

concept in lactating dairy cows in favor of accepting that AA may be bioactive to the extent of changing animal performance, even when they are not limiting.

**Key Words:** urine spot samples, amino acids, allantoin

**1533 (M247) Ruminant degradation and intestinal digestibility of crude protein and amino acids and correction for microbial contamination in rumen-undegradable protein.** H. A. Paz Manzano<sup>\*1</sup>, E. Castillo-Lopez<sup>2</sup>, T. J. Klopfenstein<sup>1</sup>, and P. J. Kononoff<sup>3</sup>, <sup>1</sup>University of Nebraska-Lincoln, Lincoln, <sup>2</sup>University of Saskatchewan, Saskatoon, Canada, <sup>3</sup>University of Nebraska, Lincoln.

Two Holstein cows fitted with ruminal and proximal duodenal cannulas were used to determine crude protein (CP) and AA ruminal degradation using an in situ incubation of 16 h and intestinal digestibility using the mobile bag technique (pore size 50  $\mu$ m). Bacterial contamination of the rumen-undegradable protein (RUP) was corrected using purines or DNA as bacterial markers. The feedstuffs evaluated were: three sources of blood meal (BM1, BM2, and BM3), canola meal (CM), low-fat distillers dried grains with solubles (LFDG), soybean meal (SBM), and expeller soybean meal (ESBM). Data were analyzed as a randomized complete block. Ruminal degradation of CP varied ( $P < 0.001$ ) across feedstuffs, 85.3, 29.8, 40.7, 75.7, 76.9, 68.8, and 37.0  $\pm$  3.93% for BM1, BM2, BM3, CM, LFDG, SBM, and ESBM, respectively. Ruminal degradation of both total essential AA and nonessential AA followed a similar pattern to that of CP. Based on the ratios of AA concentration in the RUP to AA concentration in the original feed, ruminal incubation decreased (ratio  $< 1$ ;  $P < 0.001$ ) the concentrations of His, Lys, and Trp and increased (ratio  $> 1$ ;  $P > 0.001$ ) the concentrations of Ile and Met across feedstuffs. Estimations of BCP contamination using purines were 0.75  $\pm$  0.86, 0.65  $\pm$  0.88, 0.55  $\pm$  0.91, 2.50  $\pm$  0.88, 6.45  $\pm$  0.91, 2.61  $\pm$  0.88, 10.8  $\pm$  0.91% CP and using DNA were 0.68  $\pm$  0.86, 0.18  $\pm$  0.88, 0.63  $\pm$  0.91, 4.52  $\pm$  0.88, 2.58  $\pm$  0.91, 1.36  $\pm$  0.88, and 2.49  $\pm$  0.91% CP for BM1, BM2, BM3, CM, LFDG, SBM, and ESBM, respectively. Intestinal digestibility of RUP could not be estimated for BM1, BM3, and SBM due to insufficient recovery of residue. For the remaining feedstuffs, intestinal digestibility of RUP was highest ( $P < 0.001$ ) for ESBM, followed by BM2 and LFDG, and lowest for CM, 98.8, 87.9, 89.7, 72.4  $\pm$  1.40%, respectively. Intestinal absorbable dietary protein was higher ( $P < 0.001$ ) for BM2 compared to CM and LFDG, 61.7, 17.9, and 20.7  $\pm$  2.73% CP, respectively. Ruminal degradation and intestinal digestibility of AA determine the supply of intestinal absorbable AA across feedstuffs. These factors are not constant across AA within feedstuffs and nutrition models need to account for them to increase the accuracy to predict the AA supply to the animal.

**Key Words:** rumen degradation, intestinal digestibility, amino acids, bacterial CP contamination

**1534 (M248) Validation of the bioavailability of the second generation AjiPro-L using the in vivo plasma lysine response method.**

N. L. Whitehouse<sup>\*1</sup>, A. F. Brito<sup>1</sup>, A. Crowther<sup>1</sup>, A. B. D. Pereira<sup>1</sup>, C. G. Schwab<sup>2</sup>, I. Shinzato<sup>3</sup>, and M. Miura<sup>4</sup>, <sup>1</sup>University of New Hampshire, Durham, <sup>2</sup>Schwab Consulting, LLC, Boscobel, WI, <sup>3</sup>Ajinomoto Heartland Inc., Chicago, IL, <sup>4</sup>Ajinomoto Co., Inc., Kawasaki, Japan.

Six lactating multiparous Holstein (DIM = 64 to 314) equipped with ruminal cannulas were used in a 6  $\times$  6 Latin square study with 7-d periods. The treatments were: 1) 0 g/d Lys, 2) 60 g/d of infused Lys, 3) 30 g/d of fed Lys from AjiPro-L, 4) 60 g/d fed Lys from AjiPro-L, 5) 30 g/d fed Lys from AjiPro-L 2G, and 6) 60 g/d fed Lys from AjiPro-L 2G. The infusion treatments consisted of Lys-HCl and were infused continuously into the abomasum via the ruminal cannulas. To ensure complete consumption, the AjiPro-L and AjiPro-L 2G were mixed with 1 kg of TMR and placed in tubs in front of the cows 30 min before each of the 3 daily feedings. Blood samples were obtained from each cow on the last 3 d of each period every 2 h, four times daily, from the tail vein, centrifuged, deproteinized, and composited into one daily sample/cow. Deproteinized plasma was analyzed for AA. Data for plasma AA concentrations ( $\mu$ mol basis) were analyzed using the PROC MIXED and PROC REG procedures of SAS. The bioavailability of AjiPro-L, calculated by comparing the slopes of the infused and fed AjiPro-L (Lys as % of total AA), was lower than previous evaluations using the same methodology. The infusion slope observed herein, obtained from two doses (0 and 60 g/d), was larger than those obtained previously, which were obtained using three doses (0, 30, and 60 g/d); this may explain the discrepancies among studies. To increase precision, it is recommended that at least 1 additional dose of infused Lys between 0 and 60 g/d should be used. It is important to note that the slope for the AjiPro-L 2G (i.e., 0.01011;  $P < 0.01$ ) was greater than the slope for the AjiPro-L (i.e., 0.00682;  $P < 0.01$ ) resulting in a 48% improvement in bioavailability of Lys from the AjiPro-L 2G based on the ratio of the 2 slopes. It can be concluded that the bioavailability of Lys from AjiPro-L 2G was better than that from AjiPro-L. Further research is needed to test these 2 RP-Lys products.

**Key Words:** AjiPro-L, bioavailability, lysine