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Use of metabolic profile in short-term studies for estimating optimum dietary isoleucine, leucine, and valine for pigs

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Highlights

- Increasing levels of isoleucine, leucine or valine affected the metabolic profiles
- Modelling plasma metabolites could estimate optimum amino acid requirement in piglets
- Two days of feeding may be sufficient to mediate relevant biological changes in blood

ABSTRACT

Traditional AA dose-response studies utilize many animals for evaluation of growth performance, and it is hypothesized that a new experimental design based on modern analytical techniques can reduce the number of used animals. The objective was to evaluate a short-term approach with a low number of pigs based on plasma metabolites as a method to determine the dietary Ile, Leu, and Val requirements. Three separate 6 x 6 Latin square experiments having 6 replicates per treatment were conducted with 6 diets containing increasing concentrations of Ile, Leu, and Val which were fed to 6 pigs (BW 8 to 9 kg) for 2 days, each without a wash-out period for a period of 12 days. The diets were prepared and used in 3 previous traditional-design dose-response studies and had been stored at -20 °C. Blood samples were collected at the end of each 2-day