



Effect of Dietary Incorporation of *Coriander Seed Meal* on Production Performance of Japanese quail

N. Bala Chenna Reddy, D. Srinivas Kumar*, K. Raja Kishore, K. Naga Raja Kumari

Department of Animal Nutrition, NTR College of Veterinary Science, Gannavaram-521102
Krishna (A.P), India

ABSTRACT

The present experiment was conducted to evaluate the effect of incorporation of coriander seed meal (CSM) in the diet on the performance and carcass characteristics of Japanese quail. One hundred and fifty day-old quail chicks were randomly allotted to five dietary treatment groups with 3 replicates of 10 birds for 5 weeks. The CSM was ground and included at 0% (T_1 ; Control), 0.5 (T_2), 1.0 (T_3), 1.5 (T_4) and 2.0 (T_5) percent levels in iso-caloric and iso-nitrogenous broiler quail diets to meet the nutrient requirements as per NRC (1994). Body weight gain and feed intake were recorded while feed efficiency was calculated. There was a significant increase ($P<0.01$) in body weight gain, overall feed intake and improved ($P<0.01$) FCR with incorporation of CSM at 2.0% in the diet compared to the control group. There was no significant difference in the carcass traits with respect to dressing percentage and percent weight of heart, liver, gizzard or giblet. However, incorporation of CSM at 2.0% level had increased the carcass yield, ready to cook yield ($P<0.05$) and meat to bone ratio ($P<0.01$) compared to the control group. The feed cost/kg gain decreased ($P<0.01$) with incorporation of CSM at 2.0% level in the diet. Thus, it is concluded that CSM can be safely incorporated at 2% level in quail diets without any adverse effects.

Key words: Carcass characteristics, Coriander seed meal (CSM), Production performance, Quail

INTRODUCTION

Increase in demand for good quality animal protein, health consciousness, and change in food habits, moving trend towards fast foods of the consumer hasten the entrepreneur to seek for fast growing birds other than chicken. Quail is the one among the alternative in poultry with 24% protein in meat, and comes to market age by the end of 5th week, lesser the investment required for production. In general practice usage of antibiotics as growth promoters has been banned in poultry. Now-a-days, most of the research work is concentrated on use of phytobiotics in poultry diets both for improving the production as well as value addition. Herbs are used since ages for their flavours, redolence, food or even remedy. Coriander (*Coriandrum sativum* L.) is documented in ayurvedic literature as a medicinal herb (The Ayurvedic Pharmacopeia of India., 2010). It is an umbelliferous annual plant of parsley family. Incorporation of coriander seed up to 0.3% resulted in improved body weights and better FCR in broilers (Saeid and Nasry, 2010) while, other studies (Sunbul *et al.* 2010; Farah and Jaff, 2011; Jang, 2011) reported better

performance in broilers up to 2% level of incorporation of coriander seed in diet. Most of the research has been carried out by incorporation of coriander seed in broiler diets. On the other hand, research on utilization of coriander seed in quail diets is scanty. Hence, the present study was undertaken to assess the performance of quail in terms of growth rate, carcass yield and economics of supplementation of CSM at various levels.

MATERIALS AND METHODS

One hundred and fifty day-old quail chicks were procured and randomly allotted into 5 groups, each with 3 replicates of 10 chicks. Chicks were wing banded and weight of the chick was recorded. The experiment was carried out for 5 weeks in a completely randomized design (CRD). During the experiment, coriander seed was ground and was included at 0% (T_1 ; Control), 0.5 (T_2), 1.0 (T_3), 1.5 (T_4) and 2.0 (T_5) per cent levels in iso-caloric and iso-nitrogenous quail diets (Table 1) formulated to meet nutrient requirements as per NRC (1994). All the chicks were housed in battery brooders under uniform management conditions. Feed and water were provided *ad libitum*. The feed offered and feed

*Corresponding author: kumardhulipalla@rediffmail.com; Phone: 08676-253782 Ext. 226 (Off); Mobile: 9951384777

