670 The use of logistic and cumulative normal distributions to model ruminal temperature and pH by radiofrequency rumen boluses under different conditions in goats. A. Castro-Costa[1], J. Torrent*[2], A. A. K. Salama[1], M. Creus[3], and G. Caja[1], [1]*Ruminant Research Group (G2R), Universitat Autonoma de Barcelona, Bellaterra, Spain,* [2]*Oligo Basics USA LLC, Wilmington, DE,* [3]*Nutcat, Lleida, Spain.*

The objective of this study was to investigate the relationship between ruminal temperature and pH to develop a predictive model under different feeding and environmental conditions using either logistic regressions or cumulative normal distributions (CND). Eight open and dry Murciano-Granadina goats (43.6 ± 1.4 kg BW) were randomly allocated to treatments according to a 2 × 2 factorial (control or functional oil diets, thermoneutral or heat stress temperatures) to assess whether these factors affected the relationship. The experiment consisted of 2 consecutive periods of 3 wk (adaptation, 2 wk; data collection, 1 wk) during which ruminal pH and temperature were continuously recorded every 30 min. Diet consisted of a TMR (concentrate:forage, 30:70) the functional oil being added to concentrate (1 g/goat and day). Data were collected using radiofrequency (433.92 MHz) rumen boluses (KB1000, Khane Auckland, NZ) and a receiver (KR2002). Mean pH and temperature values and ranges were 6.446 ± 0.013 (5.68 to 7.37) and 39.875 ± 0.020°C (38.91 to 40.82). Although logistic regressions predicted slightly more accurately pH and temperature kinetics (r^2 from 0.96 to 0.99; RSD from 0.037 to 0.169; $P < 0.001$) than CND ($r^2 = 0.95$ to 0.99; RSD from 0.035 to 0.174; $P < 0.001$), no significant relationship was found between the coefficients of rumen pH and those of rumen temperature. The SD of rumen temperature was more accurate predicting pH nadir and average pH than any other estimated parameter. Supplementation of functional oil increased ($P = 0.002$) and heat stress tended ($P = 0.086$) to decrease ruminal nadir pH independently of rumen temperature. In conclusion, the use of logistic regressions only marginally improved the accuracy of ruminal pH predictions over the CND. The SD of the temperature was the best predictor of nadir pH, and factors that affect ruminal pH and temperature decrease the accuracy of pH predictions that use either the rumen temperature or its SD as a predictor.

Key Words: logistic regression, ruminal pH, ruminal temperature

671 Biomarkers for bovine rumen acidosis. A. M. Danscher[1], S. C. Li*[2], P. H. Andersen[3], E. Khafipour[2], N. B. Kristensen[4], and J. C. Plaizier[2], [1]*University of Copenhagen, Copenhagen, Denmark,* [2]*University of Manitoba, Winnipeg, MB, Canada,* [3]*Swedish University of Agricultural Sciences, Uppsala, Sweden,* [4]*Danish Agricultural Advisory Service, Aarhus, Denmark.*

Prevalence of ruminal acidosis in dairy production is allegedly high with large effects on production and welfare. Field diagnosis still relies on rumen pH measurements, which are insensitive, invasive or require expensive equipment. Previous attempts to identify new candidate markers for ruminal acidosis have shown conflicting results. Here, we evaluated several blood, urine and feces parameters as potential biomarkers of this disease. Eight Danish Holstein dry cows were fed a conventional total mixed ration (TMR) with forage-to-concentrate ratio of 78:22 on a DM basis. Acidosis challenge was conducted in 4 animals for 2 d by substituting up to 45% of TMR DM with pellets containing 50% wheat and 50% barley. Rumen pH was measured continuously (eCow). Daily mean, minimum and maximum rumen pH and duration and areas below pH 6.0, 5.8, 5.6, and 5.2 were calculated. Samples of blood, urine and feces were collected at 15:00 and 21:00 on 2 acidosis days. Blood samples were analyzed for pCO_2, pO_2, pH, electrolytes, lactate, glucose, packed cell volume and total plasma protein concentration. pH was measured in urine and feces. Acidosis challenge decreased mean daily rumen pH from 6.6 to 5.8 and minimum daily rumen pH from 6.1 to 5.2, and increased the duration of pH below pH 5.8 (from 3 to 662 min/d), 5.6 (0 to 493 min/d), 5.2 (0 to 304 min/d) ($P < 0.05$). Also areas below pH 6.0, 5.8, and 5.6 were increased ($P < 0.05$). Acidosis increased blood lactate from 0.35 to 0.46 mM ($P < 0.05$). Blood pH on the first day of challenge was similar to control but tended to decline on the second day ($P < 0.10$). Acidosis also decreased urinary pH from 8.3 to 7.3 and fecal pH from 6.7 to 5.9 and both measurements were lower on the second day of challenge ($P < 0.05$). Fecal pH was lower at 21:00 relative to 15:00 ($P < 0.05$). Other parameters were not affected. Despite low rumen pH (average minimum pH = 5.2), only minor changes in blood lactate and pH were observed and no other blood parameters were altered. Blood lactate and pH in blood, urine and feces may be used as markers of ruminal acidosis especially when serial measurements are made, but changes were small and diurnal variation was observed in fecal pH.

