

Development of Rapid Method to Determine Lysine Requirement in Individual Pigs

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Previously, we have successfully developed a new method to determine amino acid requirements in piglets. This method involves feeding varying levels of a test amino acid and measuring the oxidation of an indicator amino acid (IAAO). The present study was designed to adapt the IAAO technique for use in growing pigs (20-30 kg). Although this technique can be used to establish the requirement of any amino acid, we chose lysine because it is the first limiting amino acid in most feedstuffs and its requirement in growing pigs is well established for comparison purposes.

Study Design and Results: Barrows were surgically implanted with venous catheters for isotope infusion. Pigs were fed a complete diet for 5 d (123% of lysine requirement predicted by NRC (1998)) after which phenylalanine (PHE) (the indicator) oxidation rate was determined. Test diets with one of 6 lysine intakes (56, 67, 78, 90, 101, 145% of requirement) were fed, in random order, to each pig for 2 d and PHE oxidation was determined. Two days of adaptation had previously been determined to result in a plateau in oxidation (see abstract # 19). For each pig, PHE oxidation decreased linearly ($P < 0.05$) as lysine level increased until the requirement was reached; thereafter, PHE oxidation was constant. Using two-phase linear regression, the lysine requirement (the point at which PHE oxidation stopped decreasing) was determined for each pig. The mean requirement for all pigs was $103 \pm 10\%$, in complete agreement with the estimate by NRC (1998).

Implications: The IAAO technique can be used in growing pigs to establish the requirement for any amino acid. This method is rapid (<3 weeks). This method also provides, for the first time, measurement of individual requirements, which can then be used to generate accurate estimates of population variability and "safety factors" for lysine intake. (Supported by Alberta Pork and Alberta Agricultural Research Institute.)