



Research Article

## Investigation of the Effects of Some Herbal Extremely Serum Uric Acid Level Added in Drinking Waters in Broiler under Heat Stress

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### Abstract

**Objective:** Uric acid is the last product of purine metabolism and a protective antioxidant against the oxidative stress. The clinical picture is an important diagnostic parameter, serum uric acid; gut disease, hypertension, metabolic syndrome, stroke, kidney and cardiovascular disease. On the other hand, with changes in protein and amino acid metabolism of living beings exposed to heat stress, protein degradation increases rapidly and serum uric acid levels increase. This study was undertaken to investigate the effects of *Eucalyptus glabatus labii* (eucalyptus), *Tymus vulgaris* (thyme), *Cymbopogon nardus* (lemon grass) and *Syzygium aromaticum* (clove) plants, which were added at different doses to the drinking water of broilers under temperature stress, (EOM) on the serum uric acid level.

**Materials and methods:** In this study, Ross-308 male broiler chicks were used as animal material for 400 days. In each group, there will be 50 animals, and 8 different groups will be grouped as 10 in each segment. The study lasted for 42 days by dividing into 5 subgroups to be applied to 22°C stressed and 36°C stressed groups (control, EOM (essential oil mixture) -250, EOM-500, EOM-750. At the end of the trial, 10 animals randomly selected from each group after the application of 80 animals cervical dislocation methods, the level of uric acid in blood serum samples was examined.

**Findings:** The serum uric acid levels in the experimental groups were 8.04, 11.84, 7.92, 7.96 mg/dl at 22°C and 7.42, 4.66, 12.30, 8.76 mg/dl respectively in the broiler group at 36°C stress.

**Results:** In the study, EOM-250 ml/1000 doses of EOM-500 ml/1000 It doses of EOM-500 ml/1000 It doses were increased in stressed groups at 36°C while the addition of EOM was not statistically different at different doses to drinking water at 22°C stress ( $p < 0.05$ ).

### Keywords

Serum uric acid; Plant extract; Heat stress; Broiler

### Introduction

Uric acid is the end product of the metabolism of purines as a result of catabolism of nuclear material. Uric acid endogenous in the body (liver, muscle, incebağırsaklar, kidney vascular endothelial cells,

especially muscle cells, nucleic acid conversion) and exogenous (foods may be sourced [1]. There is an antioxidant and proinflammatory effect mechanism [2]. Potential physiological protection activity against oxidative damage occurs when the urea acts as an extracellular and intracellular protection mechanism and reacts with oh molecule [3].

The normal level of uric acid is a positive molecule for our body. High levels of uric acid in the body, as well as high levels of serum uric acid in the blood, leading to significant health problems (gout, hypertension, kidney and cardiovascular diseases) [2]. It is therefore important to note that serum uric acid level is a prognostic factor in the monitoring and treatment of diseases. High levels of protein in the body, stress (psychological and physical), some drugs, parathyroid hormone height, polycythemia and long-lasting hunger affect factors such as [4,5].

Stress is an important factor in changing biochemical parameters (Daneshyar et al.). Temperature stress leads to physiological, hormonal, behavioral and molecular changes in poultry [6], slowing growth, increasing mortality rate, increasing immune system suppression [7], leading to significant economic and physiological problems due to these effects. In order to reduce the negative effects of stress on poultry, there are research on the addition of additives and plant extracts that contain antioxidant compounds to their feed or water.

The aim of this study was to investigate the effect of the essential fatty acid mixture (EOM) of plants, *Eucalyptus glabatus labii* (eucalyptus), *Tymus vulgaris* (Thyme), *Cymbopogon nardus* (Lemon grass) and *Syzygium aromaticum* (clove), which are fed under temperature stress and added to drinking water of broiler.

### Uric Acid

Uric acid is a weak acid with 5.8 PKA in the physiologic ph in a heterocyclic structure (Figure 1), The final product of purine catabolism in the body. The formula  $C_5H_4N_4O_3$  (7.9-dihydro-1H-purine-2,6,8 (3H)- trione) and has a molecular weight of 168 Dalton [8]. In the body, uric acid endogenous (liver, muscle, incebağırsaklar, kidney vascular endothelial) and exogenous (foods) may be sourced [1].

Uric acid has antioxidant properties and is an effective extracellular radical inhibitor [9]. In addition, uric acid also stimulates endothelium granulocytes to adhere to the endothelium and release free radicals of peroxide and superoxide. In this study, we aimed to investigate the relationship between serum uric acid levels and serum uric acid levels in patients with acute myocardial infarction (mi). If the serum uric acid concentration is higher than 7.0 mg/dl, it is called Hyperuricemia and crystallizes if the uric acid level is higher than 6.8 mg/dl [8]. Uric acid is associated with gout, disease, hypertension, cardiovascular, kidney damage [2]. The main nitrogenous end products in living organisms are ammonia, urea and uric acid. In this study, we aimed to investigate the effect of uric acid on serum uric acid levels in patients with acute myocardial infarction [10].

