

Performance and egg production of Japanese quails fed diets containing varying levels of sun-dried cassava peel meal fortified with palm oil

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Abstract

A total of 360, six (6) weeks old female quails with an average weight of 71.67 g of female were used to determine the effect of varying levels of sun-dried cassava peel meal on Japanese quails. The birds were randomly allotted to four dietary groups with 90 birds per treatment, each treatment was replicated thrice. The diets contained 0, 25, 50 and 75 % of sun-dried cassava peel meal (SCPM) fortified with palm oil at 0 %, 12 %, 12 %, and 12 % respectively, and were designated SCPM₀, SCPM₂₅, SCPM₅₀ and SCPM₇₅, respectively, as a replacement for dietary maize. The parameters measured were body weight, feed intake, daily weight gain, feed conversion ratio, nutrient digestibility, hen-day egg production, and henhouse egg production. The result showed that there were no significant ($P > 0.05$) difference in the body weight and daily weight gain. Significant ($P < 0.05$) difference was observed in feed intake and feed conversion ratio. There were significant ($P < 0.05$) difference in nutrient digestibility among dietary groups. Japanese quails fed SCPM₇₅ had better CF, EE and ash digestibility while quails fed SCPM₇₀ had better CP and NFE digestibility. The results also showed significant ($P < 0.05$) difference in hen-day egg production and hen-house egg production with quails fed SCPM₅₀ having better values. It was concluded that dietary maize could be replaced with sun-dried cassava peel meal (SCPM) fortified with palm oil up to 75 % without any deleterious effect on Growth Performance and egg production of laying Japanese quails

Key words: Japanese quails, sun-dried cassava peel meal, egg production and palm oil.

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Introduction

Japanese quail is reared by farmers in many parts of Nigeria and accepted by the populace especially because of their prolific nature, less susceptibility to diseases, lean meat and low level of cholesterol in both meat and egg [1]. One of the major constraints of the development of poultry industry in Nigeria is the high cost of feeds and feed ingredients, maize constitutes about 60 % of feed for poultry and this ingredient serves as food for many households in Nigeria. This leads to competition between man and livestock; thus, increasing its market value. [2], thus, the search for alternative and cheaper feed ingredient, which cassava peel is one.

The objective of the study was to investigate the growth response and egg production of Japanese quails fed diets containing varying levels of sun-dried cassava peel meal fortified with palm oil.

Materials and Methods

The study was conducted at the Teaching and Research Farm of Animal Production Department Federal University of Technology Minna, Niger state. Minna lies between latitude 9° 15' and 9° 45' N and between longitude 6° 15' and 6° 45' of the equator. The mean annual rainfall is between 1200 and 1300 mm and mean temperature ranges from 38 - 42°C [3].

Three hundred and sixty, six weeks old female quails birds were randomly allocated to four dietary treatments of varying levels of sun-dried cassava peel meal fortified with palm oil as SCPM₀ (0 % SCPM and 0 % palm oil), SCPM₂₅ (25 % SCPM and 12% palm oil), SCPM₅₀ (50 % SCPM and 12 % palm oil), SCPM₇₅ (75 % SCPM and 12 % palm oil) (Table 1). Each treatment was replicated three (3) times in a completely randomized design. Each replicate had 30 birds.

The initial weights of the birds were taken at the start of the experiment and at weekly intervals afterwards. Data of daily feed intake, weight change and egg production parameters were taken. Hen day and hen house egg production were calculated [4] while records of mortality were kept throughout the period of study. Proximate analysis of feed and faeces were determined using the procedure according to AOAC, 2005 [5]

Data collected were subjected to one-way analyses of variance (ANOVA) using the computer software package SPSS 17.0 [6].

Table 1; Composition of experimental diets fed to Japanese quails (%)

Ingredients	SCPMo	SCPM	SCPMso	SCPM75
Maize	54.27	27.87	13.88	6.69
SCPM	0.00	13.29	25.88	32.06
GNC	28.03	29.14	30.54	31.55
Palm oil	0.00	12.00	12.00	12.00
Maize bran	10.00	10.00	10.00	10.00
Fish meal	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00
Limestone	2.00	2.00	2.00	2.00
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	100.00	100.00	100.00	100.00
Calculated analysis				
Energy Kcal	2906.71	3310.88	3171.35	3099.98
Crude protein	19.98	18.77	18.77	18.89
Ether extract	4.11	15.59	16.02	16.15
Crude fiber	3.56	4.35	5.34	5.83
Lysine	0.67	0.63	0.61	0.61
Methionine	0.27	0.23	0.20	0.20
Calcium	1.30	2.01	2.01	2.01
Phosphorus	0.62	0.60	0.58	0.58

♦Premix (Vitamin / Mineral) Vit A (7,500,000iu), Vit D (500,000iu), vit. E (1,000iu), vit Bi (375mg), vit.B₂ (125mg), Vit-B₆ (500mg), VitB₁₂ (150mg), Vit. B₁₂ (2.5mg),Vit. K (15mg),Vit. C (10mg) and folic acid (150mg), Ca (12.5mg),Cu (8.0mg), Fe (32mg), I (0.8mg), Se (100mg), Mg (0.25mg), Chlorine (250mg), Panthotenic Acid (14.4mg).

