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The effects of protexin probiotic and chicoridin supplementation on performance and some hematological parameters in Japanese quail (Coturnix japonica)

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ABSTRACT

This experiment was conducted to evaluate the effects of feedingprotexin and chicoridin tableon performance and some hematological parameters of Japanese quail.A total of 240 seven days old quail chicks with an average weight of 18.50 g were divided into 8treatmentswith 3 replicates. The treatments were divided as basal diet with no protexin and chicoridinkept as control, and for others 100 mg/kg (T1), 200 mg/kg (T2) and300 mg/kg(T3) chicoridin with or without protexin (0-100 g/kg)were used respectively. The live body weight gains and feed consumption of birds were measured individually feed conversion efficiency were calculated. At the end of the trial for investigating the effect of using protexin and chicoridinsupplementationon performance of quails, 2 birds form each replicates were slaughteredand some blood samples were taken forhematological parameters determination.Data showed that using of protexin and chicoridinincreasedfeed intake (FI) in treatmentscompared to control.Alsobody weight (BW) (g/d) and Pre-slaughter weigh (g) were higher in protexin and chicoridingroups compared to the control. There were significant differences ($p<0.05$) for feed conversation ratio (FCR) among treatments.Data showed that using of protexin and chicoridincould increasecarcass yield (g), breast and drumstick meat percentage none significantly. Data showed that gizzard and intestine weightalso increased by usingprotexin and chicoridin. Hematological investigations showedthat although triglyceride, cholesterol and LDLhad decreased but glucose andHDLlevels had increased by usingprotexin and

chicoridinin the T1, T2 and T3compared to the control.Data from this study showed that protexin and chicoridinmay be used as ingredient in quails ration without harming effects on performance and carcass quality of birds.

1. Introduction

Probiotics are live microbial feed supplements, which improve the intestinal microbalance (Salminen et al., 1999).The use of probiotics in poultry was pioneered by Tortuero (1973), who reported an increase in growth rate in chicks given a Lactobacillus acidophilus culture in drinking water for 11 days from hatching. Similar results on the beneficial effects of Lactobacillus cultures on the growth of chickens were also reported by several researchers (Kalbane et al., 1992; Jin et al., 1997). One of the probiotics used in poultry feed is Protexin. Protexin is a multi-strain probiotic containing live microbes to establish, enhance or re-establish essential microflora in the gut. Protexin is a highly concentrated pre-mix containing seven strains of bacteria and two yeasts (Lactobacillus plantarum 1.89×1010cfu/kg (colony forming unit per kilo gram), Lactobacillus delbrueckii subsp. Bulgaricus 3.09×1010cfu/kg, Lactobacillus acidophilus 3.09×1010cfu/kg, Lactobacillus rhamnosus 3.09×1010cfu/kg, Bifidobacteriumbifidum 3.00×1010cfu/kg, Streptococcus salivarius subsp.Thermophilus 6.15×1010cfu/kg, Enterococcus faecium 8.85×1010cfu/kg, Aspergillusoryza 7.98×109cfu/kg, Candida pintolopesii 7.98 × 109cfu/kg). All the microorganisms in the protexin are naturally occurring and have been isolated from a wide range of feed, plant, animal, bird and human sources (Ayasan et al., 2006).Protexin can be used in a wide range ofcircumstances, either to improve the general health ofanimals, address specific problems or to maximizeanimal's performance. Under general conditionsProtexin has been promoted to: improve health naturally, stimulate appetite, aid in establishment of gut flora inimmature animals like day old chicks, calves, lambs, kids, kittens, re-establish gut microflora after antibiotic treatment, optimize digestion of feed and reduce stress(Rajmane, 1998; Cyberhorse, 1999; Panda et al., 2000, Vali.,2009).Many studies have been conducted to test the efficacy ofprotexin on animal growth and performance.Balevi et al, (2000) indicated that supplementation of diets with protexin at 500 gr/tonne quality was shown to causesome improvement in feed intake. Ayasan and Okan (2001) investigated the effect of four different levels of protex in on fattening performance and carcass characteristics of Japanese quails. Chicoridin tablet is an herbal product which is made of the root extract of Cichoriumintybus, Trigonellafoenum-graecum seed and Foeniculumvulgare oil(Iranian Herbal Pharmacopoeia).Sufficient carbohydrates, inulin, lactocin, lactopicrin and mineral salts(calcium, potassium, phosphorus, sodium, magnesium, manganese and copper), B complex, C and K vitamins are included in cichorium root. Trigonellafoenumgraecum seed contains carbohydrates such as stachiose, galactomanes, Lipids and sterols, protids and nucleoprotides, Organophosphate combinations such as lecithin, phytin and nitrogenated combinations such as cholin and trigonellin. Trigonelin can produce nicotinamid (pp). Foeniculunmvulgare oil contains 50 to 60% anethol and also anisaldehyde, dipanthen, phencon, flandren and pinen (Martindale, 2002).Because of the importance of birds as an economic and nutritious form of animal protein and the fast growing characteristics of this animal, research workers have devoted studies to the use of probiotics and some medical in poultry and quails. The objective of this study was conducted to evaluate the effects of protexin and chicoridin supple mentation table on performance and some hematological parameters in Japanese quail (Coturnix japonica).

