Concentrations of digesta metabolites in growing pigs are influenced by dietary energy level, but not by dietary amino acid level

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The formulation of swine feeds affects the composition of intestinal digesta, but the degree of influences is not defined. In this study, total 160 pigs (initial weight: 31.77 ± 3.57 kg) were allotted to 40 pens and four treatments with 4 pigs per pen and 10 replicate pens per treatment. Pigs were fed experimental diets for 90 days using a 3-phase feeding program. Diets were formulated using a 2 × 2 factorial design with 2 levels of dietary energy (high or low) and 2 levels of dietary amino acids (high or low). In these diets, concentrations of amino acids were adjusted mainly by the inclusion rates of soybean meal, and energy concentrations were adjusted by the inclusion rates of choice white grease and distillers dried grains with solubles. On d 90, one pig per pen was harvested and samples of ileal and cecal digesta were collected. Samples were immediately stored in liquid nitrogen and later analyzed using liquid chromatography-mass spectrometry (LC-MS)-based targeted and untargeted metabolomic analysis. The LC-MS data were modeled by multivariate analysis, and concentrations of metabolites in digesta were compared using Proc GLM of SAS. The distribution of samples in the multivariate models indicated that dietary energy concentration, but not amino acid concentration, resulted in compositional differences in both ileal and cecal digesta. Increased dietary energy, but not increased amino acid concentration, increased ($P < 0.05$) concentrations of essential amino acids (lysine, threonine, methionine, and valine), and fatty acids in the cecal digesta. Reduced dietary energy was associated with increased ($P < 0.05$) bile salts in the ileal digesta. Overall, the results were consistent with the growth performance data of the animals, indicating that dietary energy level influences metabolic status of growing pigs to a greater extent than dietary amino acid level.