Effects of Soya Bean Meal Replaced with Moringa Seed Meal on Growth Performance, Economics of Production, and Egg Parameters Of Japanese Quail

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Abstract

The present study was conducted to determine the effect of soya bean meal replaced with moringa seed meal diet on growth performance, economics of production, and egg parameters of Japanese quail. One hundred (100) Japanese quails were used in this experiment. The birds were randomly allotted to five treatment diets of two replicate with ten birds per replicate. Five experimental diets were formulated such that soya bean meals were replaced with moringa seed meals at 0, 10, 20, 30 and 40% levels. Birds were fed for a period of fifty six (56) days and were supplied with water and drugs. Results showed that inclusion of moringa seed meal in Japanese quail diet did not influence feed intake, weight gain, feed gain ratio and feed efficiency. Cost per kg feed reduced with increased moringa seed meal in the diet. Birds fed 20% level of soya bean meal replaced with moringa seed meal showed the least price in Naira, however, the value is not statistically different from the control. No significant difference was observed in egg weight, egg length, egg width, egg yolk weight, egg shape index and egg albumen weight of birds fed with experimental diets. However, egg shell weight, egg shell percentage and egg albumen percentage were influenced by the diets.

Key Words: *Japanese quail, soya bean meal, moringa seed meal, egg parameters.*

INTRODUCTION

The people in developing countries are highly deficient in animal protein. Consumption is 10.0g/day as against the minimum daily intake of 35g/day recommended by the Food and Agricultural Organisation (Esobhawan, Ojo, and Ikhelao 2008). One way of increasing protein supply is to diversify poultry production as well as increase the production of other micro livestock species with short generation intervals (Tuleun, Adenkola, and Yenle 2013). Among the micro livestock species with short generation interval, the Japanese quail (Coturnix Coturnix japonica) has the potential to serve as an excellent and cheap source of animal protein for the Nigerians (Babangida and Ubosi, 2006). This is because of its small body size, hardness early maturing, small space requirement and high turn-over rate when compared to other birds. The egg production is high and many offspring can be hatched from a given number of parents. (Ayasan and Okan, 2001).

Feeding is one of the most important factors for maintaining quails in good condition for normal growth and egg production. Since feed constitutes 60–70% investment at the farm for deriving maximum benefit out of quail farming, it is necessary to feed a balanced ration. In Nigeria the poultry industry is facing some challenges one of which is increase cost of feed. (Abbas and Ahmed 2013). To reduce the cost of feed, it becomes imperative to explore other alternative for livestock and the feed industry.

There has been a lot of researches on the potential of moringa leaf meal as an alternative feed ingredient for poultry due to the high protein content (Abou-Elezz, Sarminento – franco, Santos – Ricalde, and Solorio – Sanchez 2012). The seed contain a large amount of oil (Radovich, 2009) All the plant parts can be used to feed livestock (Martin et al., 2007), but the leaves are the most nutritious part of the plant (Peter, 2008). However, there is little or no information on the prospect of moringa seed meal in Japanese quail diet. This research work therefore aimed at assessing the effects of soya bean seed meal replaced with moringa seed meal diet on growth performance, economic return and egg parameters of Japanese quail.

Materials and Methods

The research work was carried out at the Teaching and Research Farm, Adeyemi College of Education Ondo. One hundred Japanese quails of two weeks old were used for the feeding trial. The birds were randomly allotted to five treatments of two replicates with ten birds per replicate. Moringa seeds were obtained from moringa plant in Ondo while other feed ingredients were purchased from a commercial feed ingredient supplier in Ondo. Moringa seeds were sundried and milled to obtain Moringa Seed Meal (MSM). Five experimental diets were formulated such that soya bean meals (SBM) were replaced with moringa seed meal at 0, 10, 20, 30 and 40% levels.

