Phytase increases net energy in low-phosphorus diets

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Phytase and xylanase addition to pig diets aims to improve digestibility of phosphorus and arabinoxylans, respectively. Increased nutrient digestibility should increase dietary net energy. Because phytase and xylanase target different nutrients, the combined addition may act synergistically to increase nutrient digestibility, and hence dietary net energy. The objective of this study was to determine the effect of these enzymes on dietary net energy.

Six individually housed gilts (35 kg initial body weight), surgically fitted with T-canulas at the terminal ileum, were restrictively fed 6 diets, calculated to be isonitrogenous and isoenergetic, in a Latin square design. The diets were a high protein control (C), a low protein diet with added amino acids (LP+), low protein without added phosphorus (LP-), and LP- diets with added phytase (P), xylanase (X) or phytase plus xylanase (PX). The pigs were subjected to 24h indirect calorimetry. Feed intake was 84.3 ±1.0 g/kg$^{0.75}$ BW and not different (P=0.70) among diets. Daily gain (518 ±30 g/d) and feed conversion ratio (0.297 kg gain per kg feed) were not different (P > 0.60) among diets. Heat production increased with BW (P=0.001), but was not affected by diet (P=0.53). Maintenance heat production (458 kJ/ kg$^{0.75}$ BW) and dietary heat increment were used to calculate net energy. Reducing dietary protein (Diet LP+ vs. C) increased net energy by 7.7%. Phosphorus removal (LP- vs. LP+) reduced (P=0.02) dietary net energy. Adding phytase (P) increased (P=0.05) dietary net energy to a level similar (P>0.57) to C and LP+. Adding xylanase alone (X vs LP-) did not increase (P = 0.96) net energy. The combination of phytase and xylanase (PX vs LP-) increased net energy.

Implications:
These preliminary results indicate that low phosphorus intake decreases dietary net energy. Addition of phytase to a low phosphorus diet increased net energy, however the addition of xylanase did not increase net energy from these diets.

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