### Materials and Methods

#### Material

**Animal material:** In relation to the present study, ethics committee approval was obtained from the local Ethics Committee of the Faculty of Veterinary Medicine (decision date and number: 22.02.2018-2/24).

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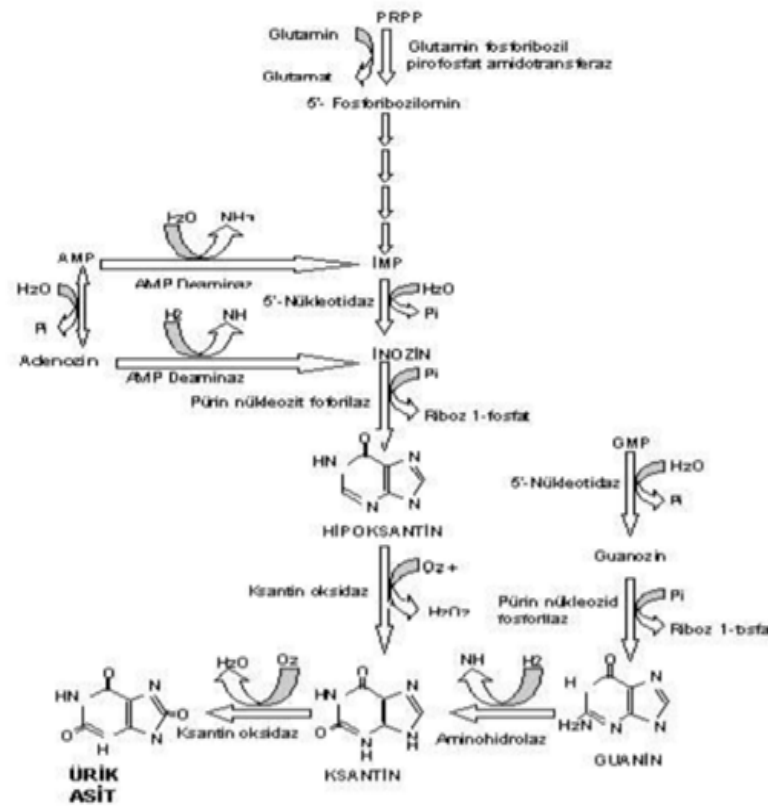


Figure 1: Purine metabolism and uric acid formation [22].

The study was carried out in line with ethical principles and rules by protecting animal welfare and rights. In the study, 400 specimens were used as animal material at 1 day age. Broiler chicks were created in a winged unit at Bayburt University Food, Agriculture and livestock Research Center during the 42-day trial period for animals, 7-day training and 35-day nutrition period, with 10 animals in each group in size of 110 × 110 × 100 cm.

In front of broiler chicks, fresh water was kept daily, where they could drink all the time. The general temperature of the heating and lighting trial set applied for the experiment set will be kept constant at 32°C-33°C and 27°C-28°C in the first day and then 5 days. The trial was applied to all groups 24 hours a day (60 W) during the trial period. The volatile oil mixture used in the experiment was obtained from bio market feed farming and livestock company. The mixture obtained was analyzed by GC (gas chromatography) device in Bayburt University Central research laboratories. In the content of essential oil mixture, 26.70% Durenol, 23.89% Eugenol, 16.49% gamma terpinene, 8.35% heptethylene glycol, 6.42% Hexethylene glycol, 3.31% cymene, 3.08% Pentethylene glycol, 2.87% caryophyllene, 2.30% D-Limonene, 2.18% Betapinene, 0.95% eucalyptol were found. 7 of the experiment. 8 groups (control, EOM (essential oil mix)-250, EOM-500, EOM-750, sk (stress applied control), SEOM (stress applied essential oil mix)-250, seom-500, SEOM-750) were divided into 50 animals each. In each group, 10 animals were divided into 5 sub-groups. During the research period, control was applied to EOM-250, EOM-500 and EOM-750 groups with 22°C to SK, SEOM-250, SEOM-500 and seom-

750 groups with 36°C. In each group, 50 animals were divided into 8 different groups.

**Collection of serum samples:** At the end of the trial, 10 randomly selected animals from each group and a total of 80 animals were numbered by taking 10 ml of blood from the flowing blood to perform biochemical blood analysis during the cervical dislocation method. Blood obtained from animals refrigerated centrifuge (NF 1200R, nuve, Ankara, Turkey) at +4°C for 12 minutes centrifuge was taken to EPONDORF tubes.

**Determination of serum uric acid:** Serum separated blood was taken into ependorf tubes and determined by spectrophotometric method in Cobas-8000 autoanalyzer system, which is closed with Roche brand kits in specific medikalde which is a commercial company in Erzurum.

