

Effects of Fenugreek, Antibiotic, Ignatia amara and Ginger on Growth Performance of Japanese Quail

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Abstract:

Effect of fenugreek, antibiotics, ginger and ignatia on body weight, body weight gain, feed consumption and FCR of Japanese quails was evaluated in this study. Fifty Japanese quails were randomly allotted to five treatments identified as T₀, T₁, T₂, T₃ and T₄. Birds on T₀ served as control and T₁, T₂, T₃ and T₄ groups were treated with fenugreek, antibiotics, ginger and ignatia respectively. Fenugreek and ginger was in powder form while others were in liquid form. Average body weight in different treatments were different from the control for body weight in 1% level of significance. Feed consumption, body weight gain and feed conversion ratio in different treatments were different from the control for body weight in 5% level of significance. The findings of the study clearly indicate that the birds fed the liquid form of ignatia showed better body weight, body weight gain, feed consumption and feed conversion ratio and are comparatively significant than those feed with fenugreek, antibiotics and ginger with those of control group. Based on the research of the study, Ignatia amara can be used as a feed additive in quail farming to get optimum profit.



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1. INTRODUCTION

Quail is the smallest and latest domesticated poultry species. There are about 131 species and 17 to 18 varieties of wild quail found all over the world, of which Japanese, Bobwhite, King and Stable quail are most important. Japanese quails are the natural inhabitant of Japan. Quails are reared in Japan from the time immemorial. The scientific name of Japanese quail is *Coturnix coturnix japonica* under the class aves and family *Phasianidae* (Hashanuzzaman, 2013). Quail farming for egg and meat is quite popular in Japan, Hongkong, Korea, China, Singapore, India, Thailand, Malaysia, Indonesia, France, Italy, Germany, Britain and Russia. Only Bobwhite quail and Japanese quail have been domesticated for commercial purposes in Bangladesh, these two are commercially available. Besides, scientists developed many quail lines e.g. white egg shell line, meat line etc. Japanese quail, a recently introduced economic avian species is ideally suited for meat and egg under intensive management due to their low maintenance cost, early sexual maturity, higher exponential growth, higher heat tolerance, fitness for higher density rearing, higher disease resistance and higher egg production than that of other poultry species. The climate and natural condition of Bangladesh are very suitable for quail rearing. Quail can be reared in this country throughout the year with a good performance in meat and egg production. Growth promoters are the organic or non organic compounds which promotes growth in animal or bird body. Mostly antibiotics are used as growth promoter in poultry. Many alternative substances obtained from nature and belonging to the groups of prebiotics, organic acids, enzymes, silicates, herbs and spices etc., have been also vigorously tested and evaluated for their potential to replace antibiotic growth promoters in poultry diets (Panda *et al.*, 2006; Khan *et al.*, 2012). Such, alternative substances were referred as natural growth promoters. There are a number of such investigated natural growth promoters that are mainly utilized for providing beneficial role for improving health of poultry against various infectious diseases rather than regular nutrition. The involvement of these natural growth promoters in improving of intestinal morphology and nutrient absorption may also encourage the scientists to include these compounds in the diet to improve gut health, promote the growth and overall performance of birds.

It is a matter of sorrow that natural growth promoters are still not using in Japanese quail widely. It may be due to the residual effect of antibiotic in quail which transfers to human body after consuming flesh. This residual effect of antibiotics in human body can ultimately cause antibiotic resistance. On the other hand, Peoples are still not concerned about the use of natural growth promoters which have a less or no residual effect. Homeopathic drugs are also being used as growth promoter in our neighboring country India. But when it is a word of quail, we cannot find any authentic document regarding use of growth promoters in quail. So, it is an urgent to find out a suitable growth promoter for quail. According to my hypothesis use of natural growth promoter or homeopathic drugs instead of using antibiotic growth promoter in quail will be more effective and economic. Alternative use of growth promoter will start a new era in quail farming.

The general objective of this study is to compare the efficacy of different growth promoter in quail production with the following specific objectives:

- a) To determine the feed consumption and feed conversion ratio in Japanese quail.
- b) To examine the efficacy of growth promoters on body weight and body weight gain.

