

EFFECTS OF REPLACING MAIZE WITH INDOMIE DOUGH IN FEEDING JAPANESE QUAILS

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ABSTRACT

A six weeks feeding trial was carried out to evaluate the effect of replacing maize with indomie waste in feeding Japanese quails. Two hundred and five quails were randomly allocated to five treatments in a completely randomized design consisting of five treatments which were five graded levels of indomie (nodules) waste (IW) at 0%, 25%, 50%, 75% and 100%. Each treatment was replicated thrice with 13 quails per replicate. Weight of birds and feed intake were measured on a weekly basis and used to compute weight gain, feed intake and feed conversion ratio. Blood samples were collected to analyze for haematological parameters. The results of the study showed that weight gain was highest for quails fed 50% IW compared to those fed 75%, 0% (control) and 25% IW. Feed conversion ratio was highest ($P<0.05$) for quails fed 50% IW as compared those fed 75%, 0% and 25% IW. There was significant ($P<0.05$) difference among the treatments in heterocyst's and lymphocytes while red blood cell, PCV, haemoglobin and total protein were similar for all the treatments. It can be concluded that indomie (nodules) waste can replace maize up to 50% without adverse effects on growth performance and haematological indices of quail birds..

Key word: Indomie waste, Japanese quails, feed intake, maize, body weight

INTRODUCTION

Noodle waste (NW) is an alternative source of energy and less expensive compared to maize which is one of the main conventional source of energy in the diet of poultry (Omole *et al.*, 2013). Noodles waste (NW) is another good source of energy that can be used to replace maize. The protein content is relatively similar to that of maize and it has high metabolizable energy, rich in minerals such as calcium and iron (Omole *et al.*, 2013). Indomie waste can be used to replace maize in the diets of poultry to get a cheaper and equally effective ration and the metabolizable energy (ME) and crude protein (CP) content of indomie waste product are closer to that of maize (Alabi and Ayoola, 2010).

Quail belongs, along with chickens, pheasants and partridges to the Family Phasianidae of Order Galliformes of the Class Aves of the Animal Kingdom (Mizurani, 2003). Species of subspecies of the genus *Coturnix* are native to all continents except the Americas. One of them; *Coturnixcoturnix* common quail are migratory birds of Asia, Africa and Europe. Several interbreeding subspecies are recognized with the more important being the European quail, *Coturnixcoturnix* and the Japanese quail (*Coturnixcoturnix japonica*) (Shim, 2004).

The Japanese quail (*Coturnixcoturnix japonica*) is the smallest avian species farmed for meat and egg production (Panda and Singh, 1990). It has also assumed worldwide importance as a laboratory animal (Wilson *et al.*, 1961). Distinct characteristics of the quail bird include rapid growth enabling its marketing for consumption at about 5 - 6 weeks of age, early sexual maturity resulting in a short generation interval, high rate of lay and much lower feed and space requirements than the domestic fowl and it is less susceptible to common poultry diseases (Edachee *et al.*, 2005). Due to their low weight, less feed and space requirements, quail farming can be started with lower capital investment as compared to chicken and duck with almost the same profit margin. With shorter reproduction cycle and earlier marketing age, it offers fast monetary circulation ultimately yielding quicker returns. Quail farming in the tropics is highly profitable (Shim, 2004).

Quails begin laying eggs at about 35 days of age and an average of 40 days (Babangida and Ubosi, 2006). Their layers are very prolificacy is very high, able to produce more than 300 eggs per year (Shim, 2004). Some authors affirm that they are also more efficient converters of feed to eggs than chickens (Sundaram, 1989). Quail eggs are widely accepted by Asians and quail meat is treated as a delicacy among the Asians (Hoffmann, 1988 and Shim, 2004). The objective of this research was to investigate the replacement value of Indomie waste for maize in Japanese Quail diets in terms of growth performance and haematological indices also due to the high cost of maize and the competition between man and animal want to source of other available nutrient to replace maize

MATERIALS AND METHOD

Experimental Site

The experiment was carried out at the Quail Unit of the Teaching and Research farm of Department of Animal Science, Ahmadu Bello University Samuru, Zaria. It is located within the Northern Guinea Savannah zone of Nigeria with latitude 11°14' 44N and 7°38' 65E, altitude of 610m above sea level.