2. Materials and methods

This experiment was carried out at the Aviculture farm of Malkha life, Shahrekord, Iran. A total of 240 seven days old quail chicks with an average weight of 18.50 g were divided into8 treatments and were further subdivided into3 replicates with 10 birds on each. Chicoridin was purchased from animal feed factory in Tehran-Iran. Corn, soybean meal and were analyzed in the lab for determine amount of dry matter, crude protein, calcium, phosphorus and its crude fiber with Association of official analytical chemists(AOAC).

The basal diet was balanced on the basis of corn and soybean meal as recommended by National Research council (NRC, 1994).The treatments were divided as basal diet with no protexin and chicoridin kept as control, and

for others 100 mg/kg (T1), 200 mg/kg (T2) and300 mg/kg (T3) chicoridin without (P0) or with (P1) (0-100 g/kg)protexinwere used respectively. The compositions of basal diet are shown in Table 2.Diets and fresh water were provided adlibitum during this experiment. The live body weight gains and feed consumption of quails were measured individually, feed conversion efficiency were calculated weekly. At the end of experimental period, 2birds form each replicates (totally 48 birds)were slaughtered for determination of other parameters. Also dressing percentage was calculated free from giblets and some organs were weighed separately as percentage of carcass weight.

2.1. Evaluation of some blood parameters

After 12 h of fasting, blood samples were taken from the brachial vein from four birds per replicate and stored at refrigerator at 4°C. Individual serum samples were analyzed for Glucose, Cholesterol, Triglyceride, HDL and LDL by an automatic biochemical analyzer following the instructions of the corresponding reagent kit (Pars Azmoon Co., Teheran, Iran).

2.2. Statically model and data analysis

The statically model was: $Yijk = \mu + \acute{\alpha} i + ßj + (\acute{\alpha} + ß)ij + eijk$

Yijk = average effect observed, μ = total average, άi= effect of chicoridin, ßj = effect of protexin, (ά +ß) ij = interactions (chicoridin × protexin), eijk = effect of errors. The GLM procedure of SAS software (SAS, 2001) was used for data analysis of variance as completely randomized design. The significant difference among the mean were calculated by Duncan's multiple range tests (1995).

3. Results

Data showed that use of protexin and chicoridinhad increased feed intake (FI) significantly ($p<0.05$) in comparison to control (Table 1).

Table 1
The effects of chicoridin and protexin on performance of Japanese quails.

Treatments*	FI (Kg)**	BW(Kg)	FCR (kg/kg)
(Chicoridin)			
Control	19.40^{c}	6.51^{ab}	3.60
T (1)	20.73^{c}	6.72^{ab}	3.41
T (2)	21.00^{b}	6.78^{ab}	3.22
T (3)	22.28^{a}	8.21^{a}	3.11
P Value	0.0130	0.0011	0.151
(Protexin)			
P (0)	20.54^{b}	6.05^{a}	3.41
P (1)	21.19^{a}	6.50^{a}	3.16
P Value		0.201	0.102
(Chicoridin× Protexin)			
Control× P (0)	22.71^{b}	7.46^{bc}	3.74
T (1) × P (0)	22.78^{b}	7.52^{bc}	3.51
T (2) × P (0)	21.02^{ab}	7.69^{bc}	3.22
T (3) × P (0)	21.46^{ab}	7.78^{ab}	3.20
Control× P (1)	21.76^{ab}	8.00^{b}	3.14
T (1) × P (1)	29.00^{ab}	8.11^{b}	3.00
T (2) × P (1)	29.11^{a}	8.49^{b}	2.99
T (3) × P (1)	29.22^{a}	8.57^{a}	2.85
P Value	0.714	0.211	0.801
SEM	0.0014	0.0014	0.105

