at low dose could mainly be due to the increase in fibre degradation, iv) increasing dose of HMBi would not lead to a further improvement of fibre degradation, but could favour other fermentation processes.

Key Words: HMBi, Energy Value, Corn DDGS

TH270 Effects of feeding a controlled rumen release urea on productivity of Holstein cows. A. Highstreet*[1], J. Robison[1], P. H. Robinson[2], and J. G. Garrett[3], [1]*California State University*, *Fresno*, [2]*University of California*, *Davis*, [3]*Balchem Encapsulates*, *New Hampton, NY*.

While urea is often added to rations of lactating dairy cattle, it is solubilized and converted to ammonia rapidly in the rumen which could lead to inefficient use of dietary N. Our objective was to determine if a controlled rumen release urea (Nitroshure (NS) Balchem, New Hampton, NY), increases performance, and efficiency of capture of dietary N in milk, when it replaced urea in diets of lactating dairy cows. NS was determined to be 45.0% N and 9.9% fatty acids that were 80% C18:0, 17% C16:0 and 3% others. Ruminal in sacco incubation, with hand washing of bags, showed 72, 89 and 99% rumen N solubilization (includes loss at t=0 h) at 0.5, 4 and 12 h respectively. Pens of multiparous lactating cows (2 early and 2 mid-lactation) on a California dairy were fed one of 2 TMR formulated to supply 5% of ration CP as urea or NS. The study was 2 experiments (early and mid-lactation) in 2×2 factorials within switchover designs with 2 experimental periods of 4 weeks. All pens were fed twice daily to appetite with daily intakes recorded by pen. TMR and TMR ingredients were sampled twice in the final week of each period for chemical analysis. Cows were milked thrice daily with milk yield and components measured at the end of each period. Urine samples were collected from 20 cows/pen voluntarily urinating at the end of each period with fecal collections from these same cows 24 h later. There were no differences among TMR in nutrient analyses, with average CP and NDF of 17.9 and 33.4% respectively. DM intakes did not differ due to treatment in either early or mid-lactation. In mid-lactation, there were no differences in milk production, or component levels or outputs, due to replacement of urea with NS in the TMR, while early lactation cows had increased (P<0.01) milk fat and protein %, as well as milk fat, protein and energy outputs. Neither early or mid-lactation cows had different urinary or fecal N output due to treatment, capture of dietary N in milk was not impacted, and whole tract NDF digestibility was unaffected. Feeding a controlled rumen release urea in replacement for urea at about 5% of dietary CP improved performance of early lactation high producing dairy cows.

Key Words: Urea, Dairy, Rumen

TH271 In vitro ruminal protein degradation and microbial protein formation of seed legumes. S. Colombini[1] and G. A. Broderick*[2], [1]*University of Milan*, *Milano, Italy*, [2]*U.S. Dairy Forage Research Center*, *Madison, WI*.

Seed legumes such as peas, lupins and faba bean are important feeds for dairy cows in Europe and other regions. Ruminal protein degradability was quantified using the inhibitor in vitro (IIV) system for samples of 5 seed legumes: 2 peas (cv. Alembo and Helena), 1 white lupin (*Lupinus albus*, cv. Multitalia), 1 blue lupin (cv. Quilinok), and 1 faba bean (*Vicia faba minor*, cv. Chiaro). Incubations were stopped by adding acid at 0, 2, 4 and 6 h; ruminal escape was computed assuming a passage rate of 0.06/h. Five standard proteins were included. Additional incubations were conducted without growth inhibitors in an attempt to correct for N incorporation by bacteria. These were conducted for 2, 4 and 6 h with ruminal inoculum containing ammonium sulfate enriched with N-15. Net microbial growth (growth above blank) was estimated from total non-ammonia N (NAN) plus N-15 enrichment of total NAN and isolated bacterial NAN. Significant differences were observed among protein sources in IIV degradation traits (Table 1). Typical estimates of degradation rate and rumen-undegraded protein (RUP) were obtained for the standard proteins. The 2 pea sources had slower degradation rates and greater RUP than the lupins and faba bean. The IIV system ranked the RUP contents of the 5 legumes differently from the Cornell model. Excessive variation prevented reliable estimates of degradability in uninhibited inoculum. However, there was a trend (P = 0.15) for an effect of seed legume on microbial NAN formation; greater content of starch and water soluble carbohydrate may have supported greater formation of bacterial NAN for Alembo peas and Chiaro faba beans. Both microbial growth and protein escape should be considered when evaluating feeds rich in protein and fermentable energy.