2. MATERIALS AND METHODS

In order to find out the effect of different growth promoters on body weight, the studies were made with the following details:

2.1. Ethical approval:

This research was carried out as a part of MS in Physiology after the approval of Chairman of Department of Physiology and Pharmacology, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh.

2.2. Management of experimental birds:

Fifty day-old quails with average body weight 5-8 g were procured from a reputed hatchery for the experiment and distributed randomly into five groups having 10 birds each by randomized block design and allocated to 5 dietary treatments as T₀, T₁, T₂, T₃ and T₄. All experimental birds were fed commercial feed. Experimental birds in control group (T₀) were fed only commercial ration while birds in T₁, T₂, T₃ and T₄ groups were fed on commercial ration supplemented with 0.50% fenugreek, .05 g antibiotics, 0.50% ignatia and 0.50% ginger respectively. The average body weight did not differ significantly (P>0.05) among the five group. The experiment was carried out at the poultry farm of Physiology and Pharmacology Department located at Hajee Mohammad Danesh Science & Technology University, city of Dinajpur district in Bangladesh. A total of 50 day-old quail were taken and maintained for two weeks on similar standard feeding and managerial conditions. These quail were divided randomly into five experimental groups T₀, T₁, T₂, T₃, T₄ having 10 birds in each group. After two weeks all experimental groups were given different treatments to study the effect of growth promoters on different parameters in quail up to six weeks of age.

2.3. Growth Promoters:

Growth promoters are the substances that are added to a nutritionally balanced diet which provoke response towards the exploitation of maximum genetic potential of the host, in terms of growth as well as improvement in feed conversion ratio.

Growth Promoters used in present investigation were:

- Fenugreek (*Trigonella foenum-graecum L.*) the recommended dose of fenugreek is 0.5% of total feed supplied to the group.
- Antibiotics the recommended dose of antibiotic Doxy-A(Vet) Powder is .05 g/100ml water/10 birds/day
- Ginger the recommended dose of Ginger is 1% of total feed supplied to the group.
- Ignatia the recommended dose of Ignatia 200 is 5 drops/100ml water/10 birds/day

The details of experimental groups used in present investigation have been presented in Table-1. Treatments given to different groups:

T ₀	Was provided basal diet and served as control.
T ₁	Was given basal diet along with recommended dose (0.5%/ total feed) of Fenugreek seed as powder.
T ₂	Was given basal diet along with recommended dose (.05 g/100ml water/10 birds/day) of DOXY- A (VET).
T ₃	Was given basal diet along with recommended dose (5 drops/100ml water/10 birds/day) of ignatia amara.
T ₄	Was given basal diet along with recommended dose (1 %/ feed) of ginger powder.

2.4. Experimental Rations:

Experimental quails were supplied commercial quail feed manufactured by Aftab feed limited.

Table 2: Calculated percentage and chemical composition of the commercial diet.

Ingredients	Quantity (%)
Corn	56.32
Soybean meal	33.32
Soybean oil	2.86
Salt	0.35
Limestone	5.35
Dicalcium phosphate	1.31
Vitamin and mineral premix ¹	0.30
DL-methionine	0.14
Choline (70%)	0.05
Total	100.00

Nutrients

Ingredients	Quantity
Crude protein (%)	20.00
Metabolizable energy (kcal/kg)	2900
Calcium (%)	2.50
Available phosphorus	(%) 0.35
Methionine (%)	0.45
Methionine + Cystine (%)	0.76
Lysine (%)	1.07
Choline (mg/kg)	1564

2.5. Feeds and feeding management:

All the birds were fed ad libitum. The feed was of two types, starter and finisher. The starter ration was given up to the age of two weeks and there after the finisher ration was given till the end of experiment. The quail received measured quantity of feed twice (morning and evening) daily after weighing. The left over feed of previous day measured and subtracted from the total feed given earlier to estimate the actual consumption.

2.6. Provision of Drinking Water:

Fresh and clean drinking water was made available to quails of all the five groups.

