# IMPACT OF INTERACTION BETWEEN GENOTYPE AND NUTRITION ON SOME PRODUCTIVE AND IMMUNOLOGICAL PARAMETERS IN LOCAL CHICKEN STRAINS

By

**EMAN SAYED OSMAN HASSAN**

B.Sc. Agric. Sci. (Agricultural Prod.), Fac. Agric., Cairo Univ., 2000

M.Sc. Agric. Sci. (Environmental Science), Institute of Environmental Studies and Research, Ain Shams Univ., 2009

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# ABSTRACT

**Eman Sayed Osman: Impact of Interaction between Genotype and Nutrition on some Productive and Immunological Parameters in Local Chicken strains. Unpublished Ph.D. Thesis, Department of poultry Production, Faculty of Agriculture, Ain Shams University, 2018**

The main objective of this study was to investigate the effect of the genetic differences in productive performance, carcass characteristics, physiological response, antioxidant activity, immunological response and histological examination by use the natural growth promoters in diets offered to local chicken strains (Golden Montaza (GM) and Bandara (B)). A total of 300 birds (150 birds of each strain) were used from 16 to 40 weeks of age. Birds were randomly distributed into six treatments. Each treatment had 20 (female) and 5 (male) birds (25X 6X 2) that were individually caged. The first treatment of each strain served as a control group and fed the formulated basal diet without any tested feed additives. The second treatment fed the basal diet with BioPlus® 2B, (400gm/ton) a commercial probiotic preparation (pro. (Bio)). The third treatment birds were fed the same basal diet with the addition of TechnoMos® (500gm/ton) a prebiotic type (pre. (Tech).The fourth treatment fed the basal diet with Diamond V® (2.5kg/ton) a commercial prebiotic produced (pre. (Dia). The fifth treatment fed the basal diet with FORMI® NDF (2kg/ton) (organic acid (FORMI)). The sixth treatment fed the basal diet with combination of (BioPlus® 2B, (400gm/ton) + TechnoMos® (500gm/ton) + FORMI® NDF (1kg/ton)) combination (BTF).

The final body weight and total body weight gain for female in prebiotic groups were higher than birds fed diet supplemented with combination (BTF). The highest values were found for probiotic and organic acid (FORMI) groups in final body weight and total body weight gain for male. Egg number (egg N.) and egg mass (egg mass) were higher in Golden Montaza than Bandara. The egg N. and egg mass in probiotic

(Bio) group had the highest value and the lowest value was found for diet supplemented with organic acid (FORMI). There were significant difference between Golden Montaza and Bandara on egg quality at 30 weeks in Egg weight (EW), egg Surface area (ES) Shell % (SP), Yolk weight (YW) and Yolk index (YI) and in Shell weight (SW), Shell thickness (ST), SWUSA (SWU), Shell % (SP), Yolk weight (YW) Yolk % (YP) and Yolk index (YI) at 40 weeks. No significant differences were detected between treatments at 30 weeks in egg weight (EW), Shell weight (SW), Shell thickness (ST), egg Surface area (ES), and eggshell index (EI) and Yolk weight (YW) Yolk % (YP) Haugh unit (HU) and Yolk color (YC). Also, there were no significant differences were detected between treatments at 40 weeks for Shell thickness (ST) and Shape Index (SI) and Yolk % (YP).

The highest value was found for prebiotic (Dia.) and the lowest value was found for organic acids (FORMI) group on carcass weight%. The value highest of Spleen% was found for combination (BTF) group while the lowest value was detected for prebiotic (Dia.) group. Organic acids (FORMI) group was higher in the relative weight of Liver than that from pro (Bio) group.

No significant differences between Golden Montaza and Bandara were detected for HDL, triglycerides (TG), glucose, calcium, phosphorus, uric acid, ALT and Glutathione Peroxidase (GPX) however, total cholesterol, LDL, total protein, albumin, globulin and A/G were higher in Golden Montaza than Bandara. On other hand, total lipids (TL), triiodothyronin hormone (T3) and AST, Total Antioxidant Capacity (TAOC) and Superoxide Dismutase (SOD) were higher in Bandara than Golden Montaza. Regarding the interaction, data confirmed that there were significant interaction effect in cholesterol LDL, HDL, triglycerides (TG), total lipids (TL), glucose, calcium, phosphorus, triiodothyronin hormone (T3), uric acid, AST, total protein, albumin, globulin and A/G

between strain and supplementation of (growth promoters). However, no interaction was observed in GPT.

There were a significant increase for total cholesterol, LDL, uric acid, total protein, albumin, and globulin for organic acids (FORMI) group than the control and pro (Bio) groups. The highest value of HDL was found for Pre (Tech.) and the lowest value was found for pro (Bio) and combination (BTF) groups. The TG level the highest value was found for Pre (Dia.) group and the lowest value was found for pro (Bio). There was a significant increase in TL and A/G levels in the pro (Bio) group than the Pre (Tech) groups. The lowest values of glucose, calcium, phosphorus and T3 were found for control group than the treated groups. The highest value of glucose level was found for pro (Bio) and Pre (Dia.) groups. The highest values of calcium, phosphorus and T3 were found for combination (BTF) group. No significant differences of AST and ALT were observed between all treatments.

The highest value was found for Pre (Tech.) group and the lowest value was found for organic acid (FORMI) group in TAOC. The highest value of GPX was associated with probiotic (Bio) group while, the lowest value was found for control group. The highest value of SOD was found for Pre (Dia.) group and the lowest value was found for control group.

Heterophils/Lymphocyte ratio percentage value was significantly higher in Golden Montaza than Bandara. The highest value was found for organic acids (FORMI) group and the lowest value was found for probiotic (Bio Plus) group. The antibody titer before vaccination the highest values were attached with pre (Tech) group in comparison to pre (Dia) group. The higher values of antibody titer against Newcastle vaccine after vaccination were detected with pre (Tech.), org ((FORMI), combination (Bio, Tech and FORMI) and control groups in compare to values of either pre (Dia) or pro (Bio) groups.

The pre. (Tech.) enhanced villi height and width but the number and size of the crypts are completely different in Bandara than Golden Montaza Strain. The probiotic addition caused similar effect on both strains. Both strains respond differently to the pre. (Dia.) addition and to organic acid (FORMI) in terms of greater villi height and an increase in crypts number in Golden Montaza birds than Bandara ones.

**Key words:** Local strains, Probiotic, Prebiotic, Organic acid, Productive performance, Carcass characteristics, physiological response, Immunological response, Antioxidant activity, Histological examination.

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