Key Words: soybean meal, canola meal, rumen-protected AA

Table 1530.

Protein RPML	SSBM -	SSBM +	CM -	CM +	Contrasts		
					Protein	RPML	P x R
Trait							
DMI, kg/d	27.1	27.2	27.8	27.5	0.04	0.66	0.36
Milk, kg/d	38.4	38.1	39.1	38.5	0.18	0.27	0.71
Milk/DMI	1.42	1.40	1.41	1.40	0.79	0.38	0.81
ECM, kg/d	39.3	38.7	40.3	39.6	0.09	0.23	0.88
ECM/DMI	1.45	1.42	1.45	1.44	0.54	0.26	0.59
Fat, kg/d	1.62	1.57	1.67	1.63	0.06	0.14	0.90
Prot, kg/d	1.27	1.27	1.30	1.29	0.14	0.65	0.51
MUN, mg/dl	15.2	15.0	15.0	15.0	0.72	0.60	0.73

1531 (M245) Determination of the comparative bioavailability of lysine in two rumen-protected lysine products using the in vivo plasma lysine response method. H. A. Tucker*[1], M. Miura[2], I. Shinzato[3], C. S. Ballard[1], and H. M. Dann[1], *[1]William H. Miner Agricultural Research Institute, Chazy, NY, [2]Ajinomoto Co., Inc., Kawasaki, Japan, [3]Ajinomoto Heartland Inc., Chicago, IL.*

The objective of this study was to use the commercially available rumen-protected lysine (RPL) AjiPro-L (AJI; Ajinomoto Heartland, Inc.) to estimate relative bioavailability of a second generation RPL product (A2G; Ajinomoto Heartland, Inc.). Ten multiparous lactating Holstein cows (109 ± 8 d in milk (DIM)) housed in a tie-stall facility were used in a replicated 5 × 5 Latin square design with 7-d periods. Cows, blocked by DIM and milk production, were assigned to treatment sequence. A common basal diet formulated to meet lysine (Lys) requirement, prepared once daily, was fed proportionately at three time points (33.4% at 0500 h, 33.3% at 1300 h, and 33.3% at 2100 h). Treatments included 0 g/d Lys, 75 g/d AJI, 75 g/d A2G, 150 g/d AJI, or 150 g/d A2G and were administered 3x/d 1 h before each feeding time on d 2 through 7 of each period in amounts proportional to feed offered to simulate inclusion in the diet. Blood samples were obtained from each cow on d 6 and 7 of each period from the tail vein at 2-h intervals starting at 0600 h resulting in four samples/cow/d. Resultant plasma was pooled by day and analyzed for amino acid (AA) concentrations. Data were reduced to a period mean and analyzed using the PROC MIXED (SAS, v. 9.2). The REG procedure was used to generate linear regression models for each RPL product using Lys (µmol) and Lys (% total AA (µmol basis)) to determine the slope of plasma Lys in response to treatment. Using the calculated slope for each product, relative estimated bioavailability of A2G was determined using the slope-ratio assay technique. Dry matter intake and milk yield did not differ ($P > 0.10$) among treatments. Plasma Lys was greater ($P < 0.05$) for 150 g/d AJI (93.8 ± 2.9 µmol) and 150 g/d A2G (95.0 ± 2.8 µmol) when compared to 0 g/d Lys (83.6 ± 2.9 µmol). The slope for A2G treatment was numerically greater (0.007; $r^2 = 0.91$) when compared to the slope for AJI treatment (0.005; $r^2 = 0.99$) when expressing the concentration of plasma Lys relative to that of total AA. This resulted in the calculated bioavailability of A2G being 132.1% of the bioavailability of AJI. Both first and second generation AjiPro-L products increased plasma LYS in lactating dairy cows with some comparative advantage for the second generation product.

Key Words: bioavailability, rumen-protected lysine, dairy cow

1532 (M246) Impacts of feeding ruminally protected phenylalanine and/or methionine to early lactation cows fed diets containing high levels of canola meal. N. Swanepoel*[1,2], P. H. Robinson[1], and L. J. Erasmus[2], *[1]University of California–Davis, Davis, [2]University of Pretoria, Pretoria, South Africa.*

The objective of this study was to determine if either Met or Phe was limiting performance of dairy cows fed a ration containing 200 g/kg of diet DM as canola meal (CM). The design used four pens of 320 early lactation (DIM < 125) cows/pen in a 4x4 Latin square with 28 d periods. Treatments were designed to deliver 8.0 and 7.5 g/cow/d of intestinally absorbable Met and Phe, respectively with treatment pens fed ruminally protected (RP) Phe (RPP) and RP Met (RPM), separately or in combination, mixed into the same control TMR based on alfalfa hay, winter wheat and corn silage, almond hulls, corn grain, fuzzy and cracked pima cottonseed and mineral premix. There were no difference in the chemical profiles of the TMR fed to the four treatments with CP, NDF, Fat and Starch amounting to 170, 310, 53, and 193 g/kg DM in the base TMR. There were no changes in plasma AA levels except plasma Met, which increased with both Met treatments, and plasma Trp that decreased with both Phe treatments. DM intake was not affected (avg: 27.6 ± 0.40 kg/d) by feeding either RP AA or the combination. Compared to control, supplemental Met increased milk protein (30.71 vs. 30.18 g/kg; $P < 0.01$) and fat (34.74 vs. 34.16 g/kg; $P = 0.01$) content, while decreasing milk lactose (47.47 vs. 47.80 g/kg; $P < 0.01$) content, thereby shifting milk energy amongst milk components without affecting milk energy output. Even though Phe alone had no effect at all on animal performance, adding it in combination with Met diverted energy away from milk components towards body condition score (BCS) gain, which increased (0.08 vs. 0.04 BCS unit change/28d; $P < 0.01$). Even though the supplemented Phe did not increase plasma Phe levels, or animal performance, it was clearly delivered and biologically active based on the finding that it changed the way that Met was utilized. While results suggest that neither Met nor Phe was a limiting AA in this study, results do suggest that both were bioactive. It may be time to reconsider the limiting AA