*no protexin and Chicoridin kept as control, and for others 100 mg/kg (T1), 200 mg/kg (T2) and 300 mg/kg (T3) Chicoridin without (P0) or with (P1) (0-100 g/kg) protexin.**Feed intake (FI), body weight (BW), feed coefficient (FCR).***Means within row with no common on letter are significantly different ($p<0.05$).

We found that body weight BW (kg) was higher significantly when the birds fed by protexin and chicoridin compared to control. Although feed conversion ratio (FCR) were lesser in protexin and chicoridin group but there were no significant differences compared to the control.

According to table 2, the carcass percentage had increased by using chicoridin and protexin. The breast weight percentage was changed no significantly by using experimental diets. Drumstick weights percentage also were tended to increase by using chicoridin and protexinand they were at the lowest on control and at the highest on T (3) × P (1). As result was relevant from Table 2 there were no significant differences between treatments about intestine and gizzard percentage.

Table 2
The effects of chicoridin and protexin on some organspercentage**.**

Treatments*	Carcass %	Breast %	Drumstick %	Gizzard %	Intestine%
(Chicoridin)					
Control	81.20	36.00	24.41	2. 23	3.64
T (1)	82.00	36.20	25.20	2.40	3.67
T (2)	82.41	37.00	26.11	2.59	3.80
T (3)	83.00	37.17	26.30	2.71	3.91
P Value	0.110	.0116	0.321	0.107	0.116
(Protexin)					
P (0)	81.65	36.62	25.00	2.60	3.63
P (1)	82.41	37.11	26.14	2.45	3.80
P Value	0.102	0.110	0.220	0.310	0.410
(Chicoridin× Protexin)					
Control× P (0)	81.80	36.12	25.00	2.20	3.30
T (1) × P (0)	82.00	36.17	26.01	2.29	3.41
T (2) × P (0)	82.16	36.51	27.00	2.40	3.50
T (3) × P (0)	82.50	36.67	27.14	2.50	3.62
Control× P (1)	82.44	36.76	26.64	2.32	4.00
T (1) × P (1)	82.69	37.00	27.77	2.39	4.01
T (2) × P (1)	83.10	37.12	27.68	2.59	4.20
T (3) × P (1)	84.11	37.25	28.02	2.60	4.40
P Value	0.92	0.241	0.621	0.224	0.236
SEM	4.30	2.22	2.10	1.64	0.630

*no protexin and Chicoridin kept as control, and for others 100 mg/kg (T1), 200 mg/kg (T2) and 300 mg/kg (T3) Chicoridin without (P0) or with (P1) (0-100 g/kg) protexin.**Feed intake (FI), body weight (BW), feed coefficient (FCR).***Means within row with no common on letter are significantly different ($p<0.05$).

As result relevant form table 3 glucose levels tended to increase by using chicoridin and protexin. There were significant differences between treatments for cholesterol, triglyceride, HDL and LDL levels. Data showed that cholesterol, triglyceride and LDL were decreased by usingchicoridin and protexin but HDL were tended to increase were quails fed by chicoridin and protexin.

In the present study, protexin and chicoridin supplementation had significant effects on the measured values in growing Japanese quails. The usage of protexin and chicoridinwas significant influences on FI, BW, FCR and carcass yield. These results are in agreement with the (Vahdatpour et al., 2011) who indicated that consumption of synbiotic (Protexin+ Fermacto) were more effective than other groups in BW, FI and FCR of Japanese quails. Balevi et al, (2001) showed that diet supplementation with probiotic could improve FIand FCR.

Many scientists showed that beneficial effects of herbal or active substances in animal nutrition may include the stimulation of appetite and feed intake, the improvement of endogenous digestive enzyme secretion, activation of immune response and antibacterial, antiviral, antioxidant and antihelminthic actions (Janssen, 1989; Manzanilla et al., 2001; Jamroz et al., 2003).

