The evaluation of different levels of Manta pulagum on performance, and blood parameters of broilers

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Abstract: This study was conducted to investigate the effects of using different levels of Menta pulagum on performance, carcass traits, blood biochemical and immunity parameters of broilers. At first 300 one day old broiler chicks were divided to 5 groups and five replicates of 12 chicks in each group. Experimental groups included T1, control group with no Menta pulagum supplementation, T2, T3, T4, and T5 received 0.75%, 1%, 1.5%, and 2% Menta pulagum respectively. The results showed that the use of different levels of Menta pulagum has significant effects on performance and carcass traits of broilers ($P<0.05$). The highest level of weight gain was in group 5 also the highest percent of liver and breast were observed in group 5 but the greatest percent of thigh was observed in group 4. The results evidence that the using of Menta pulagum in broiler feeds have significantly effects on performance and blood biochemical and carcass traits without having any significantly effects on immunity parameters except the level of heterophile to lymphocyte.
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1. Introduction

The first usage of antibiotics in poultry science goes back to the 1946. By scientific demonstration of antibiotic advantages in livestock, the usage of these syntetic products increased for many years. After many years, the long term side effects of these products like microbial resistance and increase of the blood cholestrol level in the livestock lead to the ban of these commercial antibiotics. Nowaday, there are a lot of concerns to finding non-synthetic alternatives for antibiotics among the scientists. The positive effect of herbal plants on broilers have been reported by many studies (Tekeli, 2006). 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 (Javed, 2006). Because of this problem, there have been made some restricted rules about the usage of these antibiotics, like ban and low use of them (Kamel, 2001).

Organic poultry is a relatively new expression in western countries which is going to expand in other countries. In this kind of poultry method, farmers do not use chemical compounds at all or in a very low level for sake of costumers, instead they use alternatives like organic acids, probiotics, and medicinal plants, and despite of higher prize of this method, these products have more fans in the costumers (Ipu, 2006). 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 (Ipu, 2006). 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 broiler diets has produced inconsistent results (Fritz, 1993). Some authors state significant positive effects on broiler performance (Ertas, Cross, Peric, 2005, 2007,2008), whereas another group of authors established no influence on gain, feed intake or feed conversion (Cross, Ocak, 2007, 2008).

The objective of this study was to investigate the effects of using different levels of Menta pulagum on performance, carcass traits, blood biochemical and immunity parameters of broilers.

2. Material and Methods

In this experiment that started 1 day following until 42 days that there are four treatments, at first 300 one day old broiler chicks were divided to 20 groups of 15 chicks each. Each 5 groups randomly assigned to one of the 5 treatments. control group with no thyme supplement, T2, T3, T4, and T5 received 0.75% ,1%, 1.5%, and 2% thyme powder respectively. There were similar partition for male and female birds into treatment groups. The rations were similarly formulated in all treatment groups based on the NRC, 1994 Nutrients recommendations (tables 1).

Dried Menta pulagum was supplied from local market and after fine milling, mixed with other ingredients. The diets and water was provided *ad libitum*. The lighting program during the experiment period consisted of a period of 23 hours light and 1 hour of darkness. Environmental temperature was gradually decreased from 33 ° C to 25 ° C on day 21 and was then kept constant.

Performance parameters

During days 0-42, unbound water and dietary was in poultries' access. Dietary and chick weigh were going on weekly. 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 (SAS, 2001). (Statistical Analyses Software) in the statistical level of 5% according to data gathered from dietary, average of FCR.

Carcass traits

At 42 days of age, four birds per replicate were randomly chosen, slaughtered and carcass percent to live weight and percent of carcass parts to carcass weight were calculated.

Immunity system:

In the 35th day of experiment, three chicks were chosen from each group and inoculated from brachial vien by 0.1 ml (5%). Heterophils to Lymphocytes ratio were determined and Globulin and Albumin proportion in blood were counted from blood samples which had been obtained from barchial vein of three randomly chosen chicks from each group in the 49th day of experiment.

