Effects of high fat diet on some physiological parameters in broiler chicken under high environmental temperature

The objectives of this study were to investigate the effects of increasing the level of soybean oil in the diet of broiler chicken on some physiological parameters including growth performance, some blood parameters, some blood metabolites and hormonal changes during the exposure to stress of high environmental temperature. A total of 60 one-day-old chicks were divided into three groups with each group containing 20 chicks of both sexes. One group served as a control group whereas the other two groups served as experimental groups. At day 21 of age, the control group; Normal Temperature Low Fat (NTLF) was transferred to a separate room and remained under ideal temperature (25°C) and the same fat level (3%) in the diet. In the other two experimental groups in which temperature was not adjusted and depended on the outdoor climatic condition of the summer season, one group remained under the same fat level (3%) (High Temperature Low Fat group (HTLF)) and fat level was increased in the diet of the other group (6%) (High Temperature High Fat group (HTHF)). No significant differences between the groups regarding body weight, body weight gain, feed conversion ratio and feed intake were found. A significant decrease in the total red blood cells count (RBCs) was observed in the HTLF group at 42 day of age and in the total leucocytic count (WBCs) at both 35 and 42 days of age. Heterophile/Lymphocyte ratio (H/L) was significantly higher in HTLF and HTHF group at 28 days of age. Serum total cholesterol (Tcol), triacylglycerol (TG), total lipids and high density lipoprotein cholesterol (HDL-c) were significantly higher in HTHF and HTLF group while there was a significant decrease in low density lipoprotein cholesterol (LDL-c) in these groups. Serum total protein was significantly decreased in HTHF and HTLF group. Serum triiodothyronin (T3) was significantly decreased in HTHF and HTLF group at 28 days of age. These results suggest that the addition of soybean oil to broiler diets at a level of 3 and 6% during the period of heat stress can improve growth performance parameters without affecting serum TCOL, TG, total lipids and T3. Increase serum HDL-c and reduce LDL-c.