Growth Response and Carcass Characteristics of Japanese Quails Fed Diets Containing Graded Levels of Yam Peel Meal

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Abstract

A five week feeding trial was conducted to study the effect of different dietary inclusions of yam peel meal (YPM) as a replacement for maize on growth performance and carcass characteristics of Japanese quails. Two hundred and fifty-two birds were allotted to four dietary treatment groups, each containing 63 birds replicated thrice in a completely randomized design. The four diets, T_1, T_2, T_3 and T_4 were formulated such that YPM replaced maize at 0 %, 20 %, 40 % and 60 % respectively. Parameters measured were, daily feed intake, daily body weight gain, feed conversion ratio, weight of carcass and body cuts. The results showed no significant ($P<0.05$) differences in all the parameters measured among the dietary treatment groups. It was concluded that YPM can be used as a substitute for maize in the diet of growing Japanese quails up to 60% inclusion level without any deleterious effect on the growth performance and carcass characteristics.

Key Words:-*Japanese quail, yam peel meal, growth performance, carcass characteristics.*

Introduction

The solution to the problem of inadequate consumption of animal protein by an average Nigerian is to increase the production level of highly productive animals with short generation intervals such as rabbits, pigs and poultry (1). Poultry production is a major sector of livestock enterprise dealing with different kinds of birds. In the past, chickens were the most recognized and acceptable poultry birds reared by farmers, but recently, other birds came to be recognized of which the Japanese quail (*Coturnix coturnix japonica*) is one of them (2). Japanese quail was introduced into Nigeria to expand the poultry sub-sector and help supplement the domestic chicken production through meat and eggs (3). They are hardy birds that thrive in small cages, small-sized, early maturing, prolific with excellent egg production performance. An adult quail requires only 20 – 25 g of feed per day compared to chicken that requires 120 – 130g of feed per day. They mature in about 6 weeks and are usually in full egg production by 50 days (5; 3). One of the major constraints of the development of poultry industry in Nigeria is the high cost of feeds. Seasonal availability and high cost of conventional feed ingredients such as maize which constitutes about 45 – 55 % of feed and competition by man necessitates the need to look for other non-convectional feed ingredients to reduce overall cost (6; 7; 3). One of such non convectional feed ingredients is yam peel meal (YPM). Yam peels are the by-products of processing obtained from the removal of the outer covering of the tubers when being prepared for human use. When processed by drying and ground to be incorporated into the diets, it is referred to as yam peel meal. Therefore, this study was designed to examine the growth response and carcass characteristics of Japanese quails fed diets containing graded levels of yam peel meal.

Materials and Methods

The experiment was carried out at the Poultry unit of the Teaching and Research farm of the Department of Animal Production, Federal University of Technology, Minna, Niger State, Nigeria. Minna lies between Latitude 9^0 37' north and

longitude 6° 32' east of equator. Annual rainfall averages 1312 mm with a mean temperature of between 34° C – 42° C and the vegetation is southern guinea savannah. The mean relative humidity is between 21 – 73 % (8). Fresh yam peels were collected from restaurants in Minna, soaked in clean water to wash after which, they were sun-dried. The sun-dried peels were milled to obtain yam peel meal. Other ingredients were also obtained and used to formulate the experimental diets. Two hundred and fifty-two (252) two-weeks old Japanese quails purchased from the National Veterinary Research Institute (NVRI), Vom, Plateau State, Nigeria were used for the experiment. They were randomly allotted to four dietary treatment groups, each containing 63 birds replicated thrice in a completely randomized design. The four experimental diets designated as T_1, T_2, T_3 and T_4 were formulated such that yam peel meal (YPM) replaced maize at 0 %, 20 %, 40 % and 60 % respectively (Table 1). The crude protein level of the diets was fixed at 24%. Feed and water were provided *ad libitum* throughout the experimental period which lasted for five weeks. Proximate composition of the experimental diets and the test ingredient was carried out using the method of (9). All routine management practices and vaccinations were duly adhered to.