Serum parameters:

Blood samples were obtained from barchial vein and centrifuged in order to getting serum, after 12 hours of fasting in the 49th day of experiment. Serums have been analyzed for glucose, Cholestrol, Low-density lipoprotein (LDL), High-density lipoprotein (HDL) and Triglyceride by ELISA set.

Statistical analysis:

After obtaining the data, they were analyzed by variance method (ANOVA) considering ($P < 0.05$) using SPSS 18 software. The significant differences were taken to Duncan multiple range test to compare the means.

The result from above figures is that the structure in frequency band of 0-70 is of 4 peak of displacements. The significant point is that the maximum amount of displacement is exactly created in principle frequency places. As figures show maximum amounts are in frequencies of 10.431 and 24.588 which are exactly equal to principle frequencies amounts from modal analyses and it is a reason for accuracy of modal analyses.

Table 1. Ingredients and chemical analyses composition of the starter and grower diets

Ingredients (g/kg)	1-28	29-42
Maize	557	300
Wheat	--	330
Soybean meal	370	300
Soybean oil	30	40
Fish meal	20	--
Limestone	10	--
Oyster shell	--	12
Dicalciumphosphate	5	15
Vitamin-mineral mix[2]	5	5
dl-methionine	1	1
Sodium chloride	2	2
Vitamin E (mg/kg)		--
100		
Zn	--	50
Analyzed chemical composition (g/kg)		
Dry matter	892.2	893.5
Crude protein	222.3	200.7
Fat		62.4
62.9		
Fiber	36.1	35.6
Ash	61.7	57.0
Calcium	8.22	8.15
Phosphorus	5.48	5.57
Selenium (mg/kg)	0.53	0.58
ME by calculation (MJ/kg)	12.78	12.91

[1] starter diet fed to birds from 0 to 21 days. [2]Provides per kilogram of diet: vitamin A, 9,000 IU; vitamin D3, 2,000, IU; vitamin E, 18 IU; vitamin B1, 1.8 mg; vitamin B2, 6.6 mg B2,; vitamin B3, 10 mg; vitamin B5, 30 mg; vitamin B6, 3.0 mg; vitamin B9, 1 mg; vitamin B12, 1.5 mg; vitamin K3, 2 mg; vitamin H2, 0.01 mg; folic acid, 0.21 mg; nicotinic acid, 0.65 mg; biotin, 0.14 mg; choline chloride, 500 mg; Fe, 50 mg; Mn, 100 mg; Cu, 10 mg; Zn, 85 mg; I, 1 mg; Se, 0.2 mg.

3. Result and Discussion

The effects of different levels of Menta pulagum on performance of broilers are showed in Table 2.Using different levels Menta pulagum have significant effects on weight gain and feed conversion of broilers but there was not significant effect on feed intake.

The effects of different levels of Menta pulagum on carcass traits of broilers are in Table 3. Application of different levels of Menta pulagum significantly affected the carcass traits ($P<0.05$). The highest percent of liver was observed in group 5. There are 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. *Lee et al* (Lee, 2003) 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 secretary 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 Menta pulagum 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 thyme can reduce the harmful bacterial populations in the gastrointestinal tract and improve the levels of absorbed amino acids (Lee, Zargari, 2003,2001). The carvacrol in Menta pulagum has stimulatory effects on pancreatic secretions by increasing the secretions of digestive enzymes more amounts of nutrients like amino acids can be digested and absorbed from the digestive tract and thereby improve carcass traits. Else increasing the percents of gizzard and liver by positive effects via physically grinding and increasing bile secretion on nutrient digestion. With increased amounts of absorbed amino acids, organs like breast and thigh drawn more growth.

The effects of different levels of Menta pulagum in starter and grower feeds on blood biochemical and immunity parameters of broilers are summarized in Table 4 and 5.

The use of different levels of thyme did not have any significant effects on immunity parameters of broilers except Heterophils to Lymphocytes ratio. The mean values of serum constituents in broiler chicken fed different supplemented diets are shown in table 5.The serum total cholesterol, Triglycerides and LDL concentration were significantly reduced in group of 5 compared to the control group ($P < 0.05$). The concentration of serum HDL and Glucose were not significantly effects in compared to the control group.