Key Words: cow, biomarker, rumen acidosis

672 Liver mitochondrial efficiency of two lineages of Angus bulls with high and low residual feed intake (RFI). G. Acetoze*[1], K. L. Weber[1], A. L. Van Eenennaam[1], J. J. Ramsey[2], and H. A. Rossow[3], [1]*University of California, Department of Animal Science, Davis,* [2]*University of California, School of Veterinary Medicine, Davis,* [3]*University of California, School of Veterinary Medicine, Tulare.*

Significant differences in mitochondrial oxygen consumption are observed in steers with high and low RFI (Keisler et al., 2006). Data suggest that mitochondrial function is a maternally inherited trait, however important proteins such as intermembrane space and matrix proteins are encoded in the cell nuclei and therefore, could be inherited by both the sire and the dams (Lymbery et al., 2001). It is still unknown if there's any correlation between lineage of sires and mitochondrial oxygen consumption. The objective of this experiment is to analyze mitochondrial efficiency for 2 sires with high and low RFI. Two popular Angus bulls were selected based on the HD 50K MVP genetic test (Pfizer Animal Genetics) and were used as sires at the Sierra Foothill Research and Extension Center. Eight offspring (10–11mo) from each sire were selected based on body weight and shipped to the UC Davis feedlot. Following a diet adaptation period of 14 d, steers were housed in individual pens to allow individual measurements of feed intake for 70–105 d and fed a typical feedlot finishing diet with 63% rolled corn and 17% dry distilled grains (DDG) 4 times a day. Slaughter criteria were 11mm of backfat using ultrasound (SONOVET 2000). Statistical model $Yij = \mu + xij\beta + \tau i + \varepsilon ij$ will be analyzed using ANOVA. Respiratory control ratio (RCR) is the ratio of oxygen consumption in State 3 and State 4 respiration and provides an indication of mitochondrial coupling and efficiency. State 3 (maximum ATP stimulated respiration) and State 4 (leak-dependent oxygen consumption) did not differ between the 2 group of animals ($P = 0.87$) and ($P = 0.99$), respectively. Also, no differences in RCR (±SD) were found with averages of 2.98 (0.45) and 3.03 (0.39) for low and high RFI steers, respectively ($P = 0.85$). These results differ from Keisler et al. (2006) in which low RFI steers had greater RCR values. Therefore even though there were differences

in RFI between the 2 groups, their liver mitochondria did not present differences in maximum oxygen consumption, proton leak dependent respiration or uncoupling.

Key Words: mitochondria, RFI, steer

673 Effect of lipid source on fatty acid profile in the rumen of cattle fed a tropical hay. D. F. A. Costa*[1], P. Isherwood[1], S. Quigley[1], S. R. McLennan[2], J. De Souza[3], J. Gibbs[5], X. Sun[4], and D. P. Poppi[1], [1]*The University of Queensland, Gatton, QLD, Australia,* [2]*The University of Queensland, Brisbane, QLD, Australia,* [3]*University of Sao Paulo, Piracicaba, Sao Paulo, Brazil,* [4]*College of Animal Science and Technology, Northwest A&F University, Yangling, Shaanxi, China,* [5]*Lincoln University, Lincoln, Canterbury, New Zealand.*

