



USE OF MELISSA LEAVES WATER EXTRACT AS A NATURAL ANTIBIOTIC ON SOME IMMUNOLOGICAL AND BLOOD TRAITS OF BROILERS

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Abstract

The study was carried out in farm poultry of research station in College of Agriculture in Al-Muthanna University, A total 240 chicks, one day old of broiler chickens Ross308 were used, were randomly distributed to four treatments by 60 chicks per treatment with three replicates (20 chicks per replicate). The Melissa leaves water extract treatments were added 0, 2, 4 and 6 ml per 1 liter of drinking water of broilers. The results showed that the existence of a significant improvement ($p \leq 0.05$) on some immunity traits (Enzyme Linked Immunosorbent Assay (ELISA), Delayed type hypersensitivity test (DTH), Relative weight and Bursa Index) and Blood traits (Packed Cell Volume (PCV), Hemoglobin (Hb), Concentration of glucose, cholesterol and triglycerides) in all The Melissa leaves water extract treatments compare with control treatment. There were no significant differences between T2 and T3 in all studied traits.

Keywords: Melissa leaves, water extract, natural antibiotic, immunological, blood traits, broilers

Introduction

The poultry industry is an important contributor to human consumption, global demand has increased, necessitating the need for improved breeds, for high productivity (Allen and Fetterer, 2002). Broilers with high weights when marketed because of continuous genetic improvement on breeds, cause of decreased immunity and resistance to various diseases (Hosseinzadeh and Moghaddam, 2014). Intensive use of antibiotics had increased the resistance of pathogenic microorganisms to antibiotics, needed to go towards medicinal plants (Naemasa *et al.*, 2015), Medical plants are a source of important sources of medicinal drugs, containing effective substances such as turbinos, saponins and flavones (Tipu, 2006), enhancing the effectiveness of internal organs such as liver and pancreas and improving immune status (Rahman and Lowe, 2006), they were antifungal, antifungal, and antioxidant (Saeed and Tariq, 2007). Medicinal plants as nutritional supplements improve the growth parameters of broilers such as the final weight, the daily weight gain and the feed conversion (Dala and Shayboun, 2014). Melissa officinalis herbaceous leaves to mullet, evergreen, naturally grows in wetlands and near from water sources, Melissa is an important drug in the treatment of many diseases, as an antibacterial agent and has other antimicrobial efficacy in its aromatic oil, it can be used as an alternative drug for chemical antibiotics (Nasiruddin, 2015). The present study aimed to demonstrate the effect of the use of water extract of melissa leaves on some immunological and blood characteristics of broilers.

Material and Methods

This experiment was carried out at the Agricultural Research and Experimentation Station, Faculty of Agriculture, Al-Muthanna University for the period from 2/12/2018 to 6/1/2019. A total of 240 Ross 308 broilers, one-day age, 40 g weighted, were randomly distributed to four experimental treatments with 60 broilers per treatment, three replicates per treatment (20 chick / replicate), treatments as follows: T1 (control treatment without any addition). T2: add water extract of Melissa leaves at 2 ml/liter of drinking water. T3: add water extract of Melissa leaves at 4ml /liter of drinking water. T4: add water extract of Melissa leaves at 6ml /liter of drinking water. The birds were reared inside a hall measuring 40 mx 10 m, Placed in four-storey batteries and each floor containing a cage of 1.5 x 1 m.

The Melissa leaves were brought from local markets in Al-Diwaniya province, the water extract was prepared by placing 1 kg of dried leaves in 10 liters of distilled water and boiled over low heat (60° C) for 60 minutes and then filtered to be ready liquid (Hernandes *et al.*, 1994). The immunological studied characteristics were Enzyme Linked Immunosorbent Assay (ELISA) (Voller *et al.*, 1977), Delayed type hypersensitivity test (DTH) (Ahmed and Blose, 1983), Relative weight and Bursa Index (Cazaban and Gardin, 2012). The biochemical characteristics of blood were Packed Cell Volume (PCV) (Archer, 1965), Hemoglobin (Hb) (Varley *et al.*, 1980), Concentration of glucose (Barham and Trinder, 1972), cholesterol (Richard and Francis, 1973) and triglycerides (Fossati and Prencipe, 1982) in blood plasma. Completely Randomized Design (CRD) was used to study the effect of different coefficients on

the studied traits, comparison of the mean differences between the means of the Duncan (1955) multiples test under a significant level of 0.05 and 0.01, SAS (2001) was used in statistical analysis.

