THE EFFECTS OF HIGH DIETARY CALCIUM ON THE PERFORMANCE OF DIFFERENT STRAIN OF COMMERCIAL BROILERS CHICKENS.

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Two experiments investigated the effects of different dietary levels of calcium (Ca), available phosphorus (AP) and /or vitamin D (D) on the growth performance, and calcium and phosphorus metabolism of chickens from different commercial strains.

Experiment 1 investigated the effect of Ca:AP ratio (10:4.8, 25:4.8 and 25:11 g/kg) on the performance of sexed chickens from two broiler strains (S1 and S2). A dietary 25:4.8 ratio significantly reduced weight gain and increased feed conversion ratio (FCR), whilst 25:11 ratio reduced weight gain only. There were a significant interactions between strain and sex for weight gain and FCR.

Experiment 2 investigated the effects of dietary levels of Ca (12, 22 and 32 g/kg), AP (4, 8.5, 13 g/kg) and D (400 and 800 iu/kg) on the growth performance, plasma minerals (Ca and P), electrolytes (Na and K) and total protein, tibia Ca and P content and Ca and P consumption, excretion and retention in broiler chickens from different strains. Excess dietary levels of Ca significantly reduced weight gain, tibia Ca and P content and increased plasma total Ca, Ca consumption and excretion. Ca at 32 g/kg significantly increased tibia Ca:P ratio, plasma ionized calcium and reduced plasma phosphorus, tibia ash, P excretion, faecal moisture and Ca retention. Dietary calcium did not influence plasma electrolytes, total protein or Ca:P retention. Excess dietary levels of AP significantly reduced plasma total and ionized Ca and faecal moisture and increased P consumption and excretion, plasma phosphorus and tibia ash. AP at 8.5 g/kg increased weight gain, tibia Ca and P content, Ca consumption and excretion and Ca:P retained. AP at 13 g/kg reduced tibia Ca:P. Dietary AP did not influence either plasma electrolytes or total protein. Excess dietary D increased plasma total and ionized Ca, tibia Ca:P ratio and reduced plasma sodium and phosphorus concentrations. There were a differential effects of dietary treatments in the strains upon tibia contents of Ca and Ca:P ratios to variation in dietary treatments, whilst they differed in Ca excretion and faecal moisture due to feeding either dietary Ca or AP. There were significant interactions between dietary Ca and AP for tibia Ca and P content and Ca:P ratio, plasma phosphorus and ionized Ca, between dietary Ca and D for plasma total and ionized Ca, between dietary AP and D for ionized Ca, between strain and either Ca, AP or D for weight gain and between D and strain for plasma phosphorus.

It was concluded that strain of broiler chickens influenced the tolerance to high dietary levels of calcium. A lean strain of chickens tolerated high dietary levels of calcium better than its fat counterparts.

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