

GROWTH PERFORMANCE AND WATER CONSUMPTIONS LEVELS OF BROILER CHICKENS FED GRADED LEVELS OF YAM PEEL MEALS

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ABSTRACT

A total of One hundred and eighty (180). Anak 2000 broiler chicks were used in a four week feeding trial to evaluate the effect of percentage replacement and utilization of yam peel meal (YPM) as energy substitute for Maize Meal (MM) in the diet of broiler chicks. The broiler chicks were fed graded levels of 0, 5%, 10%, 15% and 20% YPM. Complete randomized design was used in which there were five treatments and each treatment was replicated three times. Feed and clean fresh water supplies were *ad libitum*. Routine medications, vaccinations and other standard management practices were strictly observed. Results showed that birds fed 10% YPM were significantly ($P<0.05$) bigger and heavier than other birds on other treatments. Similar trend was also observed in weight gain in which birds fed 10% YPM made significantly ($P<0.05$) superior gain to birds on the rest diets. Cost of feed/kg gain significantly ($P<0.05$) reduced with increasing levels of YPM. It was concluded that YPM can be included up to 10 % level of inclusion in the diets of broiler chicks without any adverse effect on their performance.

INTRODUCTION

There is problem of animal protein scarcity in Nigeria and other developing nations. This problem may continue to be on the pages of our books so long as the conventional feed sources in poultry industry remain soybean meal, groundnut cake, fish meal and maize. The available animal protein is costly and remains grossly unaffordable by the poor. The high cost of the animal protein has been blamed on high cost of conventional ingredients, which amount to 78.8% (Akure, 2013). Mentioned earlier therefore to meet the protein requirement by man living in developing country like Nigeria, becomes a mere dream, this therefore leads to protein malnutrition. What can the Animal nutritionists do? Seek for alternative feed ingredients that are cheaper, affordable and in less use by man for food. When this is done the animal protein on the long run becomes much cheaper and more affordable then it could be found on the poor man's table. Energy has remain the most abundant nutrients to supply in a balanced diet of finished feed for poultry industry and other monogastric animals and the bulk of it is supplied by cereal grains constituting 42-55% (Akure, *et.al.*, 2020). Yam (*Dioscorea Spp.*) being cultivated in Nigeria and some other countries of the world is one of such tropical crops that the peel may be useful in animal feed. The yam peel meal (YPM) has high energy content since it contains high amounts of Nitrogen –Free- Extract (NFE), which is the soluble carbohydrate portion of feed stuff. This study was carried out to evaluate the effect of YPM on growth performance and water consumption of broiler starter chicks

Materials and method

The experiment was conducted at the poultry section, Department of Livestock, Ministry of Agriculture, Mariri, in Kumbotso Local Government Area of Kano State. The area lies between latitude 11°55'N and longitude 8°36'E at an altitude of 460m above sea level with an average annual rainfall of 600-1000mm, mean temperatures of 21.21°C and humidity of 52.81 %. (KNARDA, 2011).

Feeding trial

Fresh yam peels were collected from homes and restaurants. The peels were subsequently sun dried before milling with 2mm hammer mill and used in the formulation of the experimental diets, according to the requirement of NRC (1994). A total of 180, four weeks old ANAK 2000 broilers were used for this study. They were randomly assigned to five treatment groups of 36 birds each. Each treatment was replicated three times with twelve birds in a replicate. The five treatment groups

were fed the five experimental diets (Table 1) in a completely randomized design for four weeks. Each replicate was housed in a concrete floor covered with wood shavings. Feed and fresh water were supplied *ad libitum* throughout the four weeks of the experiment. Birds were weighed for their final weight at the end of the experiment. Feed intake and water consumption were measured daily. At the end of each week the feed intake, weight gain feed /gain ratio, water consumption and water/feed ratio were computed.

Statistical analysis

Data obtained from the performance and the carcass evaluation were subjected to analysis of variance (ANOVA) using procedure of SAS (2002), significant levels of differences among treatment means were determined using the Duncan's multiple range test (Duncan. 1955).

Table 1: Composition of Broiler starter diets containing Yam Peel Meal (YPM)

Ingredients	0%	5.0%	10.0%	15.0%	20.0%
Maize	48.45	43.45	38.45	33.45	28.45
Ground nut cake	31.60	31.60	31.60	31.60	31.60
YPM	0.00	5.00	10.00	15.00	20.0
Soya bean meal	8.00	8.00	8.00	8.00	8.00
Maize offal	5.00	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Fish meal	2.00	2.00	2.00	2.00	2.00
Lime stone	1.00	1.00	1.00	1.00	1.00
Common salt	0.30	0.30	0.30	0.30	0.30
Methionine	0.30	0.30	0.30	0.30	0.30
Lysine	0.10	0.10	0.10	0.10	0.10
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
ME (kcal/kg)	3013	3006	3001	3000	3035
Crude Protein (%)	23.00	23.00	23.00	23.00	23.00
Crude fibre (%)	3.40	4.06	4.25	4.43	4.50.
Ether Extract (%)	9.80	9.92	10.15	10.20	10.95
Ash (%)	6.40	7.45	7.95	8.42	8.75
Calcium (%)	1.21	1.23	1.28	1.30	1.20
Av.Phosphorus (%)	0.71	0.72	0.72	0.73	0.78
Lysine (%)	1.43	1.44	1.46	1.58	1.59
Methionine (%)	0.59	0.61	0.63	0.65	0.56