Results and Discussions

Immune response

Table 1 shows the effect of the use of water extract of Melissa leaves in the immuneresponse of broilers,

Table 1 : Effect of water extract of Melissa leaves in the immune response of broilers \pm standard error.

| Treatments | DTH | ELISA | Relative weight of Bursa | Bursa index |
|------------|--------------------|--------------------|--------------------------|--------------------|
| T1 | c0.001 \pm 0.141 | c8.25 \pm 2261.3 | c0.001 \pm 0.036 | c0.000 \pm 1.000 |
| T2 | b0.001 \pm 0.154 | b4.63 \pm 2319.3 | b0.002 \pm 0.048 | b0.055 \pm 1.340 |
| T3 | b0.001 \pm 0.159 | b3.05 \pm 2335.0 | b0.001 \pm 0.051 | b0.031 \pm 1.405 |
| T4 | a0.002 \pm 0.170 | a2.72 \pm 2393.3 | a0.001 \pm 0.067 | a0.024 \pm 1.864 |
| Sig. | * | * | * | * |

T1 :(control). **T2**: add water extract of Melissa leaves at 2 ml/liter of drinking water. **T3**: add water extract of Melissa leaves at 4ml /liter of drinking water. **T4**: add water extract of Melissa leaves at 6ml /liter of drinking water. **N.S** no significant differences.*The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

All of the added water extracts gave the best immune performance compared to control treatment, this improvement in immunological properties may be due to tannins that have anti-microbial activity (Drozdz and Anuszewska, 2003), As well as the presence of a large number of anti-oxidant compounds and these polyphenols compounds (Sentkowska *et al.*, 2005), which have an important role in increasing the effectiveness of the immune system by raising the number of antibodies against pathogens, which supports the digestive system (Allahverdiyev *et al.*, 2013). Saponins work to support the immune system, As it is based on increasing stimulation against antigens to be a series of lymphocytes of T-type lymphocytes, These cells produce the so-called lymphokines (Joukas *et al.*, 2014).

noting that significantly superiority ($P\leq 0.05$) in T4 compare with the other treatments in cellular immunity (DTH), ELISA, relative weight of Bursa and Bursa index, Significant increase ($P\leq 0.05$) in T2 and T3 compare with the control treatment, while there were no significant differences between the second and third treatments of the same traits.

Blood Traits

Table 2 shows the effect of Melissa leaves water extract in the blood characteristics of broilers, T4 showed a significant superiority ($P\leq 0.05$) in the Packed Cell volume and hemoglobin concentration compared to the rest of the experimental treatments, while no significant differences between T2 and T3, which also exceeded the significant superiority ($P\leq 0.05$) on the control treatment. As for the concentration of glucose, cholesterol and triglycerides, a significant increase ($P\leq 0.05$) was observed in the first treatment (control) compared with other treatments, There was no significant difference between all water extracts for Melissa leaves.

Table 2 : Effect of water extract of Melissa leaves in the blood traits of broilers \pm standard error.

| Treatments | PCV (%) | Hemoglobin (g/100 ml) | Glucose (mg/100 ml) | Cholesterol (mg/100 ml) | Triglycerides (mg/100 ml) |
|------------|-------------------|-----------------------|---------------------|-------------------------|---------------------------|
| T1 | 0.45 \pm 31.60c | 0.219 \pm 11.55c | 0.13 \pm 179.91a | 0.12 \pm 142.79a | 0.17 \pm 141.58a |
| T2 | 0.18 \pm 35.79b | 0.056 \pm 12.93b | 0.94 \pm 172.27b | 0.36 \pm 137.85b | 0.26 \pm 137.41b |
| T3 | 0.18 \pm 35.82b | 0.058 \pm 13.05b | 0.93 \pm 172.21b | 0.37 \pm 137.80b | 0.27 \pm 137.29b |
| T4 | 0.17 \pm 36.74a | 0.069 \pm 13.66a | 1.26 \pm 171.11b | 0.27 \pm 137.14b | 0.35 \pm 137.00b |
| Sig. | * | * | * | * | * |

T1 :(control). **T2**: add water extract of Melissa leaves at 2 ml/liter of drinking water. **T3**: add water extract of Melissa leaves at 4ml /liter of drinking water. **T4**: add water extract of Melissa leaves at 6ml /liter of drinking water. **N.S** no significant differences.*The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

This may be due to the role of the Melissa leaf extract in increasing the number of red blood cells, through its antioxidant effect, which act to protect the membrane of red blood cells from free radicals, thus prevent its degradation, this in turn leads to an increase in the size of the blood cells and the concentration of

hemoglobin in the blood (Franco *et al.*, 2018). Lower blood sugar level may be due to increased insulin secretion, which pull sugar molecules from the blood into the cells of the body for consumption in sustaining vital activities of the body, It also increases the concentration of serotonin and melatonin in

the blood and this leads to lower blood sugar level (Chung *et al.*, 2010). Melissa leaves stimulate the thyroid gland, which is one of the most important glands for cholesterol metabolism, because their hormones increase the formation of cholesterol, which stores in the liver and put in the bile, increasing the activity of the gland leads to a decrease in the concentration of cholesterol and triglycerides in the blood (Satini *et al.*, 2003)

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