Effects of exogenous phytase supplementation and dietary phosphorus concentration on metabolism and digestibility of beef cattle. C. J. Long*, H. H. Stein, T. L. Felix, University of Illinois at Urbana-Champaign, Urbana.

Objectives were to determine the interactions of phytase inclusion and dietary phosphorus concentration on metabolism of beef cattle fed a starch-based diet. Six ruminally fistulated steers (initial BW = 750 ± 61 kg) were allotted to a 6 × 6 Latin square design with a 3 × 2 factorial arrangement of treatments. Factors included phytase inclusion, at 0, 500, or 2000 phytase units (FTU)/kg of diet DM, and dietary P concentration, at 0.10% and 0.30% of total diet DM. Data were analyzed using the MIXED procedure of SAS with animal as the experimental unit. The CORR procedure was used to compare P concentrations between samples. There were no treatment interactions (P ≥ 0.30) for any parameter measured. There were no main effects (P ≥ 0.45) of phytase on DMI, total fecal output, apparent DM digestibility, water intake, or urinary output. Steers fed 0.10% P had decreased (P < 0.01) DMI and total fecal output but increased (P < 0.01) apparent DM digestibility compared with steers fed 0.30% P. Although N intake and retention were not affected by treatment, steers fed the 0.10% P diet tended (P = 0.10) to absorb more N and excrete more N in the urine (P = 0.02) and less N in the feces (P < 0.01) compared with steers fed 0.30% P. Steers fed 0.10% P also consumed 70.1% less (P < 0.01) total P each day and excreted 51.9% less P in the feces (P < 0.01) and 94.6% less P in the urine (P < 0.01) compared with steers fed 0.30% P. Water-soluble P in the feces was greater (P < 0.01) on a g/d basis in steers fed 0.30% P when compared with steers fed 0.10% P. However, the proportion of total fecal P excreted as water-soluble P increased by 23.0% in cattle fed 0.10% P compared with steers fed 0.30% P, regardless of phytase inclusion level. There was no effect of dietary phytase concentration on blood or urinary (P ≥ 0.27) P concentrations. Blood P concentration was positively correlated (r = 0.60; P < 0.01) with urinary P concentration when steers were fed 0.10% P; however, when steers were fed 0.30% P, there was no correlation (r = 0.36; P = 0.16). Regardless of dietary P concentration, phytase supplementation did not increase P absorption or retention.

Key Words: phytase, phosphorus, beef cattle


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