



Effect of using different levels of Protexin probiotic on performance, some carcass traits and intestinal microbial population of Japanese quails

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Article history

Received: 08 Mar, 2016

Revised: 22 Apr, 2016

Accepted: 10 May, 2016

Abstract

This study was conducted to investigate the effect of Protexin on performance, some carcass traits and intestinal microbial population of Japanese quails. A total of 156 seven day quails was divided into 4 treatments and 3 replicates each. The treatments were basal diet without Protexin as control, 0.025, 0.050 and 0.100 g/ton Protexin respectively. During the experimental period feed intake (FI), body weight gains (BWG) and feed conversion ratio (FCR) were measured weekly. At the end of the trial (56 days), 2 birds from each replicate were slaughtered for carcass and some visceral organs evaluation. In addition, intestinal microbial population of *Escherichia coli*, *Enterobacter* and *Bacillus colonies* were investigated. Data showed that using of Protexin increased feed intake none significantly. Body weights and feed to gain ratio were improved significantly ($P<0.05$) in first, second and third weeks. There were no significant differences in visceral organs between treatments except liver percentage. The results suggested that using Protexin probiotic has positively changed intestinal *Escherichia coli*, *Enterobacter* and *Bacillus* compared to the control groups ($P<0.05$). It seems that the inclusion of Protexin probiotic has a positive effect on performance and intestinal microflora in Japanese quails.

Keywords: Protexin; Performance; intestinal microflora; Japanese quails

To cite this article: Hamzeh M and V Nasrollah, 2016. Effect of using different levels of Protexin probiotic on performance, some carcass traits and intestinal microbial population of Japanese quails. Res. Opin. Anim. Vet. Sci., 6(4): 111-114.

Introduction

Probiotics are often called helpful bacteria because they help keep the gut healthy (Khaksefidi and Ghoorchi, 2006; Vali, 2009). The use of probiotics for farm animals has increased considerably over the last 15 years. Probiotics are defined as live microorganisms which can confer a health benefit on the host when administered in appropriate and regular quantities. The probiotic microorganisms can modulate the balance and

activities of the gastrointestinal microbiota (EL-Banna et al., 2010). Probiotic species belong to Lactobacillus, Streptococcus, Bacillus, Bifidobacterium, Enterococcus, Aspergillus, Candida, and Saccharomyces have beneficial effects on broiler performance (Vali et al., 2013). Protexin is one of the kinds of the probiotics. Khosravi et al. (2008) showed that Protexin can be a good alternative to antibiotic growth promoters. The approved uses include improvement of the growth rate and feed conversion efficiency in growing broilers and

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turkeys, and prevention of necrotic enteritis in broilers (Kaoud, 2010). Some researchers showed that treatment with Protexin at suggested dosages had a suitable effect on body weight gain and feed conversion efficiency in poultry (Ahmadi, 2003; Ashayerizadeh et al., 2009; Vali et al., 2013). The objective of this study was to explore the potential use of using Protexin on performance, some carcass traits and intestinal microbial population in Japanese quails.

Materials and Methods

Birds and diet management

A total of 156 one week day quails was divided into 4 dietary treatments and 3 replicates each. The treatments were basal diet without Protexin as control, and 0.025 (T1), 0.050 (T2) and 0.100 (T3) g/ton Protexin. The experiment was carried out from 7-56 days. Feed and fresh water were provided *ad libitum* during the experiment. The chicks were fed a basal diet according to the recommendation of the NRC (1994) for poultry. The body weight gains, feed consumption and feed conversion efficiency were measured weekly. At the end of the trial, 2 birds from each treatment were slaughtered and visceral parts were separated and weighed. In addition, 1g digesta from five birds per replicate from the ileum part of the intestines were also collected for determining the number of *Escherichia coli*, *Enterobacter* and *Bacillus* colonies. Briefly, 1 g ileum contents were 10 fold diluted using buffered peptone water and then 0.1 ml of the appropriate ileum dilution was spread on MRS agar plates to detect *Bacillus* bacteria and VRB agar to detect *E. coli*. The plates were incubated at 37.5°C for 48 h. After counting the number of colonies in each plate, the number obtained was multiplied by the inverse of the dilution of the result stated as the number of colony forming unit (CFU) in 1 g of the sample (Faghani et al., 2014).

Statically analysis

Data were collected and analyzed by using the general linear model procedure of SAS (2001) and different means were compared by Duncan's multiple ranges test (1995). P value less than 0.05 was considered as significant. The data were analyzed according to the following model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Whereas: Y_{ij} = Average effect observed, μ = Total average, T_i = Effect of treatments, e_{ij} = Effect of errors.

Results and Discussion

Performance

Data in Table 1 showed that the three levels of Protexin had no significant ($P < 0.05$) effect on feed intake. Unlike our result, Protexin improved feed intake, body weight gain and feed conversion rate in broilers (Aftahi et al., 2002). Data in Table 2 indicated a significant ($P < 0.05$) difference in body weight between the control and treated groups during first, second and third weeks of quails age. Weight gain was significantly ($P < 0.05$) high in T3 during first and second weeks, however, the weight gain increased significantly ($P < 0.05$) in T2 in third week compared to the other treated group. Singh et al. (2013) showed that Protexin did not affect feed intake, feed efficiency and slightly increased body weight when probiotic was supplemented. Khaksefidi and Ghoorchi (2006) recorded improvements in body weight, daily weight gain, feed consumption and feed conversion ratio in birds fed diet supplemented with 50 mg/kg of Probiotic from 22 to 42 days than birds fed the control diets. This was attributed to the increased efficiency of digestion and nutrient absorption process due to the presence of probiotic bacteria.

