Effect of replacing dietary $FeSO_4$ with equal Fe-levelled iron glycine chelate on broiler chickens

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Abstract: Iron (Fe) is an essential mineral for animal development and function. The present study was carried out to evaluate the effect of replacing $FeSO_4$ with iron glycine chelate (Fe-Gly) in the equal Fe level in diets on broiler chickens. The broilers were randomly allotted to 6 dietary treatments with 5 replicate pens and 10 birds per pen. The treatments consisted of: Control group (100 mg Fe from $FeSO_4$/kg diet), Experi-mental group 1 (80 mg Fe from $FeSO_4$ + 20 mg Fe from Fe-Gly/kg diet), Experimental group 2 (60 mg Fe from $FeSO_4$ + 40 mg Fe from Fe-Gly/kg diet), Experimental group 3 (40 mg Fe from $FeSO_4$ + 60 mg Fe from Fe-Gly/kg diet), Experimental group 4 (20 mg Fe from $FeSO_4$ + 80 mg Fe from Fe-Gly/kg diet), and Experimental group 5 (100 mg Fe from Fe-Gly/kg diet). The results showed that replacing $FeSO_4$ with Fe-Gly in the diets did not significantly improve broiler growth performance ($P > 0.05$). But it significantly ($P < 0.05$) improved the blood biochemical parameters. Xanthione oxidase activity in blood serum showed no significant difference between all treatments at day 21 except for Experimental group 5 ($P > 0.05$). In addition, catalase activity in blood serum and Cu/Zn superoxide dismutase activity in liver were increased with the increasing replacement level of Fe-Gly ($P < 0.05$). But for all of the above indicators, the observed values of Experimental groups 3, 4, and 5 did not significantly differ ($P > 0.05$). This study indicates that replacing $FeSO_4$ with Fe-Gly in the equal Fe level in the diets cannot improve the growth performance of broilers. But it can effectively improve the blood biochemical parameters and antioxidative enzyme activity. The least substitution ratio for low feeding cost and beneficial effect on the broilers was 60%.

Keywords: broiler; amino acid; chelated iron; growth performance; blood biochemical parameters; antioxidant enzyme activity