P307 Effect of Rumen-Protected Lysine and Methionine on Productivity of Early Lactation Dairy Cows. P.H. Robinson, Fredericton Research Centre, Fredericton, NB, Canada; W. Chalupa, Univ. Penn., Kennett Square, PA; W. Julien, Julien and Assoc., Omaha, NE; C.J. Sniffen, W.H. Miner Agric. Res. Ctr., Chazy, NY; H. Sato, T. Fujieda, K. Watanabe, T. Ueda and H. Suzuki, Ajinomoto Co., Inc., Japan.

Multiparous Holstein cows (26) were utilized in a lactation study to evaluate the concept that early lactation performance can be enhanced with a lower protein diet if it is tactically supplemented with ruminally protected amino acids (RPAA) to meet intestinal requirements for all amino acids. Thirteen cows were fed a traditional close-up dry cow diet for three weeks prepartum followed by a 16.5% CP diet during the first six weeks of lactation which was balanced to meet intestinal requirements for all amino acids. The other cows were fed the same close-up dry cow diet, but supplemented with 10 g/d of intestinally available lysine and 2.5 g/d of intestinally available methionine, followed by a lower protein (15.5% CP) diet during the first six weeks of lactation which was also balanced to meet intestinal requirements for all amino acids using RPAA (average: 26 g/d intestinally available lysine and 6.5 g/d intestinally available methionine). At six weeks post-partum all cows were changed to a common diet which was fed through 24 weeks post-partum. RPAA cows ate no more DM through six weeks post-partum, tended to eat more NDF and tended to eat less CP. However RPAA cows produced more milk, milk protein and milk lactose although they tended to produce less milk fat. After six weeks post-partum, when all cows were changed to a common diet, treatment differences for milk, milk lactose and milk fat yield persisted whereas those for milk protein did not. Results of this study demonstrate that performance of early lactation dairy cows can be enhanced with lower protein diets tactically supplemented with RPAA.

Performance During the First Six Weeks Post-Partum

	Treatment			
	Control	RPAA	Sig	SEM
Intake (kg/d)				
DM	18.59	18.87	.44	.457
NDF	6.51	6.77	.06	.132
CP	3.08	2.95	.06	.088
Yield (kg/d)				
Milk	33.88	35.82	<.01	.629
Fat	1.52	1.47	.12	.032
Protein	1.05	1.13	<.01	.024
Lactose	1.58	1.69	<.01	.032

P308 Effects of Lysine and/or Methionine Oversupply on Performance of Lactating Dairy Cows. P.H. Robinson, Fredericton Res. Ctr., Fredericton, NB, Canada; W. Chalupa, Univ. Penn., Kennett Sq., PA; W. Julien, Julien and Assoc., Omaha, NE; C.J. Sniffen, W.H. Miner Agric. Res. Ctr., Chazy, NY; H. Sato, T. Fujieda, K. Watanabe, T. Ueda and H. Suzuki, Ajinomoto Co., Inc. Japan.

Four multiparous Holstein cows in mid lactation were fed a mixed ration designed to be co-limiting in intestinally absorbable supplies of methionine and lysine. Cows were supplemented with no amino acids (C), L-lysine HCl by abomasal infusion to a calculated 130% of requirement (L), DL-methionine by abomasal infusion to a calculated 130% of requirement (M), or both amino acids (LM) in a 4 x 4 Latin square arrangement of treatments with 28 d periods. Intake of DM for 'C' cows appeared to be limited by intake of NDF (1.31% of BW) and this is consistent with relatively high chewing times (13.26 h/d) and rumen pH (6.39). Cows ate less DM, produced less milk and milk lactose, and tended to produce less milk protein when abomasally infused with methionine alone or in concert with lysine. Evaluation of results suggests that infusion of either amino acid actually increased its intestinal delivery to between 150 and 160% of requirement. Depressed animal performance is consistent with expectations based upon results of studies with monogastric species showing that imbalanced profiles of digestible amino acids are associated with reduced intake and animal performance. Results of this study show that the potential for negative effects on performance of dairy cows exists if methionine is supplied at levels well in excess of its calculated requirements.

	Treatment				C vs.			
	C	L	M	LM	L	M	LM	SEM
Amino acids infused (g/d)								
Lysine	0	50.0	0	49.4	-	-	-	.93
Methionine	0	0	15.9	16.2	-	-	-	.31
Intake (kg/d)								
DM	23.80	23.12	21.85	21.97	.30	.02	.02	.280
NDF	8.39	8.23	7.69	7.78	.50	.02	.03	.099
CP	3.43	3.33	3.16	3.17	.30	.02	.02	.041
Yield (kg/d)								
Milk	36.89	35.79	34.24	34.52	.18	.01	.02	.337
Fat	1.38	1.36	1.35	1.36	.64	.52	.64	.023
Protein	1.19	1.13	1.12	1.12	.11	.06	.08	.014
Lactose	1.78	1.71	1.61	1.61	.24	.01	.01	.023

P309 Influence of nonenzymatically browned soybeans on lactational performance and milk fat composition of dairy cows. S. F. Abel-Caines*, R. J. Grant, and T. J. Klopfenstein, University of Nebraska, Lincoln, T. S. Winowiski, and N. A. Barney, Lignotech USA, Rothschild, WI.

