708 Mammary use of glucose when milk yield is reduced by once daily milking and/or feed restriction in dairy cows. J. Guinard-Flament*, E. Delamaire, S. Lemosquet, and Y. David, *UMR INRA-Agrocampus Rennes Production du Lait*, *Rennes, France*.

A decrease in milk yield may alter mammary use of plasma glucose for lactose production through a modified mammary supply, uptake and/or metabolic fate of glucose. A study was conducted to better understand mammary glucose utilization following a decrease in milk yield induced by once daily milking (ODM) and/or feed restriction (FR). Five multiparous dairy cows (30 kg/d of milk) were fitted with an ultrasonic flow probe to measure mammary blood flow (MBF) and with two catheters to determine arteriovenous differences in glucose concentrations (AV). Mammary use of glucose was measured on d 7 of each experimental week according to a reversal design in which the cows were milked once or twice daily while fed a diet providing 98 or 70% of needs determined before the trial. Data were analyzed by Anova using PROC GLM of SAS. No interaction between ODM and FR was observed. The decrease in milk yield induced by ODM was larger (-5.1 kg/d) than with FR (-2.9 kg/d) ($P < 0.01$). This difference was not due to a lower mammary supply of glucose with ODM because it was less reduced with ODM than with FR (-1.7 *vs.* -3.4 mmol/min, respectively). MBF decreased by about 0.8 L/min with ODM and FR ($P < 0.01$) but arterial concentration of glucose was higher with ODM ($P < 0.03$). The difference in milk response between ODM and FR was not also due to a different decline in the mammary uptake of glucose (MBF × AV). It decreased by 0.75 mmol/min for ODM and FR ($P < 0.01$) in response to a reduced or unchanged glucose AV ($P < 0.06$ and 0.32, respectively). In fact, the difference in milk yield decrease, induced by the two treatments, was due to a more efficient intracellular use of glucose towards lactose synthesis with FR (80 *vs.* 72%). Thus, glucose supply, uptake and metabolic fate are differently involved in the regulation of milk yield by ODM and FR, implying a decrease in MBF and different intra-mammary regulations resulting in an altered glucose AV for ODM and an increased use of glucose towards lactose synthesis with FR.

Key Words: Glucose, Udder, Dairy Cow

Ruminant Nutrition: Beef and Small Ruminant—Nitrogen Metabolism

709 Metabolizable protein effects on ammonia emissions and nitrogen excretion of steers. D. Panetta*, W. Powers, and J. Russell, *Iowa State University of Science and Technology*, *Ames*.

Protein degradability effects on N metabolism and NH_3 emissions were evaluated. In Exp 1, eight steers (initial BW, 338 kg) were fed diets containing urea (D1: 10.6% CP), soybean meal (D2: 10.1% CP), or soybean meal and urea (D3: 16.9% CP). In Exp 2, nine steers (initial BW, 268 kg) were fed diets containing 0 (D0: 12.7% CP), 12 (D12: 10.7% CP), or 24% (D24: 12.9% CP) distillers dried grain with solubles (DDGs). Feces and urine collections and DMI determination occurred during one 4-d period in Exp 1 and three 3 to 6-d periods in Exp 2. An 800-g, as-excreted mixture of urine and feces from each steer was placed into duplicate plastic tubs. Air passed over the excreta at a rate of 3 L/min for 96 h and NH_3 was trapped in boric acid. In Exp 1, DMI (7.3 kg/d) and ADG (0.55 kg/d) did not differ ($P < 0.05$) between diets. Digestibility of DM (61.9%) did not differ with diet, but total Kjeldahl nitrogen (TKN) digestibility was greater in steers fed D3 (65.7 vs. 50.7 and 41.5% on D1 and D2). Daily fecal DM, NH_4^+-N, and TKN mass did not differ between diets. Steers fed D1 excreted less urinary NH_4^+-N (4.8 vs. 8.7 and 9.1 g/d for D2 and D3). Steers fed D2 excreted less urinary TKN (32.3 vs. 42.5 and 49.5 g/d for D1 and D3). In Exp 2, steers fed D0 had lower DMI (4.0 vs. 5.5 and 5.4 kg/d for D12 and D24) and ADG (-0.80 vs. 0.32 and 0.24 kg/d for D12 and D24). Intake of TKN was greater for D24 (104.9 vs. 78.6 and 88.2 g/d for D0 and D12). Digestibility of DM (77.9%) and TKN (67.3%) were unaffected by diet. Steers fed D24 had greater fecal TKN (32.7 vs. 23.6 and 25.3 g/d for D0 and D12) and NH_4^+-N (4.22 vs. 2.94 and 2.82 g/d for D0 and D12) but daily urinary TKN (12 g) was unaffected by diet. Urinary NH_4^+-N was greater for steers fed D0 (9.1 g/d) than D12 (5.4 g/d). Daily NH_3-N emissions were 170, 99, and 97 mg for D1, D2, and D3 and 70, 29, and 53 mg for D0, D12, and D24. The daily portion of total emitted NH_3 increased with time (18, 25, 28, 29% and 22, 23, 27, 28% for d 1, 2, 3, and 4 of Exp 1 and 2). Metabolizable protein fractions play a larger role than dietary CP in influencing N excretion and NH_3 emissions and DDGs, as a UIP source, contributes to reduced NH_3 emissions.

