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ORIGINAL ARTICLE

Comparison of Effects of Using Thyme and Probiotic on Performance and Serum Composition of Broiler Chickens

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ABSTRACT

This experiment was conducted to evaluate the effects of thyme and Probiotic on performance and serum composition of broiler chickens. In this study that started 1 day following until 42 days there are three treatments, at first 225 one day old broiler chicks were divided to 15 groups of 15 chicks each. Each 3 groups randomly assigned to one of the 3 treatments. Experimental groups included T1, control group, T2, basal diet containing 1% probiotic (*L. acidophilus* and *L. casei*) 1-28, T3, received 1 gr/Kg Thyme powder. As compared to the control group with the other groups observably to give improve gain in all of the experimental ($P < 0.05$). According to the results, total cholesterol (Chol), triglyceride (TG), HDL, and LDL were measured in blood samples of day 42. The amount of total Chol and triglyceride (TG) in the serum did showed a significant differences, but HDL was not significantly different among groups.

Key words: cholesterol, broiler, Thyme, Probiotic, broiler

Introduction

It is conceivable that herbal agents could serve as safe alternatives to antibiotic growth promoters due to their suitability and preference of the broiler meat consumers, reduced risks and minimal health hazards. 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 [1,2]. Nowadays, 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 [2,3].

Thyme (*Thymus vulgaris*) is a member of *Lamiaceae* family, with the main components of Phenols, thymol (40%) and carvacrol (15%) [4]. This herbs, also used traditionally for several medicinal purposes: respiratory disease, anti microbial, antinociceptive and etc [4]. Thymol and carvacrol are

the main antibacterial active substances, so this plant can be used instead of commercial antibiotics. The beneficial value of thyme in poultry industry has been reported [5].

To date, probiotics are one of major food supplements for poultry industry. According to concerns about cholesterol, there are a lot of attempts to produce foods with low cholesterol. It has been reported that *L. acidophilus* can absorb cholesterol from *in vitro* system, and this phenomenon can decrease the cholesterol level of medium [6,7]. There are many reports that probiotics can reduce the cholesterol level of blood in broiler chickens [8,9]. Panda *et al.* [10] reported that probiotics cause the reduction of serum and yolk cholesterol and also increase of egg production.

Probiotics prescription is a good alternative for antibiotics for several reasons: suitable function, nonexistence of residue in poultry productions, environmental protection and also prohibition of antibiotics usage in Europe union [11,12].

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The objective of this study was to investigate the interaction effects of supplementation of probiotic (*L. acidophilus* and *L. casei*) and Thyme (*Thymus vulgaris*) on the performance and blood chemistry of broiler chickens under commercial conditions.

Material and method

In this experiment that started 1 day following until 42 days that there are three treatments, at first 225 one day old broiler chicks were divided to 15 groups of 15 chicks each. Each 3 groups randomly assigned to one of the 3 treatments. Thus, amounts forementioned to basal diet was formulated according to table 1 Experimental groups included T1. Control group, T2. basal diet containing 1% probiotic (*L. acidophilus* and *L. casei*) 1-28, T3. Using powder form of 1 gr/Kg Thyme.

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[13] (Statistical Analyses Software) in the statistical level of 5% according to data gathered from dietary, average of FCR, weight of rearing period and carcass yield.

Measurement of Serum Indices:

On 42 day of experimental period, 3 ml of blood was collected from brachial vein from one bird of each pen (from four birds of each treatment). Serum was isolated by centrifugation at 3,000×g for 10 min. The serum concentrations of total triglyceride, cholesterol, high density lipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) ratio in serum samples were analyzed by an automatic biochemical analyzer (Clima, Ral. Co, Spain). VLDL cholesterol was calculated from triglycerides by divided the factor 5 [14].

