



Effect of Replacement Levels of Maize with Plantain Peel in Broiler Finisher Diet

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ABSTRACT

The experiment was carried out to evaluate the response of broiler finisher birds fed diets with different levels of plantain peel (pp) compounded to replace maize at 0%, 25%, 50%, 75% and 100% to form treatment diets 1, 2, 3, 4 and 5 respectively. One hundred and fifty 4 week old broiler birds of Anak strain were allocated in a completely randomized design into five treatment groups. The experiment lasted for 8 weeks with feed and water provided ad libitum. Results showed significant difference in birds' growth performance. Birds in treatment 3 showed the most superior ($P < 0.05$) daily body weight gain, feed conversion ratio (FCR) and final body weight, followed by treatments 2, 4 and 5. The daily feed intake showed a reversed trend as birds consumption significantly ($P < 0.05$) improved as maize increased in the diet, with the highest ($P < 0.05$) intake recorded for birds in T₁ (100% maize) while the least value was for birds in T₅ (100%pp). The least cost per Kg of feed was obtained from diet (T₅), it decreased as the plantain peel meal increased in the diet.

The use of plantain peel in broiler finisher diet should be encouraged as it gave promising results.

Key words: Replacement Levels, Maize, Plantain peel, Broiler finisher, diet.

INTRODUCTION

The area of feeding in the poultry industry has been a major concern as this has always led to high cost of production of livestock and poultry, [1]. Production has not been a lucrative enterprise because of high cost of conventional feedstuffs which most times are competed for by both human beings and the livestock industry including poultry.

It is therefore a common trend now for Animal nutritionist to look for non conventional feedstuffs that are readily available and cheaper in order to cutdown on the feed cost which constitute about 65-70% of the total cost of production. [2]. Ologhobo [3], reported that there is a larger number of feedstuffs with enormous potentials in Nigeria and one of such is plantain peel. Plantain peel is a source of energy which according to proximate analysis compares favourably with maize except in crude fibre and ether extract [4] plantain peel also contains higher levels of minerals such as calcium, iron and phosphorous. Nsa et al; [5] have shown that plantain peel can constitute as much as 50% of a broiler diet. High fibre diet is noted to reduce nutrient suggestibility as it increases the rate of passage of nutrient in the gastrointestinal tract with a consequent reduction in the time of its exposure to enzymatic degradation and the time in absorptive membrane [6]. Dietary fat is also observed to reduce carcass and abdominal fat, dilution of the energy component of the feed and increases feed consumption in an attempt for the animals to meet their energy requirement [7,8] Onifeide, 1993; Iyayi et al; 2005). One of the most common fibre sources in poultry and livestock rations is maize. This is used in limited proportion of 10-15% because of fairly high fibre content (Oluoyemi and Robert, 2000). This study was therefore designed to evaluate the replacement levels of plantain peel for maize in broiler finisher diet.

MATERIALS AND METHODS

The experiment was carried out in Rives State University of Science and Technology Teaching and Research farm,. One hundred and fifty 4 week old broiler finisher birds of Anak ® strain were used for the experiment. The birds were reared in deep litter floor pens. All necessary vaccinations were given before and during the experiment. Basal feel was given to the birds at starter phase before the commencement of the experiment.

Experimental Design and Data Collection

The experimental design was completely randomized design (CRD). There were 30 broiler finisher birds per treatment and 15 birds per replicate. Parameters measured were feed intake, weight gain and feed conversion ratio. Feed and water was given to the birds as libitum. Feed intake was determined by subtracting the quantity of feed leftover (unconsumed) from the total quantity offered on weekly basis. The birds were weighed as replicate groups and the group average weight divided by the number of birds to obtain the average live weight per birds. Weighing of the birds was at the beginning of the experiment and subsequently on a weekly basis usually in the morning hours (8.00-9.00 am). Weight gain was calculated as final live weight minus initial weight, feed conversion ratio (FCR) as feed intake divided by weight gain. Feed cost per kg was calculated using the prevailing market price of maize. Feed cost per kg weight gain was calculated as FCR x cost divided by kg feed.

Mortality records and other observations were kept throughout the period of study.

