
113 Digestible calcium requirements and calcium and phosphorus balance for weanling pigs.

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Two experiments were conducted to determine the standardized total tract digestible (STTD) Ca requirement of 11 to 25 kg pigs based on growth performance, bone ash, or bone Ca retention. Diets were based on corn, soybean meal, and lactose. Six diets were formulated to contain 0.36% STTD P, which is 10% above the NRC requirement to make sure that P was not limiting Ca deposition. These diets were formulated to contain 0.32, 0.40, 0.48, 0.56, 0.64, or 0.72% STTD Ca, by including increasing amounts of calcium carbonate at the expense of cornstarch. Two additional diets were formulated to contain 0.72% STTD Ca and 0.33 or 0.40% STTD P to determine if 0.36% STTD P had negative effects on the Ca requirement.

The same batch of diets were used in both experiments. In Exp. 1, 256 pigs (initial BW: 11.39 ± 1.21 kg) were randomly allotted to the 8 diets, with 8 replicate pens per diet in a randomized complete block design. Pen was the experimental unit and each pen had 4 pigs. On the last day of the experiment, 1 barrow per pen was euthanized to collect the femurs. Results indicated that ADG and G:F ratio started to decline at 0.56 and 0.43% STTD Ca, respectively. However, the requirement for STTD Ca to maximize bone ash, bone Ca, and bone P were 0.48, 0.48, and 0.56%, respectively. Growth performance was not affected by the level of P in the diets; however, bone ash increased linearly ($P < 0.05$) as the STTD P increased. In Exp. 2, eighty pigs (initial BW: 13.12 ± 1.79 kg) were randomly allotted to the 8 diets, with 10 replicate pigs per diet in a randomized complete block design. Pig was the experimental unit. Fecal and urine samples were collected using the marker-to-marker approach. Results indicated that the amount of Ca retained (g/d) increased linearly ($P < 0.001$) and quadratically ($P < 0.05$) as the level of dietary STTD Ca increased. Increasing dietary STTD P increased linearly ($P < 0.01$) the retention of Ca (g/d). The requirement for STTD Ca to maximize Ca retention (g/d) was 0.52%. In conclusion, the STTD Ca requirement by 11 to 25 kg to maximize bone ash under these experimental conditions was 0.48%, however, ADG and G:F ratio declined at 0.56 and 0.43% STTD Ca, respectively.

Key Words: calcium requirements, digestible calcium, retention