**Statistical analysis:** All the numerical data obtained as a result of the study were statistically analyzed in the IBM SPSS 20.0 statistical program with Duncan test in general linear model Univariate. The mean of the data was expressed by standard errors (±). All significant differences were evaluated by testing at p<0.05.

## Symptoms and Results

As a result of the study, the addition of EOM-750 ml/1000 lt in 22°C stress-free groups and 36°C stress-free groups in different doses of EOM-500 ml/1000 lt in different doses of drinking water did not make any statistically significant difference, whereas the addition of

EOM-500 ml/1000 lt in 36°C stress-free groups increased uric acid Serum uric acid levels was measured in Table 1. As shown in Table 1, the addition of EOM-250 ml/1000 L and EOM-750 ml/1000 lt doses in stress-free groups due to the increase in plant extract doses was not statistically significant ( $p>0.05$ ). In this case, it was concluded that epigenetic adaptation to the applied low heat application and the ability of the body to defend against heat regulation system could be related.

In addition, it was found that the increase in uric acid level in blood plasma and the decrease in uric acid level in EOM-250 ml/1000 lt of plant extracts could be effective on uric acid metabolism ( $p<0.05$ ).

## Discussion and Conclusion

Uric acid is a protective antioxidant against oxidative stress [11]. The normal level is a positive molecule for the body. High levels of uric acid in the body, as well as low levels of important health problems (gout, hypertension, kidney and cardiovascular diseases such as) trigger the emergence of [2]. It is therefore important to note that serum uric acid level is a prognostic factor in the monitoring and treatment of diseases. High levels of uric acid in the body, high protein diet, stress (psychological and physical), some drugs, parathyroid hormone height, polycythemia and long-term hunger affect factors such as [4,5].

Stress is an important factor in changing biochemical parameters [12]. In temperature stress, which is considered to be an important stress factor, suppressing the immune system in poultry, slowing growth, causing physiological, hormonal, behavioral and molecular changes that increase mortality rate [6] at temperatures above 25°C, blood acid base balance, digesting of nutrients, egg yield and live weight gain quality decrease occurs in poultry [13]. Changes in the levels of broiler uric acid, cholesterol, alkaline phosphatase, creatine kinase occur in hot stress [14]. In the study, it was reported that the levels of uric acid, blood plasma glucose, total protein, albumin, and cholesterol were decreased in the studies due to temperature stress [15,16].

In this study, we aimed to investigate the relationship between serum uric acid levels and serum uric acid levels in patients with type 2 diabetes mellitus. In the study, serum uric acid and total protein

levels decreased ( $p=0.0001$ ) in the study of male broiler chickens subjected to chronic heat stress and thermal manipulation in pre- and post-thermal processing ( $p=0.0001$ ). [17,18]. The addition of oregano (*Origanum syriacum*) to broiler ration at Tekce and Gül's [19] temperature stress has been reported to have a decreasing effect. Similarly, in our study, depending on the dose of herbal extracts applied stress and the temperature 22°C stress-free groups and 36°C in groups stressful EOM-750 ml/1000 lt doses of uric acid decreased in value, although the difference is statistically pose, while the absence of effect of herbal extracts and clinically significant ( $p>0.05$ ) have been identified and the results of this study indicates compatibility with data published in the literature.

On the other hand, Chen et al. [20], The ratio of chromium supplementation of turkeys according to the trend report advertising performance, carcass characteristics and blood Chemistry effect on their research on the identification of 3 mg/kg fed diets supplemented with cr in the group of triglyceride (TG) and a significant increase in uric acid content, 1 mg/kg in the group fed supplemented diets with cr serum glucose and uric acid an increase in the level of decrease in concentration was observed. In a similar study, the serum uric acid levels in plasma was increased due to the increase in plant extract in group EOM-500 ml/1000 lt and the increase in serum uric acid levels in group EOM-500 ml/1000 lt. In this case, it was concluded that the herbal extracts used could be effective on uric acid metabolism ( $p<0.05$ ) [21,22].

However, studies in this field are limited, and a more comprehensive and prospective study is needed to show the extent to which it affects more numbers, different herbal extracts and different doses are tested. It is thought that studies in this field will provide significant gains in temperature stress and herbal extracts in order to clarify the mechanism of uric acid physiology and its effect.

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**Table 1:** Serum uric acid data in broiler blood fed under temperature stress.

	Üric acid	
	22°C	36°C
Kontrol	8.04	7.42
EOM 250 ml/l	11.84	4.66
EOM 500 ml/l	7.92	12.30
EOM 750 ml/l	7.96	8.76
<b>Source of variation (P values)</b>		
Diet	0.55	
Temperature	0.60	
Temperature x Diet	0.01	
<b>Main effect means diet</b>		
Kontrol	7.73	
EOM 250 ml/l	8.25	
EOM 500 ml/l	10.11	
EOM 750 ml/l	8.36	
<b>Temperature</b>		
22°C	8.94	
36°C	8.28	
SEM	0.87	

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