Table 1. Ingredient (%) and chemical composition (% DM basis) of quail diets

Constituent/ Diet	T ₁ (Control)	T ₂	T ₃	T ₄	T ₅	Cost/kg (₹)
Maize	49.80	49.5	49.40	49.20	49.00	16.00
De-oiled rice bran	8.30	8.10	7.70	7.40	7.10	13.50
Soybean meal	34.50	34.50	34.50	34.50	34.50	38.00
Fish meal	5.00	5.00	5.00	5.00	5.00	30.00
Coriander seed	0.00	0.50	1.00	1.50	2.00	80.00
Di-calcium phosphate	0.30	0.30	0.30	0.30	0.30	26.00
Shell grit	1.20	1.20	1.20	1.20	1.20	0.00
Salt	0.25	0.25	0.25	0.25	0.25	3.00
Trace min mix	0.15	0.15	0.15	0.15	0.15	240.00
Feed additives	0.50	0.50	0.50	0.50	0.50	1116.00
Total	100	100	100	100	100	
ME* kcal/kg	2900.33	2900.58	2903.13	2904.53	2905.93	
Crude protein (%)	24.03	24.05	24.04	24.04	24.05	
Feed cost/100 kg (₹)	2669.00	2701.00	2734.00	2767.00	2800.00	

*Calculated value

leftover was weighed daily, to quantify the amount of feed consumed. The data for growth rate was recorded at weekly intervals.

At the end of study period (5th week), two birds per replicate and thus a total of 6 birds per experimental diet were randomly selected, weighed and slaughtered. The data on dressing percentage, carcass yield, meat bone ratio, ready-to-cook yield and per cent weight of heart, liver, gizzard and giblet were recorded. All the data were analyzed statistically (SPSS, 17th Version) as per Snedecor and Cochran (1993) and comparison of means was done using Duncan's multiple range tests (Duncan, 1955).

RESULTS AND DISCUSSION

Data pertaining to body weight gain, feed intake and FCR under different dietary treatments are presented in table 2. The mean body weight gain (g) increased significantly ($P<0.01$) with increased level of

inclusion of coriander seed meal from 1.0 to 2.0% in diet of quails as compared to the control group. The increased body weight gains observed in quails upon feeding coriander seed meal in the diet might be attributed to enhanced liver function (Hernandez *et al.* 2004) or due to appetizing and stimulatory effects of CSM on digestion process (Cabuk *et al.*, 2003). The results of the present investigation are in agreement with earlier reports which indicate increased body weight gains in quails (Guler *et al.*, 2005) and broilers (Hamodi *et al.*, 2010; Farag, 2013; Abou-Elkhair *et al.*, 2014; Rashid *et al.*, 2014) as a result of incorporation of coriander seed in diet. However, Naeemasa *et al.* (2015) reported no effect ($P>0.05$) on body weight gain in broilers fed coriander powder in the diet.

Feed intake for overall growth period (0-5 weeks) was higher ($P<0.01$) in quails fed diets incorporated with CSM at 1.0, 1.5 and 2.0% as compared to control group

Table 2. Effect of incorporation of CSM in diet on body weight gain, feed intake, FCR and feed cost/kg gain of quails

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅	Level of significance
Body weight gain (g)	157.13 ^a ±1.90	159.91 ^a ±2.41	167.46 ^b ±1.89	175.36 ^c ±3.58	184.17 ^d ±0.23	$P<0.01$
Overall feed intake (g)	581.16 ^a ±2.04	590.10 ^a ±3.52	607.01 ^b ±8.11	608.20 ^b ±1.92	609.10 ^b ±2.50	$P<0.01$
Feed conversion ratio	3.70 ^c ±0.06	3.69 ^c ±0.07	3.62 ^{bc} ±0.02	3.47 ^b ±0.06	3.30 ^a ±0.01	$P<0.01$
Feed cost/kg (₹)	98.75 ^b ±1.54	99.72 ^b ±2.00	99.09 ^b ±0.48	96.03 ^{ab} ±1.66	92.60 ^a ±0.33	$P<0.05$

Table 3. Effect of incorporation of CSM in diet on carcass characteristics of quails

