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Replacement Value of Rice Milling By-Product for Maize in Starter Broiler Chick Production

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Abstract

A total of 128 day-old Anak 2000 broiler chicks were used in a 28-day feeding trial in the poultry unit of Imo State University Teaching and Research farm to evaluate the effect of partial replacement of Rice Milling By-product (RMB) for Maize Meal (MM) on the performance of starter broiler chicks. The chicks were shared into four treatments having 0, 5, 10 and 15% RMB replacements 1,2,3 and 4 respectively and were further replicated four times in a completely randomized design. Feed and water supply to the birds were *ad libitum*. Scrupulous sanitation, appropriate medication, vaccination and other standard chick brooding conditions were applied. Liveweight of the birds were taken at the start of the experiment and subsequently on weekly basis while final liveweight was taken at the end of the experiment. Feed intake, weight gain, feed conversion ratio and cost benefits analysis were calculated. Results show that final liveweights 0.51, 0.50 0.47 and 0.42kg for chicks on 0, 5, 10 and 15% RMB respectively were significantly different ($p>0.05$) between treatments except for those on 0 and 5% RMB which were statistically similar ($p>0.05$). Liveweights were observed to reduce with increasing levels of RMB. Initial liveweight, daily weight gain and daily feed intake did not differ ($p>0.05$) between treatments. Cost benefits analysis showed significant ($p<0.05$) cost effectiveness as higher levels of RMB were added.

Keywords: Rice milling by-products, maize meal, starter broiler, chick production.

1.0 Introduction

In recent years, the Nigerian Poultry Industry has suffered tremendous setback arising from high cost of production notably the feed component, forcing many poultry farmers either to reduce scope of production or quit the business. Consequently, there is sub-optimal production of poultry products thereby widening the animal protein gap among Nigerians with its imminent protein malnutrition.

The high cost of feed has been traced to increasing costs of maize and pulses (mainly soya bean and groundnut), which are conventional sources of energy and protein respectively, (Onwudike and Omole 1994; Ngodigha 1993). The inadequate production of these crops, coupled with stiff competition for them between man and livestock have worsened the crisis.

Recently, agro by - products which hitherto were discarded as waste or sold at give away price are used as livestock feed. For instance Uko et al (2001) used cereal by- products as alternative energy sources to maize for rabbit production and discovered that maize and sorghum offal hadgood feeding value in addition to low prices. Faniyi (2002) used wheat offal and citrus pulp in broiler chick diets and got encouraging results. Ekenyem and Madubuike (2006) used *Ipomoea asarifolia* leaf to replace groundnut and reduced the cost of broiler production while Iheukwumere et al (2001) had used treated rice milling waste to assess nutrient digestibility, carcass yield and internal organ weights of finisher broilers and got high performance.

Rice milling by-products (RMB) are got from small scale rice mills that process parboiled rice by a method which combines husk removal and polishing to produce the clean grains. Rice mill by- products contain husk, bran polishing and small quantities of broken grains (Dafwang and Schwarmen 1996, Akunnisi 1991) while Awesu et al (2000) stated that rice meals and hulls are the two major by – products obtained from rice milling. The by – products are readily available, and usually discarded as waste products by burning (Akunnisi, 1991). The objective of this study is to evaluate the potentials of rice milling by products as a partial replacer for maize in starter broiler production, aimed at reducing cost and by extension making the product affordable for consumers. Rice Milling By-product appears to possess the potentials to replace maize in starter broiler diets.

2.0 Materials and Methods

2.1 Siting of the Experiment

The experiment was conducted at the poultry production unit of the Imo State University Teaching and Research Farm, Owerri, Nigeria, situated on longitude $7^{o}0'^{1}$ 06^{1}E and $7^{o}03^{1}00$E and latitude $5^{o}28^{1}24^{o}$N and $5^{o}30^{1}00^{1}$N.

2.2 Preparation of Experimental Diets

Rice milling by-products and other named ingredients were bought from Local dealers and used to replace maize meal weight for weight at levels 0, 5, 10 and 15% to form the experimental diets. Prior to that, the RMB was subjected to proximate analysis at the Biochemistry laboratory of the Federal University of Agriculture, Umudike, Nigeria, according to (AOAC 1995). The result (see Table 1) was the basis for experimental feed formation.

2.3 Procurement and Brooding of Chicks

A total of 140 day old Anak 2000 broiler chicks were bought from a local dealer from which 128 chicks were selected on the basis of apparent physical soundness and brooded for one week stabilization period before assigning them to various treatments. The dietary treatments having 0, 5, 10 and 15% RMB replacements respectively were replicated 4 times in a completely randomized design. Feed and water were supplied them ad libitum. Scrupulous sanitation, appropriate medication, vaccination and other standard chick brooding conditions were adopted.

Table 1 Proximate composition of rice milling by products.

Nutrient	Value
Dry matter %	90.00
Energy (Kcal/kg ME)	2860.00
Crude protein %	12.00
Etter extract %	12.50
Crude Fibre %	12.50
Mineral Composition	
Calcium	0.45
Potassium	0.50
Magnesium	0.60

Four Iso-nitrogenous and Iso-caloric broiler starter chick diets were compound (table 2) and fed the bird for four weeks.

