

# Oral isotope delivery for use in determining the 'metabolic availability' of amino acids by indicator amino acid oxidation

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The lysine (LYS) available for growth in pigs is currently expressed as true ileal digestible LYS. Because not all digestible LYS is available for protein synthesis, we developed a method to determine the 'metabolic availability' (MA) of LYS using the indicator amino acid oxidation (IAAO) technique. Concerns regarding maintenance of catheterized pigs and practical application of this method by others, required a less invasive application of the method. Our objective was to evaluate a method of oral isotope delivery to determine the MA of LYS in feeds.

When lysine is limiting the animals' protein synthesis, indicator (phenylalanine, PHE) oxidation decreases linearly with increasing LYS intake. The rate of decline is proportional to the MA of LYS in feedstuffs compared to free LYS. Four barrows adapted to the type of diet and experimental procedures were fed diets containing either free LYS, or LYS from peas, heated peas or heated peas plus free LYS. The pigs were fed half-hourly during study days, with the isotope mixed with the feed. Results were calculated using the procedure mixed (SAS 1999) to estimate the slope of the response to added LYS. The slope of the response per g added LYS was  $-23.7$  (SE 8.1),  $-20.5$  (SE 8.0) and  $-19.4$  (SE 7.9) for free LYS, peas and heated peas, respectively. Therefore, the MA of lysine was 90.5% in peas and 85.4% in heated peas, indicating that some of the LYS was made unavailable by heating. Adding back free LYS to the heated peas increased the slope of the response to  $-21.5$  (SE 8.1). This shows that the change in oxidation due to heating was entirely due to the change in dietary available LYS content. This agrees with the data when the method was applied using intravenous isotope infusion.

**Implications:** The results indicate that the metabolic availability of lysine can be determined using oral isotope delivery.

Supported by Alberta Pork and Alberta Agricultural Research Institute.