Impact of varying dietary lysine and isoleucine levels on growth of 10 to 20 kg pigs

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Isoleucine (Ile) and/or valine become limiting in low CP pig diets that are supplemented with Lys, Thr, Met and Trp. To estimate the optimal standardized ileal digestible (SID) Ile:Lys in wheat-barley based diet fed to 10-20 kg pigs, a 21-d growth assay was conducted with 216 purebred Yorkshire pigs, which were allotted to 9 dietary treatments with 4 pigs (2 barrows and 2 gilts) per pen and 6 pen replicates per treatment. Diets 1 to 4 and 9 contained graded levels of Ile; diets 5 to 9 contained graded level of Lys. The contents of all other AA were similar in all diets, and met established requirements. The body weight (BW) of individual pigs and per pen feed disappearance were recorded weekly. Blood samples were taken from 2 pigs per pen on day 21 for determining plasma urea nitrogen (PUN).

The overall average daily gain (ADG), gain:feed (G:F) and final BW increased linearly (P<0.001) as the SID Lys level increased, which indicates that the SID Lys requirement was higher than the highest tested level of 1.21%. Isoleucine, Ile was 1st limiting and Lys was 2nd limiting in the test diets 1 to 4 and 9, allowing for an estimation of the optimal Ile:Lys ratio. During the 21-d period, the ADG, ADFI and G:F increased linearly and quadratically (P<0.001) as the SID Ile:Lys ratio increased. The PUN level decreased linearly (P<0.001) with increasing dietary Ile:Lys ratio.

The dietary SID Ile:Lys ratio to maximize ADG was estimated to be 46% based on exponential regression (95% of asymptotic response). Using G:F as response criterion the optimal SID Ile:Lys was estimated to be 51% by exponential regression.

Implications: In 10-20 kg Yorkshire pigs, the SID Lys requirement is higher than 1.21%, and a dietary SID Ile:Lys ratio of approximately 50% is required to maximize growth performance.