



Effect of Replacing Maize with Brewer's Dried Grain in Broiler Finisher Diet

¹M. O IRONKWE AND ²A. M. BAMGBOSE

¹Department of Animal Science and Fisheries

University of Port Hartcourt, Port Hartcourt

²Department of Animal Nutrition

University of Agriculture, Abeokuta

ABSTRACT

The experiment was carried out using two hundred 4 weeks old broiler finisher birds to evaluate their response to diet with different levels of brewers dried grain (BGD). The diet was made to replace maize with brewer's dried grain at 0%, 25%, 50%, 75% and 100% to form treatment diets, 1,2,3,4, and 5 respectively. The formulated rations were made in such a way that other ingredients apart from maize and brewer's dried grain remained the same. The two hundred 4 weeks old broiler birds of Anak ® strains were allotted in a completely randomized Design into five treatment groups. Each treatment had 40 birds, which was replicated two times with 20 birds each. The experiment lasted for eight weeks with feed and water provided ad-libitum. Results showed significant differences in the birds growth performance, birds in T₃ had the most superior ($P < 0.05$) final live weight, daily weight gains and feed conversion ratio, followed by T₂, T₄ and T₅. The least value was obtained from birds in T₁. The daily feed intake showed a reverse trend, as birds consumption significantly ($P < 0.05$) improves as the level of maize increased in the diet, with the highest ($P < 0.05$) intake recorded for birds in T₁ (100% maize, the least value from birds in T₅ (100% brewer's dried grains), the least cost per kg of feed was obtained from diet (T₅), it decreased as the brewer's dried grain increased in the diet. Cost per kg weight gain showed a similar trend, and tended to favour birds fed higher levels of brewer's dried grain. The use of brewer's dried grain in broiler finisher diet should be encouraged as it gave promising results in terms of growth performance, better feed conversion and body weight gains.

Key Words: Effect, replacement levels, maize, brewer's dried grain, broiler finisher, diet.

INTRODUCTION

In the tropics, feeding the livestock and poultry industry has always posed a problem to the producers. This subsequently leads to the high cost of producing the highly needed animal's protein [1]. The high cost of production is as a result of the expensiveness of some major conventional feed ingredients which are competed for by both man and animals, [2]. Maize which is one of such costly feedstuff accounts for 45%-65% of poultry feed, thus animal nutritionist are making effort to source cheap and readily available feed materials that will replace or substitute the conventional feedstuff. This will significantly reduce the cost of animal production [3]. There is therefore need to search for non-conventional and less competitive feedstuffs for incorporation into the diets of livestock and poultry. Ologhobo [4], reported that a large number of feedstuffs with such enormous potentials abound in Nigeria, and one of such is the brewer's dried grain. Brewer's dried grain a by-product of the brewery industrial use for now. It does not form food for humans or have any other industrial use for now. It is usually dried and sold as feedstuff for livestock. Its nutrient contents vary from plant to plant depending on the type of grain used (Barley, wheat, corn etc). brewer's dried grain is an excellent source of quality by-pass protein and digestible fibre, with a good amino acid profile and it has high mineral and B-Vitamin content. Poultry and livestock production may continue to be ulcerative if costly conventional feedstuffs are not replaced with cheaper and available feedstuffs, [5]. It is therefore a recent trend among the animal nutritionist to use non-conventional feedstuffs in order to cut down on the cost of production which constitutes 60-70% of the total cost of production Ojeniyi et al [6]. Brewer's dried grain is relatively cheap, readily available with little or no competition between humans, farm animals and industries. The present study was therefore designed to determine the feeding value of brewer's dried grain as a replacement for maize in broiler finisher ration.

MATERIALS AND METHODS

The experiment was conducted at the Rivers State University Teaching and Research Farm.

Experimental Diets

Five experimental diets were formulated in such a way that apart from brewer's dried grain and maize, all other nutrient components remained the same as shown in table 1. Treatment 1, which serves as control did not contain brewer's dried grains (BDG) while the other diets were formulated in such a way that in treatments 2, 3, 4, and 5 maize was replaced with BDG in 25%, 50%, 75% and 100% respectively.

Management of Birds

Two hundred 4 week old broiler birds of Anak (R) strain were use for this experiment. The birds were reared in deep litter floor pens. All vaccinations were given before and during the experiment.

Experimental Design

At the beginning of the experiment, the birds were weighed and randomly allotted to five experimental diets in a completely randomized Design. Each treatment had 40 birds, replicated twice with 20 birds each.

Data Collection/Statistical Analysis

All data obtained were subjected to analysis of variance (ANOVA) and significant means among variables were separated using Duncan Multiple Range Test [7].

The birds were weighed at the beginning of the experiment and thereafter weighed weekly. Feed intake, feed gain ratio, protein efficiency, weight gain, feed cost were all monitored and recorded. The prevailing market price of the ingredients at the time of the study were used to calculate the cost of 1kg feed consumed and the cost of 1kg feed consumed/weight gain.