Result and Discussion

Table 2 shows the effect of different dietary on performance of boiler chickens. According to comparisons of this table it has been proven that three-way interaction between dietary treatments were observed for Dietary ($P < 0.05$) Average of feed conversion Ratio (FCR) ($P < 0.01$) and Average of Weight ($P < 0.05$) in the experiment. The result showed that both the treatments have better final result in compare with control treatment.

Toghyani *et al* [15] reported that the low dosage (5g/Kg) of Thyme have significant effect on broiler body weight and their feed conversion ratio, while the high dosage (10g/Kg) in did not show this effect. Najafi *et al.* [16] reported that the group which fed by thyme-included diet had significantly better body weight and feed conversion ratio. But Tekeli *et al* [17] and Demir *et al* [5] reported opposite results ; they found that thyme has no influence on broilers performance.

The results of this study were expected about feed probiotic conversion ratio in control group. Endens *et al.* [18] reported that probiotics improved digestion, absorption and availability of nutrition accompanying with a positive effect on intestine activity and increasing digestive enzymes.

The mean values of serum constituents in broiler chicken fed different supplemented diets are shown in table 3. The serum total cholesterol and Triglycerides concentration were significantly reduced by dietary with thyme compared to the control group. ($P < 0.05$).

The concentration of serum HDL and LDL were not significantly reduce in group T3 compared to the control group.

Our results about cholesterol were against some of studies [19]; some of researchers found no diminishing effect for Thyme. But, on the other hand, the results of Al-Kassie [20] and agree with ours. Also Al-Kassie [20] reported a big statistically difference in blood cholesterol level compar to control group.

HDL concentration did not changed in Najafi and torki 's [16] study by Thyme, Toghyani *et al.* [15] had similar results about LDL but they found that high amount of Thyme (10 g/Kg) can increase the HDL concentration.

The cholesterol level of serum significantly decreased in groups supplemented with probiotics in compared to control group (Table 3). There are many reports that are in agreement with presented results in the current study. *L. acidophilus* is capable to deconjugate glycocholic and taurocholic acids under anaerobic condition. Deconjugation of gallbladder acids in small intestine can affects control of serum cholesterol, while deconjugated acids are not capable to solve and absorb fatty acids as conjugated acids. As a consequence, they prevent from absorption of cholesterol. Also free gallbladder acids attach to bacteria and fibres and this can increase the excretion of them [21].

There is a significant decrease in the serum level of triglycerides between control group and groups treated with *L. acidophilus* and *L. casei* supplemented in male broiler diet in combination with water or alone. Moharrery *et al.* [22] reported that fat digestion rate is linked to rate of gallbladder acids in digestion latex, and subsequently the

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
Dicalcium phosphate	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. ²Provides 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.

Table 2: The effect of different treatments on the performance of broiler chicks during days 0-42.

Experiment Treatments ¹	Dietary (G)	Average of FCR	Average of Weight
T1	87.5 ^a	1.83 ^a	1990.2 ^a
T2	80.7 ^b	1.41 ^b	2361.3 ^b
T3	85.2 ^a	148 ^b	2191.5 ^c
SE	0.98	0.04	39.7
P-value	0.04	0.003	0.02

a-c Means with in columns with different superscript differ significantly

Table 3: Effect of different treatments supplementation on serum constituents of broiler chicken.

Experiment Treatments ¹	Total cholestrol	HDL	LDL	Triglycerides
T1	172.5 ^a	57.23	78.12 ^a	154.71 ^a
T2	131 ^{ab}	60.12	44.22 ^{ab}	122.56 ^b
T3	115 ^c	65.65	71.12 ^a	124.85 ^b
SE	5.3	3.21	5.01	14.06
P-value	0.004	0.2	0.001	0.03

Means with in columns with different superscript differ significantly

lipidconcentration. *L. acidophilus* and *L. casei* in diet or water cause a decrease in gallbladder acids in digestion latex and this resulted in a reduction in ability of fat digestion and therefore decreasing lipid level of blood[22].

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