INFLUENCE OF IN OVO INJECTION WITH AN EFFECTIVE BACTERIAL PREPARATION (*BIFIDOBACTERIUM SPP.)* ON SOME PRODUCTIVE AND PHYSIOLOGICAL TRAITS IN POULTRY

By

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B.Sc. Agric. Sc. (Poultry Production), Zagazig University, 2007

M.Sc. Agric. Sc. (Poultry Physiology), Zagazig University, 2013

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ABSTRACT

ABD El-MONEIM EID ABD EL-MONEIM HASSAN: Influence of In Ovo Injection with an Effective Bacterial Preparation (*Bifidobacterium spp.*) on Some Productive and Physiological Traits in Poultry. Unpublished Ph.D. Dissertation, Department of Poultry Production, Faculty of Agriculture, Ain Shams University, 2017.

The present study was conducted to evaluate the potential beneficial impact of *Bifidobacterium bifidum* and *Bifidobacterium longum* inoculation in yolk sac of developing broiler embryos at 18^{th} day of incubation on hatchability, growth parameters, haematological and blood biochemical profile, antioxidant and immunological status, antimicrobial potentiality, and histological changes. Three hundred broiler breeder eggs (Cobb-500) were obtained from a maternal flock 29 week in lay. Eggs were individually weighted at arrival and at day 17 of incubation prior to injection and divided into six equal treatment groups. The first and second groups (R1 and R2) were of control and vehicle control groups, respectively. *Bifidobacterium bifidum* was injected with high ($5x10^9$ CFU/200 ml) and low ($1x10^7$ CFU/200 ml) doses (R3 and R4 groups, respectively). Also, *Bifidobacterium longum* was injected with high ($2x10^9$ CFU/200 ml) and low ($7x10^7$ CFU/200 ml) doses (R5 and R6 groups, respectively).

Results showed that hatchability, body weight at hatch and feed consumption were not affected among experimental groups. While, live body weight, body weight gain and feed conversion were significantly improved in all injected groups during certain experimental periods and the overall period of the study. Carcass traits were not affected with Bifidobacteria strains injection except bursa relative weight was increased significantly in all injected groups. Hb concentration, WBCs count, MCV, MCH, MCHC, serum total protein, albumin, globulin levels and A/G ratio

were insignificantly affected by different treatments. Nevertheless, RBCs count and PCV% were increased in R3 group significantly. Serum AST, ALT activities were not affected with injected bacteria, however, ALP activity was decreased significantly in injected groups compared with the control group. Serum uric acid, creatinine and urea-N were not significantly influenced, but, significant increase in urea-N level was observed in R4 group. Serum glucose and T_3 levels were not significantly affected, meanwhile, T_4 level was decreased significantly. Serum cholesterol, triglycerides and LDL were insignificantly affected, however, HDL was decreased significantly in all injected groups except in R4 group was insignificantly increased. Antioxidant status of injected birds were improved; serum GSH content was insignificantly increased. MDA content was also decreased significantly in R3 and R5 groups. Moreover, SOD activity was increased in R4 and R6 groups significantly. Immunological parameters were also enhanced by treatment with Bifidobacteria strains; serum IgM was increased significantly. Furthermore, serum IgG and total Ig were increased insignificantly in all injected groups, however, IgA and antibody titer against NDV were not different among treatment groups, but numerical increase was observed in IgA levels in all experimental groups. All examined microbiological parameters were also significantly affected by *in ovo* inoculation with Bifidobateria strains. Total bacteria, total coliform, fecal coliform and Salmonella spp. counts were significantly reduced, however, Bifidobateria and total lactic acid bacteria populations were increased significantly in all treatment groups. Histological observations of ileum, bursa of Fabricius, thymus and spleen were greatly improved by bifidobacteria injection. Where, villus height, crypt depth and villus height : crypt depth were significantly increased in all of *in ovo* injected groups compared with the control groups. *In ovo* injection with Bifidobacterium strains also improved the histological structure of bursa of Fabricius and thymus gland as the two main lymphoid organs in birds in terms of B and T lymphocytes production. Furthermore, the

histological structure of spleen was greatly improved in all injected groups as the white pulp area was dramatically increased on behalf of the red pulp area.

It is concluded that, *in ovo* injection of *Bifidobacterium bifidum* and *Bifidobacterium longum* in the residual yolk at the 18^{th} day of embryogenesis could be used as an effective tool for improving subsequent post hatch productive performance, antioxidant and Immunological status of broiler chicks, without adverse effects on hatchability traits.

Based on the present results, it is recommended to use *Bifidobacterium bifidum* and (or) *Bifidobacterium longum*, especially with doses of $5x10^9$ CFU and $7x10^7$ CFU, respectively, for *in ovo* inoculation of the developing embryos in order to improve productive, physiological and immunological status of hatched chicks.

Key words:

Bifidobacterium bifidum, Bifidobacterium longum, Performance, Antioxidant and Immunological status, Microflora, Broiler.

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