

Effect of adding different levels of red ginseng roots powder to feed on some physiological characteristics of Japanese quail (*Coturnix japonica*).

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Abstract

The present study was conducted at in the Quail field of the Faculty of the Agriculture/University of Basrah for the period from 21/9/2017 to 12/11/2017 to determine the effect of adding different levels of red ginseng roots powder to feed on some physiological of the Japanese quail. A total of 240 Japanese quail birds aged one week were used in this study. The birds were randomly distributed into four treatments (60 birds for each). Each treatment was replicated three times (20 birds for each). (T1) fed a basal diet without feed additive (control), (T2), (T3), and (T4) were fed a basal diet with adding red ginseng roots powder 250, 500 and 750 mg/kg respectively. The results indicated add the red ginseng roots powder has no significant differences between treatments on some blood characteristics (RBCs, PCV and Hb) at 60 days of age in both male and female, while the T4 and T3 treatments were recorded highest value in WBCs and the lowest Value in (H / L) for both male and female compared with the T2 and T1. In conclusion, the red ginseng roots powder has a positive effect to improve the immune status of quails and reduce stress.

Key words: *ginseng, physiological characteristics, Quail.*

*This study is a part from thesis of first researcher.

I. Introduction

Due to economic development and rising living standards for citizens make a lot of countries around the world to find rich sources of nutrients which poultry products from meat and eggs, which are rich sources of animal protein, so the developed countries are working to provide these resources by raising the types Many birds such as ostrich, chicken and Japanese quail (Adeola, 2006). Japanese quail characterized many qualities, that distinguishes the meat taste special and delicious flavor is desirable for many consumers (Vali, 2008). It is also characterized by encouraging productive qualities and low breeding costs compared to the cost of raising chickens, high growth speed and early sexual maturity (Abu Al Ola, 2005). Medicinal plants have been used in poultry diets in various forms, including oil extracts, water or food additives to improve productivity and health status and reduce reliance on antibiotics (Greathead, 2003). Ginseng is one of the basic part and perennials utilized is the root because it contains many nutrients like vitamins and minerals important to the human body and animal (Lee *et al.*, 2013). As well as many active compounds which ginsenoside and polysaccharide and peptides and flavonoids (Kang *et al.*, 2013). It has many medical uses and effects where used as a stimulating for most physiological characteristics as well as being an antioxidant (Kim *et al.*, 2011). And it play a major role in stimulating the immune system (Ao *et al.*, 2011). As well as its role in increasing productive poultry performance (Yildirim *et al.*, 2013). Ao *et al.*, (2011) showed to add red ginseng extract to broiler diets in (1, 2 and 4 g/kg) led to an increase in lymphocytes cells. Yan *et al.*, (2011) indicated through their study on broiler which was two days old that the addition of red ginseng roots of to feed in concentrations (0.1 and 0.2 and 0.3%) did not effect on red blood cells (RBCs) compared to the control treatment while addition has appears high significant in the number of lymphocytes compared with the control

treatment. The current study aimed to find out the impact of adding powdered of red ginseng roots to feed on some physiological characteristics of Japanese quail.

II. Materials and Methods

The current study was conducted in the Quail field of the Faculty of the Agriculture/University of Basrah for the period from 21/9/2017 to 12/11/2017. In this experiment, 240 birds of quail were used at the age of one week, and the birds were randomly distributed into four treatments, each treatment has 60 birds. Each treatment replicated three times (20 birds for each). The first treatment birds (control) were fed on basal diet, without an addition containing 20% crude protein and 2900 kcal/kg metabolism represented by (NRC, 1994) while the second, third and fourth treatment birds were fed to the control's diet and add the red ginseng root powder by (250, 500 and 750 mg/kg feed) respectively.

Blood samples of birds were taken at 60 days of the bird's age from 3 males and 3 females of each treatment, and put in a container tube on the anticoagulant (EDTA) to estimate some blood parameter as the account of red blood cells (RBCs 10^6 cell/ ml³), and hemoglobin concentration (Hb g/100 ml) and Packed cell volume (PCV%) and White blood cells (WBCs 10^3 /mm³) and the ratio of heterophils/ lymphocytes (H/L%). As calculating (RBCs) by applying the equation referred to by Natt and Herrik, (1952) and white blood cells (WBCs) were calculated according to the equation as by mentioned (AL-Darraji *et al.*, 2008). While in Packed cell volume (PCV%) Using special centrifuge Micro-hematocrit centrifuge as indicated by (Archer, 1965), and using a Sahli device to calculate blood hemoglobin concentration (Hb) according to the way (Schalm *et al.* 1975). The ratio of Heterophils / lymphocytes cells (H/L) was calculated according to the following equation: (Humason, 1972)

$$(H/L) = \frac{\text{Heterophils} / 100 \text{ cells}}{\text{lymphocytes} / 100 \text{ cells}}$$

Collected data were subjected to one-way analysis of variance (ANOVA) and differences were considered to be significant if P was < 0.05 according to Statistics SPSS (2015) and statistical analysis by the mathematical model equation: $Y_{ij} = M + T_i + E_{ij}$ as:

Y_{ij} : The value of the J view returned for the I treatment.

M: the General average of the studied concept

T_i : Treatment effect I the study included four coefficients

E_{ij} : A random error that is distributed naturally with an average equal to 0 and a variation of σ^2_e .

