

## **Effect of different levels of *Mentha longifolia* and *Thymus vulgaris* powders on growth, carcass characteristics and immune system of Japanese quails**

Abasi, O.<sup>1</sup> and Daneshyar, M.<sup>2</sup>

Received: 05.10.2018

Accepted: 09.06.2019

### **Abstract**

Mentha and Thyme medicinal plants are the effective plants on the performance and immune system of poultry. This experiment was conducted to investigate the effect of different levels of 0, 0.25, 0.5, and 1.0% Mentha and Thyme mixture on performance, internal organs, carcass characteristics, and immunity system of Japanese quail. For this purpose, two hundred Japanese quails on day 14 were used in a completely randomized design with 4 treatments and 5 replicates for each (10 chicks per replicate). Consumption of different levels of Thyme and Mentha mixture had no significant effect on weight gain, feed intake, and feed conversion ratio during the different weeks of age or whole the experimental period in Japanese quail. The relative weight of spleen was increased by all the different levels of plant mixtures and the highest spleen weight was related to the birds fed 1.0% of Thyme and Mentha mixture. Delayed-type hypersensitivity (cellular immune) was decreased by all levels of plant mixtures and more decreased at the higher levels of plant mixtures. The consumption of 0.5 and 1.0% of Thyme and Mentha mixtures caused the increased antibody titers as compared to the low plant's mixture (0.25%) and the control diet. All plant mixtures caused higher lymphocyte proliferation and respiratory bursting as compared to control treatment. In conclusion, consumption of 0.5 and 1.0% of Thyme and Mentha mixture increase the antibody titer against sheep red blood cells, lymphocyte proliferation, and respiratory bursting ability and decrease the delayed-type hypersensitivity in Japanese quail.

**Key words:** Japanese quail, *Mentha longifolia*, *Thymus vulgaris*, performance, Cellular Immunity

---

1- MSc Student of Animal Science, Urmia University, Urmia, Iran

2- Associate Professor, Department of Animal Science, Faculty of Agriculture, Urmia University, Urmia, Iran

**Corresponding Author:** Daneshyar, M., E-mail: m.daneshyar@urmia.ac.ir

## References

- Abdulkarimi, R.; Daneshyar, M. and Aghazadeh, A. (2011). Thyme (*Thymus vulgaris*) extract consumption darkens liver, lowers blood cholesterol, proportional liver and abdominal fat weights in broiler chickens. *Italian Journal of Animal Science*, 20:101-105.
- Abtahi Froushani, S.M.; Nafisi, S.; Esmaeili Gouvarchin Ghaleh, H. and Mansouri Motlagh, B. (2015). *Journal of Shahid Sadoughi University Medical Science*, 23: 432-39.
- Abtahi Froushani, S.M. and Galeh, H.E. (2014). New insight into the immunomodulatory mechanisms of Tretinoin in NMRI mice. *Iranian Journal of Basic Medical Science*, 17: 632-637.
- Andrikopoulos, S.; Verchere, C.B.; Terauchi, Y.; Kadowaki, T. and Kahn, S.E. (2000). Beta-cell glucokinase deficiency and hyperglycemia are associated with reduced islet amyloid deposition in a mouse model of type 2 diabetes. *Diabetes*, 49: 2056-2062.
- Ao, X.; Yoo, J.; Zhou, T.; Wang, J.; Meng, Q.; Yan, L. et al. (2011). Effects of fermented garlic powder supplementation on growth performance, blood profiles and breast meat quality in broilers. *Livestock Science*. 141: 85-89.
- Awaad, M.H.H.; Abdel-Alim, G.A.; Sayed Kawkab, K.S.S.; Ahmed, A.; Nada, A.A.; Metwalli, A.S.Z. and Alkhalaf, A.N. (2010). Immunostimulant effects of essential oils of peppermint and eucalyptus in chickens. *Pakistan Veterinary Journal*. 30: 61-66.
- Azizi, K.; Daneshyar, M.; Abtahi, S. and Goldani, S.H. (2017). Performance, carcass characteristics and immune response of *Japanese quails* to different levels of *Mentha piperita* L. powder. *Iran Journal of Medicinal Aromatic Plants*, 33: 820-836.
- Bhattacharya, S. (2014). Immport disseminating data to the public for the future of immunology. *Immunology Research*, 58: 234-239.
- Bozkurt, M.; Kucukyilmaz, K.; Catli, A.U. and Cinar, M. (2008). Growth performance and slaughter characteristic of broiler chickens fed with antibiotic, mannan oligosaccharide and dextran oligosaccharide supplemented diets. *International Journal of Poultry Science*, 7: 969-977.
- Chimote, M.J.; Barmase, B.S.; Raut, A.S.; Dhok, A.P. and Kuralka, S.V. (2009). Efficacy of feeding yeast and acidifier on performance of *Japanese quails*. *Veterinary World*, 2: 185-186.
- Cook, N.C. and Samman, S. (1996). Flavonoids chemistry, metabolism, cardioprotective effects, and dietary sources. *Journal of Nutrition Biochemistry*. 7: 66-76.
- Daneshyar, M. (2012). Effect of dietary turmeric on antioxidant properties of thigh meat in broiler chickens after slaughter. *Animal Science Journal*. 83: 599-604.
- Dorman, H.J.D. and Deans, S.G. (2000). Antimicrobial agents from plants: antibacterial activity of plant volatile oils. *Journal of Applied Microbiology*, 88: 308-316.
- Glasser, L. and Fiederlein, R.L. (1990). The effect of various cell separation procedures on assays of neutrophil function. *American Journal of Clinical Pathology*, 93: 662-669.
- Hajipour Dehbalaei, Sh.; Afsharmanesh, M. and Sami, M. (2016). Effect of essential oils of thyme, oregano and their combination on quality of quail meat in comparison with virginiamycin. *Journal of Food Hygiene*, 5: 45-54.
- Hernandez, F.; Madrid, J.; Garcia, V.; Orengo, J. and Megias, M.D. (2004). Influence of two plant extracts on broilers performance, digestibility, and digestive organ size. *Poultry Science*, 83: 169-174.
- Kabouche, A.; Kabouche, Z. and Bruneau, C. (2005). Analysis of the essential oil of *Thymus numidicus* (Poiret) from Algeria. *Flavour and Fragrance Journal*, 20: 235-6.
- Lavina, S.; Gabi, D.; Drinceano, D.; Stef, D.; Daniela, M.; Julean, C. et al. (2009). The effect of medicinal plants and plant extracted oils on broiler duodenum morphology and immunological profile. *Journal of Romanian Society of Biological Sciences*. 14: 4606-4614.
- Lee, S.J.; Umamo, K.; Shibamoto, T. and Lee, K.G. (2005). Identification of volatile components in basil (*Ocimum basilicum* L.) and thyme leaves (*Thymus vulgaris* L.) and their antioxidant properties. *Food Chemistry*, 91: 131-137.

