

Abstract

The role of dietary phytate (inositol hexaphosphate) in the regulation of intestinal mucosa phytase was investigated in chicks. Seven-day-old chicks were grouped by weight into six blocks of three cages with six birds per cage. Three purified diets [a chemically defined casein diet, a chemically defined casein diet plus sodium phytate (20 g/kg diet) and a chemically defined casein diet plus sodium phytate (20 g/kg diet) and microbial phytase (1000 units/kg diet)] were randomly assigned to cages within each block. Chicks were fed experimental diets from 8 to 22 days of age then killed, and duodenal mucosa and left tibia removed. Phytase activity in duodenal mucosa, growth performance and bone ash content were determined. Addition of phytate to the chemically defined casein diet reduced ($p < 0.05$) the $V(\max)$ of the duodenal brush border phytase, but the $K(m)$ of the enzyme was not affected. Addition of phytate also reduced ($p < 0.05$) weight gain, feed intake, feed efficiency and percentage ash. Addition of microbial phytase fully restored the feed efficiency ($p < 0.05$), but $V(\max)$ and body weight gain were only partially restored ($p < 0.05$). In conclusion, it would seem that dietary phytates non-competitively inhibit intestinal mucosa phytase.