PRACTICAL APPLICATION OF TOTAL AND DIGESTIBLE AMINO ACID DATA IN THE FORMULATION OF POULTRY FEEDS

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Today poultry nutritionists have a wealth of resources to aid them in formulating poultry feeds on a total or digestible amino acid basis. These include extensive historical databases on the amino acid composition of feedstuffs and associated digestibility coefficients, information from time consuming amino acid analyses or expensive in vivo determinations or indirect in vitro determinations including more 'real-time' Near Infrared Reflectance Spectroscopy (NIRS). Regardless of the source of information, practical and realistic application of these data in commercial feed production or integrated poultry operations needs to be assessed for it to have value.

Whether digestibility coefficients for specific amino acids are from historical, actual, or indirect methodology, it is critical that accurate values for total amino acids are established for a given operation. An accurate digestibility coefficient can still result in an erroneous final digestible amino acid value being assigned to an ingredient if the total value is in error. Historical data for the total amino acids in an ingredient should be compared with values determined for samples of the ingredient being used by an operation (McGinnis, 1998). Use of NIRS provides a rapid tool for this determination. Provided the sample scan is similar to those spectra used in the calibration, the standard error of cross validation (SECV) from an NIRS reading can be used to assess the accuracy of the prediction for a particular amino acid. As a basic guideline, the actual level of an amino acid will fall within ± one SECV 60% of the time and within ± two SECV 90% of the time. A nutritionist or operation must decide what values they are comfortable with in deciding to use a NIRS predicted value in lieu of a historical or wet chemistry value for each key amino acid. By doing this it is possible to take advantage of realized real-time values.

Digestible amino acid formulation is becoming more common as a way of utilizing specific feed ingredients, utilizing the ideal protein concept which is based on digestible amino acids, allowing more accuracy in meeting the bird's requirement and decreasing nitrogen output. While on paper this is appealing, consideration needs to be given to the ability of the feedmill to segregate ingredients by this criterion and the nutritionist to know when a particular batch of ingredient will be used in feed mixes. It must also be realized that formulating diets on a digestible amino acid basis based on absolute amino acid requirement and ideal protein ratios may result in a higher cost per tonne of feed. A recent study initiated in the United States with broilers used feeds formulated on tabular digestible amino acid values and NIRS digestible amino acid values. The former diets were US$3.33, 2.61 and 2.43 more expensive per tonne for the starter, grower and finisher feeds, respectively, than the latter diets.


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