Objective: This study was conducted to investigate the effects of probiotic, prebiotic and synbiotic with and without feed restriction on broilers performance, blood parameters, carcass characteristics, and feed cost of production from 1 to 56 days of age.
Methods: Two hundred and forty unsexed one day-old chicks of Arbor Acres breed were used. Two trials, I and II, were conducted, with 120 birds in both. Each trial was divided into 4 equal groups. The birds in trial I were fed *ad libitum* throughout the experiment, while the chicks in trial II were fed *ad libitum* during the first week of age, then subjected to 5 hours/d of feed restriction from the beginning of the second week up to the end of the experiment. In both trials, the birds in group 1 were fed on a control diet while the other groups were given the same control diet supplemented either with a probiotic in group 2, prebiotic in group 3, or synbiotic in group 4.
Results: It was found that chicks fed diets supplemented with probiotic, prebiotic and synbiotic (with and without feed restriction) exhibited higher body weight and feed efficiency than chicks fed the control diets. The feed additives in both trials did not affect hemoglobin, serum total protein, albumin, globulin, glucose, and total cholesterol, except the packed cell volume which was increased in the additive treatments with restriction at the end of the experiment. Moreover, the dietary treatments did not influence the carcass yield. However, the relative weights of liver, gizzard and proventriculus, small intestine and bursa of fabricius were found to be increased. The additives decreased the visible fat in the carcass, with more decreasing effect in the additive groups with restriction. The lowest feed cost per kg of weight gain was observed in the birds fed diets supplemented with synbiotic, probiotic and prebiotic. Feed restriction improved the feed conversion ratio, economic return, but decreased the feed intake, serum total cholesterol and visible fat in comparison with non-restricted groups.
Conclusion: The biological feed additives could be routinely added to broiler diets, especially when a feed restriction program is followed. Finally, it can be recommended to restrict feed, and add probiotic or synbiotic to increase weight, improve feed conversion rate and reduce feed cost of production.