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The Feeding Value of Cassava Meal Diets For Growing Japanese Quail *(Coturnix coturnix Japonica)*

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Abstract

A six- week feeding trial was conducted to determine the replacement value of Cassava meal for maize in a practical quail diet. It involved ninety six day-old quail chicks housed in cages in a brooding house. Four isonitrogenous (22%cmde protein) diets incorporating graded levels (0.0, 15, 25, and 35%) of cassava meal as a replacement for maize were tested. The diets were also isocaloric (2800Kcal/kg M.E.) and contained crude protein (25.53%; diet 1, 25.00%; diet 2, 24.34%; diet 3 and 24.00% diet 4) and were replicated three times. Feed intake, weight gain, feed/ gain ratio and feed cost/kg gain did not differ significantly (P>O.O5) across the treatments. Feed cost decreased numerically across the treatments and was lowest for diet 4, i.e., the diet in which all the maize was replaced by 35% cassava meal. Feed cost/kg gain was numerically lower for diet 4 (146.34) than the other diets (233.16, 169.39, and 159.94). Results of this study indicated that, at dietary crude protein levels of between 24 and 25% and M.E. of 2800Kcal/kg feed, 35% cassava meal based diet was suitable for acceptable 'growth performance in Japanese quail chicks in the first six weeks of life.

Keywords: *Cassava meal, Quail chicks, Productive performance*

Introduction

Livestock feed have become expensive and consequently the prices of livestock products are exorbitant. This is because of ever increasing competition between man, and livestock for available feedstuffs. Maize accounts for about 45 to 55% of poultry feed (Bamgbose *et al.;* 2004). Therefore, any attempt to substitute maize in poultry feed will significantly reduce cost of production. As quail production gains attention and more ground in the country, more effort should 'be geared towards increased research into possible use of alternative feed sources to improve cost effectiveness, or gains in the production of quail meat and eggs.

Quail birds are highly prolific and hardy (Robbins, 1981; Anon, 1991). The meat is lean and both eggs and meat are low in cholesterol (Garwood and Diehl, 1987; Shwartz and Allen 1981). Therefore, the more 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.

The metabolizable energy of cassava meal is 3317kcal/kg and similar to that of potatoes with a dry matter of 880g/kg and crude protein of 30g/ kg, (McDonald *et al.*, 1988). Cassava contains certain toxic substances called cyanogenic glucosides (Linamarin and Lotaustralin) but they are heat labile and sun-drying has been reported

to be more effective than oven-drying as a measure of destroying the toxic materials.

This study was therefore carried out to investigate the values of cassava meal (CM) as replacement for the energy contributed by maize in feed for quail chicks. Longe and Oluyemi (1979) reported that 50% dietary cassava meal gave similar feed efficiency to the same quantity of maize and that weight loss of chicks at 6 weeks was less with cassava or maize than with guinea corn. Oke (1978) reported that not more than 20% dietary cassava meal should be allowed in poultry feed for satisfactory production. He reasoned that irritation of the respiratory tract would result from the dustiness of -the meal and also because of ulcerogenic effects of powdered starch in the gastric mucosa. This recommended level is less than that reported by Agugu and Okeke (2005) for chicks. They recommended that 42% cassava root meal would replace all the maize in the diet for pullet chicks with no significant adverse effect on performance. Similarly other reports have shown that not more than 50% of the protein contributed by soybeans can be replaced by shrimp waste meal (SWM) and cassava leaf meal (CLM) with 'no deleterious effect on rate and efficiency of weight gain in broiler chicken (Agunbiade *et al*., 2004). Furthermore, Igene and Arijeniwa (2004) had reported that even at 75% of the energy contributed by maize, cassava peel meal (CPM) can replace maize for growing pigs with no effect on hematological values.

Materials and Methods

Cassava Meal: This was obtained from the open market in Jos, Plateau State, Nigeria. It was verified to the weevils and processed by sun drying.

Birds: Ninety-six (96) day-old (unsexed) Japanese quail (*Coturnix coturnix japonica)* chicks hatched at National Veterinary Research Institute, Poultry Farm were selected on the basis of fitness and uniformity. They were housed in cages well ventilated and maintaining the space requirement of 75sqcm per bird as recommended by NVRI, (1996). Each cage housed 8 quail chicks. In all there were 12 experimental cages housed in a room. Each cage was fitted with 100-watt bulb and the entire room was heated with kerosene stove to provide enough warmth to maintain the desired brooding conditions. All chicks were weighed together in groups before being placed in the cages and all the birds in each cage were weighed weekly for six weeks. Three groups or cages each were randomly allocated to each experimental feed. Feed and water were given *ad libitum.*

Experimental diets: Four experimental diets were formulated to contain graded levels of cassava meal (0, 15, 25 and 35) at the expense of maize. The diets represented by T1, T2, T3 and T4 were isonitrogenous containing about 22% crude protein and isocaloric at 2800kcal/kg metabolizable energy. Dietary energy levels of 2500-2800kcal/kg M.E have been recommended by Olubamiwa *et al.* (1999).