Table 3
The effects of chicoridin and protexin on some hematological parameters

Treatments*	Glucose (mg/dl)	Cholesterol (mg/dl)	Triglyceride (mg/dl)	HDL (mg/dl)	LDL (mg/dl)
(Chicoridin)					
Control	169.22	212.01^{a}	208.03^{a}	100.21^{d}	146.54^{a}
T (1)	170.45	208.41^{b}	207.21^{b}	102.30^{c}	134.23^{b}
T (2)	172.34	206.30^{b}	202.23^{c}	102.15^{b}	122.54^{c}
T (3)	174.45	200.37^{c}	198.22^{d}	106.08^{a}	100.11^{d}
P Value		0.021	0.010	0.043	
(Protexin)					
P (0)	170.17	200.42^{b}	200.00^{b}	100.10^{a}	125.34^{a}
P (1)	172.36	202.406^{a}	203^{a}	105.34^{a}	126.28^{a}
P Value		0.031	0.011	0.048	
(Chicoridin× Protexin)					
Control× P (0)	170.10	209.13^{a}	208.30^{a}	100.88^{c}	134.93^{a}
T (1) × P (0)	171.25	207.01^{a}	204.20^{b}	101.16^{cb}	132.16^{a}
T (2) × P (0)	169.45	207.52^{a}	202.14^{dc}	102.47^{bc}	127.51^{ab}
T (3) × P (0)	168.54	204.36^{ab}	200.36^{d}	100.13^{cb}	116.23^{b}
Control× P (1)	170.00	206.34^{a}	205.41^{a}	105.20^{ab}	123.07^{ab}
T (1) × P (1)	169.31	207.45^{a}	203.25^{a}	101.60^{ab}	118.19^{b}
T (2) × P (1)	170.25	202.43^{b}	201.20^{ab}	106.46^{ba}	113.24^{b}
T (3) × P (1)	171.63	206.55^{b}	199.70^{c}	110.06^{a}	108.77^{c}
P Value	0.106	0.015	0.017	0.020	0.930
SEM	16.24	34.20	14.23	.0041	23.25

*no protexin and Chicoridin kept as control, and for others 100 mg/kg (T1), 200 mg/kg (T2) and 300 mg/kg (T3) Chicoridin without (P0) or with (P1) (0-100 g/kg) protexin.**Feed intake (FI), body weight (BW), feed coefficient (FCR).***Means within row with no common on letter are significantly different ($p<0.05$).

4. Discussion

Parreira (1998) has showed that dietary supplementation of protexin increased growth performance and decreased mortality in broilers. Rajmane et al, (1998) showed a significant improvement in body weight, improved feed conversion efficiency and reduction in mortality with the use of protexin as a growth promoter such as coneflower in broilers. Also Shabani et al, (2012) showed that the chicken broilers feed with protexin have the lowest feed conversion ratio and was the most favorable.

These results are similar to the findings of Ayasan and Okan (2001)who reported that growth performanceparameters and carcass characteristics of Japanesequails was not affected by protexin supplementation.

Sarica et al, (2009) showed that use of essential oils in combination with the enzyme complex, a probiotic and a mannan oligosaccharide with or without the enzyme complex in the wheat based diet significantly reduced the intestinal viscosity compared to the control diet, these treatments negatively decreased plasma total cholesterol and triglyceride on quails.Data from this study showed that carcass percentage had increased significantly ($P<0.05$) by using chicoridin and protexin. This result is agree with (Kavyani et al., 2012) who indicated that carcass yield increased in broilers fed diets containing probiotic ($P<0.05$).

5. Conclusion

It can be concluded that the supplementation of quail diets with the chicoridin and protexin had beneficial effect on growth performance. Also the use of chicoridin and protexin in quail rations during the period from 7 to 44 may manipulate weight gain and decrease feed conversion ratio. chicoridin and protexin supplementation may

be used as ingredient in quails ration up to level of (100-300 mg /kg) with or without protexin (0- 0.01%) without harming feed intake, weight gain and feed conversion ratio of quails. As mentioned above it has become clear that there is a quite bite of benefits chicoridin and protexin as source of a medical and nutritional resource to be used for quails respectively. However further studies are needed for more explanations.

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