

Effect of coriander seed powder and α -tocopheryl acetate on humoral immune response, antioxidant status and some blood parameters in broiler chickens

Sabetan Shirazee, A.A.¹; Hassanabadi, A.² and Agah, M.J.³; Nasiri-Moghaddam, H.²

Received: 23.05.2018

Accepted: 18.02.2019

Abstract

This study was conducted to investigate the effects of dietary inclusion of coriander seed and α -tocopheryl acetate on the immunological response, blood, and antioxidant parameters of broiler chickens. Two hundred forty-one-day old chicks (Cobb 500) were randomly assigned to four treatments arranged in a completely randomized design with three replicates and 20 chicks per each group and kept for 42 days. Dietary treatments included a basal diet without additive (negative control), basal diet containing 250 mg/kg alpha-tocopheryl acetate (positive control), and basal diets containing 0.3 and 0.6% coriander powder. In the days of 35 and 42 days old, two birds were selected from each treatment and evaluated for humoral Immune Response. The levels of malondialdehyde (MDA), plasma antioxidants, triglycerides, cholesterol, HDL, LDL, and VLDL were measured at 42 days of age. Serum levels of triglyceride and cholesterol were significantly lower in coriander and α -tocopheryl acetate treatments than the negative control. The use of coriander seed increased the activity of antioxidant enzymes, superoxide dismutase, and glutathione peroxidase, as well as reduced the serum concentration of malondialdehyde in broiler chickens. Both the total antibody and immunoglobulin M titers were higher in the primary immune response to SRBC injection in coriander seeds and α -tocopheryl acetate treatments compared to the negative control group. However, no significant difference in secondary immune response was observed among all study groups. The results of this study showed that the use of 0.3 and 0.6% coriander seeds in broiler chicken diet improves the immune system, reduces oxidation and balances of blood parameters.

Key words: Coriander seeds, α -tocopheryl acetate, Blood parameters, Antioxidation indexes, Broiler chickens

1- Assistant professor, Department of Agriculture, Faculty of Agriculture, Academic staff in Islamic Azad University of Fasa

2- Professor, Department of Animal Science, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran

3- Assistant professor, Department of Animal Science Research, Fars Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran

Corresponding Author: Sabetan Shirazee, A.A., E-mail: sedarat2003@yahoo.com

References

- Abou-Elkhai, R.; Ahmed, H.A. and Selim, S. (2014). Effects of Black Pepper (*Piper Nigrum*), Turmeric Powder (*Curcuma Longa*) and Coriander Seeds (*Coriandrum Sativum*) and Their Combinations as Feed Additives on Growth Performance, Carcass Traits, Some Blood Parameters and Humoral Immune Response of Broiler Chickens. *Asian Australasian Journal of Animal Science* 27: 847-854.
- Al-Jaff, F.K. (2011). Effect of coriander seeds as diet ingredient on blood Parameters of broiler chicks raised under high ambient temperature. *International Journal of Poultry Science* 10: 82-86.
- Al-Mashhadani, E.H.; Al-Jaff, F.K.; Hamodi, S.J. and Al-Mashhadani, H.E. (2011). Effect of coriander oil on broiler Performance and some Physiological traits under high ambient temperature. *Pakistan Journal of Nutrition* 10: 10-14.
- Al-Snafi (2016). A review on chemical constituents and pharmacological activities of *Coriandrum sativum*. *IOSR Journal of Pharmacy*. 6 (7):17-42.
- AOAC. (2005). Official Methods of Analysis. 18th ed. Association of Analytical Chemists, AOAC International, Arlington VA.
- Ayinde, O.C.; Ogunnowo, S. and Ogedegbe, R.A. (2012). Influence of Vitamin C and Vitamin E on testicular zinc content and testicular toxicity in lead exposed albino rats. *BMC Pharmacology & Toxicology*, 10: 13-17.
- Chithra, V. and Leelamma, S. (1999). *Coriandrum sativum* changes the levels of lipid peroxides and activity of antioxidant enzymes in experimental animals. *Indian Journal of Biochemistry and Biophysics*, 36(1): 59-61.
- Cheema, M.A.; Quresh, M.A. and Havenstein, G.B. (2003). A comparison of the immune response of a 2001 commercial broiler with a 1957 random bred broiler strain when fed representative 1957 and 2001 broiler diets. *Poultry Science*, 82: 1519-1529.
- Deepa, B. and Anuradha, C.V. (2001). Antioxidant potential of *Coriandrum sativum L.* Seed extract. *Indian Journal of Experimental Biology*, 49(1): 30-8.
- Dhanapakiam, P.; Joseph, J.M.; Ramaswam, V.K.; Moorthi, M. and Kumar, A.S. (2008). The cholesterol lowering property of coriander seeds (*Coriandrum sativum*): mechanism of action. *Journal of Environmental Biology*, 29: 53-6.
- Draper, H.H. and Hadley, M. (1990). MDA determination as index of lipid peroxidation. *Methods in Enzymology* 186: 421-430.
- ElSayed, S. and Ahmed, S. (2017). Effects of coriander seeds powder (*Coriandrum sativum*) as feed supplements on growth performance parameters and immune response in albino rats. *International Journal of Livestock Research*, 7(2): 191-200.
- Ghazanfari, S.h.; Mohammadi, Z. and Adibmoradi, M. (2015). Effects of Coriander Essential Oil on the Performance, Blood Characteristics, Intestinal Microbiota and Histological of Broilers. *Brazilian Journal of Poultry Science*, 4: 419-426.
- Guinda, A. (2006). Use of solid residue from the olive industry. *Grasas Y Aceites*, 57: 107-115.
- Guler, T.; Ertas, O.N.; Ciftci, M. and Dalki, C.B. (2005). The effect of coriander seed (*Coriandrum sativum L.*) as diet ingredient on the Performance of Japanese quail. *South African Journal of Animal Science*, 35: 261-267.
- Hosseinzadeh, H.; Alaw Qotbi, A.A.; Seidavi, A.; Norris, D. and Brown, D. (2014). Effects of Different Levels of Coriander (*Coriandrum sativum*) Seed Powder and Extract on Serum Biochemical Parameters, Microbiota, and Immunity in Broiler Chicks. *The Scientific World Journal*, 35: 55-65.
- Karimi, E.; Gholami, J.; Rezaei, P. and Mazidi, M. (2015). The effect of oral coriander seed extract on lipids, blood glucose, and oxidative stress indicators in streptozotcin-induced diabetic rats. *Qom University of Medical Sciences journal*, 8(5):85- 92. (in Persian)
- Lee, S.W. and Chung, S.S. (2010). A review of the effects of vitamins and other dietary supplements on seizure activity. *Epilepsy Behavior*. 18(3): 139-50
- Mirzavand, M.; Rahimian, Sh. and Sahari, M.A. (2014). Evaluation the effects of mint, parsley, dill, coriander, garlic and basil on broiler performance, blood factors, immune system, intestinal morphology and taste of meat. *Iranian Journal of Medicinal and Aromatic Plants*, 13 (3): 446-459. (in Persian)

- Niu, Z.Y.; Liu, F.Z.; Yan, Q.L. and Li, W.C. (2009). Effects of different levels of vitamin E on growth performance and immune responses of broilers under heat stress. *Poultry Science*, 88: 2101-2107.
- Ramadan, M.F. and Morsel, J.T. (2004). Oxidative stability of black cumin (*Nigella sativa L.*) Coriander (*Coriandrum sativum L.*) and niger (*Guizotia abyssinica Cass.*) crude seed oils upon stripping. *European Journal of Lipid Science and Technology*, 106: 35-43.
- Rathore S.S.; Saxena, S.N. and Balraj, S. (2013). Potential health benefits of major seed spices. *International Journal of Seed Spices*, 3(2): 1-12.
- Reische, D.W.; Lillard, D.A. and Eitenmiller, R.R. (2002). common natural ingredients *Drugs and Cosmetics*, 2th ed. Wiley. New York.
- Saeid, J.M. and AL-Nasry, A.S. (2010). Effect of Dietary Coriander Seeds Supplementation on Growth Performance Carcass Traits and Some Blood Parameters of Broiler Chickens. *International Journal of Poultry Science*, 9(9): 867-870.
- Spurlock, M.E. and Savage, J.E. (1993). Effects of dietary protein and selected antioxidants on fatty hemorrhagic syndrome induced in Japanese quails. *Poultry Science*, 72: 2095-2105.
- Wangensteen, H.; Samuelsen, A.B. and Malterud, K.E. (2004). Antioxidant activity in extracts from coriander. *Food Chemistry*, 88: 293-297.