2.7. Data recording:

The experimental data pertaining to different traits as per the objectives were recorded as follows:

2.7.1. Body weight:

The quails were weighed individually at Day 0, Day 14, Day 28 and Day 42 during the experimental period in the morning before offering feed, the body weight gain was also calculated.

2.7.2 Feed consumption:

Feed consumed by birds (g) was recorded daily by subtracting the residue of feed offered to each group daily from total quantities of feed offered to each group.

2.7.3 Feed conversion ratio:

Feed conversion ratios were calculated by dividing the total quantity of feed consumed (g.) by total gain in body weight (g.) during the same period. The actual daily feed consumption was

then added to get actual feed consumption during the different times of the experimental periods. The feed conversion efficiency was estimated on the basis of actual feed intake and gain in body weight by using following formula:

Feed conversion ratio = Feed consumed (g) in a particular period / Gain in live body weight (g) during the same period

2.8 Statistical analysis:

The recorded data was analyzed by the method of SPSS version 20 in Complete Randomized

3.Results

The present study was conducted on fifty quail birds to estimate the effects of different growth promoters such as Fenugreek, antibiotic, ignatia and ginger on growth, feed conversion efficiency of quail production under cage system of quail rearing.

A total of 50 day old quail chicks were divided randomly into 5 treatment groups comprised with 50 in each group and kept under cage system of management up to 42 days of age.

The data obtained in respect of various parameters studied in the experiment were arranged and analyzed by using standard statistical method. The same data have been presented in various Tables in this chapter.

3.1. Effect of growth promoters on body growth:

Growth of quail birds was ascertained in terms of absolute body weight at day 0, day 14, day 28 and day 42 days of age (**Table-3**) and body weight gain during 0-14, 15-28, 29-42 day of age. The effect of growth promoters on body weight of quail birds raised under cage system is presented in Table-1. The mean values of weight of birds at 0, 14, 28, & 42 days of age were 5.8 ± 0.11 , 14.61 ± 0.25 , 36.23 ± 0.62 and 105.4 ± 2 g. respectively (Table 3). The average weight (g) of birds of T₀ (15.4 ± 0.43) group was significantly higher at 14 day of age than those of T₁ (14 ± 0.49), T₂ (14.17 ± 0.63), T₃ (14.27 ± 0.64), & T₄ (15.23 ± 0.52). The body weight (g) of birds of T₃ group showed significantly higher body weight (41.44 ± 0.30) than those of T₀ (32.12 ± 0.66), T₁ (39.08 ± 0.34), T₂ (31.16 ± 0.94) & T₄ (37.32 ± 0.43) at 28 days. The body weight (g) of birds of T₃ group showed significantly higher body weight (127.75 ± 0.64) than those of T₀ (93.73 ± 0.88), T₁ (107.87 ± 0.72), T₂ (88.08 ± 0.51) & T₄ (109.58 ± 0.37) at 42 days.

Table-3: Effects of different growth promoters on average body weight of quails at 0 day, 14th day, 28th day and 42nd day:

The effect of growth promoters on body weight of quail birds raised under cage system is presented in Table 3.

Age	Treatments					Overall	Level of significance
	T ₀	T ₁	T ₂	T ₃	T ₄		
0 day	5.45 ± 0.22	5.53 ± 0.29	6 ± 0.22	5.9 ± 0.26	5.9 ± 0.23	5.8 ± 0.11	NS
14 th day	15.4 ± 0.43	14 ± 0.49	14.17 ± 0.63	14.27 ± 0.64	15.23 ± 0.52	14.61 ± 0.25	**
28 th day	32.12 ^a ± 0.66	39.08 ^c ± 0.34	31.16 ± 0.94 ^a	41.44 ^d ± 0.30	37.32 ^b ± 0.43	36.23 ± 0.62	**
42 nd day	93.73 ^b ± 0.88	107.87 ^c ± 0.72	88.08 ^a ± 0.51	127.75 ^d ± 0.64	109.58 ^c ± 0.37	105.4 ± 2	**

Figures in parentheses are the number of observations.

