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GROWTH RESPONSE OF BROILER STARTER CHICKENS FED BLOOD MEAL BASED DIETS SUPPLEMENTED WITH ALLZYME SSF® AS REPLACEMENT FOR FISHMEAL

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ABSTRACT

The growth response of broiler starter chickens fed blood meal-based diets with Allzyme SSF® supplementation (BMA) as replacement for fishmeal (FM) was investigated. One hundred and eighty (180) day-old broiler chicks were randomly allocated to 12 pens (15 birds per pen). Four iso-nitrogenous and iso-caloric diets were formulated. Treatment 1, was the control (without blood and fish meal). Treatment 2 contains 10% fish meal without blood meal (BM). Treatment 3 contains 5% BM with 100g Allzyme SSF® and 5%FM. Treatment 4 contains 10% BM with 100g Allzyme SSF® without FM. The four diets (replicated three times) were randomly allocated to the pens of broilers for 28 days. Daily feed intake of birds on 10% FM, 5% FM +5% BMA, `10% BMA were similar but significantly higher (P<0.05) than those on control diet. Daily weight gain (g/bird per day) of birds on 10% FM, 5% FM +5% BMA, `10% BMA were similar but significantly higher (P<0.05) than those on control. The feed to gain ratio between birds on the different diets were similar (P>0.05) to the control group. The result on feed cost of producing a kilogram of broiler shows that it is economically cheaper to produce a kilogram of broiler for birds on either 10% BMA or 10% FM diets compared to the control numerically. From this study, blood meal supplemented with Allzyme SSF can adequately replace fish meal in the diets of broiler starters.

Keywords: Growth response, Broiler chicks, Allzyme SSF® supplemented blood meal, Fish meal

INTRODUCTION

Animal protein content in diets of most Nigerians is very low and has reached a crisis level where average consumption of animal protein is estimated at 4.5g/head/day as compared with the minimum requirement of 35g/head/day (FAO, 2002). Over the years, the supply of protein concentrates to monogastric animals in Nigeria has been grossly inadequate. In an attempt to keep the livestock industry operational and also to supply the animal protein requirement of Nigerians; producers and indeed, researchers have often had to use other less known protein sources which at times led to disastrous results. Therefore, there is need to meet the challenges of shortage in animal protein intake especially poultry products. Fishmeal (FM) in most tropical countries are imported product; therefore, it is very expensive and often scarce. The fishmeal wastes obtained locally on the other hand is of inferior quality to the imported in terms of its crude protein content. There is therefore an urgent need to determine optimum levels of utilization and also investigate alternative ingredients that are close substitutes and easily available. Blood meal, an abattoir by-product is an excellent source of lysine and very rich in amino acid leucine but low in isoleucine. It's use in poultry rations is limited although it is known to contain high levels of protein and lysine (Njoku,1985). This study was designed to investigate the effect of replacing fishmeal with Allzyme SSF® supplemented blood meal-based diet on the growth performance of broiler starter chickens.

MATERIALS AND METHODS

Sources of experimental materials

Bovine blood was procured fresh at Kawo abattoir, Kaduna. The blood was properly boiled using aluminium cooking pot at 100°C for 45 minutes (Khawaja *et al*, 2007) and sundried to about 10% moisture content and ground into meal.

Experimental designs and dietary treatments

The growth response of broiler starter birds was evaluated in a 4-week feeding trial (0-4weeks) where diets containing BM was supplemented with Allzyme SSF® and use as replacement for FM during the starter phase. Four isonitrogenous (23.0% CP) and isocaloric (3000 kcal/kg ME) diets were least cost formulated to meet the NRC (2000) nutrient requirements for broiler starter birds. The enzyme used in this study was microbial phytase *Aspergillus niger* (Allzyme SSF®; Alltech Inc. Nicholasville KY) produced by solid state fermentation (SSF). The ingredient composition of the broiler starter diets is as shown in Table 1.

Table 1: Ingredient composition (%) of broiler starter diets containing blood meal-based diets with Allzyme SSF® supplementation as replacement for Fish meal (0-4 weeks)

	Diet 1	Diet 2	Diet 3	Diet 4
Ingredients	0%	10%FM	5%FM + 5% BMA	10% BMA
Maize	40.00	30.00	30.00	30.00
Wheat offal	10.00	10.00	10.00	10.00
Soya bean	25.86	26.24	26.24	26.24
Blood meal	-	-	5.00	10.00
Fishmeal	-	10.00	5.00	-
Bone meal	2.50	2.50	2.50	2.50
Limestone,	0.50	0.50	0.50	0.50
L-lysine	0.15	0.15	0.15	0.15
Dl-methionine	0.20	0.20	0.20	0.20
Vit. /Min. Premix	0.25	0.25	0.25	0.25
Salt	0.30	0.30	0.30	0.30
Allzyme SSF® (g)	-	-	100.00	100.00
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
Crude Protein, %	23.04	23.06	23.07	23.07
ME. Kcal/Kg	2812.80	2846.64	2866.04	2886.64
Ether extract, %	9.40	9.60	9.50	9.40
Crude fibre, %	4.33	4.45	4.45	4.45
Calcium, %	1.11	2.21	1.91	1.63
Available P, %	0.89	0.88	0.88	0.87
Lysine, %	1.23	1.28	1.28	1.28
Met + Cyst, %	0.87	0.96	1.06	1.26
Cost ₦/Kg	104.06	99.72	93.26	84.57

amin/ mineral premix (Animal Care.Optimix^{R}) Each 1.25kg supplied: Vit A 12,000,000 i.u., D_3 3000,000 i.u., Vit.k 2500mg, B_1, 200mg, B_2 500mg, B_6 3,500mg, Niacin 40,00mg, B_{12} 20mg, Pantothenic acid 10mg. Folic acid 1,000mg. Biotin 80mg, Choline chloride 200,000gm, Anti-oxidant 125,000mg, Manganese 70,000gm, Iron 40,000gm., Copper 8000mg, Iodine 1,200mg, Selenium 250mg, and Cobalt 250mg.
FM = Fish meal, BMA = Blood meal supplemented with Allzyme SSF

