EVALUATION OF SUBSTITUTION LEVELS OF UNRIPE PLANTAIN PEEL (*MUSA PARADISCA*) MEAL ON THE PERFORMANCE OF GROWING JAPANESE QUAILS (*COTURNIX*).

*E.O. Ahaotu[1], and C.N. Nze

[1] Department of Animal Production Technology, Imo State Polytechnic Umuagwo, Nigeria.

*Corresponding author: emmaocy@yahoo.com 08038520777

Abstract

A total of fifty growing quail birds of two weeks of age were randomly assigned to five dietary treatments at 0, 7.91, 15.81, 23.73 and 30.51% in a completely randomized design experiment to evaluate the effect of unripe plantain peel meals on the growth performance of growing quails. A feeding trails lasting for 42 days was carried out. Results on performance showed that the dietary treatments influenced ($P<0.05$) final weight, total weight gain, total feed intake , average feed intake and feed conversion ration of the quail birds with the highest total weight gain (10.11) recorded for T_1 in the control diet . For total feed intake the values were 21.57, 22.60, 14.50, 4.07 and 6.00g. This study showed that incorporation of unripe plantain peel could economically replace maize at level of 30.51%; but for optimal growth performance of unripe plantain growing quail birds, feeding of UPPM at the level of 23.73% is advised.

Key words: Japanese Quails, Unripe Plantain Peel Meal, Maize, Performance, Feed efficiency.

Introduction

Quails (*Coturnix coturnix japonica*) are popularly known as a game bird since its domestication in the world. Presently, quail rearing has been popularized because of rapid economic return from commercial quail production. Meat and eggs of quail are highly accepted by people in many countries.

The high cost of feed ingredients in most tropical countries clearly indicates that the production of cereal grains for livestock business in these countries is grossly inadequate (Ahaotu et *al.*, 2010a). Feed cost alone accounts for 75-80% of the total costs of raising livestock (Ahaotu *et al.*, 2010b). This is due to ever increasing competition between man, and livestock for available feedstuffs.

Thus, there is an urgent need to divert our attention toward exploitation of other tropical sources. One such potential source that is not realized to its fullest extent is unripe plantain peels which are generally not used for human consumption. Therefore, any attempt to substitute maize in poultry feed will significantly reduce cost of production. As quail production attention is needed in the country, more effort should be geared towards increased research into possible use of alternative feed resource to improve cost effectiveness or gains in the production of quail meat and eggs. Quail birds are highly prolific and hardy. The meat is lean, both eggs and meat are low in cholesterol (Robbins, 1981). The effort at multiplying these birds, the more readily available will be the meat and eggs for human consumption with less risk of public health implications.

Plantain peels, a waste from plantain is observed to have some nutritional values as it contains about 12% crude protein, 16% crude fibre and 1300KCal/Kg energy on dry matter basis (Uwalaka *et al.*, 2013). The plantain peel waste is known to constitute menace to the society thereby adding to the worse problem of environmental pollution particularly in places where ruminants (sheep and goat) are not allowed to roam about (Ahaotu *et al.*, 2013). The authors further reported no significant difference in the weight gain of weaned rabbit fed 15% plantain peels in place of maize. Von Loesecke (1990) revealed that fresh plantain peels are good sources of energy for broilers.

The use of plantain peels in poultry has been limited because of possible deleterious effects arising from the presence of tannins. Tannins exist in plantain in two different forms (a) free or active tannins which are insoluble, supposedly inert and which have little or no effect on the palatability (Ukachukwu, 2000). The objectives of the study were to determine the performance of quail birds

feed graded levels of unripe plantain peels meal, determine the optimum level of inclusion of unripe plantain peels meal and to evaluate the proximate chemical composition of the test ingredient.

Materials and Methods

This experiment was carried out at the poultry unit of Teaching and Research Farm, Imo State Polytechnic Umuagwo – Ohaji, Nigeria..

Management of the birds

A total of fifty growing quail birds of two weeks of age were randomly assigned to five dietary treatments at 0, 7.91, 15.81, 23.73 and 30.51% in a completely randomized design experiment to evaluate the effect of unripe plantain peel meals on the growth performance of growing quails. A feeding trails lasting for 42 days was carried out. The birds were stabilized with commercial broiler starter diets for seven days after which their initial weight were measured and consequently weekly thereafter to determine their weight gain. Adequate medication was done using broad spectrum antibiotics and vitamins via drinking water.

Experimental diets

Five experimental broiler starter diets represented by T_1, T_2, T_3, T_4 and T_5 were formulated. Treatment (T_1) was the control and contained 0% unripe plantain peel meal. Feed and clean drinking water were supplied *ad libitum*.

Table 1: Proximate Analysis of Unripe Plantain Peel Meal.

