# EFFECT OF SUPPLEMENTATION WITH IMMUNOMODULATORS ON PERFORMANCE OF JAPANESE QUAIL

By


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B. Sc. Agric. Sc. (Poultry Production), Ain Shams University, 1998

M. Sc. Agric. Sc. (Poultry Physiology), Ain Shams University, 2004


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**ALLAH**

**The most beneficent and merciful**

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# ABSTRACT

**Ghada Gouda Rashed Gad: Effect of Supplementation with Immunomodulators on Performance of Japanese Quail. Unpublished Ph. D. Thesis, Department of Poultry Production, Faculty of Agriculture, Ain Shams University, 2010.**

The present study was conducted to investigate the effects of zinc oxid (ZnO), melatonin hormon either alone or in a combination on productive performance, physiological and immunological responses of Japanese quail hens and their progeny. A total of 450 Japanese quail chicks *(Coturnix coturnix japonica)*, two wks old, were randomly assigned to nine dietary treatment groups of 25 chicks in 2 replicates, The first group was served as control, whereas, the other experimental eight groups were fed as follows: the 2$^{nd}$ and the 3$^{rd}$ groups were supplemented with 100 ppm ZnO and 50 ppm MLT respectively; the 4$^{th}$ and the 5$^{th}$ groups were supplemented with 100 ppm ZnO plus 50 ppm MLT and 200 ppm ZnO, respectively; the 6$^{th}$ and the 7$^{th}$ groups were supplemented with 100 ppm MLT and 200 ppm ZnO plus 100 ppm MLT, respectively. While the 8$^{th}$ and the 9$^{th}$ groups were supplemented with 200 ppm ZnO plus 50 ppm MLT and 100 ppm ZnO plus100 ppm MLT, respectively. Chicks from hatch till 8 WOA were reared and fed on commercial starter and grower basal rations with out any supplementation to determine the influence of dietary treatments of the parent stock upon the progeny.

Results showed that, all supplemented parent groups had better total primary and secondary anti-SRBC's compared with control one. Body weight (BW) and weight gain were higher for birds fed the diet containing 50 ppm MLT plus 200 ppm ZnO than those of the other treatments. Feed consumption and feed conversion were lower for birds fed the diet containing ZnO, MLT

either alone or in a combination. Zinc oxid and melatonin reduced ($P \leq 0.05$) mortality below that of control birds. Heterophils to lymphocytes (H/L) ratio decreased significantly indicating positive impact of all treatments on cellular immunity. Antibody response was significantly higher for the birds fed the diets containing ZnO, MLT either alone or in a combination. Adding dietary MLT, ZnO or their combination caused positive impact on the immune organs; bursa of Fabricius, thymus and spleen relative weights. There were no significant differences in hematocrit (Ht) and hemoglobin (Hb) among treatments and control. Total protein and globulin were significantly increased for birds fed the diet supplemented with ZnO, MLT either alone or in a combination, but albumin decreased significantly. Aspartate aminotransferase (AST) and Alanine aminotransferase (ALT) activities decreased significantly at six WOA for birds fed the diet supplemented with ZnO, MLT either alone or in a combination,. Chicks fed diets supplemented with 200 ppm ZnO plus 50 ppm MLT, achieved significantly the lowest values of plasma total lipids , cholesterol and triglycerides. While the highest values of plasma total lipids, cholesterol and triglycerides were recorded for birds fed on the control diets. there were no significant differences for the plasma concentrations of both Ca and P among quail chicks. Egg production were significantly improved for hens fed diets supplemented either with MLT, ZnO alone or in combination compared with control. Breeder hens fed on either level of ZnO alone or in combination with melatonin for a period of 10 wk showed significantly better fertility and hatchability percentages compared with the remaining groups and the control.

For the progeny, average body weight, weight gain, were significantly improved. Plasma concentrations of total protein and globulin were significantly increased. While total lipids, cholesterol, triglycerides, and Plasma calcium and phosphorus were not

significantly changed. The activities of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) enzymes were not affected. The greater relative lymphoid organs weights and high antibodies response against Newcastle disease virus (NDV) were reported for the progeny of hens fed diets supplemented with ZnO, MLT either alone or in a combination.The response of the progeny to phytohaemogglutinin- (PHA-P) increased for chicks hatched from hens fed on the diet supplemented with ZnO, MLT either alone or in a combination.

In conclusion, the present study, shows that optimal supplementation of 100 ppm ZnO plus 50 ppm MLT to Japanese quail diet as an antioxidants is adequate to increase body weight, feed efficiency, decrease mortality, optimize humoral immunity, cell-mediated immunity, increase egg production and hatchability of Japanese quail without unfavorable change in blood constituents and support progeny performance and immune modulation.

**Key words:**

Zinc oxide, melatonin hormone, growth, egg production, immune response, blood constituents, Japanese quail, breeder hens, progeny.

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