

Standardized ileal digestibility of reactive lysine in distillers dried grains with solubles (DDGS) fed to growing pigs

A. A. Pahm^{*}, C. Pedersen[†], and H. H. Stein^{*1}

^{*}Department of Animal Sciences, University of Illinois, Urbana, IL 61801; [†]Danisco Animal Nutrition, Marlborough, Wiltshire, U.K.

Distillers dried grains with solubles (DDGS) are produced by drying a mixture of wet distillers grains and condensed solubles. During this process, some of the ϵ -NH₂ groups in Lys may be bound to reducing sugars through the Maillard reaction. This Lys is called unreactive Lys, whereas Lys that is not bound to reducing sugars is called reactive Lys. It has been suggested that the conventional procedure to measure standardized ileal digestibility (SID) of Lys in DDGS may over-estimate the amount of digestible Lys in DDGS because this procedure does not distinguish between reactive and unreactive Lys, although only the reactive Lys is bioavailable to animals. By measuring the SID of only the reactive Lys, it is expected that the estimation of digestible Lys will be more accurate. The objective of this experiment, therefore, was to test the hypothesis that the SID of reactive Lys is lower than the SID calculated using the conventional procedure. Ileal cannulated pigs were fed diets containing each of 12 sources of DDGS and the SID for Lys was measured using standard procedures. Diets and ileal digesta samples were also guanidinated with O-Methylisourea and analyzed for the concentration of homoarginine. It was assumed that only the reactive Lys would be transformed to homoarginine, whereas the unreactive Lys would not. This procedure, therefore, allows for a separation of reactive and unreactive Lys, and the SID of reactive Lys could be calculated. Results showed that Lys in DDGS is only 76% reactive. The mean SID of reactive Lys was 66.9%, which is close to the mean SID of total Lys (66.5%). However, the concentration of SID reactive Lys (3.9 g/kg) was lower ($P < 0.05$) than the concentration of SID total Lys (5.1 g/kg). Thus, 24% of the digestible Lys that was calculated using the conventional procedure was unreactive Lys. The implication of this is that the conventional procedure overestimates the concentration of digestible Lys in DDGS, and measurement of reactive Lys may more accurately estimate how much Lys is available to the pig.

Keywords: amino acids, digestible reactive Lys, distillers dried grains with solubles, pigs.