25	0.25	0.25	0.25
Premix (%)	0.25	0.25	0.25	0.25	0.25
Dried Rumen Content (DRC) (%)	0.00	0.00	5.00	0.00	0.00
Mushroom (%)	0.00	0.00	0.00	5.00	0.00
Enzyme	0.00	0.00	0.00	0.00	++
Toxin binder	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Nutrient and energy composition					
Energy kcal/kg (ME)	3090.89	3009.03	2992.04	2964.45	3009.03
Crude protein	20.49	20.07	20.16	20.08	20.07
Crude fibre	4.22	5.14	5.45	8.24	9.14
Ether extract (%)	8.53	10.89	11.702	10.89	10.98
Ash (%)	2.99	3.26	3.29	3.01	2.99
Calcium	1.11	0.42	0.44	0.52	0.42
Phosphorus	0.81	0.36	0.34	0.46	0.36
Lysine (%)	1.12	1.27	1.28	1.27	1.27
Methionine (%)	0.51	0.54	0.53	0.53	0.54

G= %Groundnut cowpea shell meal M=%Mushroom, S=ppm Synthetic enzyme,
D=%Dried rumen content

Collection and processing of experimental materials

The mushroom, cowpea and groundnut shells were collected from the rural farmers in Kokona Local Government Area of Nasarawa State, Nigeria. The cowpea and groundnut shells were milled into powder to form a meal using a locally made miller machine (unbranded) and sun-dried at 35°C for 3-5h as recommended by Ogbe and George (2012). The mushroom was milled into powder form using pestle and mortar manually while rumen content was collected from the Keffi abattoir in Nasarawa state and sun dried for 3 days. The sundried rumen contents were milled using a hummer mill to produce finely ground dried rumen content meal.

Experimental Birds, Management and Design

Two hundred and forty (240) unsexed broiler chickens (Cobb 500 Strain) were used and their initial body weights were taken. The birds were reared under deep litter system. Feed and water were given *ad-libitum* and all the management routine practices were strictly adhered to for ultimate performance. The design for the research was Completely Randomized Design (CRD) and the birds were distributed randomly to five treatments at the rate of 12 birds per replicate. Each treatment was replicated four times.

Parameters measured

Feed intake

The amount of feed was measured on a daily basis and recorded before given to them. The feed left over in the feeding trough was subtracted from the feed given in the previous day and recorded as daily feed intake.

Body weight and body weight gain: The birds' initial weight were taken at the beginning of the experiment in each replicate and recorded to obtain the initial body weight and the process was repeated at the end of each week and was recorded as the final body weight per week. The initial body weight was afterward subtracted from the final body weight to get the weekly body weight gained. The birds feed conversion ratio was computed as the ratio of feed intake divided by body weight gain.

Chemical analysis

Samples of the DRC, mushroom, groundnut and cowpea shells were taken to International Institute of Tropical Agriculture (IITA) Ibadan for proximate analysis using standard methods (AOAC, 1990). Metabolizable energy (ME) was calculated using Formula: $ME = 37 \times \% CP + 81 \times \% EE + 35.5 \times \% NFE$ (Pauzenga, 1985).

Table 2: Chemical composition of groundnut shells, cowpea shells, died rumen content and mushroom

Nutrient	Groundnut shell	Cowpea shell	Dried Rumen Content	Mushroom (<i>G. lucidum</i>)
Crude protein (%)	5.43	19.82	9.25	16.07
Ether extract (%)	0.71	0.63	2.95	1.43
Crude fibre (%)	55.60	33.01	30.28	8.02
Ash (%)	3.17	4.11	11.41	9.01
Dry matter (%)	90.31	88.46	90.33	88.85
Nitrogen Free Extract (NFE) (%)	25.41	36.99	36.44	35.92



Results and Discussion

The results obtained in this study indicated that enzyme supplementation (crude or synthetic) had significant effect on the utilization of agricultural by-products. There was significant increase in final body weight in birds fed T5 diet was due the inclusion of synthetic enzyme. This report is in consonance with earlier works of Biwas *et al.* (1999) as well as Swain and Johri (1999) who reported that enzyme supplementation increases body weight. The lower significant values for total weight gain (1116.89g/bird), final body weight, daily weight gain, protein efficiency ratio and energy efficiency ratio of birds fed diet T4 may be due to inclusion of experimental diets and crude enzyme (mushroom at 5%) which retarded the performance of broiler finisher chickens in comparison to control. This result is not in agreement with Ogbe and George (2012) who reported that inclusion of mushroom (1-2g/kg feed) recorded improved feed conversion ratio (3.3–3.4) better than pullet that were fed with smaller quantity or without mushroom inclusion.

Table 3: Effect of crude or synthetic enzyme on growth of broiler finisher fed groundnut-cowpea shells meal based diet

PARAMETERS				T1	T2	T3	T4	T5	SEM	LOS
				OG, OD OM+OS	25G, OD, OM+OS	25G, 5D, OM+OS	25G, OD, 5M+OS	OG, OD, OM+200S		
Av. Initial	Body	Weight	(g/bird)	830.70 ^a	629.38 ^b	782.93 ^a	793.56 ^a	833.51 ^a	20.59	*
Av. Final	Body	Weight	(g/bird)	2648.26 ^a	2035.47 ^b	2131.26 ^b	1914.03 ^b	2224.16 ^b	70.51	*
Av. Total	Weight	Gain	(g/bird)	1817.32 ^a	1405.84 ^b	1348.38 ^b	1116.89 ^b	1390.63 ^b	66.16	*
Av. Daily	Weight	Gain	(g/bird/day)	64.91 ^a	50.22 ^b	48.15 ^b	39.80 ^b	49.78 ^b	2.36	*
Av. Feed intake	(g/bird/day)			151.51 ^a	128.82 ^b	142.93 ^{ab}	142.54 ^{ab}	148.04 ^a	2.34	*
Av. Feed Conversion Ratio				2.39 ^a	2.90 ^a	2.97 ^a	3.64 ^b	3.01 ^{ab}	0.12	*
Av. Protein Efficiency Ratio				2.09 ^a	1.95 ^b	1.67 ^b	1.40 ^c	1.68 ^{bc}	0.72	*
Av. Energy Efficiency Ratio				58.80 ^a	46.73 ^b	45.07 ^b	38.64 ^b	46.21 ^b	2.01	*

SEM = Standard Error of Mean, LOS = Level of Significant, NS = No Significant difference AV. = Average.

G=% Groundnut cowpea shell meal M=%Mushroom, S= ppm Synthetic enzyme, D=%Dried rumen content

Conclusion and Applications

The result of this study has revealed that growth parameters such as final body weight, total weight gain and daily weight gain increased with inclusion of synthetic enzyme though not comparable to the control. Treatments 2 and 3 had improved FCR comparable to the control. It is hereby recommended that synthetic enzyme should be used to improve utilization of agricultural by-products by broiler chickens. Good preservative measures should be provided for groundnut and cowpea shells to prevent contamination from harmful pathogens that are detrimental to poultry.

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