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The Effect of Basil Seed Powder, Vitamin C, and Their Mixing on the Blood Biochemical Traits of Heat-Stressed Broiler Chickens

Ahmed M. A. Sulaiman and Ammar H. Areaaer

Faculty of Agriculture, University of Kufa, Iraq

Abstract

This study was conducted in the poultry field belonging to the Department of Animal Production, College of Agriculture, University of Kufa for the period from August 30, 2020 to October 4, 2020, for a period of 5 weeks. To know the effect of adding and mixing basil seed powder and vitamin C on the productive performance of heat-stressed broiler chickens. In the experiment, 300 unsexed broiler chicks were used, Ross 308 hybrid of one day age, the chicks were randomly divided into 5 treatments (60 chicks / treatment) with 3 replicates per treatments. As each refined included 20 chicks with an average starter weight of 45 g and the treatments were as follows: T1 control treatment (without adding basil seed powder and vitamin C), T2 adding 4 g / kg of basil seed powder, T3 adding 6 g / kg of basil seed powder, T4 add 300 mg / kg of feed vitamin C, T5 adding 5 g / kg of feed basil seed powder + 150 mg / kg feed vitamin C. The results of the study showed that no significant differences occurred between all experiment treatments and the control group in the studied biochemical blood traits(glucose, cholesterol, cholesterol, protein, albumin and globulin) in blood serum. We conclude from the current study that the biochemical traits of the blood were not affected when different levels of basil seed powder and vitamin C were added and mixed to a diet of thermally stressed chicken.

Key words: Heat stress, basil seed powder, vitamin C, blood biochemical traits.

Introduction

The poultry industry is severely affected by the adverse effect of heat stress due to the mutual interaction between the ambient temperature of the bird's environment and its production performance. This increases the average of panting, body temperature, feed conversion ratio in the body and increases the amount of water consumption, and at the same time reduces feed intake and increases body weight and thus affects the productivity of the animal, which makes it difficult to reach the production of sufficient quantities of poultry meat, especially in tropical regions. It also leads to molecular and cellular changes that affect bird health and productivity (Tellez et al. 2017 and Surai et

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al., 2019). Poultry is one of the fastest-growing industries in animal production, in addition to genetic and environmental improvements in the commercial breeds of broilers, which have greatly contributed to a steady increase in the growth rate, which made them sensitive to high temperatures due to the heat resulting from the metabolic processes inside the body as a result of their rapid growth and lack of possession. Sweat glands through which they can relieve stress (Yousaf et al., 2017).

The nutritional strategy played an important role in mitigating the harmful effect of heat stress, so it was imperative that the diet provided to the birds meet the nutrition requirements with the inclusion of anti-stress compounds that would be a practical alternative in mitigating the harmful effects of high temperature (Jahejo et al., 2019). Managing heat stress is also key to poultry productivity during the hot summer months that suffer from extreme temperatures. Many production issues suffer from low efficiency and these effects are usually high due to reduced growth and increased leaching rate (Ratriyanto, 2018). Therefore, several methods have been adopted to find nutritional solutions that limit or reduce the harmful effect, including vitamin C, which is an antioxidant compound that works to restrict free radicals that improves villi size and increases feed intake and are considered one of the most important antioxidants used in the poultry industry to reduce the risk of heat stress. (Ramnath et al., 2008).The basil plant is also one of the well-known medicinal plants that are characterized by many qualities, including antimicrobial, bacterial, inflammatory and antipyretic, as the supplements of this plant are effective in improving the performance of broilers and blood standards in case of stress that the bird is exposed to during its life (Swathi et al., 2012).The present study aims to evaluate the addition of different levels of crushed basil seeds and vitamin C (ascorbic acid) and the mixing between them in the diets of broilers exposed to heat stress and to know its effect on the biochemical blood traits of broilers.

Materials and methods

This study was conducted in the poultry field of the Department of Animal Production, Faculty of Agriculture, University of Kufa, for a period from August 30, 2020 to October 4, 2020, for a period of 5 weeks.In it, the effect of adding (Ocimum basilicum L.) powder, vitamin C and mixing them was studied to relieve heat stress in broilers.The experiment included 300 unsexed broiler chickens, Ross308 hybrid, one day age, with an average starting weight of 45 g. It was prepared from the Al-Anwar hatchery in Al-Muradiya / Babylon province, the chicks were divided into 5 treatments, each treatment included 60 chicks with 3 replicates (each replicate 20 chicks) (Areaaer et al., 2020). The

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treatments were divided as follows:

1- The first treatment (T1): control fed its birds on a diet without adding basil seed powder and vitamin C.

