

Site of activity within the digestive tract of growing pigs of an evolved E.coli-derived and  
a fungal-derived commercial phytase

L. M. McGinnis, M. R. Widmer, C. L. Wright, T. M. Parr, and H. H. Stein.

South Dakota State University, Brookings 57007

An experiment was conducted to investigate the site of activity within the digestive tract for a bacteria-derived phytase, Quantum™ phytase (QP), and for a fungal-derived phytase, Natuphos™ phytase (FP) when fed to growing pigs. Six barrows (initial BW: 31.1 kg) were fitted with T-cannulas in the anterior duodenum and in the distal ileum. Pigs were allotted to a repeated 3 x 3 Latin square with 3 diets and 3 periods. Three corn-soybean meal diets containing no inorganic P were formulated. The control diet (NC) contained no phytase, but the remaining 2 diets contained 500 FTU per kg of either QP or FP. Each period lasted 9 d with the initial 4 d being an adaptation period. Fecal samples (d 5), ileal digesta (d 6 and 7), and duodenal digesta (d 8 and 9) were collected. Diets, duodenal, ileal, and fecal samples were analyzed for P and myoinositol hexaphosphate (IP6), myoinositol pentaphosphate (IP5), myoinositol tetraphosphate (IP4), myoinositol triphosphate (IP3), and myoinositol biphosphate (IP2). Diets and ileal samples were also analyzed for CP and AA. Apparent duodenal (ADD), ileal (AID), and total tract (ATTD) digestibility of P and the AID for CP and AA were calculated. Results showed that there were no differences in AID for CP or any AA among the 3 diets. On the other hand, ADD for P was higher ( $P < 0.05$ ) for QP fed pigs than for the NC or FP diets (14.7 vs. 1.0 and 2.3%). The AID of P for QP and FP were not different (41.2 and 36.9%, respectively) but both were higher ( $P < 0.05$ ) than for NC (13.4%). The ATTD of P also was similar for

QP and FP (42.2 and 45.3%, respectively), but greater ( $P < 0.05$ ) than for NC (14.2%). Approximately 65% and 23%, respectively, of the dietary P was in the form of IP6 and IP2. In the duodenal and ileal digesta of pigs fed NC, more ( $P < 0.05$ ) P was bound in IP6 than in pigs fed either phytase source, but in fecal samples no P was bound in any of the myoinositol forms regardless of dietary treatment. The present results indicate that QP is more effective than FP in releasing P in the upper tract (stomach and duodenal region) of pigs.