The objective of this study was to examine the fatty acid (FA) profile in the rumen fluid (RF) of steers fed a low crude protein tropical grass (Chloris gayana hay, 38g CP, 17g crude lipid and 752g NDF kg DM^{-1}) supplemented with various lipids. Five rumen cannulated steers (799 ± 15kg LW) were allocated to a 5 × 5 Latin square design. Hay ad libitum intake was determined over 7d and fixed at this level. The treatments were Control, hay only, or the addition of 3g kg hay DM^{-1} of lipid sources: Coconut (high lauric acid), cottonseed and soybean (high linoleic acid) or fish oil (high long chain FA (LCFA)). The experiment consisted of 5 runs of 18d feeding followed by 3d collection. Retention time (RT) was estimated on d 19 using CrEDTA. FA profile of RF collected at 0, 4, 8, 12 and 16h was determined by gas chromatography. Statistical analyses were done on proc GLM and LSD test for multiple comparisons. RT decreased with addition of soybean oil (14h) but no differences between other treatments (mean 17h). Coconut oil increased lauric and myristic acids in RF. No changes in total saturated FA (TSFA) in RF, with exception of a lower concentration for fish oil treatment. Addition of fish oil also decreased the concentration in RF of stearic and linolenic acid, but no differences to coconut and cottonseed treatments for linolenic acid. Fish oil also resulted in higher LCFA, linoleic and total unsaturated FA (TUFA), but no differences to soybean oil for the latter 2 acids. CLA was only different in RF between cottonseed and fish oil treatments. Differences in FA profile of oils were only partially translated into the FA profile in RF of steers fed a tropical hay.

Table 1. FA profile in RF of cattle fed a tropical hay

FA% of total FA	Control	Coconut	Cottonseed	Fish	Soybean	SEM
C12:0	1.9^{a}	8.5^{b}	1.5^{a}	0.9^{a}	1.9^{a}	1.03
C14:0	5.9^{b}	14.2^{c}	5.5^{ab}	3.9^{a}	4.7^{ab}	1.34
C18:0	8.2^{b}	6.7^{b}	8.2^{b}	3.9^{a}	8.3^{b}	1.25
C18:2n-6	9.4^{a}	4.5^{a}	10.2^{a}	19.9^{b}	18.3^{b}	9.90
C18:3n-3	2.5^{bc}	1.5^{a}	1.8^{ab}	1.3^{a}	3.0^{c}	0.60
CLAc9,t11	0.1^{ab}	0.2^{ab}	0.4^{b}	0.1^{a}	0.3^{ab}	0.19
LCFA	2.1^{a}	2.4^{a}	2.1^{a}	4.7^{b}	1.9^{a}	1.27
TSFA	66.1^{b}	64.2^{b}	62.5^{b}	43.7^{a}	53.9^{ab}	9.73
TUFA	27.6^{ab}	20.5^{a}	31.6^{ab}	47.8^{c}	40.8^{bc}	11.07

$^{a–c}$Different superscripts across rows indicate significant differences ($P < 0.05$).

Key Words: C4 grass, fatty acid, rumen fluid

674 Effect of dietary glucogenic precursors and linseed oil on growth performance, rumen fermentation and intramuscular fatty acids of lambs. R. J. B. Bessa*[1], J. M. Pestana[1,3], A. S. H. Costa[1], E. Jeronimo[2], S. P. Alves[1,2], J. Santos-Silva[2], and J. A. M. Prates[1], [1]*CIISA, Faculdade de Medicina Veterinária, Lisbon, Portugal,* [2]*UIPA, Instituto Nacional de Investigacao Agrária e Veterinária, Santarem, Portugal,* [3]*GIRM, Grupo de Investigação em Recursos Marinhos, Instituto Politécnico de Leiria, Peniche, Portugal.*

This experiment was conducted to test the hypothesis that adding glucogenic precursors (propylene glycol and calcium propionate mix) to a high-forage and high-oil diet would enrich lamb meat in *cis*-9,*trans*-11 18:2 (rumenic acid), through both the maintenance of high level of *trans*-11 18:1 in rumen outflow and an increase in its endogenous conversion to rumenic acid. To test this hypothesis, the effect of inclusion of a propylene glycol and calcium propionate mix (PP) (0 g/kg vs.50 g/kg dry matter, DM) and linseed oil supplementation (0 g/kg vs. 60 g/kg DM) in diets was evaluated, during 6 weeks, on 36 Merino Branco lambs with initial live weights of 27.3 ± 3.52 kg (randomized 2 × 2 factorial design). PP did not affect DM intake, average daily gain and carcass traits, except for an increase ($P < 0.05$) of subcutaneous fat proportion of chump and shoulders. Serum insulin concentration was not affected by treatments, although PP tended ($P = 0.09$) to decrease serum glucose concentration. Linseed oil supplementation increased 18:3n-3 as most of the C18 biohydrogenation intermediates, including trans-11 18:1 and rumenic acid. PP attenuated the strong increase of *trans*-11 18:1 induced by linseed oil supplementation and tended to reduced ($P = 0.054$) the *trans*-11/*trans*-10 18:1 ratio in meat. The stearoyl CoA desaturase activity, estimated by the ratio of catalyzed FA, was depressed by oil supplementation but not by PP, except for the *cis*-9 16:1/(*cis*-9 16:1+16:0) index. Contrarily to our working hypothesis, the PP reduced the rumenic acid concentration.