T1=0%YPM, T2= 10%YPM, T3=20%YPM, T4=30%YPM, T4 = 0%YPM

Table 2: Effects of feeding diets containing YPM on the performance of Broiler starters (1-4weeks)

Parameters	0.0	5.0	10.0	15.0	20.0	SEM
Initial weight(g/bird)	75.00	75.00	75.00	75.00	75.00	0.00
Final weight (g/bird)	700.11 ^c	776.67 ^b	840.00 ^a	770.67 ^b	706.67 ^c	4.23
Weight gain (g/bird)	625.11 ^a	701.67 ^a	765.00 ^a	695.67 ^b	631.67 ^c	4.23
Feed intake (g/bird)	1155.17 ^d	1240.28 ^c	1320.82 ^a	1399.78 ^b	1380.10 ^b	9.45
Water Consumption(ml)	2350.10	3000.20	3470.25	3700.30	3590.22	2.30
Feed to Gain Ratio	1.85 ^c	1.77 ^b	1.73 ^a	2.01 ^d	2.18 ^e	0.01
Water /Feed Ratio	2.03	2.41	2.62	2.64	2.71	0.02

^{abcd} Means within the same row with different superscripts differ significantly (P<0.05)

SEM = standard error of means

RESULTS AND DISCUSSIONs

Table 2 shows the performance of broiler starter chicks fed YPM at various levels of 0, 5.0, 10.0, 15.0 and 20.0%. At the end of the feeding trial the results were computed. The initial live weights of the experimental broiler chicks were similar ($P>0.05$) between treatments. There were significant ($P<0.05$) differences between treatment means with respect to water intake, feed intake, weight gain, feed to gain ratio and final live weight at four weeks, while water/feed ratio was not significantly ($P>0.05$) affected by treatment.

Feed consumption increased significantly ($P<0.05$) with the inclusion of YPM and with a highest level, up to 15% level of inclusion after which a decline occurred, with the 20% level of inclusion of YPM recording the least total feed intake from among the treatments containing YPM. The observed trend in feed intake may be as a result of general increase in bulkiness of feed with increasing level of YPM, because birds tend to consume more feed in order to obtain the same levels of nutrients needed to satisfy their needs. This agrees with Onimisi *et al.*, (2005) who reported that bulky feeds which are high in fibre are rather low in nutrient concentration per unit volume. A unit weight of the bulkier feed contributes less digestible nutrients and as well makes other nutrients less available. However depression in feed consumptions occurs when feed become excessively bulky. This is in agreement with the findings of Stanley and Ishizanki (1982) who reported that excess bulk in feed reduces the weight of feed consumed by birds hence imposing a physical limitation upon the intake of digestible nutrients. This could also be that the chicks had crossed the threshold of their capacity for the consumption of the YPM.

The weight gain significantly ($P<0.05$) increased as YPM increase up until 10% inclusion. The highest weight gain and highest final live weight at four weeks were recorded for the birds on treatment three (10% YPM) and not for birds on 15% YPM with the highest feed consumption. The recorded weight at 10% YPM was higher than the control diet. Significant ($P<0.05$) depression of weight occurred at 20% level of YPM. The inclusion of YPM in the diets of broiler chicks increase feed consumption significantly ($P<0.05$) up to 15% level of inclusion but with non-significant ($P>0.05$) difference in weight gain and live weight at 15% level of inclusion. This agrees with the findings of Osuji (1982) and Alawa and Umunna (1993) who reported that the inclusion of most agro-industrial by-products in livestock rations has often resulted in increase feed intake as a compensation for the reduced nutrient availability/concentration of such diets and most often with non-corresponding increase in weight gain. Linear increase occurred in feed /gain ratio with increasing level of YPM in diet. Levels beyond 10% significantly ($P<0.05$) depressed the ability of the birds to convert feed materials into weight gain. The feed conversion efficiency of birds reduced with higher level of YPM in the diet. The bulkiness of feed with increasing level of YPM reduced the quality of feed. This observation is common to most agro-industrial by-products used in livestock feeds

The water consumption pattern of birds is presented in Table 2. The result shows that the presences of YPM in the diets of the broiler chicks increased water intake. However, increasing the level of YPM in the diet did not significantly increase the water intake though consumption increased with increasing level of YPM. Since the water/feed ratio across the treatments was not significantly ($P<0.05$) different, it may be concluded that the increased water consumptions was only in proportion to the level of feed consumed. As the level of inclusion of YPM increased to 40% the level of water consumption also increased though with no significant ($P<0.05$) difference among treatments, the increase water consumption is only in proportion to the level of feed intake. This is in line with the general observation that the level of water consumption is affected by the level of dry matter intake by the animal. Onimisi *et al.*, (2005) also opined that increased dry matter consumed often increases the level of water consumed by farm animals. Therefore the presence of YPM in the diets stimulates a significant increase in water consumption, but not the quantity of it.

CONCLUSION

From the results of the experiment, it was concluded that up to 15% of YPM may be included in the diets of broiler chicks without any significant negative effect on growth performance.

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