3.0 Data Collection and Analysis

Initial live weight was measured at the start of the experiment and weekly thereafter while final live weight was measured at the end of the experiment with a salter weighing scale. Weight gain was calculated as final weight minus initial weight, daily weight gain was calculated as the weight gain divided by the number of

Table 2: Ingredient composition of the experimental starter diets.

Ingredients Treatment % RMB	0%	5%	10%	15%
Maize	35.00	30.00	25.00	20.00
RMB	0.00	5.00	10.00	15.00
Soyabean meal	26.00	26.00	26.00	26.00
Chad fish	11.50	11.50	11.50	11.50
Palm Kernel meal	14.00	14.00	14.00	14.00
Brewers dry grain	10.00	10.00	10.00	10.00
Salt	0.25	0.25	0.25	0.25
* Premix	0.25	0.25	0.25	0.25
Bone meal	3.00	3.00	3.00	3.00
Calculated Nutrient Composition of The Diets				
Crude protein	22.70	22.80	22.90	23.00
Crude fibre	6.80	7.20	7.75	8.28
Metabolisable energy (Kcal/kg)	2697.01	2668.31	2639.61	2610.91

* The premix per kg of feed contains = Vit. A 10,000 iu, Vit D_3 2,000iu, Vit E 5 iu, Vit k 2mg, riboflavin 4.20mg, Vit B_{12}o Panthothenic acid 5mg, nicotinic acid 20mg, folic acid 0.5mg, chlorine 3mg, mg 56mg, fe 20mg, cu 10mg, zn 50mg, co 125mg, iodine 0.8mg.

days. Feed intake was derived by subtracting daily left over feed from the amount of feed supplied, while feed conversion ratio was measured as feed intake divided by weight gain. Cost benefits analysis was also calculated. All data were subjected to one- way analysis of variance (Steel and Torrie, 1980) while significant mean differences were separated using the Duncan's multiple range test as outlined by (Onuh and Igwemma 1998).

4.0 Results

The result of the experiment (Table 3) shows that birds on control (0%) and 5% RMB were statistically similar ($p>0.05$) in the final liveweights of 0.51kg and 0.50kg respectively

Liveweight gain, feed intake, feed conversion ratio showed significant differences ($p<0.05$) between treatments but birds feed 0% and 5% RMB were not significantly different from each other (Table 3). The values of each parameter reduced with increasing levels of RMB.

Table 3: Final liveweight, Daily feed intake, feed conversion ratio and weight gain and cost benefit analysis of the experimental birds

Parameters	Percentage RMB replacement				
	0%	5%	0%	15%	SEM
Initial liveweight (kg)	0.14^{a}	0.14a	0.14a	0.15a	00
Final liveweight (kg)	0.51^{a}	0.510^{ab}	0.47^{bc}	0.42^{c}	0.005
Liveweight gain (kg)	0.37^{a}	0.36^{b}	0.33^{b}	0.27^{c}	0.004
Daily weight gain (kg)	0.02^{a}	0.02^{a}	0.02^{a}	0.01^{a}	0.00
Feed intake (kg)	0.41^{c}	0.42^{c}	0.56^{ab}	0.65^{a}	0.05
Daily feed intake (kg)	0.02^{a}	0.02^{a}	0.03^{a}	0.03^{a}	0.10
Feed conversion ratio (kg)	1.11^{c}	1.70^{c}	1.70^{b}	2.41^{a}	0.11
Cost benefit analysis	371.74^{c}	372.76^{c}	388.53^{b}	396.83^{a}	5.00

abc: means with different superscripts within same row are significantly different ($p<0.05$)

5.0 Discussion

The experimental chicks were uniform because initial liveweight of the birds in the various treatments were similar ($p>0.05$). However significant differences ($p<0.05$) observed in their final liveweights of 0.51, 0.50, 0.47 and 0.42kg for 0, 5, 10, 15% levels of RMB respectively, reduced with increasing levels of RMB, though, 0 and 5% levels were similar ($p>0.05$). The reducing trend on performance values could be attributed to higher fibre, which agrees with earlier reports Opara (1996), Ekenyem (2006) and Ekenyem and Madubuike (2006) that higher levels of fibre in monogastric animal diets depressed weight gain. Feed intake increased with increasing levels of RMB. Significant differences ($p<0.05$) were observed between treatment values as the birds on 10% and 15% consumed higher amounts than the birds on 0% and 5% levels thus suggesting higher acceptability of the feeds with increasing levels of RMB. This agreed with Isikwenu et al (2000), who showed that feed intake increased with increase in fibre contents. Feed conversion ratio and cost benefits analysis also showed significant differences ($p<0.05$) between their treatment means. However the cost benefits analysis showed reduced values of production cost, as more RMB was included in diets.

6.0 Conclusion

Though the experimental birds tolerated up to 15% level of RMB, the result showed that 5% level was optimal. Also, the replacement of RMB for maize reduced cost of production; made animal products affordable for consumers and in extension plays a leading role in resolving the animal protein gap in Nigeria.

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