The main reason of cholesterol and triglycerids decrease in blood of chicks is substances like carvacrol and tymol which are present in herbs. These substances have effect on cholesterol and triglyceride and decrease these harmful parameters in blood (Zargari, 2001). According to *Akiba* and *Matsumoto* high level of fibers can increase the excretion of bile and this can decrease the cholesterol level of blood (Lee, 2003). Since these plants have high level of fibers so this can one of other influences of carvacrol is on immune system, it can improve immune system of chickens. The rate of heterophile to lymphocyte is an important index in evaluating immune system, the higher rate of this ratio shows that immune system has been weakened and an increase in the body inflammation (Sturkie, 1995).

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Table 2: Effects of treatments on performance of broilers

Treatment	Weight gain (gram/day)	Feed Intake (gram/day)	Feed Conversion
T1	38.28 [a]	78.21 [a]	2.11 [a]
T2	37.62[a]	78.11 [a]	2.21 [a]
T3	39.32 [b]	79.29.5 [ab]	2.10 [b]
T4	39.15 [b]	81.62 [c]	2.16 [b]
T5	43.61[ab]	81.79[c]	2.28[b]

[a-c]Means with different subscripts in the same column differ significantly ($P < 0.05$)

Table 3. The effect of different levels of Menta pulagum on carcass traits of broilers

Parameters	T1	T2	Treatments T3	T4	T5	SEM
Abdominal Fat	3.77[a]	3.82[a]	3.52[a]	3.41[a]	3.43[a]	0.35
Gizzard	3.19[a]	3.20[a]	3.22[a]	3.36[a]	3.54[a]	0.29
Breast	32.08[b]	33.02[b]	34.63[ab]	34.45[ab]	35.20[ab]	0.76
Thigh	26[a]	25.48[a]	25.42[a]	28.63[ab]	27.37[ab]	0.52
Liver	3.07[a]	2.93[a]	3.25[a]	4.01[ab]	4.32[ab]	0.21

[a-c]Means with different subscripts in the same column differ significantly ($P < 0.05$)

Table 4: Effect of treatments on immunity system of broilers

Parameters	T1	T2	T3	T4	T5	SEM
Heterophils to Lymphocytes ratio	0.27	0.28	0.29	0.25	0.19[ab]	0.24
Globulin	1.46	1.64	1.44	1.52	1.69	0.44
Albumin	1.38	1.42	1.52	1.50	1.64	0.21

Blood Parameters	Parameters	T1	T2	Treatments T3	T5	SEM
Glucose (mg/dl)	Abdominal Fat	3.77[a]	3.82[a]	3.52[a]	3.43[a]	0.35
Cholesterol (mg/dl)	Gizzard	3.19[a]	3.20[a]	3.22[a]	3.54[a]	0.29
HDL	Liver	3.07[a]	2.93[a]	3.25[a]	4.32[ab]	0.21

[a-c]Means with different subscripts in the same column differ significantly ($P < 0.05$)

Table5. The effect of different levels of Menta pulagum on blood biochemical of broilers

Blood Parameters	T1	T2	Treatments T3	T4	T5	SEM
Glucose (mg/dl)	172.55[a]	170.89[a]	173.82[a]	174.19[a]	173.35[a]	18.29
Cholesterol (mg/dl)	135.35[b]	133.77[b]	133.82[b]	128.54[ab]	126.19[ab]	21.25
Triglyceride (mg/dl)	42.37[a]	40.69[a]	39.45[a]	36.22[b]	33.95[b]	4.21
LDL	33.19[a]	34.23[a]	32.96[a]	30.28[b]	30.25[b]	1.29
HDL	79.54[b]	79.21[b]	82.42[b]	82.89[b]	83.11[b]	1.61

[a-c]Means with different subscripts in the same column differ significantly (P < 0.05)

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