

A novel procedure for measuring endogenous phosphorus losses and true phosphorus digestibility by growing pigs

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A novel procedure was developed to estimate endogenous losses of phosphorus by growing pigs. A P-free diet was formulated using mainly cornstarch, dextrose, gelatin, and crystalline DL-methionine, L-tryptophan, L-isoleucine, and L-histidine. In Exp. 1, two P-free diets were formulated using gelatin of either porcine or bovine origin. The apparent (AID) and standardized (SID) ileal digestibility coefficients of AA in these two diets were compared to the AID and SID in soybean meal (SBM). Results of this experiment showed that there were no differences in AID or SID for any of the indispensable AA between the two sources of gelatin when fed to growing pigs (N = 4). Likewise, except for tryptophan, there were no differences in AID and SID for any of the indispensable AA between the two gelatin sources and SBM. In exp. 2, a P-free diet based on gelatin of porcine origin was used to measure the apparent (ATTD) and true (TTTD) total tract digestibility of three sources of inorganic phosphorus. In addition to the P-free diet, three other diets were formulated based on the P-diet, but each of these diets were supplemented with either monosodium phosphate (MSP), purified monocalcium phosphate (MCP) or dicalcium phosphate (DCP). The inorganic phosphate sources were added to the P-free diet to reach a total P-content in the diets of 0.2%. Each of the four diets was fed to 7 pigs for 12 d. Fecal material was collected for five d using the marker to marker procedure. Results of the experiment showed that the ATTD in DCP was lower ($P < 0.05$) than in MCP (81.49 vs. 91.88%), while the ATTD in MCP (87.96%) was similar to the other two sources. The endogenous losses of P were calculated based on the P-concentration in the fecal samples from pigs fed the P-free diet and averaged 0.139 g P per kg DMI. By correcting the ATTD for the endogenous losses, the TTTD were calculated. For DCP, MCP, and MSP, the TTTD was 88.41, 94.93, and 98.20%, respectively. The value for MSP was higher ($P < 0.05$) than the value for DCP, while the TTTD for MCP was not different from any of the other two sources. The two experiments showed that the P-free diet provide a way of estimating endogenous losses of P in pigs and can be used to calculate ATTD and TTTD in feed phosphates.