- Manafi, M.; Hedayati, M. and Arak, H. (2018). The effect of concomitant use of ethanolic mixture extractions of Thyme and Oregano on performance and morphology of gastrointestinal tract in broilers fed contaminated feed with Aflatoxin B1. *Journal of Animal Science Research*, 38: 1-16.
- Nobakht, A.; Azarfar, S.; Mehmannaavaz, Y. and Ghalehnovei, A. (2014). Effect of using different levels of pennyroyal (*Mentha Plugium L.*) and Thyme (*Thymus Vulgaris*) medicinal plants on performance and blood metabolites of Japanese laying quails. *Animal Science Journal*, 109: 3-14.
- NRC (1994). Nutrient requirements of poultry. Ninth Revised Edition, 1994, National Academy Press, Washington D.C.
- Ocak, N.; Erener, F.; Burak, A.K.; Sunga, M.; Altop, A. and Ozmen, A. (2008). Performance of broilers fed diets supplemented with dry peppermint (*Mentha piperita*) or thyme (*Thymus vulgaris L.*) leaves as growth promoter source. *Czech Journal of Animal Science*, 53: 169-175.
- Pirmohammadi, A.; Daneshyar, M.; Farhoomand, P.; Aliakbarlu, J. and Hamian, F. (2016a). Effects of *Thymus vulgaris* and *Mentha pulegium* on colour, nutrients and peroxidation of meat in heat-stressed broilers. *South African Journal of Animal Science*, 46: 278-284.
- Pirmohammadi, A., Daneshyar, M. and Farhoomand, P. (2016b). Effect of *Thymus vulgaris* and *Mentha pulegium* powders on performance, carcass characteristics and some blood parameters of broilers under heat stress condition. *Iranian Veterinary Journal*, 20: 11: 12-25.
- Qureshi, M.A. and Havenstein, G.B. (1994). A comparison of the immune performance of a 1991 commercial broiler with a 1957 randombred strain when fed "typical" 1957 and 1991 broiler diets. *Poultry Science*, 73: 1805-1812.
- Saki, A.A.; Kalantar, M. and Khoramabadi, V. (2014). Effects of drinking thyme essence (*Thymus vulgaris L.*) on growth performance, immune response and intestinal selected bacterial population in broiler chickens. *Poultry Science Journal*, 2: 113-123.
- Sikkema, J.; dse Bont, J.A.M. and Poolman, B. (1994). Interactions of cyclic hydrocarbons with biological membranes. *Journal of Biological Chemistry*, 269: 8022-8028.
- Ultee, A. and Smid, E.J. (2001). Influence of carvacrol on growth and toxin production by *Bacillus cereus*. *International Journal of Food Microbiology*, 64, 373-378.
- Vakiloddin, S.; Fuloria, N.; Fuloria, S.; Dhanaraj, S.A.; Balaji, K. and Karupiah, S. (2015). Evidences of hepatoprotective and antioxidant effect of *Citrullus colocynthis* fruits in paracetamol induced hepatotoxicity. *Pakistan Journal of Pharmacology Science*, 28: 951-957.
- Vuorte, J.; Jansson, S.E. and Repo, H. (2001). Evaluation of red blood cell lysing solutions in the study of neutrophil oxidative burst by the DCFH assay. *Cytometry*. 43:290-296.