Values with same superscripts in a row did not differ significantly.

** P < 0.01, NS = Non-Significant.

The birds of T₃ group which were administered Ignatia weighed heavier 127.75 ± 0.64 at 42 days of age than those of other treatment and control groups (Table 3). It is also evident that birds getting growth promoters from 15-42 days of age weighed heavier than that of control group indicating that growth promoters have positive impact on growth. The findings of this study are in close conformity with the observations of Panda *et al.* (1999), Shinde (2004), Kabir *et al.* (2004), Iyayi and Davies (2005), Dhekane (2005), Kannan *et al.* (2005), Bozkurt *et al.* (2008), Paul *et al.* (2010), Amer and Khan (2012) and Ogunwole *et al.* (2012) who reported that supplementation of growth promoter had significant effect on body weight in quail.

3.2. Effect of growth promoters on body weight gain:

The variations in weight gain during experimental period due to growth promoters are presented in Table 4. Average body weight gain (g) of quail birds at various ages raised under cage system of management with different growth promoters: The overall mean values of gain in body weight (g) of birds during 0-14, 15-28 and 29-42 days of age were 9.27 ± 0.60, 21.61 ± 0.70 & 69.17 ± 1.5 respectively (Table 4). During 0-14 days, the average gain in body weight (g) was significantly more for birds of T₀ group (9.95 ± 0.54) than that of T₁ (8.47 ± 0.61), T₂ (8.17 ± 0.78) & T₃ (8.37 ± 0.6). However, it did not differ significantly from those of

T₄ (9.27 ± 0.59). The average body weight gain (g) was observed to be maximum in T₃ (27.17 ± 0.64) followed by T₁ (25.08 ± 0.53), T₄ (22.09 ± 0.66), T₂ (17 ± 1.34) & T₀ (16.72 ± 0.77) during 15-28 days of age. T₃ group of birds showed significantly higher body weight gain than those of T₀ & T₂. However, it did not differ significantly from that of T₁ and T₄. Analysis of variance revealed that the effects of growth promoters on average body weight gain (g) of quail birds were non-significant at 0-14 days (1.4) and highly significant (P<0.01) at 15-28 days and 29-42 days (Table 4).

Table-4 Effects of different growth promoters on average body weight gain of quails at 0-14 day, 15-28 day and 29-42 day:

Age	Treatments					Overall	Level of significance
	T ₀	T ₁	T ₂	T ₃	T ₄		
0-14 day	9.95 ± 0.54	8.47 ± 0.61	8.17 ± 0.78	8.37 ± 0.6	9.27 ± 0.59	9.27 ± 0.60	NS
15-28 day	16.72 ^a ± 0.77	25.08 ^c ± 0.53	17 ^a ± 1.34	27.17 ^c ± 0.64	22.09 ^b ± 0.66	21.61 ± 0.70	**
29-42 day	61.6 ^b ± 0.87	68.8 ^c ± 0.8	56.91 ^a ± 1	86.3 ^c ± 0.7	72.26 ^d ± 0.49	69.17 ± 1.50	**

Figure in parentheses are of number of observations.

Values with same superscripts in a row did not differ significantly.

**P < 0.05, NS = Non-Significant.

3.3. Feed Consumption:

Feed consumption and feed conversion ratio were estimated during experimental periods for different treatment and control groups under cage system of management. The results have been presented in table 5.

3.3.1 Average feed consumption

Average feed consumption in different time interval (0-14, 15-28, 29-42 days of age) have been shown separately in Table 5. The mean values of feed consumption by birds of control group (T₀) were 16.38 ± 0.48, 85.76 ± 0.67 and 174.38 ± 0.89g during 0-14, 15-28 & 29-42 days of age respectively. The birds of treatment groups (T₁) feeding consumed feed on an average 16.37 ± 0.41, 71.58 ± 0.81 and 159.5 ± 0.92 g during 0-14, 15-28 & 29-42 days of age respectively. The birds of treatment groups (T₂) feeding consumed feed on an average 15.63 ± 0.52, 83.67 ± 0.79 and 159.74 ± 0.78g during 0-14, 15-28 & 29-42 days of age respectively. The birds of treatment groups (T₃) feeding consumed feed on an average 16.83 ± 0.44, 97.36 ± 0.96 and 200.74 ± 0.6g during 0-14, 15-28 & 29-42 days of age respectively. The birds of treatment groups (T₄) feeding consumed feed on an average 16.63 ± 0.52, 83.67 ± 0.79 and 159.74 ± 0.78g during 0-14, 15-28 & 29-42 days of age respectively.