Key Words: glucogenic precursor, linseed oil, biohydrogenation intermediate

675 The interference of time interval and number of samples on the parameter estimates of GnG1 nonlinear models for passage rate data. L. F. L. Cavalcanti*[2,1] and L. O. Tedeschi[1], [1]*Texas A&M University, College Station,* [2]*Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.*

The use of GnG1 nonlinear models to estimate fractional passage rate (kp) of grazing animals has frequently been used because its parameters are readily correlated to biological phenomena of scientific interest. The use of marker concentration to determine passage rate is laborious and occasionally expensive. Therefore, the reduction of number of samples is of interest, but how many samples are necessary without interfering with the parameter estimates has not been clearly set. This study aimed to evaluate the influence of sample size (SS) and time interval (TI) on the parameter estimates of GnG1 model using a synthetic database obtained via simulation. Ten curves for each of 3 different fibers (bermudagrass, solka floc, and wood chips) were simulated using a normal pseudo-randomization approach over 240 h of observation, using parameters' means and standard deviations obtained in the literature. The 240-h period was divided into 5 parts of 48 h each. The sample sizes were 30, 25, 20, 15, or 10 data points, and for each of them 5 different time intervals were used, with the following % distributions: 20, 20, 20, 20, 20; 30, 20, 20, 20, 10; 30, 30, 20, 10, 10; 40, 30, 20, 5, 5; or 40, 40, 10, 5, 5% of total samples within each of the 48 h interval. The 25 curves for each of the 30 initial curves (750 curves) were converged by a nonlinear least squares method using the Gauss-Newton algorithm, fitting the GnG1 model (n = 1–5). The Akaike Information Criterion was used to select the best fitted model (G1G1, G2G1, G3G1, G4G1, or G5G1). The observed kp were compared with a paired *t*-test ($\alpha = 0.05$). The estimated kp was influenced by both factors (SS and TI; $P < 0.05$) for the bermudagrass and solka floc, but not for wood chips, which had the lowest kp. The kp differences were observed more often for sample sizes lower than 20 and

in the 4th distribution interval studied. The models with less samples had better fit for more compartment GnG1 models (n > 2), differently of the original one with 2 compartments. The SS and TI may influence the interpretation regarding kp when GnG1 models are used.

Key Words: kinetics, modeling, simulation

676 Effect of increasing concentrations of DHA-Gold in concentrate diets fed to Canadian Arcott lambs on the fatty acid profiles of adipose tissue and skeletal muscle. S. J. Meale*[1,2], S. Ding[1,2], M. L. He[2], A. V. Chaves[1], and T. A. McAllister[2], [1]*1Faculty of Veterinary Science, University of Sydney, Sydney, NSW, Australia,* [2]*2Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, Alberta, Canada.*

