

Diets, duodenal digesta and blood plasma were analyzed for AA in five trials using Holstein cows fitted with rumen and duodenal cannulae and fed different diets. Profile of AA supply to the small intestine was different from the profile in the diet, which was reflected in blood free AA. Differences in AA profile between ingested feed and rumen undegraded feed protein were observed. Overall, decreases in concentration of Asp and Glu and increases in that of Gly and Lys were observed from diet to duodenum. These changes were due to undegraded feed protein. From diet to blood, His, Thr and Gly increased while Asp and Glu decreased. Endogenous contribution to the AA supply in the small intestine may be significant, such as Gly from glycocholic acid present in bile.

	DIET	DIGESTA	BYPASS	PLASMA
	-----g/kg of AA-----			
HIS	23.0	28.2	27.9	127.1
THR	30.5	40.0	40.8	81.5
LYS	49.4	75.8	69.0	31.1
ASP	112.7	103.9	56.7	7.2
GLU	182.0	146.0	114.6	56.9
GLY	55.4	83.6	150.0	151.6

Data has shown variations in amino acid patterns exiting the rumen which are sometimes uncharacteristic of the undegraded protein source in the diet. This may be attributed to differences in release rate of specific amino acids in the rumen, or other factors.

KEY WORDS: Escaping protein, amino acids, blood levels, dairy cows

631 Lysine adequacy of the lactating cow. K.J. King*, W.G. Bergen, N.K. Ames, A.L. Grant, B.D. Grieve, Michigan State University, E. Lansing; V.L. King, University of Nebraska, Lincoln.

Two lactation trials were conducted to determine the quantity of lysine (lys) necessary to be added post-ruminally for the diet to be adequate in lys. In trial 1, 6 lactating Holstein cows, fitted with abomasal cannulae, were utilized in a double 3 X 3 Latin square experiment containing an extra period. Trial 2, utilized 12 lactating Holsteins, fitted with abomasal cannulae, in a double 5 X 5 Latin square design with 2 replacement animals. Cows were fed a corn-based diet containing a corn gluten protein supplement. L-lysine HCl was abomasally infused at levels of 0, 45 and 90 g/d in trial 1, and 0, 22.5, 45, 90 and 180 g/d in trial 2. Samples of milk, feed, feces, urine, and plasma representing mammary artery and vein were taken. A positive linear response (Trial 1) to infusion occurred up to 90 g for milk protein synthesis, conversion of feed protein to milk protein and plasma lys ($P < .05$). A quadratic response (Trial 2) up to 180 g infusion was found for conversion of feed protein to milk protein and for lys venous concentration ($P < .05$). The break-point of the broken-line analysis (plasma lys vs. lys infusion) occurred at 78 g and 81 g of L-lysine HCl infusion for venous and arterial lys concentration, respectively. Negative linear responses were found for arterial concentration of threonine ($P < .10$) and methionine ($P < .05$) and lys infusion. Estimates of lys requirements, determined from the sum of lys infused and digestible escape protein and microbial lys (75% digestibility), for these cows ranged from 230 to 270 g post-ruminal absorbable lys/d. It was concluded that lys was the limiting amino acid in cows fed a corn-corn gluten based diet.

KEY WORDS: Lysine, Requirement, Amino acid, Dairy cattle