RESULTS AND DISCUSSION

Data obtained showed significant ($P < 0.05$) differences in the replacement levels among birds fed with diets containing different replacement levels of maize and brewer's dried grain in feed intake, feed gain ratio, protein efficiency, average weight gain, final live weight gain and feed cost per kg weight gain. The final live weight and average weight gain values of birds in diets 1, 2 and 4 were similar while values for birds in diet 3 were significantly ($p < 0.05$) higher than those of birds in the other treatments.

Table 1: Proximate Composition of maize and brewer's dried grain

Content	Maize	Brewer's dried grain
Dm (%)	91.25	89.56
Crude protein (%)	10.10	11.00
Crude fibre (%)	11.25	8.11
Ash (%)	6.11	6.23
Ether extract (%)	2.11	4.11
Nitrogen free extract	63.43	61.57

Table 2: Gross composition of experimental diet of brewer's dried grain with maize in broiler finisher diet

Ingredient (%)	T ₁ (0% BDG)	T ₂ (25% BDG)	T ₃ (50% BDG)	T ₄ (75% BDG)	T ₅ (100% BDG)
Wheat offal	60.00	60.00	60.00	60.00	60.00
Maize	12.00	9.00	6.00	3.00	0.00
Brewer's dried grain	0.00	3.00	6.00	9.00	12.00
Palm kernel meal	2.00	2.00	2.00	2.00	2.00
Soybean meal	20.00	20.00	20.00	20.00	20.00
Fish meal	2.00	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Table salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00

Calculated composition					
Cp %	21.25	21.55	21.85	21.15	22.45
Met. Energy (Kcal/kg)	3055.67	3092.00	3100.00	3120.00	3130.00
Crude fiber (%)	6.00	6.00	5.98	5.93	5.89

Table 3. Effect of Replacement of maize with brewer dried grain in broiler finisher diet. Performance characteristics Treatments

	T ₁	T ₂	T ₃	T ₄	T ₅
Initial weight (g)	631.38	635.44	633.21	631.44	632.10
Final body weight (g)	1.86 ^c	2.10 ^c	2.35 ^a	2.09 ^{bc}	2.25 ⁶
Daily feed intake(g)	95.08 ^a	93.74 ^a	81.14 ^b	73.98 ^c	76.50 ^c
Daily weight gain (g)	26.12 ^c	27.25 ^{bc}	30.62 ^b	27.20 ^{bc}	27.92 ^b
Feed gain ratio	3.64 ^b	3.44 ^b	2.65 ^c	2.72 ^c	2.74 ^c
Daily protein intake	1.51	1.52	1.50	1.53	1.55
Feed cost (₦/kg)	73.20 ^a	70.43 ^b	67.60 ^c	63.81 ^a	61.62
Cost lkg weight gain (₦)	266.45 ^a	242.18 ^b	179.14 ^c	173.56 ^d	168.84 ^c

abcde means weight the same row with different superscripts are significantly different from one another p<0.05.

The significantly higher life weight and weight gain in treatment 3 means that there exists some level of superiority. It then follows that for best growth performance maize can be replaced with brewer's dried grain at 1:1 ratio. The observed superior performance could be attributed to the diverse nutrients in the two feedstuffs, what is lacking in one feedstuff may be augmented by the other feedstuff. Generally, brewer's dried grain is reported to have better available protein, energy and ash composition than maize, wheat offal etc. [8,9]. This is in agreement with the results where birds fed Treatment 5, with 100% BDG have the best growth performance apart from birds in diet 3. Longe and Adetola [10]; Aletor [9]; Faniyi [11] have all recommended the inclusion of about 50% and above of brewer's diet grain in broiler diet. The feed intake showed a reversed trend as birds consumed significantly ($p<0.05$) higher feeds as the level of maize inclusion in the diet. Birds on diets 1 and 2 have a similar intake values that were significantly higher than birds in diet 3, and in turn was significantly ($P<0.05$) higher than birds in diet 4 and 5. The observed findings could be due to the palatability of maize in comprise with brewer's dried grain. Also since maize is associated with metabolisable energy, minerals, protein and relatively high fiber. Olomu, [12], in an experiment showed that poor quality feed encourages high feed intake for birds to meet their other nutrient requirement apart from energy.

The most favourable feed cost per kg weight gain was obtained for birds on diets 3, 4 and 5. The obtained values were statistically similar but significantly ($P<0.05$) lower than birds on diets 1 and 2. This indicates improved utilization of feed with higher brewer's dried grain inclusion. The seemingly poor performance, when maize level exceeded that of brewer's dried grain could be due to the high indigestible fiber content. Onifade and Babatunde [13] reported that high indigestible fiber content in a diet of broiler birds interferes with nutrient availability at the tissue level and deprives nutrients availability for growth and maintenance.

CONCLUSION

In conclusion, on cost basis, 100% replacement of maize with brewer's dried grain supported the lowest ($P<0.05$) production feed cost per kg weight gain. This implies that the highest replacement level of brewer's dried grain encouraged production of broiler meat at cheaper prices. It therefore follows that if the interest of a farmer is on production cost alone, the farmer may include brewer's dried grain to replace maize at 50% or completely in the broiler finisher diet. Brewer's dried grain could therefore be used as alternative energy source or best with maize, wheat offal at a ratio of 1: 1 in broiler finisher diet.

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