Table 1: Composition of Experimental Diet

	Levels of Replacement (%)				
Parameters	**0**	**10**	**20**	**30**	**40**
Maize	35.00	35.00	35.00	35.00	35.00
Wheat offal	20.00	20.00	20.00	20.00	20.00
Soya bean (Full fat)	30.00	26.70	23.40	20.10	18.00
Moringa seed	0.00	3.30	6.60	9.90	12.00
Blood meal	12.00	12.00	12.00	12.00	12.00
Bone meal	2.40	2.40	2.40	2.40	2.40
Lysine	0.10	0.10	0.10	0.10	0.10
Methionine	0.25	0.25	025	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00

The birds were weighed individually and tagged before the commencement of the feeding trial and were also weighed on a weekly basis. The weight of feed supplied and the left over were taken on a daily basis. To calculate the cost per kilogram (kg) feed, the price of each ingredient was taken and this was used to multiply the kg of that ingredient for the different experimental diets. To calculate the cost per kg of bird produced, the price for one kg of each diet was used to multiple feed conversion ratio.

The first egg drop was observed when quail was six weeks old. Egg laid were collected from different treatments and assessed for egg weight, egg length, egg, width, egg shell weight, egg yolk weight, egg shell (%), egg shape index, egg albumen weight and egg albumen (%). Data collected were analysed using Analysis of variance and differences between treatment means were calculated using Duncan Multiple Range Test.

Results and Discussion

The result of the effect of soya bean meal replaced with moringa seed meal on the growth and economics of production of Japanese quail is presented in Table 2. The result showed that moringa seed meal diet exerted significant different in the feed intake of Japanese quail. Birds fed 40% level of replacement exhibited lower feed intake when compared with other levels. Birds fed 10% level of replacement had significantly higher feed intake when compared with the control. This result differs from the report of Olugbemi, Mutayoba, and Lekunle (2010) who noticed that supplementing Moringa oleifera leaf meal at 10% level in a cassava chip-based diet offered to laying hens had no significant effect on their feed intake when compared with the control.

There is no significant difference in the initial weight of Japanese quail used for the feeding trial which shows that initial weights could not influence the final weight of the birds. The final weights were significantly lower in quails fed moringa inclusion levels of 30 and 40% when compared with other levels. This result is contrary to the observation of Olugbemi, Mutayoba, and Lekunle (2010) who reported that an addition of Moringa oleifera leaf meal had no significant effect on the final body weight of the bird when compared with the control diet. Total weight gain, weekly weight gain and daily weight gain of Japanese quail fed soya bean meal replace with moringa seed meal had significantly higher weight at 0–20% levels of replacement when compared with 30–40% levels of replacement. These results showed that weight gain declines as the level of moringa seed meal increased above 20% replacement level. This could be due to the higher volume of feed to energy consumption at the level above 20%. This result is similar to the findings of Melesse, Tiunch and Negesse (2011) who reported that the use of Moringa stenopetala leaf meal in the diet of Rhode Island Red Chicks produced significantly ($P<0.05$) increased the weight gain of the birds.

Feed gain ratio was significantly higher in birds fed with 30 – 40% level of replacement when compared with the lower levels. The result is similar to the report of Kakengi, Kaijage, Sarwatt, Matayoba, Shem and Fujihara (2007) who observed that addition of 10 and 20% Moringa oleifera leaf meal to the diet of laying hen as a substitute for sunflower seed meal significantly increased the feed gain ratio. However, feed efficiency is significantly lower in bird fed 30% level of moringa seed meal inclusion when compared with other levels. This result is similar to that of Abbas and Ahmed (2012). They observed that the

use of 1.5% Moringa oleifera un-decorticated seed powder in the broiler's diet significantly reduced the feed efficiency of broiler. The price per kg feed reduced with increased levels of moringa seed meal in quail diet. There is significant difference in the price per kilogram (kg) bird produced. Quail fed 20% level of replacement showed the least price in Naira. However the value is not statistically different from that of the control.

Table 2: Effect of Soya Bean Meal Replaced with Moringa Seed Meal on Growth Performance and Economic of Production of Japanese Quail