Experimental Design

The design of the experiment was a Completely Randomized Design (CRD) comprising of two hundred two weeks old birds randomly divided into five treatments with three replicates and 13 birds per replicate. The experiment lasted for four weeks.

Experimental Diets

Five experimental diet were formulated comprising of diet containing 0, 25, 50, 75 and 100% Indomie waste as displayed in Table 1. The diets were is caloric and is nitrogenous.

Table 1: Feed Composition of the Experimental Diets (2-6 weeks)

Ingredient	Treatments				
	0% IW	25% IW	50% IW	75% IW	100% IW
Maize	67.96	50.52	33.46	16.60	0.00
Indomie	0.00	16.84	33.46	49.80	65.97
Soya beans cake	18.09	18.41	18.73	19.04	19.35
Ground nut cake	9.04	9.20	9.36	9.52	9.67
Bone meal	3.00	3.00	3.00	3.00	3.00
Limestone	1	1	1	1	1
Salt	0.20	0.20	0.20	0.20	0.20
Lysine	0.10	0.10	0.10	0.10	0.10
Methomine	0.30	0.30	0.30	0.30	0.30
Premix	0.25	0.25	0.25	0.25	0.25
Calculated Analysis					
ME Kcal/kg DM	2831.23	2811.4	2798.32	2781.24	2774.52
Crude protein (%)	20.00	20.00	20.00	20.00	20.00
Crude fibre (%)	4.70	3.53	3.53	3.53	3.53
Ether extract (%)	3.75	5.43	5.43	5.43	5.43
Calcium (%)	0.90	0.90	0.90	0.90	0.90
Phosphorus (%)	0.72	0.72	0.72	0.72	0.72
Lysine (%)	1.40	1.40	1.40	1.40	1.40
Methionine (%)	0.85	0.85	0.85	0.85	0.85

Management of the experimental birds

During the period of the experiment, feed and clean drinking water were given *ad-libitum*. All routine practices were duly followed throughout the experiment.

Data collection

Performance characteristics were taken at the beginning of the experiment, the initial week was taken and weekly weight gain was also taken. Weekly feed intake and left over was taken as well per week.

Haematological parameters determination

Blood samples from three birds per replicate was collected and were transferred to test tubes containing EDTA and was taken to the Haematological Laboratory at the Veterinary Department, A.B.U., Zaria . The parameters measured were Packed Cell Volume (PCV), Hemoglobin (HB), White Blood Cell (WBC), Red Blood Cells (RBC), Total Protein (TP), Heterocyst and Lymphocyte.

Statistical analysis

Data collected were subjected to analysis of variance. The data was statistically analyzed using the General Linear Model Procedure of Statistical Analysis (SAS, 2002) while Duncan's multiple range test was used to compare the means.

Table 2: Effects of feeding graded levels of Indomie waste based diets on the performance characteristics of quail birds (2-6weeks)

Parameters	Levels of indomie waste inclusion (%)					SEM
	0%IW	25%IW	50%IW	75%IW	100%IW	
Initial weight (g)	44	45	44	45	45	0.06
Final weight (g/bird)	119 ^c	118 ^c	136 ^a	123 ^{bc}	131 ^{ab}	2.60
Daily weight gain (g/bird)	76 ^{bc}	73 ^c	92 ^a	78 ^{bc}	89 ^{ab}	1.80
Total feed intake (g/bird)	438	462	436	451	463	16.48
Daily feed intake (g/bird)	15.7	16.5	16	16	17	1.50
Feed conversion ratio	5.81 ^{bc}	6.32 ^c	4.74 ^a	5.77 ^{bc}	5.41 ^{bc}	1.90 ^a

^{abcd} Means with different superscripts within the same row are significantly ($P < 0.05$) different. SEM= Standard error of the means

RESULTS AND DISCUSSION

The performance of growing Japanese quails fed indomie waste is presented in Table 2. There was no significant difference ($P > 0.05$) in the average daily feed intake, average weekly feed intake and total feed intake. Final weight, average weight gain and feed conversion ratio (FCR) of growing Japanese quails were significantly ($P < 0.05$) affected by the inclusion of indomie waste.

