

EFFECT OF ENZYME SUPPLEMENTATION ON GROWTH PERFORMANCE OF COBB500 AND ROSS308 BROILER CHICKENS FED FINISHER DIETS.

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ABSTRACT

This experiment was designed to study the effects of broiler strain and dietary level of enzymes on growth performance. A total of 180 4-week-old broiler chickens (90 Ross 308 and 90 Cobb 500) were distributed over three experimental groups according to a 2 x 3 factorial design. There were three different experimental diets presented to chicks within each strain, Treatment 1 was the control diet containing 0.0% enzyme inclusion, Treatment 2 contained 0.01 % enzyme inclusion and Treatment 3 contained 0.015% enzyme inclusion. Initial body weight and final body weight gain during the finisher phase showed that chicks of Ross 308 recorded significantly higher initial weight and final body weight gain compared to chicks of Cobb 500 strain, whereas, birds fed 0.00% enzyme had higher growth performances compared to those that contain enzyme in their diet. Strain, enzyme level, and their interactions, had significant effects ($p < 0.05$) on all the growth parameters during the finisher phase. Values of total feed intake (TFI) during the finisher phase showed that birds of Cobb 500 recorded significantly higher TFI compared to birds of Ross 308 strain, while birds fed 0% enzyme consumed more feed than those that contain enzyme in their diet. Additionally, the cost of feed consumed and cost per kg of body weight presented no significant differences between strains, whereas enzyme level had a significant effect on the cost per kg of body weight.

Keywords: Broiler, Strain, Enzyme, Body weight, Diets

INTRODUCTION

The feed cost accounts for around 60–75% of the poultry processing cost (Ravindran, 2013). Hence, the effective use of feed ingredients and additives is essential to reduce the feed cost by lessening the feed needed to produce a certain amount of animal protein and fewer nutrients lost in the bird's excreta (Kalmendal and Tauson, 2012).

Additionally, it was reported that the addition of enzymes to poultry feed improves bird's productivity (Saleh *et al.*, 2005) and digestibility of corn-soybean meal-based diets, which in turn, induces less viscosity of ingested feed for broilers (Zanella *et al.*, 1999; Gracia *et al.*, 2003; Olukosi *et al.*, 2007; Cowieson and Ravindran, 2008).

Attia *et al.* (2008) reported that the addition of an enzyme mixture to dietary feed enhances the cost-effective efficiency of the chicken feed. Similarly, energy, protein, and calcium utilization in poultry were shown to be enhanced by using an enzyme mixture containing carbohydrases and proteases (Yang *et al.*, 2010).

Kalmendal and Tauson (2012) also observed that using a blend of enzymes improved the feed conversion ratio, compared to the control diet with no effect on body weight and feed intake.

However, the effects of exogenous enzymes can be variable and are dependent on a large number of factors such as the age of the bird and the quality and type of diet, and the method of supplementation (Bedford and Schulze 1998)

Overall, the supplementation of poultry feed rations with a mixture of multi-enzymes is considered one of the nutritional manipulation approaches to enhance the productive performance and health status of poultry.

MATERIALS AND METHODS

Experimental Site

This research was carried out at the poultry unit of the teaching and research farm of Department of animal production and health, Federal University Oye-Ekiti, Nigeria (7.7983N, 5.5145OE) and on altitude of about 250m above the sea level.

Experimental Animals and Management

90 each of the breed, (Cobb 500 and Ross 308) making a total of 180 broiler chickens were sourced at maturity (4 weeks old) from pre-existing flock at FUOYE Teaching and Research farm.. The birds were randomly allotted to three dietary treatments in a battery cage system. Treatment one (T1) served as the control group (received a diet containing 0.00% enzyme), birds in treatment two (T2) received 0.01% of enzyme, and those in treatment three (T3) received 0.015% enzyme.

Data collection

Records of feed intake and weight gain were kept throughout the experiment and the resultant feed conversion ratio was estimated. Weight gain for each animal was calculated by subtracting initial weight (g) from the final weight. While the conversion ratio was calculated by dividing the average feed intake (g) by the average weight gain (g).

Experimental Design and Statistical Analysis

The experimental design was completely randomized design (CRD) in 2×3 factorial arrangement. Data were subjected to the general linear model procedure of statistical analysis software to analyze for the interaction between breed and inclusion level on growth performance. The means were separated using Turkey's Honestly Significant Difference

RESULTS AND DISCUSSION

Table 2 shows the effect of broiler strains, enzyme level, and strain-enzyme level interaction on Growth performance and cost implications on broiler birds.