2- The second treatment (T2): Their birds were fed on a diet added to which 4g of basil seed powder for each kg of diet.

3- The third treatment (T3): Their birds were fed on a diet added to which 6g of basil seed powder for each kg of diet.

4- The fourth treatment (T4): Their birds were fed on a diet added to which 300 mg of Vitamin C for each kg of diet.

5- The fifth treatment (T5): Their birds were fed on a diet added to which 5g of basil seed powder + 150 mg of Vitamin C.

Feeding chicks

The chicks are fed, according to the recommendations of the producing company, with starter feed for a period of (1-10) days, and growing feed for a period of (11-24) days, and final feed for a period of (25-35) days. The feeds were prepared in the Al-Sbateen feed factory in Babylon province. According to the following table:

Table 1. percentage of substances included in the diets used in the experiment

Feed material	Starter diet %	growth diet%	Final diet %
Crushed yellow corn	**50.50**	**54.00**	**58.00**
Soybean meal	**36.00**	**32.00**	**27.50**
Crushed wheat	**8.00**	**8.00**	**7.00**
Premix *	**2.50**	**2.50**	**2.50**
corn oil	**1.50**	**2.00**	**3.50**
Dicalcium Phosphate **	**0.1**	**0.1**	**0.1**
limestone	**1.1**	**1.1**	**1.1**
salt	**0.3**	**0.3**	**0.3**
Total	**100**	**100**	**100**

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Total Calcium%	**1.102**	**1.09**	**1.08**
Available phosphorous%	**0.74**	**0.72**	**0.71**
Crude fiber%	**2.30**	**2.41**	**2.45**
Total lysine%	**1.12**	**1.08**	**1.02**
Methionine + Cysteine%	**0.73**	**0.69**	**0.65**
Crude protein / energy ratio	**130.4**	**143.2**	**163.9**

Use the protein concentrate produced by Profemi Jordan company. It contains ready energy 4900 kg / kg, crude protein 18%, calcium 15-19%, lysine 9.4%, phosphorus 6.8%, sodium 4.8%, chlorine 5.8%, methionine 7.8%, methionine + Cysteine 7.8% and Threonine 0.55%. It also contains a mixture of vitamins and trace minerals to secure the needs of the bird. It also contains dicalcium phosphate, it contains: 22% inorganic calcium and 18% inorganic phosphorous.

Study traits:

Blood samples were taken at the end of the fifth week, as blood was drawn from the humeral vein and placed in tubes that did not contain anticoagulants. Blood samples were drawn from 15 birds with (one male per replicate) at an average of (3 ml/bird) and the blood was placed in tubes free of anticoagulant to separate blood components from serum for biochemical tests. The tubes containing the blood were placed in the centrifuge at a speed of 3000 revolutions per minute for a period of (15) minutes to separate the blood components from the serum, and then the biochemical traits of the blood were measured, which included: (glucose concentration, cholesterol concentration, triglyceride concentration, total protein concentration, Albumin concentration and globulin concentration) in serum.

statistical analysis:

Data were analyzed for the studied traits using (CRD) Completely Randomized Design. To know the effect of different treatments, the significance of differences between the treatments was tested using the Duncan (1955) polynomial test at 0.05 significance level, and using the SAS (2012) statistical program in statistical analysis.

Results and discussion:

The effect of adding and mixing basil seed powder and vitamin C to a diet of broiler exposed to heat

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stress on biochemical parameters.The study of the blood traits of broiler chickens is an important criterion through its direct effect on the productive performance of the bird and its health status .It was noted from the results of the statistical analysis in Table 2. The birds whose diets were added to the basil seed powder and vitamin C and the mixture between them had no significant effect on the biochemical indicators (glucose, cholesterol, triglycerides, total protein, albumin and globulin). It may be that there was no significant response in lowering the cholesterol concentration in high-temperature conditions to the concentration of food additives, which was not at an ideal level for the occurrence of cholesterol metabolism and the increase in the activity of hormones, especially thyroxine and thyrone triiodine, which work to reduce its concentration in the blood serum by increasing its representation in the body (Darraji, 1998). Results and discussion:

The effect of adding and mixing basil seed powder and vitamin C to a diet of broiler exposed to heat stress on biochemical parameters.