Key Words: Ammonia, Protein

710 Effects of energy source on methionine utilization by growing steers. G. F. Schroeder*, E. C. Titgemeyer, M. S. Awawdeh, J. S. Smith, and D. P. Gnad, *Kansas State University*, *Manhattan*.

We evaluated the effects of different supplemental energy sources on methionine (Met) utilization in growing steers. Ruminally cannulated Holstein steers were used in two 6 × 6 Latin squares with data pooled for analyses. In Exp. 1, steers (148 kg) were fed 2.3 kg DM/d of a diet based on soybean hulls. Treatments (2 × 3 factorial) were abomasal infusion of 0 or 3 g/d of L-Met, and supplementation with no energy or with glucose (360 g/d) or fat (150 g/d) continuously infused into the abomasum. In Exp. 2, steers (190 kg) received 2.6 kg DM/d diet and were provided in a 2 × 3 factorial with 0 or 3 g/d L-Met and with no supplemental energy or with acetate (385 g/d) or propionate (270 g/d) continuously infused into the rumen. Energy sources supplied 1.3 Mcal ME/d. In both trials, all steers received basal infusions of 400 g/d acetate into the rumen and a mixture (125 g/d) of all essential AA except Met into the abomasum. Nitrogen balance (23.6 vs 27.8 g/d, $P<0.01$) and whole-body protein synthesis (2.1 vs 2.3 kg/d, $P<0.07$) were increased by Met supplementation, indicating that Met limited protein deposition. Energy supply reduced ($P<0.01$) urinary N excretion and increased ($P<0.01$) N retention, without differences among energy sources. Increases in N retention in response to Met were numerically greater when energy was supplied. Efficiency of supplemental Met utilization was 11% when no energy was supplemented but averaged 21% when 1.3 Mcal ME/d was provided. Whole-body protein synthesis and degradation were not affected by energy supply. Serum insulin concentrations were increased by glucose and propionate supplementation. Serum IGF-I concentrations were increased by supplementation with Met or glucogenic sources of energy. In growing steers, N retention was increased by energy supplementation even though Met limited protein deposition, suggesting that energy supplementation improves the efficiency of AA utilization. These responses were independent of the source of energy supplemented.

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Key Words: Energy, Methionine, Growth

711 Ruminal fermentation of ^{15}N-labeled alfalfa hay N fractions *in vitro*. A. Melgar* and A. N. Hristov, *University of Idaho*, *Moscow*.