Chemical and Data Analyses

Plantain peel was analyzed for proximate composition according to methods of A. O. A. C (101990), table 1: Data collected were subjected to analysis of variance (ANOVA) and differences between treatment means were separated using Duncan’s multiple Range Test (11Duncan, 1955). All statistical procedures were according to Steel and Torrie (121980)

Table 1: Proximate composition and energy value of sun dried plantain peel (%)

Crude protein	9.83
Crude fibre	5.63
Ether extract	14.23
Ash	13.16
Calcium	0.96
Phosphorous	0.32
Energy ME MJ/Kg)	13.96

Table 2: Gross composition of experimental diet of plantain peel with maize in broiler finisher diet

Ingredients % Replacement level of dried plantain peel

	T ₁ (0%pp)	T ₂ (25%pp)	T ₃ (50%pp)	T ₄ (75%pp)	T ₅ (100%pp)
Maize	60.00	50.00	40.00	30.00	-
Maize offal	12.00	12.00	12.00	12.00	12.00
Plantain peel	-	10.00	20.00	30.00	60.00
Palm kernel cake	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	100	100	100	100
Analyzed composition					
Crude protein`	20.02	20.21	20.56	20.88	20.07
Crude fiber	5.50	5.01	5.08	6.03	6.09

RESULTS AND DISCUSSION

There were significant (P< 0.05) differences in the replacement levels of maize and plantain peel levels among birds fed with diets containing different replacement levels of maize and plantain peel in feed intake, feed gain ratio, final live weight and feed cost per kg weight gain. The final live weight and average weight gain values of the birds in 2, 4 and 5 were similar, while the values for birds in diet 3 were significantly (P< 0.05) higher than those in other treatments.

The daily feed intake showed a reversed trend as birds consumption significantly ($P < 0.05$) improved as maize increased in the diet, with the highest ($P < 0.05$) intake recorded for birds in T1 (0% pp) while the least value was for birds in T5 (100% maize).

The chemical composition of plantain peel compare favourable with maize except in crude fibre and ether extract (13Etuk et al; 2011). Generally, plantain peel is reported to have better protein, energy, calcium and phosphorous composition than maize with more crude fibre and ether extract (14Amos and Odu 1996). Performance data was given in table 3.

Table 3:- Performance of broiler finisher birds fed graded levels of plantain peel (5-12weeks).

	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)	SEM
Initial body weight (g)	631.38	635.44	633.21	631.44	632.10	0.01
Final body weight (g)	1.86 ^c	2.10 ^{bc}	2.35 ^a	2.09 ^{bc}	2.25 ^b	0.16
Daily feed intake (g)	95.08 ^a	93.74 ^a	81.14 ^b	76.98 ^c	23.50 ^c	0.18
Daily weight gain (g)	26.12 ^c	27.25 ^{bc}	30.62 ^a	27.20 ^{bc}	27.92 ^b	0.10
Feed gain ratio	3.64 ^b	3.44 ^b	2.65 ^c	2.72 ^c	2.74 ^c	0.03
Daily protein intake	1.51	1.52	1.50	1.53	1.55	0.01
Feed cost (#1kg)	73.20 ^a	70.43 ^b	67.60 ^c	63.81 ^a	61.62 ^c	1.00
Cost/ kg weight gain(#)	266.45 ^a	242.18 ^b	179.14 ^c	173.56 ^d	168.54 ^c	0.50

abcd means within the same row with superscripts are significantly different from one another ($P < 0.05$).

The significant higher live weight and weight gains recorded in diet C means that the birds made best use of the diets given to them. It then follows that for best growth performance, plantain peel can replace maize at 1:1ratio.

The observed superior performance could be due to the nutrients in the two feedstuffs, what is lacking in one feedstuff may be furnished by the other feedstuff. The most favourable feed cast per kg weight gain was obtained for birds on diets 3, 4, and 5. The obtained values were statistically ($P < 0.05$) lower than birds on diets 1 and 2. This indicates improved utilization of feed with higher plantain peel inclusion at cheaper costs. The seemingly poor performance, when maize level exceeded that of plantain peel was it's high indigestible fibre by the broiler finisher birds. This would have interfered with the nutrient availability at the tissue levels and deprived them of nutrients available for growth and maintenance.

CONCLUSION

In conclusion, maize can conveniently be replaced with plantain peel up to 50% inclusion, as the best final body weight gain was recorded at that point. Above that level. The feedstuff became depressant on the birds. But the cost basis, of 100% replacement of maize with plantain peel supported the lowest ($P < 0.05$) production cost per kg weight gains. It therefore follows that if the interest of the farmer is on production cost which always is, the farmer can include plantain peel to replace maize at 1.1 ratio or completely in the broiler finisher diet. Plantain peel palatability can be enhanced by mixing it with palm kernel cake, maize offal, rice bran, wheat offal etc or reduce it's grittiness. Plantain peel therefore is a good alternative energy source for broilers.

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