The birds were weighed at the beginning of the experiment and weekly thereafter. The mean weekly body weight and weekly thereafter. The mean weekly body weight and daily feed intake were recorded. Average daily weight gain and feed conversion ratio (FCR) were calculated from the mean body weight gain and feed intake. At the end of the 5th week, two birds per replicate were selected and slaughtered for carcass analysis. Live weight, dress weight, dressing percentage and weights of body parts were determined as percentage live weight. All data collected were subjected to one-way analysis of variance and means separated by Duncan's multiple range tests using a computer software package (10).

Results and Discussion

The proximate composition of the experimental diets and the test ingredients, (YPM) is shown in Table 2. The growth response and carcass characteristics of the birds fed different levels of inclusion of YPM as a replacement for maize is shown in Table 3. The results show that there were no significant ($P>0.05$) differences in the feed intake, daily weight gain and feed conversion ratio among the different dietary treatments. However, slight increase observed in the feed intake as the level of YPM inclusion increased could be explained with the observations of (11) and (12) who reported higher feed intake in feed ingredients with lower energy density. This is in agreement with the observations of (13) who replaced maize with dried trifoliate yam tuber meal at levels, 0 %, 30 %, 60 %, 90 % and 100 % and observed increased feed intake and body weight gain with higher rates of replacement with the yam peel and concluded that yam peel could serve as alternative source of energy in place of maize for broiler chicken production. The results of carcass analysis showed no significant ($P>0.05$) differences among the treatment means.

Conclusion

It is therefore concluded that YPM can be used as a replacement for maize in the diet of growing Japanese quails up to 60 % inclusion without any deleterious effect on the growth performance and carcass characteristics.

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Table 1: Composition of the experimental diets (%)

Maize	44.17	35.74	27.11	18.28
Yam peel meal	0.00	8.97	18.07	27.42
Groundnut cake	39.13	38.63	38.12	37.60
Maize offal	10.00	10.00	10.00	10.00
Fish meal	2.00	2.00	2.00	2.00
Bone meal	2.50	2.50	2.50	2.50
Lime stone	1.50	1.50	1.50	1.50
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated				
Crude protein	23.99	24.01	24.01	24.02
ME kcal/kg	3727.96	3678.83	3685.42	3693.20

Table 2: Proximate composition of the experimental diets and yam peel meal

Dry matter	91.90	91.50	91.80	92.70	87.12
Crude protein	24.15	23.45	22.40	22.75	11.83
Crude fibre	3.73	4.53	5.33	4.93	7.50
Ether extract	10.70	11.50	10.40	11.40	3.46
Ash	9.50	10.50	9.00	11.00	4.78
Nitrogen free extract	43.82	41.52	44.67	42.62	59.55

Table 3: Performance and carcass characteristics of Japanese quails fed diets containing graded levels of yam peel meal

	Dietary treatment					
Parameters	T_1	T_2	T_3	T_4	SEM	Remark
Initial weight g/bird at 2 weeks	26.19	26.19	25.00	25.40		
Final weight g/bird at 7 weeks	141.80	149.14	144.35	142.62		
Daily feed intake g/bird	16.07	16.97	16.17	17.31	0.54	NS
Daily weight gain g/bird	3.30	3.51	3.40	3.37	0.11	NS
Feed conversion ratio (FCR)	4.87	4.83	4.76	5.14	0.17	NS
Carcass characteristics						
live weight (g)	200.00	183.33	183.33	183.33	6.53	NS
Dress weight (g)	59.95	60.20	65.27	65.13	2.70	NS
Dressing %	29.98	32.84	35.60	35.53	1.35	NS
Thigh	5.69	6.88	6.21	6.92	0.35	NS
Drum stick	4.09	4.29	4.57	4.65	0.19	NS
Thoras	9.21	11.10	10.11	10.32	0.52	NS
Wings	8.48	8.91	10.20	12.11	0.81	NS
Breast	12.93	12.75	14.71	13.96	0.81	NS
Heart	0.66	0.74	0.80	0.73	0.03	NS
Lungs	0.67	0.82	0.91	0.90	0.04	NS
Liver	1.46	1.49	1.45	1.48	0.10	NS
Gizzard	1.34	1.70	1.94	2.07	0.13	NS
Crop	1.06	0.49	0.95	0.63	0.12	NS