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Effect of supplementation of multi-species probiotic on production performance of Japanese quail

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Abstract

An experiment was conducted to study the effect of multi-species probiotic on production performance of Japanese Quails. Three hundred Japanese quail day old chicks were randomly divided into a control and three treatment groups with three replicates of 25 each and reared in cages for six weeks. The basal diets were supplemented with multi-species probiotic to control, T1, T2, and T3 diets @ 0, 0.005, 0.01, and 0.02 % level respectively. The parameters such as bi-weekly body weight, FCR, and livability were recorded and analyzed. The groups supplemented with multi-species probiotic at 0.01, and 0.02 % level had resulted in significantly ($P \leq 0.01$) higher mean body weight (185.62 ± 2.51 g and 195.05 ± 2.12 g), better FCR (2.84 ± 0.03 and 2.69 ± 0.04) respectively than other groups. It can be concluded that the supplementation of multi-species probiotic in diet at 0.01, and 0.02% levels were found to be beneficial for higher production performance of Japanese quail.

Keywords: Japanese quails, multi-species probiotic, production performance

Introduction

In India, commercial quail farming is practiced as a diversified poultry among farmers for both meat and egg production to cater the needs of consumers as a good animal protein source. Different types of feed additives are being supplemented as growth promoters in broiler production in order to get higher body weight with economic feed efficiency at age at marketing. Probiotics are defined as live microbial feed supplement which beneficially affects the host by improving its intestinal microbial balance (Fuller, 1989)^[1]. Nowadays, probiotic is commonly used as an alternative to antibiotics as growth promoter either single species or multi-species in the commercial broiler production. Most of the previous researches on probiotic utilization in poultry focused on the use of monospecies probiotic. Majority of the probiotic products are based mainly on *Lactobacillus acidophilus*, although other organisms such as *Streptococcus faecium*, *Bacillus subtilis* and yeast are also used (Patterson and Burkholder, 2003)^[2]. Until recently, information on combination of mixed bacterial-based probiotic is lacking although its application into poultry production is on the increase. According to Gardiner *et al.* (2004)^[3] and Timmerman *et al.* (2004)^[4], functionality of a multi-strain/multi-species probiotics could be more effective and more consistent than that of a mono-strain. There are contradictory results concerning the use of probiotics as a growth promoter in poultry. Arslan and Saatci (2004)^[5] found a positive response on live weight, feed consumption and feed efficiency in quail fed diets with *Lactobacillus bulgaricus* via both the feed and drinking water. A probiotic of *Lactobacillus sp.* given either through drinking water or feed to meat-type quails had no effects on quail's performance from 1 to 35 days old (Otutumi *et al.*, 2010)^[6]. Therefore, the present study was conducted to investigate the effect of multi-species probiotic on production performance of Japanese quails.

Materials and Methods

The study was conducted at Poultry Research Station, Chennai, Tamil Nadu, to study the effect of multi-species probiotic on the production performance of Japanese Quails. A total of 300 day old Japanese quail chicks were randomly divided into four treatment groups with three replicates of 25 chicks each. The basal diets were supplemented with multi-species probiotic to control, T1, T2, and T3 diets @ 0, 0.005, 0.01, and 0.02 % level respectively. Each gram of the probiotic supplement contain 10^{12} CFU of selective strains of beneficial

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microbes, namely, *Lactobacillus spp.*, *Bacillus spp.*, *Acetobacter spp.* and *Saccharomyces spp.* All the birds were fed standard quail starter and finisher diets containing ME levels of 2855 and 2750 Kcal/kg and crude protein levels of 25.51 and 24.00% respectively. The birds were housed in cage system and reared with standard managemental condition. Production performance viz., body weight, feed intake and livability were recorded biweekly from 0 day to 6 weeks of age. The recorded data were analyzed statistically as per Snedecor and Cochran (1994)^[7].

Results and Discussion

The effect of multi-species probiotic on the production performance of Japanese quails is presented in Table.