	Levels of Replacement (%)					
Parameters	**0**	**10**	**20**	**30**	**40**	**SEM**
Total feed intake (g)	529.65^{d}	517.70^{c}	510.85^{b}	531.30^{d}	487.90^{a}	1.67
Weekly feed intake (g)	132.42^{d}	129.43^{c}	127.71^{b}	132.83^{d}	121.98^{a}	0.42
Daily feed intake (g)	18.91^{d}	18.49^{c}	18.24^{d}	18.98^{d}	17.43^{a}	0.06
Initial weight (g)	36.50	36.50	36.40	36.50	36.40	0.69 NS
Final weight (g)	133.60^{b}	124.60^{b}	123.60^{b}	98.50^{a}	105.00^{a}	2.23
Total weight gain (g)	97.10^{c}	88.10^{bc}	86.60^{b}	62.00^{a}	68.60^{a}	1.99
Weekly weight gain (g)	24.28^{c}	22.03^{bc}	21.65^{b}	15.50^{a}	17.13^{a}	0.05
Daily weight gain (g)	3.47^{c}	3.15^{bc}	3.10^{b}	2.21^{a}	2.45^{a}	0.07
Feed gain ratio	5.51^{a}	5.96^{a}	6.02^{aa}	9.58^{c}	7.83^{b}	0.26
Feed efficiency	0.18^{c}	0.17^{c}	0.17^{c}	0.12^{a}	0.14^{b}	0.00
Price/kg feed (N)	109.9	104.09	98.31	92.38	88.86	-
Price/kg bird (N)	606.04	620.69	591.65	88.46	695.58	21.83

a,b,c: Mean values with different superscript along the same row indicate significant difference (P<0.05).

The effects of soya bean meal replaced with moringa seed meal on egg parameter is shown in table 2. The result showed that there is no significant difference in egg weight, egg length, egg width, egg yolk weight, egg shape index, and egg albumen weight across the treatment. This shows that the tested diet did not exert any influence on egg weight, egg length, egg width, egg yolk weight, egg shape index and egg albumen weight. This result is similar to that of Novak and Scheldeler (2001) who reported that no change in egg characteristics of layer fed diet containing linseed.

The result revealed that egg shell weight and egg shell percentage were higher in bird fed 30% level of replacement compared with 0 and 10% levels of inclusion. This result is in conformity with the findings of Al-daraji, Mshadami, Al – Hayeni, and Al – Hassan (2012) who stated that egg shell weight and egg shell percentage were significantly higher (P< 0.05) when quail were fed with sesame seeds

Egg albumen percentages were significantly higher in bird fed with 10 and 20% levels of replacement compared with the other levels. This result is in conformity with the report of Dalton (2000) who stated that the inclusion of sunflower seed meal in laying hen resulted in significant increase in egg albumen percentage.

Table 3: Effect of Soya Bean Meal Replaced with Moringa Seed Meal on Egg Parameters of Japanese Quail

Parameters	**Levels of Replacement (%)**					**SEM**
	0	**10**	**20**	**30**	**40**	
Egg weight	9.98	9.84	9.77	9.64	9.96	0.1 INS
Egg length	8.67	8.73	8.68	9.71	8.74	0.05NS
Egg width	7.72	7.62	7.57	14.77	7.70	1.40NS
Egg shell weight	6.85^{a}	0.85^{a}	0.89^{ab}	0.95^{b}	0.9 l^{ab}	0.01
Egg yolk weight	3.04	3.00	2.88	2.92	3.79	0.14NS
Egg shell (%)	8.57^{a}	8.64^{a}	9.12^{ab}	9.83^{b}	9.19^{ab}	0.13
Egg shape index	89.09	87.25	87.41	89.19	79.92	1.62NS
Egg albumen weight	5.54	5.71	5.74	5.36	5.59	0.07NS
Egg albumen (%)	55.89^{a}	57.95^{b}	58.20^{b}	55.14^{a}	56.01^{a}	0.33

a,b,c: Mean values with different superscript along the same row indicate significant difference (P<0.05).

Conclusion

These results suggested that soya bean meal could be replaced with moringa seed meal up to 20% level without any deleterious effect on the growth performance of the birds. Feeding Japanese quail with moringa seed meal inclusion of 30% and above will reduce the weight gain of the birds. Economically, feeding Japanese quail with soybean meal replaced with moringa seed meal diet will reduce cost per kg feed, cost per kg bird produced and competition for soya bean existing between man and livestock industry.

The inclusion of moringa seed meal in Japanese quail diet will improve egg shell weight, egg shell percentage and egg albumen weight while it exert no significant effect on egg yolk weight, egg shape index and egg albumen weight. In practice, therefore, 20% level of moringa seed meal inclusion in Japanese quail diet is recommended for optimum growth performance, economics of production and improvement in egg quality.

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