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The objective of this study was to determine the impact of vitamin E (E) status on Fe metabolism in the young pig. Two littermate gilts bred to the same boar were fed a NRC-based gestation diet with 1% corn oil, 1% cod liver oil, and no added E from day 84 of gestation. At 3 days of age, 12 pigs were weaned and allowed to treatment based on sex and litter and fed a slurry made from a semi-purified dried skim milk diet which met NRC requirements except for Fe and E. The treatments given IM at 6 days of age were (1) Fe dextran (Fe200 mg), (2) Fe plus Se and vitamin E (FeSe-15 mg Se and 1.5 IU E) or (3) Fe plus E (Fe200-100 IU E). Serum alpha-tocopherol was determined by HPLC. Initially all pigs had low concentrations of E (mean = 2.6 ± 0.3 μg/mL), but only pigs receiving FeE had a significant (P < .0001) increase in serum alpha-tocopherol concentrations compared to Fe and FeE (44 vs. 1.4 and 2.1 μg/mL, respectively) 24 hours after injection. The 18-fold increase in serum E for the FeE pigs was transient, and E concentrations were not significantly different from pigs receiving Fe or FeE at 14 days of age (1.9 vs. 7 and 9 μg/mL, respectively). There was a significant treatment by bleeding time interaction (P < .0005). As previously reported, there was no effect of treatment on hemastircti, hemoglobin concentration, or ceroplasmin activity. In conclusion, administration of a high dose of E in early weaned pigs caused a transient elevation of serum alpha-tocopherol concentration, but did not influence the changes in hemastircti, hemoglobin or ceroplasmin associated with Fe administration. At 7 days post injection, neither injected E or Se and E provided adequate circulating alpha-tocopherol to pigs from dams fed a low E diet. This study was partially funded by the Missouri Pork Producers Association.

alpha -tocopherol, iron dextran, pigs

Key Words: Pigs, Niacin, Metabolism


An experiment was carried out in 56 pigs (BW 10 to 40 kg; exp. unit: pen of piglets, 13 piglets in group: 20 kg to 110 kg; exp. unit: pen of pigs of the three way cross Y × (F1 × D1) and 12 reproductive sows [5 or more; exp. unit 1 sow of the cross F1 × D1 during lactation and subsequent pregnancy to evaluate the apparent total tract digestibility of P (dP) in a diet either or not supplemented with microbial phytase (MP) from Aspergillus niger (500 phytase units (PTU) per kg diet). The treatments were formulated without inorganic feed phosphate and consisted of corn (310 g kg⁻¹), tapioca meal (200 g kg⁻¹), phytase-reactivated wheat middlings (200 g kg⁻¹), peas (75 g kg⁻¹), extr. soybean meal (51 g kg⁻¹) and extr. sunflower meal (50 g kg⁻¹) as major components. The mix of minerals and vitamins was adjusted according to specified requirements of each category of pigs. The diet had an analysed content of Ca, total P and phytate P of 6.2, 4.8 and 3.7 g kg⁻¹, respectively and a low intrinsic phytase activity. CrO₇⁻ was used as a marker. The animals were fed twice daily at a feeding level of 2.8 times maintenance requirement (M = 0.418 x ME W₀.75), except for the apparent digestibility of Ca which was fed at 1.2 x M. The diets were not soaked in water. In growing-finishing pigs, an effect of age/BW could be detected, however the course was inconsistent. dP of the phytase-deficient treatment with growing pigs of 60 kg BW was 28.2 % and MP enhanced dP by 16.7 percentage units. In piglets, dP was strongly dependent on age/BW and was always lower than dP with growing pigs of 60 kg BW (8.3 to 2.9 percentage units). As the piglets grew older, dP increased and differences with growing pigs became smaller. Efficacy of MP on dP in piglets was decreased by 4.2 to 2.0 percentage units as compared to growing pigs of 60 kg BW. dP in multiparous sows during mid pregnancy and end pregnancy and lactation was substantially lower (14.5, 9.9 and 8.3 percentage units, respectively) as compared to growing pigs of 60 kg BW. Efficacy of MP in multiparous sows was lowered by 10.0 and 1.7 percentage units during mid pregnancy and end pregnancy, respectively. During lactation efficiency of MP was improved by 5.0 percentage units as compared to growing pigs of 60 kg BW.

It can be concluded that dP of a phytase-deficient diet with piglets and multiparous sows is lower than in growing pigs. Efficacy of MP is lowered in piglets and multiparous sows during pregnancy, whereas it is increased in multiparous sows during lactation.

Key Words: pigs, age, phosphorous, digestibility