The objective of this study was to compare the ruminal *in vitro* rate and extent of bacterial utilization of ^{15}N-labeled alfalfa hay N fractions. Nitrogenous fractions from green house-grown alfalfa hay were isolated and incubated *in vitro* with mixed ruminal populations. The following N fractions were prepared: insoluble N (InsN), soluble protein N (SolPN), non-protein N (NPN), neutral-detergent insoluble N (NDFN), and acid-detergent insoluble N (ADFN). Casein labeled with ^{15}N (Cas) was used as a control. Incubation was repeated three times (n=3). All N fractions were incubated with ruminal inoculum/buffer media containing sugars, starch, and pectin as energy sources. Concentration of ^{15}N in the incubation media was 5.6 mg/L. Samples were taken at 0, 0.25, 0.5, 1, 2, 4, 6, and 8 h, fractionated into: ammonia N (NHN), bacterial N (BactN), N

associated with particulate matter and adherent microorganisms (SolidN), and non-ammonia, non-bacterial, non-protein N (NABPN), and analyzed for ^{15}N-enrichment. Data were analyzed through regression or as a completely random design by time of sampling. Treatment means were separated by a pairwise *t*-test. The greatest ($P < 0.05$) rate of release of ^{15}N into NHN was associated with SolPN. The rates of ^{15}N release from InsN and NPN were greater ($P < 0.05$) than from NDFN, ADFN, and Cas. The rate of recovery of ^{15}N into BactN (as proportion of the total ^{15}N recovered) was greater ($P < 0.05$) for SolPN than for any other N fraction except NPN (1.26 and 0.94 h^{-1}, respectively). The rates for InsN, Cas, NDFN, and ADFN were 0.46, 0.24, 0.10, and 0.02 h^{-1}, respectively. At the incubation end-point, the greatest ($P < 0.05$) proportion of ^{15}N recovered in BactN was with SolPN (13.4% of the total recovered) and the least with ADFN (0.5%). The greatest ($P < 0.05$) proportion of ^{15}N recovered in NABPN was with Cas (47.8%) and the least with NDFN (7.4%). Most ^{15}N was recovered in NHN with NPN (8.1%, $P < 0.05$) followed by SolPN (3.6%). These results indicate a rapid bacterial utilization of N from alfalfa hay SolPN and NPN fractions in the rumen.

Key Words: Alfalfa, Nitrogen, Rumen

712 Total splanchnic flux of nutrients in wethers fed oscillating crude protein diets. S. L. Archibeque*, H. C. Freetly, and C. L. Ferrell, *USDA, ARS; U.S. Meat Animal Research Center*, *Clay Center, NE*.

We hypothesized that oscillating dietary CP would improve ruminant N retention by increasing nutrient flux compared to static dietary CP regimens. Chronic indwelling catheters were surgically implanted in a mesenteric artery, mesenteric vein, hepatic vein, and portal vein of 18 growing Suffolk × Dorsett wethers (44.65 ± 3.59 kg). Wethers had ad libitum access to the following diets: 1) Low (9.91% CP), 2) Med (12.5% CP), or 3) Low and High (14.19% CP) oscillated on a 48 h interval (**Osc**). Dry matter intake tended ($P = 0.09$) to be greater in Osc (1,313 g/d) than Low (987 g/d) fed wethers, but not those fed Med (1,112 g/d). Nitrogen intake was not different between Osc (25.3 g/d) and Med (22.2 g/d) fed wethers but was reduced ($P < 0.01$) in wethers fed Low (16.0 g/d). Osc wethers (6.66 g/d) retained more ($P < 0.02$) N than either Low (3.20 g/d) or Med (3.96 g/d) fed wethers. There were no discernable alterations in nutrient flux over the 4 d oscillation period (Time × Diet interaction, $P > 0.15$). Arterial blood flow was lower ($P = 0.02$) in Osc (32 L/h) fed wethers than either Med (48 L/h) or Low (69 L/h) fed wethers. Net release of α-amino N by the portal-drained viscera (**PDV**) did not differ ($P = 0.44$) among the Low (35.9 mmol/h), Med (34.3 mmol/h), or Osc (53.0 mmol/h) fed wethers. Net PDV release of ammonia N was lower ($P = 0.03$) in Low fed wethers, which was accompanied by a similar decrease ($P = 0.02$) in hepatic ammonia N uptake. Urea N concentrations tended ($P < 0.08$) to be reduced in arterial (1.67 mM), portal (1.58 mM), and hepatic (1.70 mM) blood in wethers fed the Low diet compared to Med or Osc fed wethers. However, net release of urea N did not differ across the PDV ($P = 0.30$), liver ($P = 0.76$), or total splanchnic tissues ($P = 0.42$). Portal net uptake of glutamine was greater ($P < 0.01$) in the Low (7.6 mmol/h) fed wethers than those fed the Med (3.46 mmol/h) and Osc (3.08 mmol/h) diets. There were no alterations ($P > 0.15$) in glutamate, glucose, lactate, or oxygen flux. Although diet effects on PDV and splanchnic release of α-amino N were not significant, numerical differences were consistent with observed patterns of N retention.

