

PERFORMANCE OF JAPANESE QUAILS FED DIETS CONTAINING *Moringa oleifera* LEAF MEAL IN SUDAN SAVANNAH REGION OF NIGERIA

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ABSTRACT

This study was conducted to determine the performance and egg quality characteristics of Japanese quails. Five diets were formulated containing *Moringa oleifera* leaf meal (MOLM) at 0, 2.5, 5, 7.5 and 10% levels designated as Treatment T1, T2, T3, T4 and T5 respectively. Ninety (90) four weeks old Japanese quails were fed these diets in a completely randomized design (CRD). Each treatment was replicated 3 times consisting 6 quails per replicate. The experiment lasted 5 weeks. Feeds were offered daily and water was supplied *ad libitum*. The results of the performance of quails showed there were significant differences ($P<0.05$) in the final body weight (143.80 -165.23g), percent body changes (24.45- 30.32%), daily feed intake (23.23-26.87g) and hen day egg production of quails (67.34 - 88.54%): The feed cost per kilogram gains (90.14 - 95.95 ₦/Kg gain) and feed conversion ratio (3.27- 4.28). The quails fed 7.5 MOLM diets had efficiently utilized the feed at lowest cost compared to others. The results of eggs qualities characteristics showed no significant differences ($P>0.05$) in the eggs weights among the treatments means. However, the eggs length (2.81- 3.16 cm), albumen weight (2.69 - 2.89g) and egg yolk weight (2.72- 3.73g) were significantly ($P<0.05$) affected by the treatments. Albumen and yolk weights were recorded highest for quails fed 7.5% MOLM diets. The Hug Unit value evaluated was significantly ($P<0.05$) better for quails fed 7.5% MOLM diets compared to other treatments. Based on this study, it was therefore concluded that *Moringa oleifera* leaf meal can be included in the diet of Japanese quails up 7.5 % without any detrimental effect on the performance and egg quality characteristics with some reduction in the cost of production.

Keywords: Quails, *Moringa oleifera* leaf, performance and eggs quality characteristics.

INTRODUCTION

The shortage of animal protein intake among the ever increasing human population in the third world countries has long been recognized (Omoikhoje *et al.*, 2008). Therefore, there is a need to increase protein intake by producing animals with short generation interval like quails. Japanese quails require low space, low capital investment and adoptable to intensive systems like other poultry. They also produce eggs which are valuable for increasing health and considered as valuable products in poultry enterprise (Oke, *et al.*, 2005). However, feeds account for 60-70% cost of production in poultry production (Smith, 2001). In tropical area there is growing scarcity of animal feed resources and as such, there is a need for testing other alternative feed ingredients that are available in the localities. *Moringa oleifera* plant is known as Zogale in Hausa language and is readily available in Sudan Zone of Nigeria. It contains some antibiotics compound beside its nutritional

value. It is important plant specie that has beneficial effect in human and livestock nutrition. Its leaves are very rich in carotene and ascorbic acid with good amino acids profile (Olugbemi *et al.*, 2012). The objective of this study was to determine the effect of *Moringa oleifera* leaf meal on the performance and eggs quality characteristics of Japanese quails.

MATERIALS AND METHODS

Experimental Site.

This experiment was conducted at Poultry Unit of Teaching and Research Farm of the Department of Animal Science, Faculty of Agriculture and Agricultural Technology, Kano University of Science and Technology, Wudil. The farm is located on latitude 11° 37'N and longitude 8° 58'E at an altitude of 403m above sea level (Olofin *et al.*, 2008).

Experimental Diets

Five diets were formulated using *Moringa oleifera* leaf meal which was incorporated in the

diets at 0, 2.5, 5, 7.5 and 10% levels designated as T1, T2, T3, T4 and T5 respectively. Sample Moringa leaf meal was analyzed in the laboratory for proximate composition according to A.O. A. C. (1990). It contains crude protein and crude fibre (15.66% and 10.44% respectively).

Experimental Animal management and design

Ninety (90) four weeks old Japanese quails were fed diets in a completely randomized design and each treatment was replicated 3 times having 18 quails per treatment. Quails were raised in cages hutches which were constructed using wooden frame covered with wire mesh. Each hutch was portioned into a compartment and occupied six quails per replicate.

