Dry Matter and Phosphorus Digestibility Respond Differentially to Graded Dietary Levels of Sodium Chloride Intake in Weaned Pigs

M.Z. Fan* and T. Archbold
Department of Animal and Poultry Science, University of Guelph, Guelph, ON Canada
*Correspondence author: (519) 824-4120, ext. 53656; E-mail: mfan@uoguelph.ca

Background

Amino acids, monosaccharides and inorganic phosphate are hydrolyzed from both dietary and endogenous sources by digestive enzymes and are primarily transported across the small intestinal apical membrane via sodium (Na^+)-substrate co-transport systems.

Objectives: The objective of this study was to examine effects of graded levels of sodium chloride (NaCl) intake on apparent ileal and fecal dry matter (DM) and true ileal and fecal phosphorus (P) digestibility in weaned pigs.

Methods and Procedures: Four Yorkshire barrows, with average initial and final BW of 6 and 15 kg, were fitted with a simple T-cannula at the distal ileum and fed four diets according to a 4 x 4 Latin square design. The diets were cornstarch, lactose and dextrose-based containing 54.6% soybean meal and four levels of NaCl (0.08, 0.16, 0.24 and 0.32%, on as-fed basis). Chromic oxide (0.40%) was included as a digestibility marker. Each experimental period consisted of 8 d with a 4-d adaptation period and 4-d collection of ileal digesta and fecal samples. Feed intake was 3,05, 616, 930 and 1,500g/d for periods 1 to 4, respectively.

Results:

- Apparent ileal DM digestibility was decreased at dietary NaCl level of 0.32% (57.3%) but not at the dietary NaCl levels of 0.08, 0.16 and 0.24% (74.4, 71.1, and 78.0%).
- Apparent fecal DM digestibility (89-91%) values were not affected ($P > 0.05$) by dietary NaCl intake levels.
- On the other hand, the lowest true ileal and fecal P digestibility values were observed at dietary NaCl level of 0.32%, whereas the highest true ileal and fecal P digestibility values were obtained at the dietary NaCl level of 0.24% in weaned pigs.
- In addition, DM and P digestibility values respond differentially in response to graded dietary NaCl intake levels at the ileal and the fecal levels.

Take Home Messages

- Our results further suggest that the present dietary NaCl levels (0.3-0.5%) for weaned pigs (10-20 kg), as recommended by the present NRC (1998), are likely to be too high and are inadequate to the optimal digestive utilization of nutrients in the weaned pig.
- Further studies need to be conducted to establish an optimal NaCl intake level for reducing fecal nutrient excretions in pigs.

Financial support from Ontario Pork Producers' Marketing Board, NSERC, Agriculture and Agri-Food Canada and Canadian Pork Council Multi-Partner Hog Environmental Management Strategy Program, and OMAF-University of Guelph Animal and Resources Management and Environment Research Programs is appreciated.