Key Words: Nitrogen, Metabolism, Wethers

713 Splanchnic metabolism of nutrients in response to methionine supplementation in ewes. T. Thelen*[1], J. Taylor[2], C. Loest[1], S. Wang[2], and G. Lewis[2], [1]*New Mexico State University*, *Las Cruces*, [2]*USDA-ARS, US Sheep Experiment Station*, *Dubois, ID*.

Nulliparous yearling Rambouillet cross ewes (61.9 ± 2.6 kg BW) fitted with chronic indwelling hepatic (H), portal (P), and mesenteric vein and mesenteric artery (A) catheters were used in a randomized design to determine whether dietary methionine affected splanchnic metabolism of nutrients. Treatments were no added methionine (CON; n = 5) or 1.2 g of rumen-protected methionine (MET; Mepron M85, Degussa; n = 6) bolused twice daily at feeding (1.3 kg/d sugar beet pulp pellets, DM basis). Arterial, P, and H blood samples were simultaneously collected before treatment (h 0) and then every 2 h for 12 h. Continuous para-aminohippurate (3% wt/vol; 0.57 mL/min; mesenteric vein) infusion was used to estimate vessel plasma flows. The treatment × time interaction was significant ($P = 0.04$) for P-A lactate concentration differences. The lactate P-A differences were greater ($P = 0.04$) for MET at h 12 compared to CON (h 12 = 0.06 vs. -0.07 mM, respectively, SE = 0.04). Methionine P-A and H-P ammonia concentration differences were lower ($P < 0.05$) than CON (P-A = 0.13 vs. 0.22 mM and H-P = -0.11 vs. -0.20 mM, respectively, SE = 0.03). Hepatic plasma flow was greater ($P = 0.02$) for MET than for CON (140.9 vs. 104.2 L/h, respectively, SE = 7.29); however, treatment did not affect portal and arterial plasma flows. The treatment × time interaction was significant ($P = 0.03$) for ammonia portal-drained viscera flux, which was lower ($P = 0.01$) at h 4 for MET compared to CON (h 4 = 9.40 vs. 26.30 mmol/h, respectively, SE = 4.60). Methionine treatment did not affect glucose venous-arterial concentration differences or flux. In conclusion, supplemental rumen-protected methionine increased hepatic plasma flow and decreased ammonia flux across the portal-drained viscera.

Key Words: Nutrient Flux, Methionine, Ewes

714 Effects of supplemental RDP versus increasing amounts of supplemental RUP on N retention and digestion of a low-quality forage diet by growing lambs. R. L. Atkinson*, C. D. Toone, and P. A. Ludden, *University of Wyoming*, *Laramie*.