There was a significant effect of breed on the total weight gain (TWG) and the feed conversion ratio (FCR) on the birds fed with varying dietary levels of enzymes, the total weight gain of Ross 308 broiler birds was statistically higher (4.07kg) than that of Cobb 500 (3.97kg).

Also, the feed conversion ratio of Ross 308 broiler birds (1.10) fed varying dietary levels of enzymes was statistically lower than that of Cobb 500 (1.27).

On the Other hand, there was no significant enzyme level effect (0%, 0.01%, and 0.015%) on the growth parameters of the experimental broiler chickens fed varying dietary levels of the enzyme, only the cost per kg of feed consumed out of all the cost parameters was significantly affected.

A significant interaction ($p < 0.05$) between enzyme level concentration and broiler strains was observed in all the growth parameters of the experimental birds. The initial weight and final weight of the Ross 308 broiler breed were statistically higher than that of Cobb500 while birds fed with 0% enzyme level had higher weight gain than those fed with 0.01% and 0.015% of the enzyme. These results were in agreement with (Deif, 2008) who stated that the feed conversion ratio was significantly affected by studied strains (Hubbard, Ross, and Arbor acres)

Also, the feed conversion ratio during the finisher phase was significantly affected by strain, enzyme level, and their interactions.

Ross308 strain recorded significantly lower FCR compared to chicks of Cobb 500 strain, while, birds fed with 0% enzyme level had lower FCR than those fed with 0.01% and 0.015% of the enzyme. These results were in disagreement with Al-Rishan (2006) who stated that feed consumption was not significantly affected by studied strains (Hubbard, Ross, or Arbor Acres) during the starter phase.

However, no significant association was found between enzyme level concentration and broiler strains ($p>0.05$) on the cost of feed consumed and the cost per kg of body weight.

CONCLUSION AND RECOMMENDATION

From the findings of this study, it may be suggested that incorporation of enzyme in the diet of Ross 308 and Cobb 500 might not be necessary if the diet is not high in crude fiber, the significant effect of enzyme inclusion was only evident on the feed conversion ratio of the growing birds. Also, the inclusion of enzyme had no negative effect on the performance and health status of the broilers. Enzyme supplementation could therefore be recommended for appreciable growth performance of broiler chickens.

Table 1: Result Of Growth Performance As Affected By Strains, Enzyme Levels And Their Interaction

	AVIW G	AFW G	TW G	TFI	AF I	FC R	CPKGO F	COFI	AVCO FI	AWGP B	CPKGB W
BREED	NS	NS	*	NS	NS	*	NS	NS	NS	NS	NS
COBB 500	1.19	1.94	3.79	16.2 5	5.4 2	1.2 7	342.6	5564.9	1112.97	0.93	1197.83
ROSS 308	1.14	1.96	4.07	15.6 9	5.2 3	1.1 0	342.6	5375.0	1074.99	0.92	1168.16
ENZYM E	NS	NS	NS	NS	NS	NS	*	NS	NS	NS	NS
0.00%	1.20	1.99	4.76	16.2 1	5.4 0	1.1 9	342.3	5550.5	1081.11	0.95	1168.11
0.01%	1.12	1.93	4.54	15.8 8	5.2 9	1.1 4	342.6	5441.7	1083.49	0.91	1180.97
0.015%	1.18	1.93	4.59	15.8 1	5.2 7	1.2 3	324.7	5417.5	1088.35	0.92	1199.91
B * E	0.00	0.10	0.03	0.19	0.1 5	0.0 2	0.02	21471. 7	856.07	0.00	249.61
SEM	0.02	0.01	0.18	0.11	0.0 4	0.0 3	0.07	18.88	7.49	0.01	6.90

Level of significant ($P<0.05$)

NB: AVIWG: Average initial body weight, AVTWG: Average total body weight gain, TFI: Total feed intake, AFI: Average feed intake, TWG: Total weight gain, FCR: Feed conversion ratio,

CPKGOF: Cost per kg of feed, COFI: Cost of feed intake, AVCOFI: Average cost of feed intake
 AVWTGPB: Average weight gain per bird, CPKGBW: Cost per kg of body weight

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