Full Length Article

EFFECTS OF FEED FORM ON GROWTH PERFORMANCE OF JAPANESE QUAIL

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ABSTRACT

A study was carried out to determine the effects of feed form i.e.crumble and mash feed on growth performance in Japanese quail. Totally 500 Nandanam quail III day-old chicks were weighed individually, then randomly assigned to two dietary treatment groups of 250 chicks each. They were 50 chicks per replicate and five replicate per dietary treatment group. These Japanese quails were fed with starter diet in the form of crumble and mash up to 5 weeks. The parameters such as weekly body weight, feed consumption, livability and carcass characteristics were recorded. There was a significant difference ($P \leq 0.01$) in weekly body weight and body weight gain was observed between crumble and mash dietary treatment groups during entire study period of 5 weeks. Similarly, the feed consumption and FCR also showed significant ($P \leq 0.01$) difference between the dietary treatment groups. The per cent livability showed no significant difference between dietary treatment groups. The pre-slaughter live weight showed significant ($P \leq 0.01$) difference between the dietary treatments; however, the other carcass characteristics such as eviscerated weight, ready to cook yield, giblets yield, breast yield, and thigh yield showed no significant difference between dietary treatments. It can be concluded that crumble form of diet had improved the growth performance than mash form in Japanese quail.

Key words: Crumble, Growth performance, Japanese quail, Mash feed.

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INTRODUCTION

The physical form of feed like mash, pellet and crumble is a crucial factor in poultry for meat production. Mash is a form of a complete feed that is finely ground and mixed so that birds cannot easily separate out ingredients; each mouthful provides a well-balanced diet. Mash diet gives greater unification of growth and less death loss and

is more economical. However, ground feed is not so palatable and does not retain its nutritive value as well as ungrounded feed (Jahan *et al.,* 2006). Pellet system of feeding is really a modification of the mash system. It consists of mechanically pressing the mash into hard dry pellets. It is generally accepted that, compared to mash, the feeding of pellets improves broiler growth rate with an increased feed intake (Nir *et al*., 1994). Crumble also is a type of feed prepared at the mill by pelleting the mixed ingredients and then crushing the pellet to a consistency coarser than mash. Reasons for the enhanced performance may be due to increased digestibility, decreased ingredient segregation, reduction of energy during prehension, and increased palatability (Behnke, 1998). Recently this form of feed has become popular in broiler production due to its convenience of feeding. With these views, this study was carried out to determine the effects of crumble feed on growth performance in Japanese quail.

MATERIAL AND METHODS

The study was conducted up to 5 weeks in Nandanam quail III strain at Poultry Research Station, TANUVAS, Chennai. Nandanam quail III is a dual type Japanese quail strain developed by Tamil Nadu Veterinary and Animal Sciences University, Chennai -51 during the year 2004. Totally 500 Nandanam quail III day-old chicks were weighed individually, then randomly assigned to two dietary treatment groups of 250 chicks each. There were 50 chicks per replicate and five replicate per dietary treatment group. These Japanese quails were fed with starter diet of crumble and mash forms of up to 5 weeks. The chicks in each replicate were housed in colony cages with standard floor space. The chicks were housed under standard managemental conditions. The parameters such as weekly body weight, feed consumption, livability, and carcass characteristics were recorded. The body weight gain and feed conversion ratio (FCR) were calculated from the collected data. The carcass characteristics such as eviscerated weight, ready to cook yield, giblets yield, breast yield and thigh yield were studied from six birds in each treatment at 4th week of age.

Statistical analysis

The data were analyzed as per standard statistical procedure described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Body weight and body weight gain (g)

The effect of feed form on mean body weight (g) and body weight gain (g) of Nandanam quail III are presented in Table 1 and 2. The body weight was significantly higher in Japanese quails fed with crumble than mash feed throughout the experimental period. The weekly body weight (g) of birds fed crumble form of feed had significantly higher body weight at second week ($P<0.05$) and later weeks ($P<0.01$) of the study period compared to their counterparts fed mash feed (Table 1). The results were in accordance with those of Ocak and Erener (2005) who found that Japanese quail on the crumble dietary regimen had significantly heavier body weight when compared with birds fed mash regimen.

Table 1. Effect of feed form on body weight (g) (Mean ± SE) of Nandanam quail III

Period	Feed form		P-Value
	Crumble	Mash	
Hatch weight	9.39±0.02	9.35±0.01	0.45^{NS}
1st week	41.25±0.45	38.20±0.39	0.00*
2nd week	80.10±1.19	74.35±1.28	0.00**
3rd week	124.35±1.32	117.20±1.57	0.00**
4th week	170.31±1.50	158.54±1.62	0.00**
5th week	214.19±1.69	205.10±1.79	0.00**

**Significant (P<0.01);

* Significant (P<0.05); NS – Not significant (P> 0.05)

Table 2. Effect of feed form on weekly body weight gain (g) (Mean ± SE) of Nandanam quail III

Period	Feed form		P-Value
	Crumble	Mash	
1st week	31.86±0.02	28.85±0.03	0.00**
2rd week	70.71±0.28	65.00±0.31	0.00**
3th week	114.96±1.04	107.85±1.28	0.00**
4th week	160.92±1.59	149.19±1.47	0.00**
5th week	204.80±1.82	190.75±1.91	0.00**

**Significant (P<0.01)

Similarly, there was a significant (P<0.01) difference in weekly body weight gain between crumble and mash dietary treatment groups from 1st to 5thweek of age. The body weight gain between crumble and mash dietary treatment group during 5th week of age was 204.80 (g) and 190.75 (g) respectively. The body weight gain in Japanese quail reflects similar trends related to that of body weight. The present study agreed with Choi *et al.* (1986) who observed that the broiler chicks fed crumbled diet gained more weight, significantly improved weight gain compared to those fed on mash diet. In this study the feeding of crumble, compared to mash, improved body weight and body weight gain, which was associated with improved feed conversion efficiency.