Twelve suffolk wether lambs (29.9 ± 2.7 kg BW) were used in a 4 × 4 Latin square designed experiment to compare supplemental RDP versus increasing amounts of supplemental RUP on N retention and digestion of a low-quality forage diet. Lambs were fed a basal diet of crested wheatgrass hay (4.9% CP, 60% NDF, 40% ADF) for ad libitum consumption, plus one of four protein supplements: isolated soy protein fed to meet RDP requirements assuming a microbial efficiency of 11% of TDN (CON), or corn gluten meal (RUP) fed at 50, 100, or 150% of the supplemental N provided by CON (C50, C100, and C150, respectively). Source and level of supplemental protein had no effect ($P \geq 0.31$) on forage OM intake. Total tract OM digestibility did not differ ($P = 0.10$) between CON and C100. However, OM digestibility increased ($P = 0.004$) from 50.8 to 53.7% as level of RUP increased. Similarly, total tract NDF and ADF digestibilities increased ($P \leq 0.04$) with increasing RUP, but did not differ ($P \geq 0.27$) between CON and C100. Although lambs fed C100 had lower ($P = 0.05$) fecal N excretion (g/d) than those fed CON, urinary N excretion ($P = 0.20$), total tract N digestibility ($P = 0.64$), and N retention ($P = 0.34$) were similar between CON and C100. Supplemental RUP increased ($P = 0.001$) N intake, but also increased ($P \leq 0.008$) both fecal and urinary N excretion. Nonetheless, total tract N digestibility ($P = 0.001$) was enhanced with increasing RUP supplementation, resulting in improved N retention both in g/d ($P = 0.001$) and as a percentage of N intake ($P = 0.004$). However, supplemental RUP had no effect ($P \geq 0.59$) when expressed as a percentage of digested N. Although increasing the amount of supplemental RUP may have provided additional metabolizable protein for tissue deposition, these data further suggest that a portion of the supplemental RUP may be used as a source of N for endogenous recycling, thereby maintaining forage intake and digestion similar to lambs fed supplemental RDP.

Key Words: Ruminally Degradable Protein, Ruminally Undegradable Protein, Nitrogen Recycling

715 Nitrogen balance in goats fed a novel byproduct protein source. S. Freeman*[1], M. Poore[1], P. Ferket[1], G. Huntington[1], and T. Middleton[2], [1]*North Carolina State University*, *Raleigh*, [2]*AgProvisions, LLC*, *Kenansville, NC*.

Disposing of spent laying hens presents environmental and economic challenges to the poultry industry. Processing hens into feedstuffs has been explored as an

option for disposal. Using a mechanical deboner, hens were separated into hard and soft tissues. The hard tissue (bones, feathers, and connective tissue) was further processed using hydrolysis and co-extrusion with soybean hulls to yield a meal (94.2% DM, 22.2% CP). This product was incorporated into soybean meal/corn based pellets to provide 0, 20, 40, or 60% of the added N. Pellets with no added N served as negative control (-C). Concentrates were offered to 25 wether goats (avg initial wt 22.8kg) that had been blocked by weight. The total diets were 50% hay and 50% concentrate. They were fed to achieve 10% orts. Following 14d of adaptation, feed offered was stabilized and kids were fitted with fecal collection bags for a 5d total excreta collection. A day after the excreta collection ended, blood was collected via jugular venipuncture before feeding and at 2, 4, and 8h after feeding. Ruminal fluid was also obtained at 4h after feeding. Dietary treatment had no influence (P>.10) on ruminal pH (5.7), total VFA (97.8mM), or A/P ratio (3.2). Likewise, DM digestibility (68.7%) and the proportion of absorbed N retained (24.7%) were not altered by treatment. Results of contrasts between -C and N-supplemented diets and among the N-supplemented diets are given below. Ruminal NH_3 showed a trend towards a quadratic relationship among N-supplemented diets (p=.1012). These data show that the hard tissue meal performed similarly to the standard protein source, soybean meal.

Parameter	-C	0	20	40	60	Contrast
DMI (g/d)	608	703	710	673	779	a
DM Digestibility (%)	69.2	69.2	68.0	67.9	68.9	
N intake (g/d)	7.6	12.4	12.0	12.0	14.3	a,c
Fecal N (g/d)	3.7	4.5	4.6	4.5	5.4	a,b
N Digestibility (%)	47.0	60.5	57.0	57.5	55.6	a,b
N retained (g/d)	1.0	2.2	1.4	2.1	2.5	a,c
%urinary N as urea	66.7	81.8	83.0	82.6	86.8	a
Ruminal NH3 (mg/dl)	2.53	13.9	12.2	12.3	15.8	a

a: -C differs from N-supplemented (P<.10), **b:** linear relation among N-supplemented (P<.10), **c:** quadratic relation among N-supplemented (P<.10)

Key Words: N-Balance, Byproduct, Protein

716 Monitoring the fate of microwave treated whole cottonseed proteins in the rumen. A. A. Sadeghi*[1] and P. Shawrang[2], [1]*Islamic Azad University*, *Tehran, Iran*, [2]*Tehran University*, *Karaj, Iran*.

