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Influence of garlic and sumac powder (*Rhus coriaria* L.) on performance, carcass and blood biochemicals of Japanese quails

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ABSTRACT

In this study we tried to investigate the effect of dietary garlic and sumac (RhusCoriariaL.)powder on performance and serum composition of Japanese quails.In this study that startedone week following until 42 days there are five treatments and five replicates, at first 375,7 day old quails were divided to 25 groups of 15 quils each. Each 5 groups randomly assigned to one of the 5 treatments. Experimental groups included Q1, control group, Q2,basal diet containing 2% sumac powder,Q3, using 2% of garlic powder, Q4, fed by basal diet plus 2%garlic and sumac powder. Results showed that the highest feed conversion rate was in control group but the lowest FCR was in Q4 (P< 0.05). The highest amount of daily feed intake was observed in the group 2 and the lowest group was observed in control group also the highest carcass and liver percentage were in Q4 and Q2 respectively (P<0.05).The lowest level of total cholesterol (Chol) and triglyceride (TG)were in Q3. All results showed that using sumac and Garlic powder have positive effects on performance, carcass traits and blood biochemical parameters of Japanese quails.

Keywords: Garlic, Sumac, Japanese quails, Carcass, Performance.

INTRODUCTION

Nowadays, there are a lot of concerns to finding non-synthetic alternatives for antibiotics among the scientists. The positive effect of herbal plants on quails have been reported by some studies. Their anti biotical potential, hypocholestrolemic effects, growth promoting and availability are the most benificial part of herbs, which have drawn the scientists attention themselves[1].There are a lot of reports indicating the positive effects of herbs like anti-coccidal , anti-oxidant, anti-fungi and etc. Some of medical effects of herbs are related to their secondary metabolites such as phenols, necessary oils, saponins and etc [2]. Herbs have been used for some disease since long time ago because of availability, easy usage, non side effects.

Many herbs have a long history of use even prehistoric use, in preventing or treating human and animal diseases. Aromatic plants have been used traditionally in therapy of some diseases

worldwide for a long time. Research on the use of herbal mixtures in birds diets has produced inconsistent results [3]. Approximately 80% of domestic animals have been fed synthetic compounds for the purpose of either medication or growth promotion [4]. Recently, the concerns about possible antibiotic residues and antibiotic resistance have aroused great caution in the usage of antibiotics in the animal industry. Garlic (*Alliumsativum*) is one of the most traditionally used plants as a spice and herb. Garlic has been using for a variety of reasons which most of them has been aproved scientifically: anti atherosclerosis, anti microbal, hypolipidemic, anti thrombosis, anti hypertension, anti diabetes and etc. There are a lot of active components in garlic like: Ajoene, S-allylcycteine, Di allyl (di/ three) sulfide and the most active one Allicine [5]. Allicine possibly reduces LDL, triglyceride and cholestrol in serum [6] and it has been used for cardiovascular diseases [7]. Also Research indicated that sumac is effective against both gram positive and negative bacteria, but it is more effective on gram positive than gram negative microorganisms [8].

The objective of this study was to investigate the effects of using different levels of garlic and sumac (*RhusCoriaria*L.)on performance, carcass traits and blood biochemical of Japanese quails.

MATERIALS AND METHODS

In this study that started one week following until 42 days there are five treatments and five replicates, at first 375, 7 day old quails were divided to 25 groups of 15 quils each. Each 5 groups randomly assigned to one of the 5 treatments. Experimental groups included Q1, control group, Q2, basal diet containing 2% sumac powder, Q3, using 2% of garlic powder, Q4, fed by basal diet plus 2% garlic and sumac powder. During days 0-42, unbound water and dietary was in access.