Table 5: Effects of different growth promoters on average feed consumption of quails (g/bird) at 0-14 day, 15-28 day and 29-42 day:

Age	Treatments					Level of significance
	T ₀	T ₁	T ₂	T ₃	T ₄	
0-14 day	16.38± 0.48	16.37± 0.41`	15.63 ± 0.52	16.83 ± 0.44	16.63 ± 0.51	NS
15-28 day	85.76 ^b ± 0.67	71.58 ^a ± 0.81	83.67 ^b ± 0.79	97.36 ^c ± 0.96	84.07 ^b ± 0.71	**
29-42 day	174.38 ^b ± 0.89	159.5 ^a ± 0.92	159.74 ^a ± 0.78	200.74 ^d ± 0.6	189.1 ^c ± 0.58	**

Figure in parentheses are of number of observations.

Values with same superscripts in a row did not differ significantly.

**< 0.05, NS = Non-Significant.

The present findings agreed with the findings of Maiorka *et al.* (2002) Marina *et al.* (2006), Shareef and Dabbagh (2009) Saied *et al.* (2011) Pervez *et al.* (2011), Mehmet *et al.* (2012) and Amer and Khan (2012) who reported that supplementation of growth promoters showed significant effect.

3.3.2 Feed conversion ratio

Cumulative feed conversion ratio have been calculated for different treatment and control group and presented in Table 6. The FCR (Feed conversion ratio) ranged from 1.69:1 (T₀), 2:1 (T₁), 2.09:1 (T₂), 2.1:1 (T₃) and 1.85:1 (T₄) during 0-14 days of experimental period. The FCR (Feed conversion ratio) was lower for group T₃ (2.32 ± 0.01) followed by groups T₁ (2.32 ± 0.02), T₄ (2.61 ± 0.01), T₂ (2.81 ± 0.04) and T₀ (2.83 ± 0.04) during 29-42 days.

Table 6: Effects of different growth promoters on average feed conversion ratio of quails at 0-14 day, 15-28 day and 29-42 day:

Age	Treatments					Level of significance
	T ₀	T ₁	T ₂	T ₃	T ₄	
0-14 day	1.69 ± 0.11	2 ± 0.12	2.09± 0.23	2.1 ± 0.23	1.85 ± 0.12	NS
15-28 day	5.24 ^c ± 0.28	2.86 ^a ± 0.08	5.22 ^c ± 0.42	3.6 ^b ± 0.08	3.84 ^b ± 0.15	**
29-42 day	2.83 ^c ± 0.04	2.32 ^a ± 0.02	2.81 ^c ± 0.04	2.32 ^a ± 0.01	2.61 ^b ± 0.01	**

Figure in parentheses are of number of observations.

Values with same superscripts in a row did not differ significantly.

**P < 0.05, NS = Non-Significant.

Design (CRD) model.

4. CONCLUSION

The quails reared with supplemented growth promoters such as ginger, fenugreek, ignatia and antibiotics in different treatment groups performed better for all economic traits as compared to those reared with commercial diet only. Those growth promoters in combination or alone may be used with commercial diet for getting more return from commercial quail farming. According to this research article ignatia ensures increased body weight gain with good feed conversion ratio. Fenugreek can also be used in quail production as it is more economic than ignatia and serves a good body weight gain. But use of antibiotics as growth promoter can be avoided as it results less and more expensive. In this research, effects of growth promoters in growth performance of quail was seen. Further research may be done on growth promoters regarding its effects on carcass, hematological effects and immunological responses

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