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅	Level of significance
Carcass yield (g)	106.5 ^a ±1.94	111.17 ^{ab} ±2.67	116.00 ^{ab} ±7.76	117.17 ^{ab} ±4.48	123.17 ^b ±6.29	P<0.05
Dressing (%)	60.47±1.02	60.56±2.16	60.83±1.77	60.97±1.32	60.98±1.49	NS
Ready to cook yield (g)	114.83 ^{a±} 2.63	119.50 ^{ab} ±2.70	125.67 ^{ab} ±7.99	126.83 ^{ab} ±5.46	132.83 ^b ±6.69	P<0.05
Meat: bone ration	5.70 ^a ±0.01	5.83 ^b ±0.01	6.21 ^c ±0.01	7.06 ^d ±0.01	7.13 ^e ±0.03	P<0.01
Heart (%)	0.84±0.12	0.85±0.13	0.86±0.12	0.88±0.12	0.89±0.09	NS
Liver (%)	1.68±0.39	1.69±0.19	1.71±0.17	1.73±0.26	1.74±0.22	NS
Gizzard (%)	2.17±0.15	2.18±0.11	2.19±0.23	2.21±0.02	2.22±0.14	NS
Giblet (%)	4.69±0.45	4.72±0.31	4.76±0.44	4.82±0.45	4.85±0.31	NS

but incorporation of CSM at 0.5% in feed did not show any significant effect on feed intake over control group. The improvement in the feed intake observed with the addition of CSM might be attributed to the presence of linalool. Linalool has an appetizing effect and stimulates the digestive process in animals (Çabuk *et al.*, 2003). Similarly, increased feed intakes upon feeding diets containing coriander seed were reported in Japanese quails (Esteghamat, 2014) and broiler chicken (Hamodi *et al.* 2010; Al-Mashhadani *et al.* 2011; Farag, 2013; Naeemasa *et al.* 2015). In contradiction to the present finding, Kumari *et al.* (2014) reported significantly (P<0.05) lower feed intake in Vanaraja chicken fed basal ration mixed with 2.5% coriander seed meal as compared to the control. On the other hand, no effect (P>0.05) of feeding coriander seeds in the diet on feed intake of broiler chicken was reported by other research workers (Abou-Elkhair *et al.*, 2014; Rashid *et al.* 2014; Saleh *et al.* 2014).

The FCR improved significantly (P<0.01) in quails fed diets incorporated with CSM at 1.5 and 2.0% level in comparison to the control group, indicating better feed utilization in terms of body weight gain. These findings are in agreement with those of other researchers (Guler *et al.*, 2005; Hamodi *et al.*, 2010; Al-Mashhadani *et al.*, 2011; Farag, 2013; Abou-Elkhair *et al.*, 2014; Saleh *et al.*, 2014; Naeemasa *et al.*, 2015). However, Hosseinzadeh *et al.* (2014) and Rashid *et al.* (2014) reported that feeding coriander seed in the diet had no effect (P>0.05) on FCR in broiler chicken.

Data pertaining to carcass characteristics are presented in table 3. Incorporation of CSM at 2.0% level

in the diet of quails resulted in increased (P<0.05) carcass yield (g) and ready to cook yield (g) as compared to the control. These results corroborated with the findings of Guler *et al.* (2005), who reported that carcass yield (%) was significantly higher in quails fed 2.0% coriander seed in the diet. On the other hand, Abou-Elkhair *et al.* (2014) and Ramadan *et al.* (2014) reported that feeding of CSM at 2.0% level in the diet had no effect (P>0.05) on carcass weight in broiler chicken. Incorporation of CSM upto 2.0% level in the diet had no effect (P>0.05) on dressing percentage in current study. Rashid *et al.* (2014) also reported that feeding broilers with diets containing CSM up to 1.5% levels had no effect (P>0.05) on dressing yield as compared to the control. In contradiction, Ramadan *et al.* (2014) reported that the dressing percentage increased significantly (P<0.05) in broilers fed 2% coriander seed in the diet as compared to control. Incorporation of CSM up to 2.0% level in the diet had no effect (P>0.05) on per cent weight of heart, liver, gizzard and giblets in quails which was in agreement with the findings of earlier researchers (Abou-Elkhair *et al.*, 2014; Saleh *et al.* 2014; Naeemasa *et al.*, 2015).

There was a significant (P<0.05) decrease in feed cost/kg gain (₹) with incorporation of CSM at 1.5 and 2.0% in diet as compared to the control (Table 2). Similarly, Rashid *et al.* (2014) revealed that total production cost per kg broiler was lower (P<0.05) in birds fed CSM at 1.5% as compared to control group.

CONCLUSIONS

Results of the present study indicate that incorporation of CSM at 2.0% in the diet resulted in

increased carcass yield, ready to cook yield with a concomitant decrease in feed cost/kg gain. Thus, it would be beneficial to incorporate coriander seed meal at 2% in the diet of broiler quails.

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Received on 07-09-2018 and accepted on 03-03-2019