



## MINISTRY OF JIHAD-E-AGRICULTURE

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### **The effects of sodium humate (HNa) and probiotic (PB) on performance, nutrient digestibility, immuno system and meat oxidative stability in broiler chickens**

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#### **Abstract**

This study was conducted to determine the effects of sodium humate (HNa) and probiotic (PB) supplementation on meat oxidative stability, immuno system, bone morphology and nutrient digestibility in broiler chickens. For this purpose, 288 male broiler chicks (Ross 308) were used from 1 to 42 days old. A 3×2 factorial experiment on the basis of completely randomized design was done with four replications. Experimental factors were: HNa1, HNa2 and HNa3 in three levels (0, 0.15 and 0.30 % of the diet) and PB1 and PB2 in two groups (0 and 0.02 % of the diet). The results showed that, the best feed conversion ratio was obtained at the finisher1 and 2 and the whole period at the use of 0.30 % of the diet ( $P \leq 0.05$ ). The highest live weight of the last course was obtained in the treatment of 0.30 % sodium humate in the diet ( $P \leq 0.05$ ). The production index improved at a level of 0.30 % of sodium humate compared to other treatments ( $P \leq 0.05$ ). Percentage of the carcass was higher in the group receiving PB2 and HNa2 than the control group. The abdominal fat pad was lower in the PB2 and HNa2 group than in the control group ( $P < 0.05$ ). Water holding capacity (WHC) in HNa2 and HNa2+PB2 were higher than other groups ( $P < 0.05$ ). PH was lower in PB2 and HNa2 and HNa2+PB2 than other groups ( $P < 0.05$ ). TBA was lower in HNa2 and HNa3 than HNa1 ( $P < 0.05$ ), but not influenced from different groups of PB and HNa+PB ( $P > 0.05$ ). In nutrient digestibility items such as organic matter, crude protein, crude fat and calcium digestibility, high percent were observed in HNa2 groups, but only organic matter and calcium digestibility were higher in PB2 than others ( $P < 0.05$ ), but other items were not affected by different groups of HNa and PB. No interaction effects observed between HNa and PB on this item. In bone morphology, bone weight and ash percent were not affected by HNa levels and interaction effects of HNa and PB. But higher bon weight and ash percent were observed in PB2 ( $P < 0.05$ ). The highest levels of SRBC and G-type immunoglobulin were obtained in groups receiving HNa2 and PB2 ( $P < 0.05$ ). The microbial population of the small intestine was not influenced by the main effects of HNa

and PB. However, the population of Bacillus in the group receiving PB2 was higher than the PB1 group ( $P < 0.05$ ). In conclusion, 0.30 % HNa and 0.30 % HNa + 0.02 % PB supplementation improved performance, increased the nutrient digestibility, meat oxidative stability, bone ash, calcium content, boosted immunity system in broiler chickens and had no harmful effects on the gastrointestinal flora.

**Key Words:** Broiler chicken, HNa, Probiotic, Immunity, Meat quality, Nutrient digestibility, Performance