
PERFORMANCE AND COST BENEFITS OF USING RICE BRAN IN BROILER CHICKENS DIETS

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ABSTRACT

There is currently a continuous increase in prices and scarcity of conventional feed ingredients used in poultry feed production. Wheat offal has remained the chief fiber source in poultry diets. The demand for wheat offal as conventional fiber source by the poultry feed millers coupled with its low production locally has placed additional constraints on its continual use in poultry diets. This research was therefore conducted to evaluate the performance and cost benefits of broiler chickens fed dietary levels of rice bran at the Poultry Research Unit of Bauchi State College of Agriculture, Bauchi. Three experimental diets were formulated at both starter (23%,cp) and finisher (20%,cp) phases. Rice bran was included at 0, 50 and 100% coded as diets 1, 2, and 3 respectively. One hundred and twenty unsexed Anak broiler chicken strain were used. The birds were brooded for seven days during which commercial broiler starter diet was fed to them. Feed and water were given ad-libitum. After a week brooding period, they were randomly allotted to the three dietary treatments, each treatment was replicated four times with ten birds per replicate in completely randomized design. Performance parameters measured at the starter and finisher phases were not significantly affected ($P>0.05$) by the dietary levels of rice bran. Feed cost in (N) per kg diet, per bird and per kg gain were decreasing with an increasing level of rice bran with birds fed 100% rice bran found to be cheaper. High cost saving (N 39.86. 00) and percent cost saving 10.6% were also observed with birds fed diet three 100% rice bran. It is therefore concluded that rice bran is a suitable alternative to wheat offals as fiber source in broiler chickens diet with concomitant reduction in feed cost.

Keywords: Performance, Carcass, financial benefits, rice bran, wheat offals

INTRODUCTION

The shortage of protein particularly of animal origin in human diets in all parts of Africa and most developing countries of the world has been well documented (Shaahu *et al.*, 2022). They also stated nutritional status (Nigerian inclusive) is marked by inadequate protein intake both in quality and quantity. FAO has recommended that one third of the daily protein intake should be of animal origin. The total dietary protein for a healthy adult with minimal physical activity is currently 0.8g per kg body weight per day while total protein requirement of 52g is recommended (Akinduro *et al.*, 2022). Therefore adequate consumption of high quality protein from animal products is essential for optimal growth, development and health of humans (Akinduro and Asaniyan, 2022). The development of poultry industry has been described as the fastest way of ameliorating animal protein deficiency in the third world countries due to the short generation interval of domestic fowl their high feed utilization efficiency and ease of management (Depeolu *et al.*, 2004). High cost of feed and day old chick limit the opportunity and advantages of poultry production in Nigeria (Bello *et al.*, 2005). Sugihirto (2019) stated poultry production such as broiler chickens, feed has been a major cost accounting about 70% of the total production cost. Currently, there is a continuous increase in prices and scarcity of conventional feed ingredients used in poultry feed production. One of these ingredients is wheat offal. Wheat offal has remained the chief fibre source in poultry diets. The demand for wheat offals as conventional fibre source by the poultry feed millers coupled with its low production in the country (Summan *et al.*, 2017) there is also high cost of wheat importation due to high rate of naira (₦) devaluation these have resulted in increase of this ingredient by about 500% for the passed 10 years. A bag of 50kg wheat offal was sold at ₦ 2,000.00 in 2014 but now it is sold at ₦ 10,000 per the same kg bag. These has places additional constraints on its continual use in poultry diets. Therefore, there is the need towards looking for cheap, easily available fibre source like rice bran that could help to meet the nutrition requirement of the birds.

MATERIALS AND METHODS

Experimental site

This experiment was conducted at the Poultry Research Unit of Bauchi State College of Agriculture, Bauchi State, Nigeria.

Experimental diets and design

Three experimental diets were formulated for starter (23%) cp (Table 1) and finisher (20%) cp (Table 2) phases. Rice bran was included at 0, 50 and 100% levels coded as diets 1, 2 and 3 respectively for both starter and finisher phases. The design of the experiment was completely randomized design (CRD).

Table 1: Ingredients and percentage composition of dietary levels of rice bran fed to broiler chickens at the starter phase (2 – 4 weeks)

Ingredients	Diet 1 (0%)	Diet 2 (50%)	Diet 3 (100%)
Maize	47.13	45.47	41.80
Soya bean meal	33.47	35.13	38.80
Wheat offal	10.0	5.00	0.00
Rice bran	0.00	5.00	10.00
Fish meal	5.00	5.00	5.00
Bone meal	2.00	2.00	2.00
Limestone	1.50	1.50	1.50
Common Salt	0.25	0.25	0.25
Premix	0.25	0.25	0.25
Lysine	0.20	0.20	0.20
Methionine	0.20	0.20	0.20
Total	100	100	100
Crude protein (%)	23.00	23.00	23.00
ME (Kcal/kg)	2922.57	2923.4	2912.28
Crude fibre (%)	4.19	4.81	5.49
Calcium (%)	1.68	1.68	1.69
Phosphorus (%)	0.90	0.86	0.85
Ether extract (%)	8.48	9.17	10.13

Table 2: ingredients and percentage composition of dietary levels of rice bran fed to broiler chickens at the finisher phase (4 – 6 weeks)