Table 1. In vitro ruminal protein degradability and microbial NAN formation

			Inhibitor in vitro			Cornell model		Uninhibited
Source	Cultivar	N (%)	Rate	RUP	Rank	RUP (%)	Rank	Microbial NAN
			(/h)	(%)				[mg/(h*100 ml)]
Casein		14.07	0.230	18				
Solvent SBM		7.16	0.106	35				
Expeller SBM		7.07	0.031	67				
Alfalfa hay		2.74	0.039	59				
Alfalfa silage		2.98	0.057	45				
Pea	Alembo	3.40	0.088	39	2	16	4	3.5
Pea	Helena	4.17	0.078	42	1	20	3	2.3
White lupin	Multitalia	5.62	0.137	29	5	11	5	1.9
Blue lupin	Quilinok	5.11	0.124	30	4	20	2	2.0
Faba bean	Chiaro	4.41	0.095	38	3	24	1	2.7
SE			0.008	2.3				0.7
P > F			< 0.01	< 0.01				0.15

Key Words: Seed Legumes, Protein Degradation, Rumen-Undegraded Protein

TH272 In situ ruminal degradation of nitrogen fractions of cottonseed and canola meals. T. Tashakkori, M. Danesh Mesgaran*, A. R. Heravi Mousavi, and H. Nasri Moghaddam, *Ferdowsi University of Mashhad*, *Mashhad, Iran*.

The experiment was investigated to determine ruminal degradation of nitrogen fractions [true protein (TP), buffer insoluble protein (BIP), neutral detergent insoluble protein (NDIP) and acid detergent insoluble protein (ADIP)] of cottonseed meal (CP= 280 g/kg DM) and canola meal (CP= 420 g/kg DM) using nylon bag technique. Two Holstein steers (450±50kg body weight) fitted with ruminal fistula were used.

Samples were weighed into nylon bags (19×12 cm, pore size= 48μm, n= 8) and incubated in the rumen for 0.0, 8, 24, 48 and 72 h. Nitrogen fraction concentrations were determined in intact and incubated samples using standard procedures. Data were applied to the equation of P= a+b(1-e-ct); P= degradability potential, a= rapidly degradable fraction, b= slowly degradable fraction, c= degradable constant, t= time. True protein degradation of cottonseed meal (a= 0.35±0.059, b= 0.49±0.394, c= 0.018±0.028) was markedly different from those of canola meal (a= 0.24±0.041, b= 0.71±0.046, c= 0.08±0.013). BIP degradation of cottonseed meal (a= 0.42±0.031, b= 0.89±0.723, c= 0.01±0.011) was higher than canola meal (a= 0.35±0.035, b= 0.63±0.047, c= 0.06±0.012). NDIP degradation coefficients of cottonseed meal and canola meal were a= 0.45±0.063 and 0.16±0.086, b= 0.66±1.46 and 0.71±0.01, c= 0.008±0.026, 0.056±0.023, respectively. Ruminal degradation of ADIP of canola meal and cottonseed meal were a= 0.15±0.175 and 0.29±0.102, b= 0.29±0.226 and 0.17±0.126, c= 0.086±0.179 and 0.04±0.114, respectively. Results of the present study indicate that the nitrogen fractions of cottonseed meal and canola meals were degraded in the rumen with different kinetics.

Key Words: In Situ, Nitrogen Fraction, Degradation