Table 1. Ingredients and chemical analyses composition of diets

Ingredients	(g/kg)
Corn	47.5
Soybean oil	2.4
Soybean meal	41.3
Fish meal	5.8
Dicalcium	1.6
Vitamin premix*	0.25
Mineral premix**0.25	
Methionine	0.25
Analyzed chemical composition (g/kg)	
Dry matter	91.8
Crude protein	22.8
Fat	3.12
Fiber	5.05
Ash	5.9
Calcium	1.19
Phosphorus	0.5
ME by calculation (MJ/kg)	12.71

** Vitamin premix (/kg diet): Vitamin A - 1.000 IU; vitamin D_3 – 1.000 IU; vitamin E - 42 g; vitamin K_3 - 4 g; vitamin B_1 – 3.6 mg; vitamin B_2 - 7 g; vitamin B_6 - 8 mg; vitamin B_{12} – 0.02 mg; niasin - 24 mg; folic acid - 12 mg; biotin – 0.05 mg; cal-D-pentothenat (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.*

Dietary 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 analyzes were 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, six quails 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 branchial vein and centrifugated in order to getting serum, after 12 hours of fasting in the 42th day of experiment.

RESULTS AND DISCUSSION

The results obtained on the performance of quailsare shown in Table 2.The highest feed conversion rate was in control group but the lowest FCR was in Q4 (P< 0.05). The highest amount of daily feed intake was observed in the group 2 and the lowest group was observed in control group.The effects of different levels of sumac and garlic on carcass traits of quails are in Table 3. Application of different levels of sumac and garlic significantly affected the carcass traits (P<0.05). The highest carcass and liver percentage were in Q4 and Q2 respectively (P<0.05). This result is in agreement with the finding of and Azadegan-meher*et. al*.[9] who reported decreasing in liver weight due to supplemental protexin. But these results are not consistent with work of Yazdankish*et. al*., [10].Langhout [11], who showed that herbal planet could stimulate the digestion system in birds, improve the function of liver and increase the pancreatic digestive enzymes. Enhancement of the metabolism of herbal planet, carbohydrates and proteins in the major organs would increase growth rate of these organs [12-13].

There is a possibility of gathering these to antimicrobial herbs made a remarkable decrease in the amount of intestine microbal colony and this prevented from lysis of amino acids and they used in formation of proteinic tissues and increased the breast percentage [4]. The effects of experimental plants on blood biochemical parameters are presented in Table 4. The effects were significant on biochemical parameters (p<0.05), which the serum total cholesterol and triglycerides concentration were significantly reduced in G2 compared to the control group (P<0.05).

The mean values of serum constituents in quails fed different supplemented diets are shown in table 4.The serum total cholesterol and Triglycerides concentration were significantly reduced by dietary with garlic and sumac compared to the control group. (P < 0.05).According to *Akiba* and *Matsumoto* high level of fibers can increase the excretion of bile and this can decrease the cholesterol level of blood [14]. The main reason of cholesterol and triglyceride decrease in blood of chicks is substances like carvacrol and thymol which are present in herbs such as these herbal. These substances have effect on cholesterol and triglyceride and decrease these harmful parameters in blood [15].

Table 2: Effect of different combinations of herbal plants on performance of Japanese quails.

Items	Q1	Q2	Q3	Q4	SEM
Feed conversion ratio	3.74^{a}	3.32^{ab}	3.38^{ab}	3.26^{ab}	0.09
Feed intake (g/day)	13.01^{b}	13.40^{a}	13.15^{a}	13.32^{ab}	0.30
Average daily gain (g/day)	3.98^{a}	4.12^{ab}	4.08^{a}	4.32^{ab}	0.10

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

Table3: Effect of different combinations on carcass of Japanese quails

Characters (%)	Q1	Q2	Q3	Q4	SEM
Carcass	^{a}77.12	77.61^{ab}	77.32^{a}	^{ab}77.82	2.16
Liver	2.36^{a}	2.95^{ab}	2.40^{a}	2.51^{a}	0.17
Gizzard	7.41^{a}	7.78^{ab}	7.82^{ab}	7.86^{ab}	0.11
Spleen	2.42^{a}	2.40^{a}	2.50^{a}	2.68^{ab}	0.12

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

	Treatments				
Blood Parameter	Q1	Q2	Q3	Q4	SEM
Glucose (mmol/L)	122.23	122.65	123.54	122.0	5.66
Cholesterol (mg/dl)	118.23^{a}	110.23^{ab}	109.35^{ab}	112.06^{ab}	5.10
Triglyceride (mmol/L)	117.75^{a}	116.29^{a}	110.09^{ab}	111.36^{ab}	4.69

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

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