Lamb is often characterized by high saturated fatty acid concentrations, such that the saturated: polyunsaturated FA ratio (SFA: PUFA) is high, an attribute considered to be a risk factor for coronary heart disease (CHD). Increasing consumption of PUFA, especially n-3 PUFA, such as EPA (C20:5) and DHA (C22:6) is considered to reduce the risk of CHD. The primary source of DHA in human diets is fish, however, fish consumption is considered to have peaked, yet intakes of DHA and EPA are still well below recommend levels of 500 mg/d. As such, this trial aimed to investigate the effects of supplementing a commercial algal meal (DHA-Gold, Schizochytrium sp.), high in DHA, in the diet of Canadian Arcott lambs, on the FA profiles of subcutaneous (SAT) and visceral adipose tissues (VAT) and skeletal muscle (diaphragm; SM). Forty-four lambs were randomly assigned to dietary treatments by LW, where flax oil was replaced with 0, 1, 2 or 3% DM DHA-Gold in a barley-based finishing diet. Adipose tissues and SM samples were taken at slaughter and analyzed for FA profiles (% total FA). Data were analyzed using the mixed procedure of SAS with orthogonal contrasts testing linear or quadratic contrasts when $P \leq 0.05$ for treatment effects. Total SFA content of SAT and VAT was not affected (50.79 ± 0.98; $P > 0.05$), but a linear decline was observed in SM ($P = 0.01$). In comparison, VAT was the only tissue to exhibit changes in PUFA content, linearly increasing ($P = 0.003$) with additional DHA-Gold (47.47, 48.09, 48.27 ± 0.39 for 1, 2 and 3% DM, respectively). Consequently, the SFA:PUFA ratio was linearly reduced ($P = 0.01$) in VAT. The content of EPA linearly increased ($P < 0.01$) in both SM and VAT. Percentage of DHA linearly increased ($P \leq 0.01$) in both adipose tissues, but was not affected ($P > 0.05$) in SM. Supplementing DHA-Gold decreased ($P \leq 0.03$) the n-6/n-3 ratio in all tissue types. These results indicate supplementing DHA-Gold can beneficially alter the FA profiles of adipose tissues and diaphragm muscle in growing lambs.

Key Words: adipose tissue, Canadian Arcott lamb, fatty acid

677 Small intestinal digestion of raw cornstarch in cattle is increased by duodenal infusion of glutamate. D. W. Brake*, E. C. Titgemeyer, and D. E. Anderson, *Kansas State University, Manhattan.*

Previous research demonstrated that small intestinal starch digestion (SISD) in cattle is increased by postruminal infusion of casein or of crystalline non-essential AA (NEAA). Our objective was to determine if these improvements in SISD could be replicated by supplementation of Glu or of a mixture of some essential AA. Five duodenally and ileally cannulated steers (initial BW = 361 kg) were used in a 5 × 5 Latin square with 6-d periods. All cattle were fed 4.8 kg DM/d of a soybean hull-based diet and received continuous duodenal infusions of raw cornstarch (1.6 kg/d) and Cr-EDTA in 12.6 L/d volumes. Treatments were duodenal infusions of 1) 436 g/d casein, 2) negative control, 3) 133 g/d Glu, 4) a mixture of 30.4 g/d Phe, 6.5 g/d Trp, and 17.5 g/d Met (PTM), and 5) a combination of Glu and PTM. On d 6 of each period, 6 spot samples of ileal digesta and feces were composited and subsequently analyzed. Effects of treatments were evaluated using contrasts for a 2 (Glu) × 2 (PTM) + 1 (casein) treatment structure. Casein reduced ($P = 0.02$) ileal starch flows and increased SISD ($P = 0.02$), but increased ileal flow of ethanol-soluble oligosaccharides (ESO; $P = 0.06$). Duodenal infusion of Glu decreased ($P < 0.01$) ileal starch flow and increased ($P \leq 0.01$) SISD, whereas PTM did not. Neither Glu alone nor PTM alone increased ileal flow of ESO, although Glu and PTM provided together tended to increase ileal flows of ESO (interaction, $P = 0.07$). Ileal flows of glucose averaged 16.5 g/d and were not affected by treatment. Infusion of casein tended ($P = 0.08$) to decrease fecal flow of starch and of ESO, and Glu decreased ($P = 0.02$) fecal flow of glucose. However, large intestinal starch digestion was not different among treatments ($P \geq 0.37$). Postruminal digestion of starch averaged 91% and tended to be greater for casein than for control ($P = 0.07$). Data suggest that Glu alone can increase SISD in cattle similarly to casein, but increases in SISD in response to Glu were not associated with increases in ileal flows of ESO as was observed for casein.

Key Words: cattle, glutamate, small intestinal starch digestion

678 Importance of yeast viability for reducing the effects of ruminal acidosis in beef heifers during and following an imposed acidosis challenge. D. Vyas*[1], A. Uwijeye[1], W. Z. Yang[1], K. A. Beauchemin[1], and N. Walker[2], [1]*Agriculture and Agri-Food Canada, Lethbridge, AB, Canada,* [2]*AB Vista, Marlborough, Wiltshire, UK.*