One hundred and eighty (180) day-old broiler chicks of mixed sexes were used for this experiment. The chicks were weighed at day-old and randomly allocated to 12 pens in groups of 15 birds per pen. Four diets were randomly allocated to the pens. Treatment 1. Was the control (without blood and fish meal). Treatment 2 contains 10% fish meal without BM. Treatment 3 contains 5% BM with 100g Allzymes SSF® and 5%FM. Treatment 4 contains 10% BM with 100g Allzyme SSF® without FM. Each treatment was replicated three (3) times with 15 birds per replicate in a completely randomized design.

Birds were fed and supplied water *ad libitum*. Weighed quantity of feed was given daily and leftover feeds were collected and weighed. The birds were weighed at the commencement of the experiment and at weekly intervals subsequently. The record of mortality and feed intake was kept.

Feed conversion, average daily gain, and feed cost per kilogram gain were calculated for the period.

Data analysis

Data collected from this study was subjected to Analysis of variance procedure. (ANOVA-Single factor) using "Analyse-it'' for Microsoft Excel (3.03) Standard Edition. Significant means were separated using the Duncan Multiple Range Test (1995) taking P <0.05 as level of significance.

RESULTS AND DISCUSSION

The performance of broiler chicks during the starter phase is as shown in Table 2. Daily feed intake of birds on 10% FM, 5% FM +5% BMA, `10% BMA were similar but significantly (P<0.05) higher than those on the control diet. This is contrary to the findings of Khawaja *et al*., (2007) who observed a decrease in feed intake in broiler when they were fed BM at 3% inclusion level. The increased in feed intake observed in this experiment could be attributed to Allzyme SSF® supplementation. The enzyme has increased the palatability of the diet and promoted its consumption. Similarly, daily weight gain (g/bird per day) of birds on 10% FM, 5% FM +5% BMA, `10% BMA were similar but significantly (P<0.05) higher than those on the control diet. This is also similar to the findings of Khawaja *et al*., (2007), who reported increased weight gain in broiler diets when fed with BM at 3% level of inclusion. The improvement in weight gain over the control in this study could be as a result of the Allzyme SSF® supplementation. Enzymes have been proved to increased nitrogen digestibility of maize and wheat offal (Wu *et al*., 2003). The feed to gain ratio between birds on the different diets were similar (P>0.05) to the control group. This is in conflict with the findings of Khan *et al*., (2006) who observed poor feed conversion by birds fed hamecoenzyme® enzyme-based diets compared to the control. While the feed cost per kilogram gain (N) was similar between birds on 10% FM ,10% EBM and the control which were significantly higher than those on 5% FM+5% BMA. The result on feed cost of producing a kilogram of broiler shows that it is economically cheaper to produce a kilogram of broiler for birds on either 10% BMA or 10% FM diets compared to the control numerically. Mortality was not recorded for birds on the control diet, but the percentage mortality of birds on diets containing 10% FM and 10% MBA were similar (P>0.05) and significantly (P<0.05) lower than those on 5%EBM +5% EBM

Table 2: Performance of broiler chicks fed blood meal-based diets with Allzyme SSF® supplementation as a replacement for fish meal (0-4 weeks).

Parameter	0	10%FM	5%BMA+5%FM	10%BMA	SEM†
Initial weight (g/bird)	40.15	40.21	40.16	40.15	0.0
Final weight (g/bird)	900.00^{b}	982.00 ^{a}	990.00^{a}	986.67^{a}	17.50
Daily weight gain (g/bird)	30.70^{b}	33.37^{a}	33.90^{a}	33.80^{a}	0.20
Daily feed intake (g/bird)	77.50^{b}	87.97^{a}	90.07^{a}	85.20^{b}	1.35
Feed to gain ratio	2.53	2.60	2.67	2.53	0.50
Feed cost/kg gain (₦)	210.27	206.62	234.27	205.90	-
Mortality (%)	0.00^{a}	20.00^{b}	30.00^{a}	20.00^{b}	2.50

Means within rows with different superscripts differ significantly (P<0.05)
SEM† = Standard error of mean, (g/bird) =gram per bird, % = percentage

CONCLUSION

From the findings in this study, it can be concluded that:

1. The daily weight gains of birds on 10% FM, 5% FM + 5%BMA and 10%BMA were similar (P>0.05) and better when compared to the control.
2. There is no difference (P>0.05) in feed cost/kg gain (₦) of bird's group on FM and BM based diets supplemented with Allzyme SSF®.

RECOMMENDATION

From this study, the BM based diets supplemented with Allzyme SSF® can be used for broiler starter diets in place of fish meal on economic basis.

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