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Influence of different levels of cinnamon extract on performance, carcass and blood parameters of Japanese quails

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ABSTRACT

This study was conducted to find out the effects of cinnamon on performance, carcass characteristics and blood parameters were studied in Japanese quails. This study was carried out with 375, 7 days old of Japanese quails in 5 treatment groups and 3 repetitions. The experimental groups were as follows: EG1, First group as control group did not receive any herbal plant extract, EG2, 100 ppm of cinnamon extract, EG3, 150 ppm cinnamon extract, EG4, 200 ppm cinnamon extract, EG5, 250 ppm cinnamon extract herbal plant. The results showed that the best result for FCR and the highest feed intake were in EG4 and the highest percent of carcass was observed in the group 5 but the lowest percent of carcass was observed in control group also the highest percentage of liver and the lowest level of cholesterol and triglyceride were observed in group 4.

Keywords: Cinnamon, Japanese quails, Performance, Carcass.

INTRODUCTION

Nutrients from plants by products are perhaps the most naturally abundant and the cheapest potential source of feeds. Natural resources are available for the synthesis and polymerization of glucose into less mobile forms and stored such as in plant. The antimicrobial activity of essential oils derived from spices and herbs [1-2] is of interest as these oils could be used as feed additives alternative to antibiotics [3]. There are a lot of advantages in using medicinal plants such as easy usage, non side effects, no waste particulars in the target body and etc. Several compounds like, enzymes, organic acids, probiotics, and phytochemicals are used to improve the performance [1,4]. It was suggested that terpenoids and phenylpropanoids can penetrate the membranes of the bacteria and reach the inner part of the cell because of their lipophilicity [5]. There is an increasing trend in the prevalence level of disease, by industrialization of poultry science and breeding chickens in a large scale. To cope with this problem and improve the biological and

nutritional characters of chickens, chemical compounds like antibiotic have been used highly in poultry industry [6]. After many years, the long term side effects of these products like microbial resistance and increase of the blood cholesterol level in the livestock lead to the ban of these commercial antibiotics[7-8].

Unfortunately, over use of these products ended up with a lot of problems both for animals and costumers, for example, bacterial resistance to antimicrobial agents [9]. Because of this problem, there have been made some restricted rules about the usage of these antibiotics, like ban and low use of them [10]. In the past, the major growth promoters added to the feed of broilers were antibiotics. But because of their residues and subsequent occurrence of antibiotic resistant-bacteria [11-12].Cinnamon inhibits *Helicobacter pylori* at the concentration range of common antibiotics, its antimicrobial properties are mainly related to its cinnamaldehyde content, followed by eugenol and carvacrol contents [13]. Cinnamon and its constituents (cinnamaldehyde and eugenol) have antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Staphylococcus aureus*, *Staphylococcus epidermis*, *Salmonella sp.* and *Parahemolyticus* [14]. Also they have inhibitory properties against *Aspergillus flavus*[15].In this study, we investigated the effect of cinnamon on performance, carcass quality and blood biochemical of Japanese quails.

Table 1. Ingredients and chemical analyses composition of diets

Ingredients (g/kg)	
Com flour	48.8
Soybean oil	2.2
Soybean meal	40
Fish meal	6
Dicalcium	1.6
Vitamin premix	0.25
Mineral premix	0.25
Methionine	0.25
Analyzed chemical composition (g/kg)	
Dry matter	92.2
Crude protein	23.9
Fat	3.46
Fiber	4.13
Ash	6.7
Calcium	1.22
Phosphorus	0.41
ME by calculation (MJ/kg)	12.21

* Vitamin premix (/kg diet): Vitamin A - 1.000 IU; vitamin D₃ - 1.000 IU; vitamin E - 42 g; vitamin K₃ - 4 g; vitamin B₁ - 3.6 mg; vitamin B₂ - 7 g; vitamin B₆ - 8 mg; vitamin B₁₂ - 0.02 mg; niasin - 24 mg; folic acid - 12 mg; biotin - 0.05 mg; cal-D-pentotenat (pantothenic acid) - 12 mg; cholin chloride - 150 mg; vitamin C - 60 mg