Data collection

The initial weights of the quails were recorded at the beginning of the feeding trial and subsequently the birds were weighed on weekly basis to determine the weight gain. The feed intake was determined by subtracting the leftovers for the feed offered daily. Water was supplied to birds *ad libitum*. Some antibiotics were also offered as prophylaxis (Amprolium and Terramycin powders). The eggs laid per day for each replication were all recorded. At the end of experiment, the egg quality parameters were evaluated such as egg length, width, yolk diameter, yolk weight, albumen height, shell weight and shell thickness using digital scale and vanier calliper.

Data Analysis

Data generated was subjected analysis of variance using SAS (2002) software package and where significance were exist among the means, Duncan's multiple range test option was used to separate them.

RESULTS AND DISCUSSION

The results of performance quails are presented in Table 2. The results showed there were Significant differences ($P < 0.05$) in the final body weight, percent body changed, feed intake and hen day production of quails. Birds fed 5.0 and 7.5% MLOM diets were significantly ($P < 0.05$) higher in final body weights (163.39 and 165.23g respectively) and percent body gain (29.56 and 30.32% respectively) compared to others birds fed other treatments. Feed intake and hen day egg production was significantly

($P < 0.05$) higher in birds fed 7.5 MOLM diets (26.87g and 88.54% respectively) compared to others. The feed intake by quails agreed with work of Babangida and Ubosi (2006) and lower than the value reported by Bawa *et al.* (2011) on the response of Japanese Quails to diets. Feed cost per kilogram gains and feed conversion ratio were observed better for quails fed 7.5 MOLM diets (90.14 ₦/ kg and 3.27 respectively) compared to others.

The results of eggs quality characteristics are presented in Table 3. The eggs weights showed no significant differences ($P > 0.05$) among the treatments means. However, the egg length and egg width were significantly ($P < 0.05$) influenced by the treatments. The egg length was recorded higher for 5.0 and 7.5% MOLM diets (3.15 and 3.16 cm) compared to others. Similarly, there were significant differences ($P < 0.05$) in the yolk and albumen weights. The values were compared favorably with other workers (Murakami, *et al.*, 1994; Babangida and Ubosi, 2006 and Bawa *et al.* 2011). The yolk weight was recorded highest for quails fed 7.5% MOLM diet (3.73g) and the Albumen weight was also highest in Treatment 4 (2.89g). The shell weight was not significantly ($P > 0.05$) affected by dietary treatments. The Hug unit value evaluated was better for quails fed 7.5% MOLM diets compared to others. This agreed with work of Olugbemi *et al.* (2012) who recorded good results when fed *Moringa oleifera* leaf meal diets to broilers.

CONCLUSION

Based on this study, *Moringa Oleifera* leaf meal can be included in the diet of Japanese quail without any depression of performance and egg qualities with concomitant reduction in the cost of production.

REFERENCES

- A.O.A.C. (1990). Official Methods of Analysis, Association of official Analytical Chemist, Washington D.C. pp 423-858.
- Babangida, S. and Ubosi, C.O. (2006). Effect of dietary protein level on the performance of laying Japanese quails (*Coturnix coturnix Japonica*) in a semi-arid environment of Nigeria, *Nigerian Journal of Animal Production* 33(1):45-52.
- Bawa, G.S., Lombin, L.H., Karsin, P., Musa, U., Payi, E., and Shamaki, D. (2011). Response of Japanese Quails to varying Dietary Protein levels in the Tropics, *Nigerian Journal of Animal Production* 28:1 Pp 43-54.
- Murakami, A.E. Moraes, V.M.B. Ariki J., Junqueira, O.M. and Knonka, S.D. (1994) Niveles de merionina