The objective of this study was to determine ruminal protein degradability characteristics of untreated 2, 4 and 6-min microwave (800 W) treated whole cottonseed (WCS) by using nylon bags and sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) techniques. Nylon bags of untreated and treated WCS (2-mm particle size) were suspended into the rumen of three Holstein steers from 0 to 48h, and data was fitted to non-linear degradation characteristics to calculate effective rumen degradation (ERD). Degradation coefficients of CP were significantly (P<0.05) affected with microwave irradiation, reducing the values for wash out fraction and constant degradation rate, but increasing the values for potentially degradable fraction. The ERD of CP decreased (P<0.05) as microwave processing time increased. The effective CP degradability of 2, 4 and 6-min microwave treated WCS were 675, 590 and 487 g/kg, respectively, that were lower than untreated WCS (735 g/kg). From SDS-PAGE pattern, WCS proteins are composed of three major components; Globulin 9S, Globulin 5S and Albumin 2S, accounting for 12, 30 and 40 percent of buffer soluble WCS proteins, respectively. Electrophoretic analysis of untreated, 2, 4 and 6-min microwave treated WCS protein residues revealed that three subunits of albumin 2S were degraded completely within 2, 4, 24 and 48-h, respectively. Globulin 5S were degraded in the middle of incubation periods. Two subunits of globulin 9S in untreated and treated WCS were degraded within middle and longest incubation periods, respectively. In vitro crude protein digestibility of 4-min microwave treated WCS was highest among treatments. In conclusion, WCS proteins appeared to be effectively protected from ruminal degradation by a 4-min microwave treatment. SDS-PAGE results indicated that Globulin 9S in untreated, whereas Globulin 9S, Globulin 5S and Albumin 2S in microwave treated WCS make the bulk of escaped protein.

Key Words: Whole Cottonseed, Microwave Processing, SDS-PAGE

717 Monitoring the fate of steam flaked corn proteins in the rumen. A. A. Sadeghi*[1] and P. Shawrang[2], [1]*Islamic Azad University*, *Tehran, Iran*, [2]*Tehran University*, *Karaj, Iran*.

The objectives of this study were to monitor the fate of steam flaked corn true proteins in the rumen using electrophoresis and nylon bag techniques and to evaluate the effect of steam flaking on ruminal crude protein (CP) and starch degradation characteristics of corn grain (CG). Nylon bags of untreated and steam flaked CG (360 g/L) were suspended into the rumen of three 450 kg Holstein steers from 0 to 48-h, and data was fitted to non-linear degradation characteristics to calculate effective rumen degradation. Untreated and steam flaked CG differed (P<0.05) in CP and starch degradation characteristics. Degradability coefficients of CP were significantly (P<0.05) affected by steam flaking, reducing the values for wash out fraction and constant degradation rate, but increasing the values for potentially degradable fraction. The effective CP degradability of steam flaked CG (457 g/kg) was lower than that for untreated CG (512 g/kg). For starch, steam flaking increased (P<0.05) the wash out fraction and decreased the potentially degradable fraction. The degradation rate of latter fraction increased with this treatment. The effective starch degradability of steam flaked CG (710 g/kg) was higher than that for untreated CG (641 g/kg). From electrophoretic analysis, four major components were observed: prolamin (zein), albumin, globulin and glutelin. From 12.5% slab gel analysis, the globulin appeared to be composed mainly of subunits with a molecular mass ranging from 25 to 50 kDa. Corn zein was consisted of two major subunits of 22 and 24 kDa. Electrophoretic analysis of protein residues revealed that steam flaking decreased degradation of corn true protein. The bulk of the rumen escaped protein for untreated corn was only zein and for steam flaking were both zein and other protein fractions. In conclusion, corn proteins appeared to be effectively protected from ruminal degradation and starch fermentation improved by steam flaking.

Key Words: Corn Grain, Steam Flaking, SDS-PAGE

718 Urea treatment of corn straw and its use in fattening of Holstein bull calves. S. A. Shiri*, *Agricultural and Natural Resources Research Center of Khorasan*, *Mashhad, Iran*.

