

Session: Dairy: Feed Additives I (poster)

M311

Day/Time/Location: Monday, July 16, 2012, 7:30 AM - 9:30 AM, North Hall AB

Determining the bioavailability of lysine in AjiPro-L using the plasma free amino acid dose response method. N. L.

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Six multiparous ruminally cannulated Holstein cows averaging 108 d in milk were used in a 6 × 6 Latin square study with 7-d periods. Samples were collected during the last 3 d. The 6 treatments were: 1) control (0 g/d l-Lys), 2) 30 g/d of abomasally infused Lys, 3) 60 g/d of abomasally infused Lys, 4) 30 g/d of feed supplemented Lys, 5) 45 g/d of feed supplemented Lys, and 6) 60 g/d of feed supplemented Lys. An l-Lys HCl product containing 80% Lys and assumed to be 100% bioavailable was used for the infusions. The AjiPro-L (Ajinomoto Co. Inc., Tokyo), which contains 40% Lys (as fed basis) was mixed with 454 g of concentrate and offered to the cows 1 h before each of the 3 daily feedings. The basal diet was formulated to meet the Lys requirements and contained 36% corn silage, 14% grass silage, 3% alfalfa hay and 47% concentrate. Four blood samples were collected from the tail vein at 2-h intervals starting at 0700 h; samples were centrifuged, deproteinized, and composited by cow/day with plasma stored at -80°C for AA analysis. Data were analyzed using the MIXED and PROC REG procedures of SAS. Milk yield and composition, and DMI were not different among treatments. Lysine was the only plasma AA that increased linearly ($P \leq 0.05$) in response to infused or feed supplemented Lys. The slopes for the infused and feed supplemented Lys were 0.0224 ($r^2 = 0.98$) and 0.0078 ($r^2 = 0.94$), respectively, when the concentration unity $\mu\text{g/mL}$ was used for expressing the concentration of plasma Lys relative to that of total AA. When the concentration unity μM was chosen to express plasma Lys as a proportion of total AA, the slopes were slightly lower for the infused (0.0183; $r^2 = 0.97$) and feed supplemented (0.0068; $r^2 = 0.93$) treatments. The calculated bioavailabilities for AjiPro-L using the 2 different sets of slopes (0.0224 and 0.0078 $\mu\text{g/mL}$ vs. 0.0183 and 0.0068 μM) were relatively similar averaging 35% ($0.0078/0.0224 \times 100$) and 37% ($0.0068/0.0183 \times 100$), thus indicating marginal impact of concentration unity ($\mu\text{g/mL}$ vs. μM) on the outcome of Lys bioavailability values using the in vivo plasma response method.

Key Words: amino acids, lysine, bioavailability

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