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# The effect of herbal plant (*thyme*) on performance and certain blood biochemicals of Japanese quails

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**ABSTRACT**

*This experiment was conducted to investigate the effects of thyme of medicinal plant on performance, carcass characteristics and blood biochemicalwere studiedinJapanese quails.In this experimentat first 300one week old japanese quails were divided to 5 groups and 3 replicates of 20 chicks in each group. Experimental groups included G1, control group with no thymesupplementation, G2, G3, G4, and G5 received 0.75% ,1%, 1.5%, and 2% Thymerespectively. The results showed that the use of different levels of Thymehas significant effects on performance and carcass traits (P<0.05). The highest level of average daily gain, spleen and liver were in group 5 but the greatest percent of gizzard was observed in group 4.Also the serum total cholesterol and triglycerides concentration were significantly reduced in groups of 4 and 5 compared to the control group (P<0.05). The results evidence that the using of thyme in Japanis guils have significantly effects on performance and blood biochemical and carcass traits.*

**Keywords:** Blood parameter, Japanese quails, Performance, Thyme

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## INTRODUCTION

Antibiotics are growth promoters with high rate of usage in the poultry industry, they improve growth and the yield of feed. But since the society concerns about antibiotical resistance and the possibility of transferring some of these antibiotics to the human by using these chicks, there are some banns in the usage of these growth promoters. Since then the scientists are trying to find alternatives, and one the best options is herbs and their drivens. 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 phytogenics are used to improve the performance (Lenstra,1981; Mansoub,2010). 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(Helander et al.,1998). Moreover, structural properties, such as the presence of the functional groups (Farag et al.,1989) and aromaticity(Bowles and Miller,1993) are also responsible for the antibacterial activity of essential oils.

Unfortunately, over use of these products ended up with a lot of problems both for animals and costumers, for example, bacterial resistance to antimicrobal agents (Javed et al.,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;Mansoub2011a). 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 (Lee et al.,2004; Guler et al.,2006;Mansoub,2011b). 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(Firtz et al.,1993). Herbs have been used for some disease since long time ago because of availability, easy usage, non side effects.They also exert certain immunological consequences in bird's body kong et al.,2006). Lots of studies on phytogenic compounds of plants essential oils have beenperformed while there are limited evidences about the effect of herbal solid forms on live birds health and performance. Easy and practical application, availability and less cost are known as advantages of the whole herbs application in compare to extracted or essential oil forms. In the other hand, a synergistic effect of phytogenic compounds have been reported in studies with essential oils (Mitsch,2004). In this experiment we tried to investigate effects of different level of Thyme on performance, blood chemistry.

## MATERIAL AND METHODS

In this experiment at first 300 one week old japanese quails were divided to 5 groups and 3 replicates of 20 chicks in each group. Experimental groups included G1, control group with no thymesupplementation, G2, G3, G4,and G5 received 0.75% ,1%, 1.5%, and 2% Thymerespectively. 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 42$^{th}$ day of experiment.

**Table 1. Ingredients and chemical analyses composition of diets**

| | |
|---|---|
| **Ingredients (g/kg)** | |
| **Corn 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 $D_3$ – 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-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*

## RESULTS AND DISCUSSION

The effects of different levels of thyme on performance of Japanese quails s are showed in Table 2.Using different levels thyme has significant effects on weight gain and feed conversion of Japanese quails but therewas not significant effect on feed intake*Toghyani and Tohidi*, (2010) reported that the low dosage (5g/Kg) of Thyme have significant effect onaverage daily gain and their feed conversio ratio, while the high dosage (10g/Kg) in did not show this effect. *Najafi et al.*(2010) reported that the group which fed by thyme-included diet had significantly

better body weight and feed conversion ratio, . But *Tekeli et al.*(2006) and *Demir et al.*(2008) reported opposite results; they found that thyme has no influence on broilers performance.

The effects of different levels of Thymeon carcass traits of Japanese quails are in Table 3.Application of different levels of Thyme significantly affected the carcass traits (P<0.05). The highest percent of liver was observed in group 5.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.They are reported to stimulate secretion of digestive enzymes (lipase and amylase) and intestinal mucous in broilers, to stimulate feed digestion, to impair adhesion of pathogens and to stabilize microbial balance in the gut(Lee et al.,2003;Mansoub,2011c).

The effects of different levels of Thyme in starter and grower feeds on blood biochemical are summarized in Table 4.The serum total cholesterol and triglycerides concentration were significantly reduced in groups of 4 and 5 compared to the control group (P<0.05).

Theconcentration of serum glucose were not significantly effects in compared to the control group. The main reason of cholesterol and triglycerids and cholestrol 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). *Al-Kassie* [14] reported a big statistically difference in blood cholestrol level compar to control group. According to *Akiba* and *Matsumoto* (1982) high level of fibers can increase the excretion of bile and this can decrease the cholesterol level of blood. *Al-Kassie*(2009) reported a big statistically difference in blood cholestrol level compare to control group.

**Table 2: Effect of different level of thyme on performance of Japanese quails.**

| Treatments | G1 | G2 | G3 | G4 | G5 | SEM |
|---|---|---|---|---|---|---|
| **Feed conversion ratio** | 3.25$^{a}$ | 3.17$^{a}$ | 3.32$^{a}$ | 3.47$^{ab}$ | 3.41$^{ab}$ | 0.21 |
| **Feed intake (g/day)** | 12.11 | 12.16 | 12.15 | 12.19 | 12.20 | 0.98 |
| **Average daily gain (g/day)** | 3.97$^{a}$ | 4.11$^{ab}$ | 4.16$^{a}$ | 4.26$^{ab}$ | 4.29$^{ab}$ | 0.29 |

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

**Table3: Effect of different level of thyme on carcass of Japanese quails**

| Characters (%) | G1 | G2 | G3 | G4 | G5 | SEM |
|---|---|---|---|---|---|---|
| **Carcass percentage** | $^{a}$77.10 | 77.44$^{a}$ | 78.52$^{a}$ | $^{ab}$79.97 | 79.11$^{ab}$ | 2/97 |
| **Spleen** | 2.23$^{a}$ | 2.28$^{a}$ | 2.32$^{a}$ | 2.89$^{ab}$ | 2.99$^{ab}$ | 0.12 |
| **Liver** | 2.30$^{a}$ | 2.47$^{ab}$ | 2.94$^{a}$ | 2.90$^{ab}$ | 2.98$^{ab}$ | 0.19 |
| **Gizzard** | 7.28$^{a}$ | 7.31$^{a}$ | 7.37$^{ab}$ | 7.90$^{ab}$ | 7.86 | 0.23 |

*a-bMeans 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 | G1 | G2 | G3 | G4 | G5 | SEM |
|---|---|---|---|---|---|---|
| Glucose (mmol/L) | 122.10 | 121.36 | 122.11 | 121.60 | 123.31 | 5.31 |
| Cholesterol (mg/dl) | 115.43$^{a}$ | 113.13$^{a}$ | 111.39$^{a}$ | 107.39$^{ab}$ | 106.39$^{ab}$ | 3.22 |
| Triglyceride (mmol/L) | 117.23$^{a}$ | 116.53$^{a}$ | 110.11$^{a}$ | 108.21$^{ab}$ | 107.21$^{ab}$ | 2.61 |

*a-b Means with different subscripts in the same column differ significantly.*

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