Sixty Holstein cows were assigned to one of five TMR from wk 3 to 18 of lactation: 1) 4.5% added lipid from soybean oil (SBO), 2) 1.5% added lipid from nonenzymatically browned soybeans (NEBB) and 3% SBO, 3) 3% added lipid from NEBB and 1.5% SBO, 4) 4.5% added lipid from NEBB, and 5) 4.5% added lipid from calcium salts of long-chain fatty acids (CaFA). All TMR consisted of 50% forage (1:4 alfalfa:corn silages, DM basis) and were equivalent in CP, RUP, RDP, and energy. Means for the entire 18-wk trial indicated no effect of diet on DMI, milk yield, protein production, or 4% FCM yield. However, during the final 9 wk of the trial, DMI and FCM yield were reduced ($P<.05$) by 11 and 15%, respectively, for the SBO diet compared with the other diets. Milk fat production increased with decreasing SBO and increasing NEBB concentration in the diet.

Milk fatty acid (weight %)	Diet 1	2	3	4	5
C16:0	26.03^{b}	25.61^{bc}	26.58^{b}	24.22^{c}	35.73^{a}
C18:0	15.01^{b}	16.20^{ab}	16.62^{a}	16.54^{a}	10.78^{c}
C18:1	33.49^{a}	27.87^{b}	24.07^{c}	23.78^{c}	27.48^{b}
C18:2	5.62^{d}	6.35^{c}	10.52^{b}	12.76^{a}	5.62^{d}
C18:3	.59^{d}	1.06^{c}	1.52^{b}	1.92^{a}	.73^{d}

^{abcd}($P<.05$)

Content of C16:0 in milk fat was greatest ($P<.05$) for CaFA. Content of C18:2 and C18:3 was increased ($P<.05$) as NEBB inclusion in the diet increased. Addition of SBO elevated milk C18:1. Transfer of C18:2 fatty acid into milk was 12.4% for diet 3 which contained the highest amount of NEBB. All levels of the NEBB tested resulted in FCM similar to CaFA diet and higher than the SBO diet, but with more desirable milk fatty acid profiles.

P310 Effect of nonenzymatically browned soybeans on ruminal function and milk fatty acid profiles in dairy cattle. S. F. Abel-Caines*, R. J. Grant, T. J. Klopfenstein, University of Nebraska, Lincoln, T. S. Winowiski, and N. A. Barney, Lignotech USA, Rothschild, WI.

Four ruminally fistulated Holstein cows were assigned to one of four diets in a 4 × 4 Latin square with 3-wk periods to investigate the effects of added lipid from nonenzymatically browned soybeans (NEBB) or soybean oil (SBO) on rumen function and milk fatty acids. All diets contained 50% forage (1:4 alfalfa:corn silages, DM basis) and either: 1) 4% added lipid from SBO, 2) 4% added lipid from NEBB, 3) 6% added lipid from NEBB, or 4) no added lipid. There were no dietary effects on DMI, milk yield, or milk composition in this short-term trial. However, milk fatty acid profiles were influenced by source of added lipid. Addition of lipids from either SBO or NEBB reduced ($P<.10$) concentration of C16:0 in milk fat by 41%. The NEBB diets increased ($P<.10$) C18:2 by 35% compared with SBO, whereas C18:1 and C18:0 were reduced. Rate and apparent extent of ruminal NDF digestion (alfalfa, soyhulls) were greatest for the control diet, and lowest for the 4% SBO diet ($P<.10$). Intermediate effects were observed for the diets containing 4 and 6% lipid from NEBB, which supported the milk fatty acid data. Ruminal acetate to propionate ratio was reduced ($P<.10$) for SBO diet compared with NEBB and control diets. Total tract NDF digestibility was least for the SBO diet.

Item	Diet 1	2	3	4
C16:0, weight %	26.08^{b}	28.74^{b}	29.98^{b}	40.12^{a}
C18:2, weight %	3.32^{b}	7.29^{a}	8.31^{a}	3.83^{b}
Alfalfa K_d, /h	.050^{b}	.063^{ab}	.070^{a}	.115^{a}
Acetate:propionate	2.76^{b}	3.27^{a}	3.36^{a}	3.14^{a}

^{ab}($P<.05$).

Fatty acids in NEBB were subjected to substantially less biohydrogenation than those in SBO, and had minimal negative impact on fiber digestion, indicating that fatty acids of NEBB are partially protected from the ruminal environment.