

UTILIZATION OF RICE OFFAL AS A REPLACEMENT FOR WHEAT OFFAL AS DIETARY FIBRE SOURCE BY BROILER CHICKENS

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ABSTRACT

An experiment was conducted to evaluate the response of broiler chickens to dietary levels of Rice offal as replacement to Wheat offal, using a completely randomized design. A total of three hundred (300) day-old *Cobb 500* broiler chicks obtained from a commercial hatchery were used for the experiment. Feed and water were supplied *ad lib* and the trial lasted for 4 weeks. In the experiments, Rice offal replaced Wheat offal as diet 1,2,3,4 and 5 respectively, as 0 (diet 1), 25 (diet 2), 50 (diet 3), 75 (diet 4), and (diet 5)100% levels. However, a synthetic enzyme, Roxazyme G, at 100g/kg feed was supplemented along with the offal. The Results showed no significant influence ($P < 0.05$) of diet on initial weight, total weight, final weight gain and feed conversion ratio. However, performance traits significantly ($P < 0.05$) differ among the diets on total feed intake, daily feed intake, daily weight gain and week 4 weight gain respectively. It was therefore concluded that Rice offal can replace Wheat offal with synthetic enzyme supplementation up to 100% level in broiler chicken diets without compromising performance.

Keywords: Commercial diets, Broiler chickens and performance.

INTRODUCTION

Poultry production is the management of some or other species of birds (as earlier enumerated) mainly for economic and nutritional purposes. These are domesticated birds reared for their flesh or meat. The production of table birds (broilers) has grown into a major industry in many advanced countries. However, it is more specialized than egg production (Oluyemi and Roberts, 2011). Hence, commercial table birds' industry is now largely based on broilers. These are fast growing birds which reach market weight of 1.8 to 2.0kg in eight or twelve weeks at most. They are referred to as meat chicken. Members of this group grow rapidly and attain market weight within two (2) to three (3) months of age. Depending on the size and age, a meat chicken can be further classified as fryer or a roaster. However, whether a fryer or a roaster, all meat chickens are generally called broilers. They are sold and eaten before they attain egg laying age. Alltech, (2018), also referred to castrated male chickens as capons.

Sorghum, millet, maize offal, rice bran and wheat offal, millet bran, spent sorghum grain and broken rice could be recommended as alternative sources of feed ingredients in poultry diets. (Medugu *et al.*, 2011). Several workers have emphasized the need for utilizing alternative feed ingredients removed from human and industrial uses (Durunna *et al.*, 1999; Fanimu *et al.*, 2007; and Nsa *et al.*, 2007).

MATERIALS AND METHOD

Experimental Site

The experiments were carried out at the Poultry Unit, Teaching and Research Farm, Abubakar Tafawa Balewa University, Bauchi. The town, Bauchi, is located within the southern guinea savannah on latitude 10.31 N and longitude 9.84 E. It is 616 metres above sea level characterized a rainy season that commences in May and terminates in October and a dry season that starts in November and ends in April. Mean annual rainfall is 1009 mm,

highest relative humidity 94% (August) and the lowest 35% (February). Temperatures are between 13-17°C (December – February) and 36 – 37°C (March – April) (World Atlas, 2015).

Experimental diets

Five experimental starter diets containing 23% CP were formulated. Diet 1 which served as the control contained 0% rice offal, while diets 2, 3, 4 and 5 contained 25, 50, 75 and 100% levels of rice offal as replacement for wheat offal. The ingredients were measured out and mixed using a feed mill mixer to ensure homogeneity. Percentage composition of graded levels of rice offal for wheat offal in broiler starter diets are presented in Tables 1.

Table 1: Ingredients Composition (%) and Calculated Analysis of Dietary Levels of Rice Offal Supplemented with Raxozyme® Fed to Starter Broilers (1- 4 weeks)

Ingredient	Diets				
	1	2	3	4	5
Maize	47.90	47.90	47.90	47.90	47.90
Full-fat soya bean	19.23	19.23	19.23	19.23	19.23
Groundnut cake	14.37	14.37	14.37	14.37	14.37
Wheat offal	10.00	7.50	5.00	2.50	0.00
Rice offal	0.00	2.50	5.00	7.50	10.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Bone meal	2.50	2.50	2.50	2.50	2.50
Limestone	1.00	1.00	1.00	1.00	1.00
Salt (NaCl)	0.25	0.25	0.25	0.25	0.25
Premix* (Starter)	0.25	0.25	0.25	0.25	0.25
Methionine	0.30	0.30	0.30	0.30	0.30
Lysine	0.20	0.20	0.20	0.20	0.20
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis (%)					
ME (Kcal/kg)	2840.00	2851.00	2862.00	2873.00	2884.00
Crude Protein	22.98	22.83	22.72	22.61	22.50
Crude Fibre	3.62	3.72	3.82	3.92	4.02
Ether Extract	6.76	6.99	7.22	7.45	7.67
Calcium	1.61	1.60	1.59	1.58	1.57
Phosphorous	0.73	0.74	0.75	0.76	0.77
Methionine	0.64	0.65	0.66	0.67	0.68
Lysine	1.28	1.28	1.29	1.29	1.30

ME; Metabolizable energy

Experimental Design

The birds were weighed to determine their initial weights and randomly allotted to five experimental diets in 3 replicates of 20 birds each in a completely randomized design (CRD). (Steel and Torrie, 1990).

