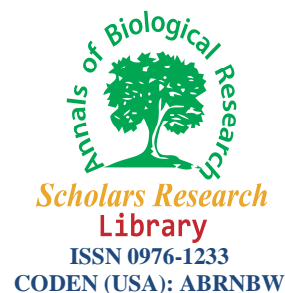




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Effect of different level of Alfalfa extract on performance, Egg Quality and some Blood parameters of Laying Hens

Navid Hosseini Mansoub

Department of Animal Science, Islamic Azad University, Maragheh Branch, Iran

ABSTRACT

Four feeding trials were conducted to investigate the effects of using different levels of alfalfa extract on performance, egg quality, blood biochemical and immunity parameters of laying hens. This study was carried out with 500 of Hy-line (W36) hens in 4 treatment groups and 5 repetitions and 25 hens for each group. The groups were follow:

E1) First group as control group did not receive any herbal plant oil, E2) E3) and E4) 100 ppm, 150 ppm and 200 ppm of alfalfa extract respectively.

The highest percent of production percent and Mass production were in group 4 but the best result for FCR was in the E3. The highest level for special weight and yolk index were in E4 also the shell weight were increase in E3. Also the serum total cholesterol and Triglycerides concentration were significantly reduced in group of 4 compared to the control group ($P < 0.05$). But the concentration of serum HDL and LDL were not significantly reduce in groups compared to the control group. But did not show significantly change on the immune system of laying hens.

Key words: Alfalfa, Laying Hens, Blood parameters, Egg quality.

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]. 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 [3]. Because of this problem, there have been made some restricted rules about the usage

of these antibiotics, like ban and low use of them [4]. There are a lot of reports indicating the positive effects of herbs like anti-coccidial, 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 [5]. Herbs have been used for some disease since long time ago because of availability, easy usage, non side effects. There are a lot of reports indicating the positive effects of herbs like anti-coccidial, 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 [6]. 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]. There are a lot of evidences about the benefits of herbs on hens and chickens. Ghasemi *et al.* [7] reported that 0.2% of Thyme and Garlic in the diet of laying hens improves the yolk index and increases the lymphocytes rate of their blood. Eseceland Kahraman [8] found out that the oil of several plants could optimize the yolk index and the weight and thickness of shell. Mitschet *et al.* [9] showed that usage of herbs in the diet of laying hens decrease the bacterial colony in their intestine. Cabuk *et al.* [10] proved that Thymol and Carvacrol can improve the digestion of nutrients.

According to the results, alfalfa has significantly effect on performance, quality of eggs, some blood parameters and immunity parameters of laying hens.

MATERIALS AND METHODS

This study was carried out with 500 of Hy-line (W36) hens in 4 treatment groups and 5 repetitions and 25 hens for each group. The groups were follow:

E1) First group as control group did not receive any herbal plant oil, E2) E3) and E4) 100 ppm, 150 ppm and 200 ppm of alfalfa extract respectively.

The hens were 65 to 75 weeks old and basal diet were based on corn – soybean meal considering the necessary nutrients were recommended by (table 1).

Three hens were chosen from each group and inoculated from brachial vein 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 brachial vein of three randomly chosen chicks from each group in the 49th day of experiment.

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

The amounts of intake food, egg production, egg mass and feed conversion were measured weekly. At the end of experiment, 5 eggs from each repetition were randomly chosen and weighted, and their mass was determined by sinking them into the water and salt soluble with different concentrations.

The height meter which were used in order to measure the height of concentrated white. The shells were weighted by weighing machine which had 0.01g accuracy. The thickness of the shell was measured by micrometer with the accuracy of 0.001mm in the middle and 3 points of egg shell and the average was considered as the shell thickness. This process was taken on each 5 eggs and the averages of them were considered as the final result for each group. The strength of the shell was determined by the mg weight of shell to every cm of the surface of it.

Table 1- Ingredients and chemical analyses composition of groups

| Ingredients | (%) |
|--|-------|
| Com | 45.25 |
| Wheat middling | 16.36 |
| Wheat grain | 12.49 |
| Soybean meal | 18.20 |
| Soybean oil | 0 |
| Limestone | 0.2 |
| Oyster shell | 6.2 |
| Dicalcium phosphate | 0.5 |
| Vitamin-mineral mix ¹ | 0.5 |
| dl-methionine | 0.1 |
| Sodium chloride | 0.2 |
| Analyzed chemical composition (%) | |
| Dry matter | 90.1 |
| Crude protein | 15.1 |
| Fat | 5.9 |
| Fiber | 4.1 |
| Ash | 6.1 |
| Calcium | 0.8 |
| Phosphorus | 0.6 |
| ME by calculation (MJ/kg) | 13.01 |

¹Provides 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.²T2=1%, T3=1.5%, and T4 =2% thyme powder