Feed consumption and feed conversion ratio (FCR)

Effect of feed form on mean feed consumption (g/bird/week) of Nandanam quail III is presented in Table 3. There was a significant difference ($P \leq 0.01$) in feed consumption between two dietary treatment groups. The crumble fed group consumed significantly ($P \leq 0.05$) less feed (560.40 g) than mash fed group (603.27g) during entire 5 weeks study period.

Table 3. Effect of feed form on weekly feed consumption (g) (Mean ± SE) of Nandanam quail III

Period	Feed form		P-Value
	Crumble	Mash	
1st week	30.10±1.25	35.10±1.12	0.03*
2rd week	71.25±1.39	79.20±1.75	0.01*
3th week	110.40±2.65	122.01±2.16	0.02*
4th week	149.50±2.74	161.38±2.58	0.00**
5th week	199.15±3.91	205.58±2.89	0.00**

**Significant (P<0.01);

* Significant (P<0.05)

The effect of feed form on weekly feed conversion ratio of Nandanam quail III is presented in Table 4. Similar to the feed consumption, the FCR also showed significant difference between the dietary treatment

groups throughout all the weeks. The low cumulative FCR (2.61) observed in crumble dietary group which indicated significantly high feed conversion efficiency during first (P<0.05) and later weeks (P<0.01) of the experiment; on the other hand, comparatively high FCR values were observed in mash (2.94) group, which indicated low feed conversion efficiency.

Table 4. Effect of feed form on cumulative feed conversion ratio (Mean ± SE) of Nandanam quail III

Period	Feed form		P-Value
	Crumble	Mash	
1st week	0.73±0.35	0.91±0.18	0.01*
2rd week	1.26±0.52	1.53±0.73	0.00**
3th week	1.70±0.85	2.01±0.82	0.00**
4th week	2.12±1.10	2.50±1.02	0.00**
5th week	2.61±1.12	2.94±1.11	0.00**

**Significant (P<0.01);

* Significant (P<0.05)

The result of the present study is similar to the findings of Kim and Chung (1996), who concluded that crumble-pellet treatment significantly improved feed conversion in broiler chicken. Similarly, Reece *et al.* (1984) reported that crumbling improved feed conversion by 1.5 per cent.

Livability (%)

The data on livability did not differ significantly between two dietary groups and the weekly livability percentage is presented in Table 5. The cause for mortality observed in different dietary treatment groups was non-specific. These results provided no evidence to suggest that the physical form of feed to have any ill effect on the health of the birds. This result is supported by Deaton (1992); and Ocak and Erener (2005) who observed no significant difference in mortality between mash (3.0 %) and crumble type (5.0%) and this mortality were due to non-specific management cause in Japanese quails.

Table 5. Effect of feed form on per cent livability (%) (Mean ± SE) of Nandanam quail III

Period	Feed form		P-Value
	Crumble	Mash	
1st week	98.15±0.20	98.40±0.30	0.45NS
2rd week	97.25±0.35	97.10±0.35	0.40 NS
3th week	96.50±0.45	96.75±0.55	0.65NS
4th week	95.30±0.60	95.15±0.60	0.60 NS
5th week	95.15±0.64	95.10±0.65	0.55 NS
Overall livability (%)	95.15	95.10	

NS – Not significant (P> 0.05)

Carcass traits

The effect of feed form on slaughter performance of Nandanam quail III is presented in Table 6. The pre-slaughter live weight showed significant (P ≤ 0.01) difference between two dietary groups; however, the other carcass characteristics such as eviscerated weight, ready to cook yield, giblets yield, breast yield, and thigh yield showed no significant difference.

Table 6. Effect of feed form on carcass characteristics (Mean ± SE) of Nandanam quail III

Parameters	Feed form		P-Value
	Crumble	Mash	
Pre slaughter live weight (g)	214.19±1.69	205.10±1.79	0.00**
Eviscerated weight (g)	158.25±1.25	151.77±1.30	0.22 NS
Ready to cook yield %	64.82±1.14	64.10±1.12	0.32 NS
Giblets yield %	5.28±0.19	5.18±0.15	0.34 NS
Breast yield %	46.10±2.02	45.64±2.50	0.45 NS
Thigh yield %	13.44±0.85	13.28±0.85	0.78 NS

**Significant (P<0.01); NS – Not significant (P> 0.05)

The present findings were in agreement with the report of Ocak and Erener (2005) who reported that the carcass weight, dressing percentage and percentage yields of breast and back were similar for crumble and mash fed Japanese quail at 28 d of age.

Economics on production (feed cost/quail)

The feed cost per quail up to 5 weeks of age was Rs.19.61 and Rs.19.90 for crumble and mash fed groups respectively and this might be due to that crumble fed group consumed significantly ($P \leq 0.05$) less feed (560.40 g) than mash fed group (603.27g) during entire 5 weeks study period.

In conclusion, a significant benefit of feeding the crumble diet over the mash diet was obtained in terms of weekly body weight, body weight gain, feed consumption and feed conversion ratio in the Japanese quail.

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