Corn fiber residues collected following grain harvesting, chopped and treated with commercial urea at five levels including 0, 2, 3, 4 and 5% (one liter water per one kilogram DM basis after 45 days). Dry matter degradability was determined by using three fistulated sheep. The incubation times were 0, 2, 4, 8, 16, 24, 36, 48, 72 and 96 hours, after feeding. The results showed that the best level of urea for treating of corn straw based on DM degradability was 3%. The voluntary intake of untreated and treated corn straw (3% urea) was determined in 6 calves per treatment. The results showed that treating of corn straw increased voluntary intake (P<0.01). In the other experiment, the effect of three different diets including: a) treated corn straw with 3% urea(30%) + alfalfa hay (10%) + concentrate (60%), b) untreated corn straw (30%) + alfalfa hay (10%) + concentrate (60%) and c) control diet (traditional ration containing wheat straw (15%) + alfalfa hay(10%) + concentrate (75%)) on 18 bull calves (6 calves per ration) for a period of 126 days was evaluated. The results showed that mean daily gain of the calves in rations a, b and c were 1050, 865 and 880 g respectively and the differences among of treatments were significant (P<0.05). Voluntary feed intakes based on metabolic body weight were 141, 133 and 150 $g/kg^{0.75}$ for ration a, b and c respectively. The differences among treatments were not significant. Feed to gain ratios (kg/kg) for the diets containing treated corn straw (3% urea) and the control were 9.77 and 14.76, respectively. It was concluded that treating corn straw with urea (3% DM) can increase voluntary intake, feed efficiency and daily gain and decrease cost of production in growing bull calves.

Key Words: Corn Straw, Degradability, Calves

719 Degradability of dry matter and crude protein of sugar beet tops and crown silage treated with urea and molasses in Iranian Balouchi sheep. M. Raisianzadeh*[1], G. Moghaddam[2], M. Daneshmesgaran[3], H. Fazaeli[4], and M.

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Sugar beet tops and crown (SBTC) is one of the important agricultural waste products in Iran. Economically, the best method of applying SBTC in ruminant feeding is ensiling. SBTC was treated with additives and ensiled for two months. Degradability characteristics were determined by in situ method. Two male Balouchi lambs (8 months of age) were fitted with a rumen fistula and were fed a diet consisting of alfalfa hay (50%) barley grain (30%) and SBTC (20%). Dried samples were grounded through a 2 mm screen prior to incubation. Nylon bags were placed in the rumen for 0, 2, 4, 8, 16, 24, 48 and 72 hours. Treatments were: 1) unchopped SBTC. 2) Chopped SBTC, 3) Chopped SBTC + 5 % molasses, 4) Chopped SBTC + 5% molasses + 2% urea, 5) Chopped SBTC + 10 % molasses, 6) Chopped SBTC + 10 % molasses + 2% urea and 7) Chopped SBTC + 10% molasses + wheat straw (8% of dry matter). After removal from the rumen, the bags were washed using cold water and dried in air forced oven. The equation of $P = a + b (1- e^{-ct})$ was used for the in situ degradability which P is DM and CP degradability (%) at time t, a is soluble fraction, b is slow degradable fraction, e is logarithmic number, c is fractional rate and t is time of incubation. Means were compared with LSmean. By increasing molasses in silages, degradability of dry matter was enhanced ($P<0.05$). The greatest rapidly degradable coefficient (a) of dry matter was observed in treatments 3 and 5 (0.59 and 0.62 respectively). Slowly degradable coefficient (b) of dry matter in treatment 5 was decreased by increasing molasses in comparison with control silage (0.26 vs. 0.33). The increase of urea did not affect the degradability coefficients of silages, however, it just caused the coefficient (a) to change from 0.55 in control treatment to 0.57 in treatment 6. By increasing the amount of molasses and adding urea, rapidly degradable coefficient of crude protein was increased whereas slowly degradable coefficient was decreased. Adding wheat straw to the silage 7 decreased the rapidly degradable coefficient (a) and increased the slowly degradable coefficient (b).

Key Words: Degradability, Sugar Beet Tops, Silage