RESULTS 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 the highest percent of production percent and mass production were in group 4 but the best result for FCR was in the E3. 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*[11] 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. The quality of eggs significantly affected by alfalfa. ($P < 0.05$) (Table 3). The highest level for special weight and yolk index were in E4 also the shell weight were increase in E3. Increase in these parameters with the alfalfa could have been due to its antibacterial and antifungal effects which can lead to decrease in the amount harmful microbes of digestive system, improve their immunity and performance. This is possible that it is result of synergetic influence of effective

substances in increasing antimicrobial activity. 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. The present of antioxidants and phenolic substance in liquorice root 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 liquorice root can reduce the harmful bacterial populations in the gastrointestinal tract and improve the levels of absorbed amino acids [11-12]. The enhance in the yolk index is related to stability of yellow pigments in the membrane of the yolk among the lipid molecules, the antioxidants can prevent these molecules from oxidative stress [13]. There can be another scenario too, some carotenoids in these plants like xanthophylls transferred to the yolk and increase it's yellowish, as this item is related to the compounds of diet like corn and wheat. Farkhoy, M. *et al.*[14] indicated that by depositing pigments of plants into the yolk, this makes them more colorful.

Table 2: The effect of different levels of alfalfa on egg quality characters of laying hens

| Treatments | FCR | Intake food(gr) | Mass production(gr) | Production percent | Egg's weight(gr) |
|------------|--------------------|-----------------|---------------------|---------------------|------------------|
| E1 | 3.26 ^a | 103.21 | 31.36 ^a | 52.97 ^a | 60.23 |
| E2 | 3.18 ^a | 104.19 | 31.98 ^a | 52.99 ^a | 60.26 |
| E3 | 2.97 ^{ab} | 106.54 | 32.01 ^a | 53.12 ^{ab} | 60.39 |
| E4 | 3.10 ^{ab} | 105.98 | 32.96 ^{ab} | 53.19 ^{ab} | 60.42 |
| SEM | 0.19 | 5.23 | 1.23 | 1.76 | 1.28 |

^{a-c}Means with different subscripts in the same row differ significantly ($P < 0.05$)

Table 3: The effect of different levels of alfalfa on eggs quality characters of laying hens

| Treatments | Weight of each mg of shell | Shell Thickness (mm) | Yolk weight (gr) | White weight (gr) | Shell weight (gr) | Yolk index (%) | Special weight (mg/cm ²) |
|------------|----------------------------|----------------------|------------------|-------------------|--------------------|---------------------|--------------------------------------|
| E1 | 84 | 0.34 | 21.23 | 36.45 | 6.12 ^a | ^a 40/35 | ^{bc} 1/11 |
| E2 | 84 | 0.35 | 20.98 | 36.68 | 6.23 ^a | ^a 41/01 | ^{bc} 1/09 |
| E3 | 85 | 0.36 | 21.56 | 36.99 | 6.91 ^{ab} | ^a 78b43 | ^{ab} 1/30 |
| E4 | 86 | 0.35 | 21.98 | 37.02 | 6.89 ^{ab} | ^{ab} 43/99 | ^{ab} 1/38 |
| SEM | 2 | 0.02 | 0.98 | 0.95 | | 0/96 | 0/002 |

^{a-c}Means with different subscripts in the same row differ significantly ($P < 0.05$)

Table 4. The effect of different levels of thyme on blood biochemical of hens

| Blood Parameters | Treatments | | | | SEM |
|----------------------|---------------------|---------------------|----------------------|----------------------|-------|
| | E1 | E2 | E3 | E4 | |
| Glucose (mg/dl) | 176.26 | 175.23 | 175.11 | 178.13 | 4.23 |
| Cholesterol (mg/dl) | 136.36 ^a | 133.19 ^a | 130.48 ^{ab} | 129.89 ^{ab} | 5.63 |
| Triglyceride (mg/dl) | 46.56 ^a | 45.69 ^a | 43.36 ^{ab} | 43.16 ^{ab} | 11.26 |
| LDL | 34.63 ^a | 33.23 ^a | 34.06 ^a | 33.18 ^a | 1.55 |
| HDL | 85.12 ^a | 84.15 ^a | 83.10 ^a | 84.36 ^a | 2.19 |

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

The results evidence that the using of alfalfa extract in lying hens have significantly effects on blood biochemical. The serum total cholesterol and Triglycerides concentration were

significantly reduced in group of 4 compared to the control group ($P < 0.05$). But the concentration of serum HDL and LDL were not significantly reduce in groups compared to the control group (table 4). Also did not show significantly effects on the immune system of laying hens (table 5).

Table 5: Effect of different levels of alfalfa on immunity system of hens

| Parameters | Treatments | | | | SEM |
|----------------------------------|------------|------|------|------|------|
| | E1 | E2 | E3 | E4 | |
| Heterophils to Lymphocytes ratio | 0.26 | 0.27 | 0.28 | 0.29 | 0.04 |
| Globulin | 1.40 | 1.51 | 1.52 | 1.55 | 0.11 |
| Albumin | 1.56 | 1.57 | 1.55 | 1.59 | 0.19 |

^{a-c}Means with different subscripts in the same row differ significantly ($P < 0.05$)

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