Evaluation of lysine digestibility in rumen undegraded protein using the precision-fed rooster assay and two in vitro methods. S.E. Boucher¹, C. Pedersen², H.H. Stein³, C.M. Parsons³, and C.G. Schwab¹, ¹University of New Hampshire, Durham, ²Danisco Animal Nutrition, Marlborough, UK, ³University of Illinois, Urbana.

Sixteen feed samples were obtained from the Feed Analysis Consortium, Inc. to evaluate furosine and homoarginine (HA) methods for determining the availability of Lys in rumen undegraded protein (RUP-Lys). Furosine is a secondary product of the initial stages of the Maillard reaction, and HA is formed by the reaction of reactive Lys with O-methylisourea (guanidination reaction). Three samples of soybean meal (SBM), 3 samples of SoyPlus®, 5 samples of dried distillers grains with solubles (DDGS), and 5 samples of fishmeal (FM) were used. Samples were incubated for 16 h in situ in the rumen of 4 lactating Holstein cows, averaging (mean ± SD) 48 ± 4 days in milk, fed a 55% forage, 45% concentrate diet. Residues were collected and pooled by feed sample, and portions were crop-intubated to cecectomized roosters. Four birds per sample were intubated with the residue, and endogenous AA excretion was estimated from fasted roosters. Total excreta was collected for 48 h post-intubation and analyzed for Lys content. True digestibility (TD) of RUP-Lys was calculated. In the furosine method, all residues were analyzed for furosine and Lys content; however, only 9 of the 16 samples contained furosine. Percent blocked Lys was calculated. In the HA method all residues were guanidinated for 72 h and analyzed for Lys and HA content. The percent Lys converted to HA was calculated. The results of the experiment showed that percent furosine (n=9), blocked Lys (n=9), and Lys converted to HA (n=16) were correlated to TD of RUP-Lys (R² = 0.86 0.94, and 0.90, respectively). In conclusion, it appears that measurements of furosine or HA in rumen digesta residues of SBM, SoyPlus®, DDGS, and FM can be used to predict RUP-Lys digestibility.

Key Words: Lysine digestibility, rumen undegraded protein, cecectomized roosters