Body Weight (gm)

The mean hatch weight of Japanese quail chicks do not differ significantly between control and treatment groups. The significant ($P \leq 0.01$) effects of supplementation of multi-species probiotic were found on 4th and 6th week body weight between control and treatment groups. The groups supplemented with multi-species probiotic at 0.01, and 0.02 % level had resulted in significantly ($P \leq 0.01$) higher sixth week mean body weight of 185.62 ± 2.51 g and 195.05 ± 2.12 g, respectively than 0.005% supplemented group (180.01 ± 2.31 g) and control (179.15 ± 2.21 g). However, there were no significant differences in mean body weight between the birds supplemented with probiotic at 0.01% level and control. Significantly higher growth recorded in probiotic supplemented group may be attributed to stimulation of production of certain digestive enzymes, vitamins and other biologically active substances in multi-species probiotic which lead to inhibition of growth of the enteropathogens in the gut by decreasing the intestinal P^H and better digestion and efficient utilization of nutrients by the beneficial microbes. Similarly, Asmita Kumari *et al.* (2001)^[8] also reported improved live weight of quails due to probiotic in diet.

Feed Conversion Ratio (FCR)

The feed conversion ratio in our study differ significantly ($P < 0.01$) between probiotic supplemented and control groups. The groups supplemented with probiotic at 0.01, and 0.02 % level had resulted in significantly ($P \leq 0.01$) better FCR of 2.84 ± 0.03 and 2.69 ± 0.04 , respectively than 0.005% supplemented group (2.89 ± 0.08) and control (2.92 ± 0.04). However, there were no significant differences in mean body weight and feed conversion ratio between the birds supplemented with probiotic at 0.01% level and control. This is in accordance with Asmita Kumari *et al.* (2001)^[8] who also reported better FCR on feeding of probiotic in quails. Improvement in growth performance and feed conversion of Japanese quail chickens supplemented with multi-species probiotic may be attributed to the total effects of multi-species probiotic action including the maintenance of beneficial microbial population and alteration of bacterial metabolism in the gut and better digestion and absorption of nutrients.

Livability (%)

There was no significant difference in mean per cent livability between the multi-species probiotic supplemented groups and control. This is in agreement with the results obtained by Jin *et al.* (1998)^[9] and Masoud Teshfam *et al.* (2011)^[10] also reported that dietary supplementation of probiotic had no effect on mortality in broilers.

Conclusion

The results of this study revealed that the supplementation of in multi-species probiotic in diet at 0.01, and 0.02 % levels were found to be beneficial to obtain higher production performance viz., higher sixth week body weight and better FCR in Japanese quail production. However, more research is required in both experimental and field conditions to confirm this conclusion.

Table 1: Mean (\pm S.E.) effect of supplementation of multi-species probiotic on the production performance of Japanese quail

Parameters Studied	Control (0%)	T1 (0.005%)	T2 (0.01%)	T3 (0.02%)
Hatch weight NS	8.97 ± 0.09	8.97 ± 0.11	8.99 ± 0.14	8.94 ± 0.09
2 nd week body weight(g) NS	50.03 ± 1.20	50.56 ± 1.84	53.55 ± 0.88	52.08 ± 1.02
4 th week body weight(g) **	$134.86^b \pm 2.64$	$135.10^b \pm 2.36$	$150.04^a \pm 2.78$	$154.19^a \pm 1.59$
6 th week body weight (g) **	$179.15^b \pm 2.21$	$180.01^b \pm 2.31$	$185.62^b \pm 2.51$	$195.05^a \pm 2.12$
Livability up to 42 days (%)NS	90.50	91.50	91.00	91.00
FCR **	$2.92^b \pm 0.04$	$2.89^b \pm 0.08$	$2.84^a \pm 0.03$	$2.69^a \pm 0.04$

Mean values having the same superscript in a row do not differ significantly ($p \geq 0.05$).

** - Highly Significant ($p < 0.01$)

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