Keys: SCPMO - 100 % maize: 0 % SCPM; SCPM25 - 75 % maize: 25 % SCPM ; SCPM50 - 50 % maize: 50 % SCPM; SCPM75 - 25 % maize: 75 % SCPM ; SCPM= sun-driedcassavapeelmeal GNC- Groundnut cake

Results and Discussion

The results of growth performance are presented in Table 2. Final body weight gain, total feed intake and daily feed intake were affected ($P < 0.05$) by the replacement of maize with SCPM fortified with palm oil in the diets of the birds. Final weight gain of birds in SCPMO, SCPM₂₅, and SCPM₅₀ had similar, value. The birds on SCPM₂₅ and SCPM₅₀ also have similar ($P > 0.05$) final weight gain, however birds on SCPM₂₅ and SCPM₇₅ had final body weight higher than those on SCPM₅₀. The reason for this is not known. The total and the daily feed intake of birds fed SCPM were lower than the control; this might be because of the higher energy values in the SCPM diets. Thus, the birds need less feed to meet their energy needed for sustenance, growth and development. This is in line with the results of [7] who observed that as the dietary energy feed of duck increased from 2,600 to 3,100 Kcal of AME/kg the feed intake decreased significantly. The feed conversion ratios were better in quails on SCPM diets. This might

probable be as a result of lower feed consumed by the birds in these treatments and better protein and ether extract digestibility.

Table 2: Performance of laying quails fed sundried cassava peel meal fortified with palm oil

Parameters	SCPM ₀	SCPM ₁₅	SCPM ₅₀	SCPM ₇₅	SEM	LS
Initial body weight (g)	74.44	67.78	71.67	72.78	2.21	NS
Final body weight (g)	144.45 ^a	148.40 ^s	128.44 [”]	148.67 [*]	3.29	*
Body weight gain (g)	70.01	80.62	56.78	75.90	4.48	NS
Total feed intake / bird (g)	2226.73 [’]	1340.00 [”]	1338.05 [”]	1445.89 [”]	113.57	*
Feed conversion ratio	2.57 [”]	1.29 ^s	1.85 ^{ab}	1.52 [*]	0.18	◆
Daily feed intake (g)	24.47 [*]	14.73 [”]	14.70 [”]	15.89 [”]	1.25	*
Daily weight gain (g)	0.77	0.89	0.62	0.83	0.49	NS

- means of the same row with different superscript are significantly (P<0.05) different

NS - No significant difference (P>0.05)

SEM - Standard error of means

LS - Level of significance

The nutrient digestibility results (Table 3) indicated that birds on SCPM had better digestibility. This is in contrast with the findings of [8], who reported that birds could only tolerate cassava peel meal at levels up to 50 % replacement at the expense of dietary maize beyond which, it leads to poor digestibility. The better digestibility in the birds on SCPM treatment diets observed in this work might be because of the palm oil fortification.

Table 3: Apparent nutrient digestibility of Japanese quails fed diets containing varying levels of sun-dried cassava peel meal fortified with palm oil

Parameters	SCPM ₀	SCPM ₁₅	SCPM ₅₀	SCPM ₇₅	SEM	LS
Dry matter (%)	81.23 [”]	86.69 [*]	84.90 ^s	83.38 [”]	0.89	◆
Crude protein (%)	61.78 [”]	72.83 [”]	75.80 [’]	71.02 [”]	2.22	◆
Crude fiber (%)	66.62 [”]	68.76 [”]	69.60 [”]	79.72 [*]	2.09	◆
Lignin extract (%)	87.20 [”]	93.11 [’]	92.51 [’]	93.58 [*]	0.95	*
Ash (%)	53.74 ^s	58.38 [”]	47.83 [”]	67.50 [*]	2.81	*
NFE (%)	86.14 [”]	83.05 [”]	90.52 [’]	84.77 [”]	1.05	*

Results of the hen-day and hen-house egg production (Table 4) showed that birds on diets with SCPM had better values. This indicates that SCPM can improve the hen-day and hen-house egg production. The birds on SCPM₅₀ had better hen and hen-house egg production. This might mean that the requirements for optimal production of these parameters were met at 50 % SCPM level.

Table 4: Egg production of Japanese quail fed varying levels of sun-dried cassava peel meal fortified with palm oil

Parameters	SCPM ₀	SCPM ₁₅	SCPM ₅₀	SCPM ₇₅	SEM	LS
Hen day egg production (%)	5.57 ^c	9.36 [”]	14.50 [’]	9.87 [”]	0.58	*
Hen house egg production (%)	4.58 ^c	9.23 [”]	14.38 [*]	9.28 [”]	0.56	*

Conclusion

Results of the study showed that dietary maize could be replaced with SCPM up to 75 % level without any deleterious effect on the growth performance, nutrient digestibility and egg production parameters of laying Japanese quails without any adverse effect.

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