The study was aimed at determining the importance of yeast (*Saccharomyces cerevisiae*) viability for reducing the severity of ruminal acidosis in cattle during and following an imposed acidosis challenge. Six ruminally cannulated beef heifers (680 ± 50 kg BW) were used in a replicated 3 × 3 Latin square design and fed a diet consisting of 40% barley silage, 10% chopped grass hay, and 50% barley grain based concentrate (DM basis). Treatments were: 1) control (no yeast); 2) active dried yeast (ADY; 4 g providing 10^{10} cfu/g; AB Vista, UK); and 3) killed dried yeast (KDY; 4 g autoclaved ADY). The treatments were directly dosed via the rumen cannula daily at the time of feeding. The periods consisted of 2 wk of adaptation (d1–14), wk 3 of baseline measurements (d15–20) and wk 4 of acidosis challenge (d21–28). The acidosis challenge was imposed by restricting consumption of the TMR to 50% of ad libitum intake for 24 h (d21) followed by adding barley grain (amount equivalent to 25% of DMI) directly to the rumen before feeding the TMR (d22). The acidosis challenge reduced mean ruminal pH from 6.20 to 5.75 and nadir pH from 5.47 to 4.77. The DMI on d1 post challenge was reduced by 5 and 15% for control and KDY respectively, while for ADY DMI was maintained similar to that during the pre-challenge baseline period. No treatment effects were observed for mean, nadir and maximum ruminal pH on d1 post challenge (0–24 h). However, ADY tended to increase mean ruminal pH ($P = 0.13$) and lower area under curve below pH 5.8 ($P = 0.11$). Ruminal lactate and VFA profile on d1 post-challenge were similar for all treatments. During the recovery phase (d24–28), both yeast treatments improved minimum ruminal pH ($P = 0.04$) and reduced bout frequency (pH <5.8; $P = 0.05$) irrespective of yeast viability. In conclusion, yeast supplementation did not elevate rumen pH during a severe acidosis challenge, but viable ADY helped stabilize DMI and elevate rumen pH during recovery. This study demonstrates the importance of yeast viability in stabilizing rumen fermentation during conditions that predispose cattle to ruminal acidosis.

Key Words: acidosis, rumen pH, yeast

679 Molecular weight of legume condensed tannins does not correlate with biological activity. H. D. Naumann*[1,2], J. P. Muir[2], L. O. Tedeschi[1], B. D. Lambert[2,3], and A. E. Hagerman[4], [1]*Texas A&M University, College Station,* [2]*Texas A&M AgriLife Research, Stephenville,* [3]*Tarleton State University, Stephenville, TX,* [4]*Miami University, Oxford, OH.*

Condensed tannins (CT) are polyphenols that sometimes demonstrate biological activities in ruminants including suppression of ruminal CH_4 and protein binding (PB). Some evaluations of limited numbers of highly purified compounds have resulted in positive correlations between CT molecular weight (CTMW) and biological activity, while others have failed to show a correlation. The objectives of this study were to determine if MW of CT from a variety of rangeland legumes could predict biological activity relative to in vitro ruminal CH_4 suppression and PB. Condensed tannin MW, in vitro CH_4 and in vitro PB were determined for 9 species of rangeland legumes. Methane was assayed using an in vitro gas production technique. A randomized-incomplete block design was used. Two fermentation chambers were concurrently run in 2 separate events where each fermentation chamber was a block, individual fermentation flasks within each chamber were random factors, and CH_4 was a dependent variable. Protein binding ability was determined using a completely random design where 3 separate in vitro protein-precipitable phenolic assays were conducted for each species and nitrogen analysis of the protein-phenolic precipitates was conducted. Molecular weights of CT were determined by size-exclusion chromatography. The GLIMMIX procedure of SAS was used to estimate LS-means. A value of $P \leq 0.05$ was considered significant. Molecular weights ranged from 552 Da for *L. stuevei* to 1483 Da for *L. cuneata*. Fermentation of *L. retusa* resulted in the greatest amount of CH_4 (40.7 g/kg DM) whereas that of *A. angustissima* var. *hirta* resulted in the least (0.6 g/kg DM). Condensed tannins from *L. stuevei* bound the greatest amount of protein (74.8 g/kg DM), whereas *L. retusa* only bound 4.4 g/kg DM. In vitro CH_4 regressed on CT MW resulted in a R^2 of 0.0009 ($P = 0.80$). There was also no correlation between CT MW and PB (R^2 0.08; $P = 0.23$). The results from our study strongly suggested that CT MW does not explain the biological activities of enteric CH_4 suppression or PB by CT from the forage legumes surveyed.

Key Words: bypass protein, condensed tannin, ruminal methane