Treatment 3 (50% IW) had the highest final body weight which was significantly higher than treatments 4 (75%), 1 (0%) and 2 (25%) but similar to treatment 5 (100%). Treatments 5 (100%) and 4 (75%) have similar final body weights while 4 (75%), 1 (0%) and 2 (25%) also had similar final body weights. Treatment 3 (50% IW) had higher ($P < 0.05$) average weight gain compared to treatments 4 (75%), 1 (0%) and 2 (25%) but similar to treatment 5 (100%). Treatments 5 (100%) and 4 (75%) and 1 (0%) had similar ($P > 0.05$) average weight gains. Treatments 4 (75%), 1 (0%) and 2 (25%) also had similar average weight gains.

Feed conversion ratio was highest ($P < 0.05$) for treatment 3 (50% IW) as compared to treatments 4 (75%), 1 (0%) and 2 (25%) but similar to treatment 5 (100%). Treatments 5 (100%) and 4 (75%) and 1 (0%) had similar ($P > 0.05$) feed conversion ratios. Treatments 4 (75%), 1 (0%) and 2 (25%) also had similar ($P > 0.05$) feed conversion ratio.

Eniolorunda *et al.* (2008) reported that indomie waste has no anti- nutritional factor and the high energy content of indomie waste makes a good substitute for maize (and other cereal grains).

The effect of feeding indomie dough to Japanese quails on haematological parameters is shown in Table 3. There were no significant differences ($P > 0.05$) in all the treatments for PCV however the values obtained (46.44 to 52.67) fell within the normal range of 37 to 69% (Campbell, 1988). There were no significant ($P > 0.05$) differences in haemoglobin values obtained across the treatments (14.83-17.51). They however fell above the normal range of 12 to 15.52g/dl (Campbell 1988). Total protein values indicated no significant differences ($P > 0.05$) across treatments (4.42-5.23). Ayup *et al.* (2012) recorded higher values of 3.7 to 12.6g/dl for total protein. There were no significant ($P > 0.05$) differences across the treatments for RBC (7.33-8.88) but was higher than the range of 3.8 to 5.5x10⁶/ul reported by

Campbell (1988). There was no significant difference among all white blood cell values for treatments which had values of 3.34ul-4.02ul but fell below the normal range of 4.10.9x103/ul (Campbell 1988).

There were significant ($P<0.05$) differences among the treatments in heterocyst's with treatment 3 having the lowest value of 6.78. It was statistically lower than the values for treatments 2 and 5. Treatments 2, 5, 1 and 4 had similar values while treatments 1, 4 and 3 had similar values.

There were significant ($P<0.05$) differences among the treatments in lymphocytes with treatment 3 being significantly higher than treatments 2 and 5. Treatments 3, 1 and 4 had similar values.

Table 3: Effects of feeding graded levels of Indomie waste based diets on the haematological characteristics of quail birds (2-6weeks)

Parameters	Levels of indomie waste inclusion (%)					SEM
	0%IW	25%IW	50%IW	75%IW	100%IW	
PCV	52.67	50.78	46.44	50.78	50.89	12.67
HGB	17.11	15.82	14.83	15.67	15.67	3.56
TP	5.01	5.23	4.42	4.60	4.82	3.21
WBC	3.74	4.02	3.34	3.64	3.40	2.56
RBC	8.89	7.91	7.49	7.33	8.16	4.32
HETERO	9.67 ^{ab}	10.33 ^a	6.78 ^b	9.56 ^{ab}	11.22 ^a	1.02
LYMPHO	90.33 ^{ab}	88.89 ^b	93.22 ^a	90.44 ^{ab}	88.78 ^b	1.22

^{abcd} Means with different superscripts within the same row are significantly ($P<0.05$) different. SEM= Standard error of the means

PCV= packed cell volume, Hb=haemoglobin, TP=total protein, RBC=red blood cell,

WBC=white blood cell. Hetero= heterocyst, Lympho= lymphocytes

CONCLUSION AND RECOMMENDATION

The results of this study show that indomie (nodules) waste can replace maize without adverse effects on growth performance and haematological indices of the quail birds. From the finding of the study, indomie waste can be included up to 50% inclusion without deleterious effects on quail performance and haematological indices.

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