

Effects of dietary Vitamin D and 25-OH D₃ levels on 0-53 d broiler chicken performance, processing, tibia ash, and serum Ca and 25-OH D₃ status

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Broiler chicken production is Mississippi's top agricultural commodity. Feed and feed manufacture represent ~70% of the costs required to rear poultry; therefore, any small change in diet formulation can have a dramatic impact on production cost, as well as broiler performance and health. Previous research has demonstrated improved breast yield and bone mineralization for broilers fed diets supplemented with 25-OH D₃. The objective of this study was to investigate the effects of dietary Vitamin D and 25-OH D₃ supplementation on day 0-53 broiler performance, processing yield, tibiae ash; as well as serum Ca and 25-OH D₃. The following inclusions were made to a common corn, soybean meal and DDGS based diet: treatment (Trt) 1-Low Vitamin (Vit) D₃ (165 IU/kg); Trt 2-Low Vit D₃ + 34.8 ppb Bio-D; Trt 3-High Vit D₃ (2756 IU/kg); Trt 4-High Vit D₃ + 34.8 ppb Bio-D; Trt 5-High Vit D₃ + 69.7 ppb Bio-D. On day 0, 1140 male chicks were equally placed in 60 pens; each Trt was randomly assigned to pen with 12 replications per trt. On day 0, 14, 28, 42, and 52 blood was collected from 3 birds/pen and analyzed for serum Ca and 25-OH D₃ levels. Also, on day 14 and 28 tibiae were extracted from 3 birds per pen and on day 53 from processed birds for bone ash measurements. Birds fed Trt 1 exhibited decreased performance, as well as lowest tibiae ash weight and serum Ca and 25-OH D₃ levels. Birds fed Trts 2-5 demonstrated improved performance as compared to Trt 1, along with serum 25-OH D₃ levels displaying a stepwise increase from treatment 1-5 (P <0.001). Overall, birds fed a diet with added 25-OH D₃ and Low Vit D (165 IU/kg) levels had improved performance as compared to birds fed High Vit D (2756 IU/kg).