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ECONOMICS OF PRODUCTION OF STARTER BROILER CHICKENS FED GRADED LEVELS OF *MULTIGRAIN ENZYME*-SUPPLEMENTED RICE HUSK AS A REPLACEMENT FOR MAIZE

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ABSTRACT

This study was conducted to investigate the effects of different levels of multigrain-supplemented rice husk as a replacement for maize in the diet of starter broiler chickens. A total of 150 day-old broiler chicks were used in a completely randomized design comprising of five treatments (T1, T2, T3, T4 and T5) where rice husk supplemented with *multigrain* enzyme replaced 0%, 25%, 50%, 75% and 100% of maize respectively. There were three replicates per treatment with ten birds per replicate. Feed intake, weight gained, feed conversion ratio, feed cost, feed cost per kilogram weight gained, revenue and profit were determined. All data collected were subjected to ANOVA using Statistical Package for Social Science. Treatment means were separated using Duncan Multiple Range Test. Results show a decrease in the cost of feed as rice husk inclusion level increases. Treatments T3, T4, and T5 were not significantly different ($P>0.05$) in their effects on feed intake and feed cost per bird while treatments T1 and T2were significantly higher. The FCR for treatment T2 was significantly lowest among the treatments. There were no significant differences ($P>0.05$) among the treatments in their effects on feed cost per kilogram weight gained, revenue and profit. It was concluded that treatment T2 (25% replacement of maize) with significantly lowest FCR was better than other treatments. Therefore, it was recommended that multigrain- supplemented rice husk can replace 25% of maize in the diets of starter broilers.

Key words: Broiler, Economics, Feedstuffs, *Multigrain*, Rice husk

INTRODUCTION

Poultry production has a relatively short gestation period on investment as it offers quick returns on investment. It also has high feed conversion ratio compared to other livestock species. Poultry meat is one of the cheapest, commonest and the best source of animal protein and it contributes about 10% of the national meat production. Thus the place of poultry industry in both economic transformations of rural households farming and national economy at large cannot be overemphasized (Ajighjigh, 2018). Poultry business offer the farmers the unique privilege of employing inputs such as labour, capital, raw materials and land in the least cost and most efficient manner to produce affordable marketable commodities. Feed accounts for about 70% of the total cost of poultry production (Olugbenga *et al*., 2015). Therefore, the cost of feed will affect to a large extent the economics of production of poultry business.The search for cheaper source of feedstuff has brought about the use of nonconventional feedstuffs like BDG, Rice husk, cashew nut meal etc. Rice husk is the outermost covering of the paddy grain. Rice husk is obtained during milling of the paddy rice and it is about 20% of the paddy weight. Rice husk is available in abundance in rice growing parts of Nigeria where it presently constitutes a nuisance to the environment (Belewu, 1998). It is highly fibrous and this has hampered its use in monogastric nutrition. Alabi *et al*. (2014) and Adeniji (2010) observed that an increase in the dietary level of rice husk significantly ($P<0.05$) decreased weight gain and nutrient digestibility and increased feed conversion ratio. This has necessitated the use of exogenous enzymes. Exogenous enzymes have the potential to release entrapped nutrients or energy in fibrous feedstuffs thereby lowering the inclusion level and cost of conventional feedstuffs. This study was therefore designed to investigate the effects of different levels of rice husk supplemented with *multigrain* enzyme on economics of production of starter broilers.

MATERIALS AND METHODS

The study was carried out at the Livestock Teaching and Research farm of Federal University of Agriculture, Makurdi. Rice husk was collected immediately after its production from the milling machine at rice mill factory, Wurukum, Makurdi. Multigrain enzyme was obtained from feed additives' supplier from Lagos, Nigeria and was produced by DSM Nutritional Company. It composed of xylanase, β-glucanase, cellulase and xyloglucanase. Five broiler starter diets were formulated comprising of a control (T1) and four experimental diets as shown in table 1. One hundred and fifty-day old broiler chicks were randomly allocated to five treatments with three replicates each in a completely randomized design. All necessary vaccinations and medications were carried out as well as good biosecurity measures. Feed and water were given *ad libitum* to the birds and the study lasted for four weeks. Parameters collected were feed intake, weight gained, cost of feed, feed cost per kilogram weight gained, revenue and profit. Feed conversion ratio was also calculated. All data collected were subjected to analysis of variance suitable for completely randomized design using Statistical Package for Social Science (SPSS, 2011). Significant differences between treatment means were determined using Duncan Multiple Range Test (Duncan, 1955).