Chemical	**Unripe plantain peel meal (%)**
Component	
Crude protein	10.64
Crude fibre	5.82
Ether extract	9.57
Ash	12.82
ME (Kcal/kg)	3918.90

Table 2. Nutrient composition of Experimental Diets

	%T_1 (Control)	**T_2 %**	**T_3%**	**T_4%**	**T_5%**
Maize	31.62	23.43	15.26	7.06	0.00
UPPM	0.00	7.91	15.81	23.73	30.51
GNC	38.68	39.23	39.23	39.52	39.79
PKC	14.00	14.00	14.00	14.00	14.00
Fish meal	1.50	1.50	1.50	1.50	1.50
Soya bean meal	10.00	9.73	9.71	9.99	10.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Limestone	1.50	1.50	1.50	1.50	1.50
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10	0.10
Calculated Crude Protein	20.59	20.10	20.89	20.63	20.92
ME/KCal/kg	2782.3	2799.8	2788.4	2783.7	2785.6

Key: UPPM= Unripe Plantain Peel Meal, GNC= Groundnut cake, PKC= Palm kernel cake

Experimental Procedure

At the end of the seventh day of the stabilization period with commercial feed, the birds were allocated to their various treatment diets. Their initial weights were determined using a weighing balance. Their feed intakes were calculated by subtracting the weight of left over feed from the weight of quantity of feed offered each day.

Data Analysis

Data generated was subjected to Analysis of variance (ANOVA). Means were separated using Duncan multiple range test (DMRT) (Gordon and Gordon, 2004).

Results and Discussion

The result of the nutrient composition of UPPM agrees with the report of Uwalaka *et al.,* (2013) who reported that UPPM contains 10.64% Crude protein, 5.82% Crude fibre, 9.57% Ether extract, 12.82% Ash and 71.2% Nitrogen free extract. Also, the values obtained on the nutrient composition of UPPM agrees with the values of 10-12% Crude protein, 8-11% Crude fibre, 11-16% Ash, 8-12% Ether extract reported by Nwifa and Hedo (2010).

Table 4: Growth Performance of Growing Japanese Quail Birds Fed Graded Levels of Unripe Plantain Meal (Uppm) from 2-6 Weeks

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
Initial weight (g)	27.10	26.20	26.60	25.90	26.36	0.45^{ns}
Final weight (g)	37.44^{a}	34.00^{b}	31.86^{b}	28.33^{c}	26.40^{c}	0.69*
Total weight gain (g)	10.11^{a}	8.26^{ab}	5.57^{b}	2.00^{c}	0.80^{c}	0.05*
Daily weight gain (g)	1.44^{a}	1.18^{ab}	0.80^{b}	0.29^{c}	0.11^{c}	0.11*
Total feed intake (g)	21.57^{a}	22.60^{a}	14.50^{b}	6.00^{d}	4.07^{c}	0.43*
Av. Daily feed intake (g)	0.05^{b}	0.06^{a}	0.04^{c}	0.02^{d}	0.02^{d}	0.02*
Feed Conversion Ratio	2.04^{a}	2.13^{b}	2.60^{c}	2.74^{d}	3.50^{e}	0.03*
Age at First egg (day)	39.33^{a}	40.90^{a}	42.22^{a}	44.22^{b}	46.77^{c}	3.58*
First Egg Weight (g)	10.10	10.18	10.13	10.15	10.17	0.03^{ns}

abcde: Means with different superscripts within the same row are significantly($P<0.05$) different.
SEM= Standard error of the means.

The general increase in feed intake of birds in treatment 2 groups with increase in the dietary levels of UPPM could be attributed to the increased crude fibre content of the diet. As the inclusion levels of UPPM increased, there was a reduction in the feed intake of the diets. Thus, quails had to increase their feed intake to satisfy their energy needs. In addition, the higher the UPPM level, the higher the expected concentration of tannins which was reported to cause growth depression and increased feed conversion ratio (Calles *et al.*, 2010). Tannins also interferes with the digestive action of trypsin and α-amylose by forming an indigestible complex with the substrates (Ferket *et al.,* 1999) leading to poor digestibility.

Decrease in daily feed intake at higher levels of UPPM in this study did not agree with the findings of Uwalaka *et al.*, (2013) who observed a linear increase in feed intake as the level of maize replaced by UPPM increased. Also, Ahaotu *et al.,* (2013) observed that feed consumption and body weight gains especially in meat type birds decreased when birds were fed high fibre diets. There was a reduction in daily weight gain of birds with increased UPPM and with reduced maize levels of inclusion in the tested diets. This revealed the superiority of the quality of the control diet which contained higher levels of maize than other diets containing UPPM and maize.

Conclusion

UPPM was beneficial for inclusion in the diets of quails but separate use of either 7.91% or 15.81% UPPM (T_1 and T_2) gave good results during the grower phase. Also, utilization of UPPM at 30.51% inclusion levels during egg laying phase gave the best performance and did not affect egg production and egg quality. There is an economic advantage of using UPPM in quail diets with lower feed cost per kg weight gain and therefore, their usage should be encouraged.

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