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Effect of *Lippia citriodora*, *Cynara scolymus* and *Salvia officinalis* on response of broilers chickens under cold stress condition

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Abstract

This study was conducted to investigate the effects of medicinal plants of *lippia citriodora*, *cynara scolymus* and *salvia officinalis* powder on ascites syndrome in broiler chicken. A total of 720-day-old male broilers (Ross 308) were divided into nine experimental groups. The experiments were performed in four replicates and 20 birds per pen in a completely randomized design for 42 day. Dietary treatments included 1-control group (basal diet), 2, 3-, were defined by the inclusion of 1 or 2 percent of *lippia citriodora*, 4 , 5- inclusion of 1 or 2 percent of *cynara scolymus*, 6 ,7 inclusion of 1 or 2 percent *salvia officinalis* powder, 8- inclusion of antibiotic 0.0015 percent and 9- inclusion of Aspirin 0.2 percent. Growth performance, immune system, serum biochemical parameters, hematological parameters, microbial population, heart condition, systolic blood pressure, ascites indices and carcass characteristics were evaluated. The diets contain medicinal plants powder increased feed intake and body weight gain ($P<0.05$). The diet was supplemented by 1% *lippia citriodora* had lowest feed conversion ratio ($P<0.05$). Use of 2% of *cynara scolymus* and *salvia officinalis* led to a decrease in the cholesterol and LDL- cholesterol at the end of experiment ($P<0.05$). The experiment diets had no effect on biochemical serum blood and blood cells in 21 day. At the entire period, red blood cells of birds fed the diets supplemented with 1 and 2% *Cynara scolymus* were shown a significant decrease ($P<0.05$). In the entire period the diets supplemented with both of levels *Lippia citriodora* and 2 % *salvia officinalis* increased lymphocyte. The diet supplemented with 2 % *Salvia officinalis* was decreased heterophile:lymphocyte ratio and eosinophils percent as compared to control group ($P<0.05$). Using the medicinal plants led to decrease total mortality and ascites related mortality compared to the control group ($P<0.05$). Supplementing diet with antibiotic led to a significant decrease in lactobacilli and bifidiobacteria loads at the 21 and 42 days of ages. Both levels of *Salvia officinalis* and level of 2% of *lippia citriodora* were caused to increase bifidiobacteria at the end of 21 days. The diet that including 2% *cynara scolymus*.decreased *Eshershia coli*(*E. Coli*) compared to the control and antibiotic diets at the end of 42 day of age($P<0.05$) and levels of 2% *lippia citriodora* .and 2% *Salvia officinalis* increased bifidibacteria population. The villous heights in the duodenum by supplementing diet with 2% medicinal plants were significantly increased in comparison with those of control and antibiotic at 21 days. Treatments had no effect on crypt depth. The experimental diets had no effect on IgG and IgM against sheep red blood cells (SRBC) in primary response. The aspartate

amino transferase was significantly decreased by adding 2% level of medical plants to control diet ($P<0.05$). The experiment diets had no effect on carcass traits. Erythrocyte osmotic fragility, and RV:TV ratio were significantly decreased by feeding supplemented by medicinal plants ($P<0.05$). Systolic blood pressure was also significantly decreased in the groups fed diets supplemented by *cynara scolymus* at 28, 35 and 42 days of ages ($P<0.05$). The medicinal plants of *Lippia citroidora*, *Cynara scolymus* and *Salvia officinalis* have a positive effect on growth performance and decrease ascites incidence under cold stress condition, it is concluded that the inclusion of one or two percent powder of these medicinal could be recommend.

Key Words: *Lippia citroidora*, Broiler chicken, Growth performance, *Cynara scolymus*, *Salvia officinalis*, Ascites syndrome.