Parameters	Diets		
	1(0%)	2(50%)	3(100%)
Maize	50.53	48.03	45.53
Soya bean meal	28.07	30.57	33.07
Wheat offal	15.00	7.50	0.00
Rice bran	0.00	7.50	15.00
Fish meal	2.00	2.00	2.00
Bone meal	1.50	1.50	1.50
Limestone	2.00	2.00	2.00
Common Salt	0.25	0.25	0.25
Premix	0.25	0.25	0.25
Lysine	0.25	0.25	0.20
Methionine	0.25	0.25	0.20
Total			
Crude protein (%)	20.00	20.00	20.00
ME (Kca/kg)	2857.00	2850.00	2843.00
Crude fibre (%)	4.27	5.21	6.14
Calcium (%)	7.69	9.71	9.74
Phosphorus (%)	1.49	1.49	1.49
Ether extract (%)	0.89	0.81	0.76

Experimental birds and their management

One hundred and twenty (120) day old Anak broiler strain were procured from Ibadan Nigeria. The birds were brooded for seven days during which commercial feed (vital) was fed to them. After a week brooding period the birds were randomly allotted to three dietary treatments. Each treatment was replicated four times and ten per each replication. Feed and water were given *ad-libitum*. All necessary vaccinations were dully observed when due.

Parameters measured and data analysis

Data on feed intake were taken on daily basis while weight gain was recorded weekly. Feed conversion ratio was calculated. All data generated were subjected to analysis of variance (Anova). Data on cost of each ingredient used for the formulation, cost of feed per kg diet, cost of feed per bird and per kg gain were computed. Cost saving and percentage cost saving were also calculated.

RESULTS AND DISCUSSION

The results on performance of broiler chickens fed dietary levels of rice bran base diets as replacement for wheat offal are presented in Table 3. The starter and finisher final weights were not significantly influenced by the dietary levels of rice bran. However, the values ranged from 575.62 – 588.09g, 1660.62– 1709.21g for starter and finisher respectively. These findings agreed with the report of Duru and Dafwang (2010) in which rice offal was fed to broiler chickens up to 15% and there was no any adverse effect on their performance attributes. The daily feed intake obtained in this research was not significantly affected by varying levels of rice bran. Although the intake at the starter phase was 69.13 – 72.00g, finisher 128.36 – 135.33g. Similar findings was reported by Misha *et al.* (2022), they stated non significant difference was observed between broiler chickens fed dietary levels of rice bran. The results on daily weight gain in this experiment revealed no significant influence among the three dietary treatments. The values obtained at the starter and finisher ranged from 21.22 – 22.29g, 38.75 – 40.04g respectively. There was not statistical difference exist between the three dietary treatments in relation to feed conversion ratio at both starter (3.14- 3.37) and finisher phase (3.25 - 3.38). Contrary to these findings Misha *et al.* (2022) reported significant difference exist between broiler chickens feed varying levels of treated rice bran based diets. The difference could be as a result of the treatment done.

Table 3: Performance of broiler chickens fed dietary levels of rice bran based diets at the starter finisher

Parameters	Diets			SEM
	1(0%)	2(50%)	3(100%)	
Initial weight(g)	120.00	135.00	130.00	4.79 ^{NS}
Starter Final weight (g)	588.09	583.35	575.62	27.20 ^{NS}
Daily feed intake (g)	70.18	72.00	69.13	5.96 ^{NS}
Daily weight gain (g)	22.29	21.35	21.22	1.46 ^{NS}
Feed conversion ratio	3.14	3.37	3.26	0.25 ^{NS}
Mortality (number)	2	2	1	-
Finisher phase (5 – 6 weeks)				
Finisher Initial weight(g)	588.09	583.35	575.62	27.20 ^{NS}
Finisher Final weight (g)	1709.21	1696.35	1660.62	68.40 ^{NS}
Daily feed intake (g)	135.33	129.21	128.36	7.74 ^{NS}
Daily weight gain (g)	40.04	39.75	38.75	2.36 ^{NS}
Feed conversion ratio	3.38	3.25	3.31	0.19 ^{NS}
Mortality (number)	0	1	0	-

The feed cost in ₦/kg is decreasing with an increasing level of rice bran in the diet. Diets 1(0%) wheat offal bran haven ₦ 455.34 and 3(100%) rice bran (₦ 424.14). Similar trend was also observed with cost of feed in naira (₦) per bird and cost of feed in naira (₦) per kg gain. Higher cost saving ₦ 39.86 was found with broiler chickens fed 100% inclusion level of rice bran.

Table 4: Financial benefit of using rice bran in the diet of broiler chicken

Parameters	Diets		
	1(0%)	2(50%)	3(100%)
Total feed intake(g)	4,320.00	4,230.00	4,150.00
Feed cost (₦/kg)	455.34	437.65	424.15
Cost of feed (₦/bird)	1306.83	1234.17	1174.89
Total weight gain (g)	870	860	840
Cost of feed (₦/kg gain)	396.14	376.37	356.28
Cost saving(₦)	00.00	19.77	39.86
Percent cost saving	0.00	4.99	10.06

CONCLUSION AND RECOMMENDATION

Based on the study, rice bran is a suitable alternative fibre source in broiler chickens diet. It is therefore recommended that rice bran can be used upto 100% with no adverse effects on their performance attribute with reduction in feed cost.

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