Table1. Composition of Experimental Diets

Ingredient	T1(%)	T2(%)	T3(%)	T4(%)	T5(%)
Maize	40	30	20	10	0
Rice husk	0	10	20	30	40
Full fat Soya	27	26.5	25.7	25.5	24.5
Groundnut Cake	22.2	24.2	26.5	28.2	30.7
Maize offal	7	5.5	4	2.5	1
Bone	2	2	2	2	2
Limestone	1	1	1	1	1
Lysine	0.1	0.1	0.1	0.1	0.1
Methionine	0.15	0.15	0.15	0.15	0.15
Salt	0.3	0.3	0.3	0.3	0.3
Broiler Premix	0.25	0.25	0.25	0.25	0.25
Multigrain	0	0.012	0.012	0.012	0.012
Total, %	100	100.012	100.012	100.012	100.012
Calculated Analyses					
Crude Protein,%	23.28	23.27	23.28	23.25	23.27
ME, Kcal/Kg	2951.7	2726.3	2499.25	2275.5	2047.35
Ether Extract,%	7.32	6.95	6.53	6.21	5.76
Crude Fibre,%	5.3	7.75	10.21	12.66	15.12
Lysine,%	1.16	1.16	1.15	1.15	1.14
Methionine,%	0.45	0.44	0.43	0.42	0.41
Calcium,%	1.11	1.11	1.11	1.11	1.11
Available Pho.,%	0.59	0.56	0.54	0.51	0.48

ME: Metabolisable Energy

RESULTS AND DISCUSSION

Table 2 shows the effects of the treatments on economics of production of the starter broilers. The cost of feed decreased as the inclusion level of rice husk increases from ₦262.51 (T2) to ₦193.77 (T5). This can be attributed to the low cost of the material as it is a waste in rice milling factory. Feed intake increases as the inclusion level of rice husk increases in the diets although there were no significant differences (P> 0.05) in treatments T3, T4 and T5. Treatments T1 and T2 were significantly lower (P< 0.05) than other treatments. This is due to the need for birds to obtain more energy from the feed. This finding is similar to the findings of Alabi *et al*. (2014). Atteh (2003) opined that birds eat to satisfy energy requirement and this may be attributed to increase in feed intake observed in this study. The feed cost per bird (₦) for treatment T3 was significantly higher (p<0.05) than that for other treatments. Treatments T1, T2, T4 and T5 were not significantly different (p>0.05) in their effects on feed cost per bird. Feed cost is a reflection of the cost of materials and an increase in inclusion of rice is expected to reduce cost of feed. This is because of its cheap price compared to maize that is being substituted.

Table 2: **Effects of Different Levels of Multigrain-Supplemented Rice Husk on Economics of Production of Starter Broiler Chickens (0-4 Weeks)**

	Treatments						
Parameters	T1	T2	T3	T4	T5	P Value	
Cost of Feed (₦/Kg)	283.63	262.51	239.51	216.89	193.77	NA*	
Av. Feed Intake/bird (g)	1.02^{b}	1.04^{b}	1.46^{a}	1.53^{a}	1.57^{a}	0.439	NS
Feed Cost/Bird (₦)	289.30^{b}	272.14^{b}	350.48^{a}	332.56^{b}	303.57^{b}	0.11	NS
Total Cost of Production (₦)	413.29^{b}	396.13^{b}	474.47^{a}	456.55^{b}	427.56^{b}	0.11	NS
Final Weight (g)	0.53	0.69	0.68	0.70	0.68	0.186	NS
FCR	2.07^{a}	1.63^{b}	2.31^{a}	2.39^{a}	2.52^{a}	0.191	NS
Feed Cost/Kg Weight Gained (₦)	585.96	425.7	553.97	518.06	488.1	0.056	NS
Revenue (₦)	666.67	866.67	854.17	875	854.17	0.186	NS
Profit (₦)	253.37	470.54	379.69	418.45	426.6	0.135	NS

a,b: Means in the same row with similar superscript are not significantly different (P> 0.05)
SEM: Standard Error of Mean, NA: Not Analyzed, NS: Not significant, FCR: Feed Conversion Ratio

Similar trend was observed for total cost of production. There were no significant differences between the treatments in their effects on feed cost per weight gained. Similarly, there were no significant differences between the treatments in their effects on revenue (₦) and profit (₦). The FCR was significantly lowest (P> 0.05) for treatment T2. This value for treatment T2 may be ascribed to the effect of the multigrain enzyme. According to Atteh (2001) exogenous enzymes are known to improve the digestibility of fiber feedstuffs. However, the higher values of FCR obtained in treatment T3, T4 and T5 may be due to the fact that the quantity of rice husk may have subdued the effect of the enzyme especially as the fiber level increases and the active sites of the enzymes are fully exhausted. The results of this study show that replacement of maze with rice husk in the diets of starter broilers has no significant effect on the profit margin of starter broiler production especially beyond 25% inclusion level. This may be attributed to the effect of the enzyme. The efficacy of exogenous enzymes depends on factors like profile of the enzymes, activity of the enzymes, pH, temperature and presence of specific substrate (McCleary,

2001). The activity of the enzyme can determine to a large extent the amount of substrate that can be degraded by the enzyme. The non-significant difference observed in this study for some of the parameters may be attributed to the quantity of fiber fractions in the rice husk.

CONCLUSION AND RECOMMENDATION

The findings of this study indicate that replacing maize with rice husk in the diets of starter broilers beyond 25% has detrimental effect on the profit margin. It could be seen that an increase in replacement level beyond 25% has no significant effect on parameters measured with same level of enzyme. Based on the FCR, it is hereby recommended that multigrain-supplemented rice husk can replace 25% of maize in the diets of starter broiler chickens. The findings of the study suggest that as the fiber level of feed increases, there may be the need to also correspondingly increase the level of enzyme.

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