III. Results and Discussion

The current study designed to evaluate adding 250, 500, and 750 mg/kg from red ginseng roots powder by adding to a nutrition that Japanese quail birds had feed. The study tested both genders of the Japanese quail birds. The results have no significant differences between treatments on the account of red blood cells, (RBCs 10^6 cell/ ml³) hemoglobin concentration (Hb mg/100 ml) and packed cell volume (PCV%) in both sexes bird in both males and females (**Table:1**). The study agrees with (Yan *et al.*, 2011) who used 0.1, 0.2, and 0.3 % of the same plant root powder mixed with the nutrition that meat chickens feed. Yan *et al.*, (2011) showed that no significant different on the RBCs account of the birds compared with the control group. Also, the present study had the agreement with

(Kim *et al.*, 2015) when they tested 0.5, 1, and 2% of the same plant added to the nutrition of 76 week old chickens. Kim *et al.*, (2015) referred that no significant effects on the Hb concentrations of the birds.

Treatment	Male			Female		
	RBC	HB	PCV%	RBC	HB	PCV%
T1	5.28±0.07	14.08±0.20	42.25±0.62	3.87±0.16	11.16±0.45	35.00±1.35
T2	5.34±0.15	14.24±0.41	42.75±1.25	3.96±0.09	11.41±0.25	35.75±0.75
T3	5.43±0.24	14.50±0.64	43.50±1.93	4.03±0.10	11.46±0.38	36.25±0.85
T4	5.46±0.30	14.58±0.82	43.75±2.46	4.02±0.09	11.58±0.25	36.25±0.77
Significant	N.S	N.S	N.S	N.S	N.S	N.S

Table 1 Effect of red ginseng roots powder on some blood parameter of male and female Japanese quail at the age of 60 days (mean ± standard error)

T1-Control without any addition. T2 = Add the Red ginseng root powder with a concentration of 250 mg/kg feed. T3 = Add the Red ginseng root powder with a concentration of 500 mg/kg feed. T4 = Add the Red ginseng root powder with a concentration of 750 mg/kg feed.

Related to the effects of the tested plant (red ginseng roots powder), the 250, 500, and 750 mg/kg possessed the significant evidences ($P \leq 0.05$) on the account white blood cells (WBCs) and ratio of heterophils to lymphocytes (H/L) in both males and females at days old birds. The significant effects recorded in the birds of third and fourth treatments, The males of the birds at fourth treatment had appeared 25.76 ($10^3 / \text{ml}^3$) as a highest value in comparison with the control treatment, 17.15 ($10^3 / \text{ml}^3$). In the females of the treatment, the values was 23.78 ($10^3 / \text{ml}^3$) compared with the control treatment, 18.48 ($10^3 / \text{ml}^3$) (**Table:2**). The results may be due to the increasing force of the bird immunity that taking the root powder of ginseng which led to make the immune cells increased against any immunogenic (Jensen *et al.*, 2000; Kim *et al.*, 2011). So, it may be said that the root powder represented as immunogenic agents in the bird blood that led to WBCs proliferated.

The results of the study showed a little value of the Heterophils to lymphocytes ratio (H/L) in which 0.24 recorded in bird males while 0.25 in the females of fourth treatment compared with the control treatment which was 0.78 noted in males, and 0.79 in the females. The results may be the explanation that is because the red

ginseng powder used as a regulator for the metabolic processes in the body. The regulation of the plant may be to make a body to be adapted against the stress factors that made the immunity to be forced against pathogens and immunogenic agents (Jang *et al.*, 2007; Kim *et al.*, 2011). Therefore, the third and fourth treatments gave a good immunity especially increasing lymphocyte cells due to adding root powder of red ginseng to birds nutrition. The results of the study agree with (Zhang *et al.*, 2009; Ao *et al.*, 2011) who showed to add red ginseng extract broiler diets in (1, 2 and 4 g/kg) led to an increase in lymphocytes cells.

Table 2 Effect of red ginseng roots powder on white blood cell (WBC) ($10^3/\text{mm}^3$) and H/L ratio in the blood of male and female Japanese quail at 60 days of age (mean \pm standard error)

Treat meant	Male		Female	
	WBC	H\L	WBC	H\L
T1	17.15 c \pm 0.65	0.78 a \pm 0.035	18.48 c \pm 0.66	0.79 a \pm 0.066
T2	19.14 bc \pm 0.86	0.65 a \pm 0.072	20.46 bc \pm 1.43	0.70 a \pm 0.073
T3	22.78 ab \pm 1.50	0.29 b \pm 0.008	21.80 ab \pm 0.58	0.33 b \pm 0.023
T4	25.76 a \pm 2.26	0.24 b \pm 0.016	23.78 a \pm 0.56	0.25 b \pm 0.021

Significant	*	*	*	*
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* Different characters mean there are differences between treatments.

T1-Control without any addition. T2 = Add the Red ginseng root powder with a concentration of 250 mg/kg feed. T3 = Add the Red ginseng root powder with a concentration of 500 mg/kg feed. T4 = Add the Red ginseng root powder with a concentration of 750 mg/kg feed.

IV. Conclusions

The current study concluded that the red ginseng roots powder possesses an ability to increase the Japanese quail birds immune cells when the root powder is given with their diet. Additionally, the powder of red ginseng roots can decrease the stress of the birds.

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