Experimental birds and their management

A total of three hundred (300) day-old Cobb 500 broiler chicks obtained from a commercial hatchery were used for the experiment. Prior to the commencement of the experiment, the study pens were cleaned washed, disinfected and fumigated. Similar treatment was also made on the feeders, drinkers and other equipment. A week after, wood shavings were spread on the floor of the experimental pens to a depth of approximately 3 inches. Adequate heating/lighting facilities, feeders, and drinkers were also provided.

After brooding the chicks for 2 weeks, where all recommended vaccinations were also made, the birds were weighed to determine their initial weights. Feed and clean drinking water were

served ad libitum throughout the 56-day trial period. Birds were also given the second dose of Infectious Bursal Disease vaccine (Gumboro vaccine) (Booster) on the 21st day and another of NCDV a week after. All vaccines and drugs were orally administered.

Data Collection

Performance parameters

Feed consumption, weight gain, feed conversion ratio, daily weight gain, initial weight and final weight were the performance parameters monitored during the study period. Initial live weights of chickens were taken at the beginning of experiment, thereafter, weekly weights were determined. These were in turn used to calculate the daily weight gain (DWG). Daily mean feed intakes were also determined by subtracting the weight of left-over feed from the quantity offered the previous day. Feed conversion ratio on the other hand, was calculated from the relationship; $FCR = FI/WG$

Where FCR= feed conversion ratio, FI= feed intake and WG= weight gain.

Mortalities were recorded for each treatment throughout the feeding trial

RESULTS AND DISCUSSION

The performance of broiler chickens fed dietary levels of rice offal as replacement for wheat offal were presented in Table 2. Results for productive performance did not reveal any significant influence of diet, except for body weight at 4 weeks. Initial weight of birds ranged between 233.33 g on diets 2 and 4 to 246.67 g on diet 5. Body weight of broiler chickens at the end of starter phase (4 weeks) was significantly ($P<0.05$) lower on diet 1 (645.13 g) than on all other diets (711.85 – 737.15 g) which were the same

During the starter phase, daily feed intake and daily weight gain were significantly ($P<0.05$) affected. Daily feed intake was higher on diets 3 (52.45 g) and 4 (51.57 g) and lower on diet 1 (45.45 g). However, diets 2 (49.23 g) and 5 (49.91 g) did not differ from 1, 2 and 3. Daily weight gain was lower ($P<0.05$) on diet 1 (14.50g) and higher on other diets (17.08 – 17.52 g). Feed conversion ratio, 2.82 to 3.15 on diets 2 and 1 respectively, did not differ among diets, while mortalities of 2 (diet 1), 2 (diet 2), 1 (diet 3) and 1 (diet 5) birds were recorded during this growth segment. The significant ($P<0.05$) effect of diet on total feed intake, daily feed intake and daily weight gain obtained in this experiment, supports the findings of Supriyati *et al.* (2015) using fermented rice bran in broiler chicken diets. The decreased feed intake in the rice bran based diets could be attributed to the higher crude fibre content of the diet. According to Gonzalez-Alvarado *et al.* (2007), increased crude fibre content of the diet decreases feed consumption of broiler chickens.

Table 2: Performance of Broiler Chickens Fed Diets Containing Rice Offal as Replacement for Wheat Offal (g/bird)

	Replacement for Wheat Starch (g/kg)					
	Diets					
Parameters	1	2	3	4	5	SEM
Productive performance						
Initial weight (g)	239.17	233.33	235.83	233.33	246.67	9.53 ^{NS}
Week 4 weight (g)	645.13 ^b	722.22 ^a	714.58 ^a	711.85 ^a	737.15 ^a	14.53*
Total weight gain (g)	884.30	955.56	950.41	945.18	983.82	98.03 ^{NS}
Starter phase (1 – 4 weeks)						
Total feed intake (g)	1272.60 ^b	1378.44 ^{ab}	1468.60 ^a	1443.96 ^a	1397.48b	57.31*
Daily feed intake (g)	45.45b	49.23ab	52.45a	51.57a	49.91ab	2.81*
Daily weight gain (g)	14.50b	17.46a	17.09a	17.08a	17.52a	1.00*
Feed conversion ratio	3.15	2.82	3.08	3.03	2.85	0.27 ^{NS}
Mortality (No.)	2	2	1	0	1	-

^{abc}Means bearing different superscripts within the same row differ; * = ($P<0.05$); NS= Not significant; SEM = Standard Error of Means

CONCLUSION AND RECOMMENDATION

Based on the results obtained in this study, it was concluded and recommended that; Rice offal can replace dietary wheat offal in broiler chicken rations without any deleterious effect on performance parameters. Rice offal supplemented with enzyme can replace wheat offal in broiler chicken diets up to 100% without adverse effect on performance, therefore Rice offal can be used in place of wheat offal in broiler starter ratios. Raxozyme G® enzyme is recommended at inclusion level of 100g/kg feed in broiler chicken diets at starter phase.

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