The study of the blood traits of broiler chickens is an important criterion through its direct effect on the productive performance of the bird and its health status. It was noted from the results of the statistical analysis in Table 2. The birds whose diets were added to the basil seed powder and vitamin C and the mixture between them had no significant effect on the biochemical indicators (glucose, cholesterol, triglycerides, total protein, albumin and globulin). It may be that there was no significant response in lowering the cholesterol concentration in high-temperature conditions to the concentration of food additives, which was not at an ideal level for the occurrence of cholesterol metabolism and the increase in the activity of hormones, especially thyroxine and thyrone triiodine, which work to reduce its concentration in the blood serum by increasing its representation in the body (Darraji, 1998).It may also be that the lack of significantly excelled in the concentration of albumin in the blood serum is a natural result, as it is one of the components of serum proteins or it may be due to the role of vitamin C in increasing the percentage of amino acids in the bird’s body during its growth period (Hamouda and Dabbagh, 2018).The absence of significant differences between treatments in some of the studied blood cell traits of broilers according to the conditions of the experiment. It may be explained that the level of nutritional supplementation of basil seed powder, vitamin C and their mixture, which were added to broiler chicken's diet in the case of heat stress, did not have the desired effect in creating the significant increases between treatments. As the level of these concentrations was not sufficient to cause significant changes in the level of cellular blood parameters, it is possible that higher concentrations of them have a clear effect on these parameters. This result was not in agreement with the study of Hady

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et al. (2013), as the addition of vitamin C at a concentration of 250 mg/L produced a significant (P <0.01)) reduction in the concentration of glucose and cholesterol in the blood serum of Japanese quail birds under heat stress conditions, while they were compatible with the concentration of each Of albumin and globulin, which decreases during the hot summer months due to blood-thinning due to high temperatures, They did not get a significant response when adding vitamin C to the drinking water of heat-stressed Japanese quails. It also did not agree with the findings of Hady and Jasim (2013) who found a significant reduction in the concentration of cholesterol and triglycerides in the blood serum when treating the thermally stressed diet of Japanese quail birds with 1.5 g / kg of basil powder.It also agreed with the findings of Ashraf and others (2015) who concluded in their study that the concentration of total protein in the blood increases when the diet is supplemented with basil. While it did not agree with Hammouda and Dabbagh (2018), who obtained a significant reduction in the level of total cholesterol and a significant superiority in the concentration of total protein in blood serum when adding vitamin C to the drinking water of chicken meat at the age of 35 and 45 days and under heat stress conditions.

Table 2. Effect of adding basil seed powder (Ocimum basilicum L.) and vitamin C to reducing heat stress and its effect on blood biochemical traits.

Treatments	**Mean ± Standard error (g)**					
	Glucose mg \ dl	Cholesterol mg \ dl	**Triglycerides g / dl**	**Total protein g / dl**	**Albums g / dl**	**Globulin g / dl**
T1	304.67 11.14±	130.33 9.386±	60.33 12.346±	2.83 0.202±	0.93 0.033±	1.90 0.173±
T2	292.33 19.53±	125.66 3.179±	53.33 4.666±	3.00 0.057±	1.00 0.057±	2.00 0±
T3	280.67 8.353±	116.66 3.666±	52.33 22.519±	2.86 0.120±	0.93 0.033±	1.93 0.088±
T4	286.00 8.386±	124.00 5.567±	45.33 2.905±	3.36 0.338 ±	1.10 0.152±	2.26 0.185±
T5	281.33 7.172±	118.66 6.359±	53.33 6.489 ±	2.93 0.133±	0.96 0.033±	1,96 0.120±

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The level of significance	***N.S***	***N. S***	***N.S***	***N.S***	***N.S***	***N.S***

We conclude from the current study that adding several levels of basil seed powder and vitamin C and mixing them to the diet had no significant effect on the biochemical characteristics of the thermally stressed broilers.