- para eodonas japonesas (*Coturnix coturnix Japonica*) Em postura In: 31 Reunia Annual da Sociedade brasileira de Zootecnia. Maringa PR Brasil. Pp 64-65.
- Oke, U.K. Herbert, U. and Joseph, K. (2005). Photo stimulated changes in egg production and reproductive performance of the Guinea fowl in a sub-humid Tropical environment. *Nigerian Journal of Animal Production* 32: 246.
- Olofin, E. A., Nabegu, A.B. and Dambazau, A.M. (2008). Wudil within Kano region; A geographical synthesis, 1st edition, Adamu joji publishers. Kano State, Nigeria, Pp. 134-138
- Olugbemi, T.S., Gambo, S.A., Orunmuyi, M.O. and M.O. Daudu (2012) Effect of feeding varying levels of Moringa Oleifera Powder on growth characteristics and organs weights in quails. In Proceeding of 37 Annual conference of the Nigerian Society for Animal Production, University of Agriculture Makurdi, Benue state. Pp205
- Omoikhoje, S.O., Bamgbose, A.M. and Aruna, M.B. (2008). Replacement value of unpeeled cassava root meal (UPCRM) for maize in weaner rabbit diets. *Nigerian Journal of Animal production* 35:63-68
- SAS. (2002). User's Guide Statistics version, 6th edition, SAS statistical package Inc, Cary, North Carilina, U.S.A.
- Smith, A.J. (2001) Poultry; Tropical Agriculturalist, 2nd edition. Macmillan education Ltd. Uk Pp 221-223.

Table 1: Composition of Japanese quails diets containing Moringa oleifera leaf meal

Ingredients	Treatments				
	T1 (0%)	T2 (2.5%)	T3 (5%)	T4 (7.5%)	T5 (10%)
Maize	50.58	46.58	42.80	40.76	37.70
Soya beans meal	30.92	35.42	36.70	36.24	36.80
Moringa Oleifera leaf meal	0.00	2.50	5.00	7.50	10.00
Fish meal	3.00	3.00	3.00	3.00	3.00
Wheat offal	4.00	4.00	4.00	4.00	4.00
Bone meal	4.00	4.00	4.00	4.00	4.00
Limestone	3.5	3.50	3.5	3.50	3.50
Salt	0.30	0.30	0.30	0.30	0.30
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.20	0.20	0.20	0.20	0.20
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis					
Crude protein (%)	22.00	22.00	22.00	22.00	22.00
Methabolizable	2989	2898	2812	2811	2905

Table 2: Performance of Japanese Quail fed diets containing Moringa oleifera leaf meal.

Parameters	Treatments				
	T1 (0%)	T2 (2.5%)	T3 (5%)	T4 (7.5)	T5 (10%)
Initial body weight	115.14	115.04	115.10	115.15	115.14
Final body weight	152.68 ^b	142.05 ^c	163.39 ^a	165.23 ^a	143.80 ^c
Percentage body change (%)	24.45 ^c	27.05 ^b	29.56 ^a	30.32 ^a	28.67 ^b
Daily feed intake (g)	23.23 ^c	24.94 ^b	25.17 ^a	26.87 ^a	23.92 ^c
Feed cost N/ kg gain	95.95 ^a	95.37 ^a	94.69 ^b	90.14 ^c	91.37 ^c
Hen day production (%)	76.03 ^b	77.68 ^b	86.56 ^a	88.54 ^a	67.34 ^c
Feed conversion ratio	4.23 ^b	4.25 ^b	4.28 ^b	3.27 ^a	4.24 ^b
Mortality rate (%)	0.33	0.00	0.00	0.00	0.00

^{abc}= means with different superscript on the same raw are significantly different (P<0.05)

Table 3: Egg Quality characteristics Japanese quails fed diets containing Moringa oleifera leaf meal

Parameters	Treatments				
	T1 (0%)	T2 (2.5%)	T3 (5.0%)	T4 (7.5%)	T5 (10%)
Egg weight (g)	9.60	10.13	9.47	10.27	9.83
Egg length (cm)	2.92 ^{ab}	2.81 ^b	3.15 ^a	3.16 ^a	2.98 ^{ab}
Egg width (cm)	1.66 ^{ab}	1.56 ^b	1.72 ^{ab}	1.83 ^a	1.64 ^{ab}
Yolk weight (g)	2.97 ^b	3.14 ^b	2.90 ^b	3.73 ^a	2.72 ^c
Albumen weight (g)	2.73 ^{bc}	2.69 ^c	2.68 ^{ab}	2.89 ^a	2.78 ^{ab}
Albumen height (cm)	2.53	2.53	2.87	2.90	2.70
Shell weight (cm)	1.27	1.25	1.24	0.26	0.26

^{abc}= means with different superscript on the same raw are significantly different (P<0.05).