The better feed conversion ratio was seen when quails were fed Protexin probiotic but there was no significant difference in control and treated groups. Habibi et al. (2013) reported that the probiotic feed supplement improved the feed efficiency by manipulating the intestinal microbial balance of the host. The results of this study are in agreement with Khosravi et al. (2008) who showed that Protexin probiotic can be a good alternative to antibiotic growth promoters. The previous studies showed that a diet supplemented with probiotic could improve feed intake and feed conversion ratio (Balevi et al., 2001). However, some studies observed that feed consumption and feed conversion ratio were not affected by the dietary probiotics (Homma and Shinohara, 2004). Researchers have previously demonstrated a significant increase in body weight gain in broilers receiving diets supplemented with probiotics (Babazadeh et al., 2011). According to Table 5, we did not find any *Enterobacter*

Table 1: The effects different levels of Protexin on feed intake of Japanese quail

Treatments	Control	Protexin 0.025 (g/ton)	Protexin 0.050 (g/ton)	Protexin 0.100 (g/ton)	SEM
1 Week	11.17	11.02	10.84	10.73	0.19
2 Week	16.42	16.62	16.54	17.39	0.30
3 Week	17.58	17.01	17.12	17.42	0.44
4 Week	22.11	22.21	22.48	22.32	0.45
5 Week	23.66	23.86	24.45	24.49	0.78
6 Week	26.01	25.60	24.85	26.60	0.80

Table 2: The effects different level of Protexin on body weight gain in Japanese quails

Treatments	Control	Protexin 0.025 (g/ton)	Protexin 0.050 (g/ton)	Protexin 0.100 (g/ton)	SEM
1 Week	44.01 ^b	43.46 ^b	46.72 ^{ab}	48.70 ^a	1.22
2 Week	78.69 ^b	76.69 ^b	78.24 ^b	94.70 ^a	2.27
3 Week	119.65 ^a	116.10 ^{ab}	120.14 ^a	110.43 ^b	2.76
4 Week	155.08 ^a	148.30 ^a	151.97 ^a	156.48 ^a	2.79
5 Week	195.73 ^a	192.02 ^a	191.39 ^a	191.93 ^a	2.72
6 Week	206.76 ^a	203.69 ^a	205.08 ^a	208.45 ^a	3.38

Means within row with no common on letter are significantly different (P<0.05)

Table 3: The effects different level of Protexin on feed conversion ratio in Japanese quails

Treatments	Control	Protexin 0.025 (g/ton)	Protexin 0.050 (g/ton)	Protexin 0.100 (g/ton)	SEM
1 Week	3.02	2.92	2.91	2.96	0.09
2 Week	2.47	2.40	2.45	2.37	0.10
3 Week	2.11	1.90	1.93	1.94	0.10
4 Week	1.83	1.96	1.78	1.58	0.12
5 Week	0.47	0.48	0.54	0.67	0.09
6 Week	0.48	0.62	0.40	0.55	0.07

Means within row with no common on letter are significantly different (P<0.05)

Table 4: The effects using different level of Protexin on some carcass traits in Japanese quails

Treatments	Live body	Carcass	Breast	Drum stick	Wing	Liver
	g	g	%	%	%	%
Control	264.80	174.33	65.15	36.89	13.46	6.14 ^{ab}
Protexin 0.025 (g/ton)	248.03	172.78	65.67	36.78	14.01	6.87 ^a
Protexin 0.050 (g/ton)	235.73	170.94	61.56	35.72	12.91	4.92 ^c
Protexin 0.100 (g/ton)	250.83	176.00	65.13	37.02	13.33	5.38 ^{bc}
SEM	9.65	7.55	3.23	1.09	0.51	0.61

Means within row with no common on letter are significantly different (P<0.05)

Table 5: The effects using different level of protexin on intestinal microflora in Japanese quails

Treatments	Entrobacter <i>Escherichia coli</i> Bacillus		
	Cfu/g	Cfu/g	Cfu/g
Control	0.00	0.00	0.00
Protexin 0.025 (g/ton)	6.88	0.00	0.00
Protexin 0.050 (g/ton)	6.93	4.08	4.24
Protexin 0.100 (g/ton)	339	0.00	0.00

colony in control groups. Also *Escherichia coli* and *Bacillus* colonies were found higher in T2. Ghaedi et al. (2014) reported that the intestinal population of *Escherichia coli* decreased and *Lactobacillus* increased significantly in probiotic treated groups. Abdel Hamid et al. (2013) showed that Sarafloxacin and Protexin were effective in the treatment of *Salmonella enteritidis* infection in newly-hatched chicks, but Protexin seems to be more safe and effective without any deleterious effect on animal health. Alloui et al. (2013) demonstrated that probiotics can be effective as antibiotics, they have high efficacy in reducing colonization of *Salmonella*, modulating immunological response and suppressed inflammatory reactions in the intestinal walls preventing tissue damage.

Conclusion

It is concluded from this study that Protexin supplementation is useful for better production traits

and intestinal microbiological balance in Japanese quail.

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