Data collection: The mean weekly body weight and feed consumption of birds were recorded from 0 to 6weeks of age when the first eggs were laid. From the mean body weights and feed intake, feed conversion ratio, and feed cost/gain were calculated.

Data collected were subjected to analysis of variance (ANOVA) as described by Steel and Torrie (1980).

Results and Discussion

Data on feed consumption, weight gain and feed/ gain ration are shown in Tables 2. All the groups on the different treatments started to lay by the sixth week of life. More than half of the treatments

Table 1: Composition of experimental diets.

Ingredients (%)	1	2	3	4
Maize	35.24	20.24	10.24	-
Cassava meal	-	15.00	25.00	35.24
Soya bean cake	28.06	29.06	29.06	29.06
Wheat offal	10	10	10	10
Full fat Soya	20	20	20	20
Fish meal	2	2	2	2
Bone meal	2.5	2	2	2.25
Lime stone	1.5	1	1	1
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
	100	100	100	100
Calculated Composition				
C.P(%)	25.53	25.00	24.34	24.00
M.E (Kcal/Kg)	27824.4	2799.7	2788.2	2783.7

started to lay before the 6th week with intervals of one or two days between the replicates. This corresponds to the records of Martins (1987) of Japanese quail age at first lay of between 5 and 6 weeks. The weight of eggs at first lay recorded for all the treatments ranged from 9.5 to 10grams which was interestingly high for first eggs. This may be due probably to the high body weight of the quails at 6 weeks ranging from 144 to 164 grams. There were numerical differences in feed intake between treatments but the differences were not significant ($P>0.05$). This is probably

Table 2: Performance characteristics of cassava meal based diets fed to quail chicks

	1	2	3	4	SEM
Feed consumption(g)	822.34	709.97	688.07	688.16	±19.11
Weight gain(g)	137.96	145.13	41.75	154.09	±3.87
Feed efficiency	6.85	5.74	5.50	5.28	±1.59
Feed cost/Kg(N)	35.84	33.84	32.34	30.83	±1.86
Initial weight (g/bird)	8.88	8.33	8.50	8.56	±0.20
Final weight (g/bird	148	132.66	153.33	158	±9.54
Cost/Kg gain (N)		169.39	159.94	146.34	±73

due to the observed ability of quail to adjust feed intake developed in the wild. Sebastia *et al.* (1978) had reported significant differences in feed intake and weight gain when they fed fattening chickens with up to 31% cassava meal as replacement for maize. Birds fed with up to 18.6% CM according to them were heavier than those receiving larger amounts. This was not observed in this study probably due to different energy concentration or amino acid balances. However, Agugu and Okeke (2005) had fed day old chicks with up to 42% cassava meal diet and observed no significant effect of the meal on weight gain or other productive performances. There was no significant effect of the diets on body weight gain and this also agrees with the report of Agugu and Okeke (2005) that fed up to 42% cassava meal diet to day old pullets and recorded no significant differences in body weight gain as compared to maize based diet. The lack of significant effect of the diets on feed efficiency as recorded in this study has also been observed by Longe and Oluyemi (1979) who replaced maize with cassava meal. This disagrees with the report of Sebastia *et al.* (1978) who reported depressive effect of cassava meal diets on feed efficiency of fattening chickens as the quantity in the meal increased. The feed conversion ration for quail chicks was poor compared to reports for chickens (Sobamiwa and Longe, 1998). This has also been observed by Haruna et al. (1997) and may be due to feed wastage characteristic of quails. Feed cost/gain was numerically lower for diet 4 (table 5) than for the other diets. As the level of cassava meal in the diet increased, feed cost and feed/kg gain numerically reduced. This translates into a cost saving of 14% using cassava meal as the main energy source. It is, however, important to

investigate the upper level of cassava meal for growing quail.

Conclusion and Recommendation

Cassava meal is relatively cheaper than maize and should be allowed to contribute to poultry and livestock production in Nigeria. Since the 35% dictary cassava meal did not depress feed intake, weight gain or feed conversion ratio, 35% cassava meal based diet is recommended for growing Japanese quail, while the upper level of cassava meal for quail chicks should be investigated.

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