References:

1. Al-Darraji, Hazem Jabbar, 1998. The effect of adding lion's ascorbic to the bush on the physiological and productive traits of broiler broiler flocks during the summer months. PhD thesis, College of Agriculture, University of Baghdad. The Republic of Iraq.
2. Hammouda, Muhammad and Muhammad Nader Dabbagh. 2018. The effect of adding vitamin C to drinking water on some biochemical parameters of broilers exposed to heat stress. Hama University Journal. 1 (10): 83--94.
3. Hadi, Muhammad Mortada, Raad Jaafar Hussain, and Salah Mahdi Kata. 2013. The effect of adding the biological reinforcer (Iraqi) and vitamin C and their mixture under the influence of heat stress conditions on some blood and biochemical traits in Japanese quail. Karbala Journal of Agricultural Sciences. 1 (1): 122--133.
4. Hadi, Muhammad Murtada and Doaa Badr Jassim. 2013. The effect of using dried basil leaf powder on some productive and puppet traits of Japanese quail. Al Furat Journal of Agricultural Sciences. 5 (3): 57--64.
5. Ashraf, Y.; S. Shalaby,; B. Nemetallah; N. Saleh; E. Sakr and Toutou, M. 2015. Possibility of using basil (*Ocimum basilicum*) supplementation in gilthead sea bream. Egypt J. Aquat. Res., 41: 203-210.
6. Areaaer, A. H.; T. S. Almrsomi and Hammod, A. J. 2020. Effect of fasting and early feeding by using hydro-gel 95 after hatching on the growth parameters of broiler chicks. Sci. J. King Faisal Uni., 1–7.
7. Duncan, B. D. 1955. Multiple range and multiple F. tests, Biometrics, 11: 1-42.
8. Jahejo, A. R.; N. Rajput; W. X. Tian; M. Naeem; D. H. Kalhoro; A. Kaka; S. Niu and Fajie, J. 2019. Immunomodulatory and growth promoting effects of Basil (*Ocimum basilicum*) and ascorbic acid in heat stressed broiler chickens. Pakistan J. Zool., 51(3): 801–807.
9. SAS. 2012. SAS/Statistics Users Guide: Statistics Cary. North Carolina, United States of America: SAS Institute Inc.
10. Surai, P. F.; I. I. Kochish; V. I. Fisinin and Kidd, M. T. 2019. Antioxidant defense systems and oxidative stress in poultry biology: An update. Antioxidants. 8(7): 22–33.
11. Swathi, B.; P. Gupta and Nagalakshmi, D. 2012. Effect of tulsi (*Ocimum sanctum*) and turmeric (*Curcuma longa*) on broiler performance and blood constituents during heat stress in broilers. Int. J. Pharm. Bio Sci., 3: 446–453.
12. Ramnath, V.; P. Rekha and Sujatha, K. 2008. Amelioration of heat stress induced disturbances

of antioxidant defense system in chicken by Brahma Rasayana. Evidence-Based Complem. Altern. Med., 5: 77–84.

13. Ratriyanto, A. 2018. Osmoregulatory function of betaine in alleviating heat stress in poultry. J. Anim. Physiol. Anim. Nutr. (Berl.), 102: 1634–1650.
14. S. O., A. ., J. O, A. ., M. A. , A., & O. F., A. (2021). Effects of Stocking Density on the Performance Characteristics, Egg Quality, and Nutrient Composition of the Eggs of Japanese Quails (Coturnix Coturnix Japonica). Journal of Scientific Research in Medical and Biological Sciences, 2(2), 11-22. https://doi.org/10.47631/jsrmbs.v2i2.248
15. Serge-Olivier, . K. K., Mathieu , B. ., Dje Bi, Y. B. T. ., Kamagate, S. ., & Angoué, P. . (2021). Influence Of Crude Protein Diet on Growth Performance and Some Blood Biochemical Parameters of Growing Male Japanese Quail In Côte d'Ivoire. Journal of Scientific Research in Medical and Biological Sciences, 2(1), 10-18. https://doi.org/10.47631/jsrmbs.v2i1.217
16. Tellez, Jr.; G. T. Isaias and Dridi, S. 2017. Heat stress and gut health in broilers: role of tight junction proteins. Advances in Food Tech. & Nut. Sci., 3(1) : 77–84.
17. Yousaf, A.; A. Jabbar and Ditta, A. 2017. Effect of pre-warming on broiler breeder eggs hatchability and post-hatch performance. J. Anim. Health and Prod., 5(1): 1–4.