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COMPARATIVE STUDY OF USING PROBIOTIC AND PREBIOTIC IN FEEDING BROILER CHICKS REARED IN CAGES

By

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B.Sc. Agric. Sc. (Poultry Production), Ain Shams University, 1997

M.Sc. Agric. Sc. (Poultry Nutrition), Ain Shams University, 2005

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Approval Sheet

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ABSTRACT

Fayza Mohamed Mansour Salem: Comparative Study of Using Probiotic and Prebiotic in Feeding Broiler Chicks Reared in Cages. Unpublished Ph.D. Thesis, Department of Poultry Nutrition, Faculty of Agriculture, Ain Shams University, 2012.

Two hundred and forty unsexed one day-old Hubbard broiler chicks were used up to 6 weeks of age to study effects of probiotic, prebiotic, and their combination (synbiotic) on growth performance, feed utilization, and intestinal microbial populations. Chicks were divided into 6 treatments, each with 5 replicates of 8 chicks each. Starter (1-14 days) and growing (15-42 days of age) diets were fed *ad lib*. Treatments were as follows, the control (T1); probiotic (Bio-plus2B®, 400g/ton diet, T2); prebiotic (Techno Mos®, 500g/ton diet, T3); and three synbiotic treatments (200 and 250g/ton (T4), 400 and 500g/ton (T5), and 800 and 500g/ton diet (T6), for Bio-plus2B® and Techno Mos®, respectively). Effect of treatments on body weight and gain was only significant at growing period. Body weight and gain at 6 weeks of age were significantly increased by synbiotic treatments at recommended (T5) or at high level (T6), while the effect of synbiotic at low level (T4) was not significant. Similar trend was observed with the full period (0-6 weeks). The addition of either probiotic (T2) or prebiotic (T3) had a significant ($P < 0.05$) reduction in body weight and gain in comparison with the recommended synbiotic (T5). However, synbiotic treatments significantly ($P < 0.05$) increased feed intake at starter and growing periods, while only prebiotic (T3) resulted in a significant reduction in feed intake ($P < 0.05$) and numerically improved feed conversion ratio during growing period.

Plasma total protein was significantly ($P < 0.05$) increased by only prebiotic (T3). Similar trend was shown with plasma albumin, although the effect was non-significant ($P > 0.05$). Plasma globulin was significantly ($P < 0.01$) increased by only prebiotic (T3) which indicates

same trend as plasma total protein. Synbiotic at low level (T4) showed the lowest values of plasma globulin and total protein. Plasma triglycerides was significantly ($P < 0.05$) reduced by adding only prebiotic (T3) in comparison with the control (T1) and probiotic (T2) treatments. In addition, chicks fed on synbiotic treatments showed a significant ($P < 0.05$) reduction in plasma triglycerides and cholesterol. However, neither the addition of probiotic (T2) nor prebiotic (T3) had a significant effect on plasma cholesterol.

Birds receiving a ration containing only prebiotic (T3) showed a significant ($p < 0.05$) increase in carcass (%) as compared with the control (T1), while birds receiving combination treatments (T4, T5 and T6), numerically improved carcass (%) compared to the control group. However, there was no significant difference in carcass (%) between adding probiotic alone (T2) and control treatment (T1). On the other hand, all dietary treatments had no significant effect on carcass weight or on relative value of gizzard, liver, heart, spleen and bursa as a percent of live body weight. However, the effect of experimental treatments on dry and organic matter intake, excretion, and retention was non-significant compared to the control treatment.

There was a significant ($P < 0.01$) reduction in total coliform (TC), fecal coliform (FC) and fecal streptococci (FS) in all experimental treatments compared to the control group. The effect of adding probiotic and/or prebiotic at different levels to broiler diets did not have a significant effect on total viable bacterial (TVBCs) and *Lactobacillus* bacterial counts. Addition of different levels of probiotic and/or prebiotic to broiler diets increased all of jejunal villi height and width and also the number of villi and crypts cells.

Results revealed that probiotic and prebiotic can be used as good growth promoters in broiler diets. The use of broiler diets supplemented with synbiotic appeared to have better performance than the use of either probiotic or prebiotic solely. Synbiotic addition resulted in reduction of plasma cholesterol and triglycerides, and the harmful bacteria in small

intestine that can produce healthy broiler meat products for human consumption.

Keywords: broiler chicks, probiotic, prebiotic, synbiotic, performance, bacterial population, villi, and blood metabolites.

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