

Determination of the metabolic availability of lysine in feedstuffs using oral isotope delivery

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Because lysine is the first limiting amino acid in pig feeds and is usually supplemented, an accurate determination of lysine (LYS) availability from feedstuffs is necessary to reduce feed costs. Not all of the digestible LYS is metabolically available for protein synthesis (ie lean growth), especially in heat-treated feedstuffs. The objective of the present study was to determine the metabolically available (MA) content of LYS in several feedstuffs using our newly developed indicator oxidation methodology.

Four barrows were adapted for at least 7 d to experimental procedures and diets providing 4 levels of free LYS up to 7.1 g/kg or protein bound LYS at the same level provided by feedstuffs. Phenylalanine (PHE) oxidation was determined over 4 h twice per pig after 3 days adaptation. Isotope, PHE, was mixed with half-hourly allowances of feed. Results were calculated using the procedure mixed (SAS 1999) to estimate the slope of the response to added LYS. PHE oxidation (% of dose) decreased by 3.42 (SE 0.53) units/g free LYS added. Soybean meal, canola and cottonseed meal decreased PHE oxidation by 2.96 (SE 0.36), 2.24 (SE 0.34) and 1.98 (SE 0.31) units/g added LYS, respectively. These results indicate a MA for LYS in soybean meal of 86.5%, in canola of 65.7% and in cottonseed meal of 57.9%. The MA of LYS in soybean meal was similar to the true ileal digestibility of LYS (88%, NRC 1998), but the MA of LYS in canola meal and cottonseed meal was lower than their ileal digestibilities of 78% and 64%, respectively. We believe, this difference in MA of LYS may have been caused by the heat processing of these feedstuffs.

Implications:

The indicator amino acid oxidation technique can be successfully applied for the determination of the MA of LYS in feedstuffs.

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