Using lysine estimates to detect heat damage in DDGS

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Distillers dried grains with solubles (DDGS) are a good source of energy and protein in swine diets. However, they can be damaged by excessive heat during processing, compromising their nutritional value. University of Illinois researchers have found that it is possible to assess heat damage by predicting the digestibility of lysine in DDGS.

Excessive heat causes some of the lysine in DDGS to bond with sugars and form Amadori compounds. The lysine bound in these compounds is called unreactive lysine; pigs cannot digest it. Lysine that is not bound is referred to as reactive lysine; pigs can use it for protein synthesis.

"Some sources of DDGS are heat damaged. And, therefore, the digestibility of the lysine in particular is poor," said animal sciences professor Hans Stein. "If you know up front that a particular source is heat damaged, then you can add synthetic lysine to compensate. But the question is, how do you know whether or not a specific source is heat damaged?"

To answer this question, Stein and his team predicted the digestibility of lysine in 21 samples of corn DDGS based on several different methods of analysis: total crude protein concentration, total analyzed lysine concentration, reactive lysine concentration as determined using the furosine procedure, and lysine to crude protein ratio.

After making the predictions, they determined ileal lysine digestibility in the 21 samples using cannulated pigs and compared the predicted values

for lysine digestibility with results obtained in the animals. Results indicated that the concentration of analyzed lysine in the sample was a good predictor of lysine digestibility (r2 = 0.849), but using the concentration of reactive lysine rather than the concentration of analyzed lysine improved the prediction accuracy (r2 = 0.898). Using the lysine to crude protein ratio as a second independent variable in the regression equation improved the predictions. Researchers could not accurately predict lysine digestibility using the concentration of crude protein alone.

"The practical outcome of this is that you can't analyze only for crude protein. You will need to have some kind of an estimate of lysine or furosine to know if your source of DDGS is heat damaged," Stein said. "However, if the concentration of lysine or furosine in a given source of DDGS is known, the digestibility of lysine can be predicted fairly accurately."

More information: The study was published in the *Journal of Animal Science*.

Provided by University of Illinois at Urbana-Champaign