** Mineral premix (mg/kg diet): Fe - 72; Zn - 72; Cu - 6; I - 1.2; Co - 0.24; Se - 0.18; Mn - 96

MATERIALS AND METHODS

This study was carried out with 375, 7 days old of Japanese quails in 5 treatment groups and 3 repetitions. The experimental groups were as follows:EG1, First group as control group did not

receive any herbal plant extract, EG2, 100 ppm of cinnamon extract, EG3, 150 ppm cinnamon extract, EG4, 200 ppm cinnamon extract, EG5, 250 ppm cinnamon extract herbal plant. 6 weeks unbound water and dietary was in poultries' access. Dietary, chick and weigh feed consumed was recorded daily, the uneaten discarded, and feed conversion ratio (FCR) was calculated (total feed : total gain). At the end of experiment, some analyses was done via SAS (Statistical Analyses Software) in the statistical level of 5% according to data gathered from dietary, weight improvement, average of FCR, weight of rearing period and carcass yield. At 6 weeks of age, five quils per replicate were randomly chosen, slaughtered and carcass percent to live weight and percent of carcass parts to carcass weight were calculated. Blood samples were obtained from barchial vein and centrifuged in order to getting serum, after 12 hours of fasting in the 42th day of experiment.

RESULTS AND DISCUSSION

The data which obtained from performance of Japanese quails fed by cinnamon are shown in Table 2. According to comparisons of this table it has been proven that the best result for FCR and the highest feed intake were in EG4. There is an evidence to suggest that herbs, spices and various plant extracts have appetite and digestion stimulating properties and antimicrobial effects [16]. These results agree with the work of Lee *et al.* [11], who found that adding the herbal planet to the diet of broilers improved their growth performance. Aromatic plants and essential oil extracted from these plants have been used as alternatives to antibiotics.

The effects of different levels of cinnamonon carcass traits of Japanese quails are in Table 3. The highest percent of carcass was observed in the group 5 but the lowest percent of carcass was observed in control group also the highest percentage of liver was observed in group 5. There is a possibility of gathering these to antimicrobial herbs made a remarkable decrease in the amount of intestine microbial colony and this prevented from lysis of amino acids and they used in formation of proteinic tissues and increased the breast percentage. Lee *et al* [3] found that the existence of harmful microbes in digestive system causes an increase in the lysis of protein and amino acids of nutrients, di-amination activity of proteins and amino acids and rapid decomposition of these molecules due to secretory substances from bacteria like urease. Considering this fact and antimicrobial activity of these herbs, the whole matter seems sensible.

The present of antioxidants and phenolic substance in cinnamon may be the main cause of improvement in breast percent of broilers carcass. The presence of harmful bacterial populations in the gastrointestinal tract may cause breakdown of amino acids and thereby reduce their absorption as antimicrobial substances are present in cinnamon can reduce the harmful bacterial populations in the gastrointestinal tract and improve the levels of absorbed amino acids [17-18]. The mean values of serum constituents in Japanese quails fed different level of cinnamon are shown in table 4. The serum total cholesterol and triglycerides concentration were significantly reduced in group of 4 and 5 compared to the control group ($P < 0.05$) but The concentration of glucose was not significantly reduce in groups compared to the control group.

Table 2: Effect of different level on performance of Japanese quails

Items	EG1	EG2	EG3	EG4	EG5	SEM
Feed conversion ratio	3.74 ^a	3.70 ^a	3.61 ^a	3.32 ^{ab}	3.36 ^{ab}	0.14
Feed intake (g/day)	13.01 ^b	13.31 ^a	13.19 ^a	13.41 ^{ab}	13.35 ^{ab}	1.12
Average daily gain (g/day)	3.96 ^a	3.99 ^a	4.02 ^a	4.17 ^{ab}	4.15 ^{ab}	0.25

a-b.Means with different subscripts in the same column differ significantly ($P < 0.05$)

Table3: Effect of different level on carcass of Japanese quails

Characters (%)	EG1	EG2	EG3	EG4	EG5	SEM
Carcass	77.10 ^a	77.12 ^a	77.15	77.62 ^{ab}	77.71 ^{ab}	2.13
Liver	2.38 ^a	2.40 ^a	2.40 ^a	2.46 ^a	2.51 ^{ab}	0.15
Gizzard	7.40 ^a	7.48 ^a	7.49 ^{ab}	7.66 ^{ab}	7.79 ^{ab}	0.16
Spleen	2.42	2.40	2.50	2.68	2.67	0.19

Means with different subscripts in the same column differ significantly ($P < 0.05$)

Table4. The effect of different level of treatment on blood biochemical of Japanese quails

Blood Parameter	EG1	EG2	EG3	EG4	EG5	SEM
Glucose (mmol/L)	122.23	122.65	123.54	120.12	122.23	4.60
Cholesterol (mg/dl)	117.69 ^a	116.75 ^a	115.36 ^a	110.12 ^{ab}	111.19 ^{ab}	4.23
Triglyceride (mmol/L)	118.23 ^a	116.13 ^a	115.13 ^{ab}	112.26 ^{ab}	113.30 ^{ab}	4.01

a-bMeans with different subscripts in the same column differ significantly ($P < 0.05$)

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