of WMI between consecutive parities were low ($0.11 \leq r \leq 0.18$; $P < 0.05$). The repeatability of WMI was low (0.08). The probabilities of sows being mated 4 - 6 d postweaning at subsequent parity in the WMI 0 - 3, 4 - 6, 7 - 20, 21 - 27, and ≥ 28 d were 82.6, 88.4, 73.9, 75.6, and 69.6%, respectively. The probability of sows being mated 4 - 6 d increased from 59.8 to 83.0% as LL increased from 8 to 31 d ($P < 0.05$). These results indicated that sows in any WMI group were more likely to be mated 4 - 6 d postweaning at subsequent parity. Increasing LL at subsequent parity can be used for sows with prolonged WMI to increase the probability of sows being mated 4 - 6 d postweaning at subsequent parity.

Key Words: Farm management, Weaning-to-first-mating interval

Ruminant Nutrition: Analytical Techniques

W187 Can the chemical composition of the whole body of a goat be estimated from parts of its body? I. A. M. A. Teixeira*[1,4], K. T. Resende[1], J. M. Pereira Filho[2], M. M. Salin[1], R. A. Gomes[1], R. C. Canesin[1], and L. O. Tedeschi[3], [1]*Universidade Estadual Paulista/FCAV*, *Jaboticabal, SP, Brazil*, [2]*Universidade Federal de Campina Grande*, *Patos, PB, Brazil*, [3]*Texas A&M University*, *College Station*, [4]*FAPESP*, *São Paulo, SP, Brazil*.

Two trials were conducted to determine which part of the empty body of Boer x Saanen male kids can be used to predict chemical composition of the whole body. In the first trial, kids were fed *ad libitum* and were slaughtered at 5, 10, and 15 kg BW. Eighteen animals were allocated to one of three nutritional levels (*ad libitum* and restricted to 30 and 60% of the *ad libitum*), within six groups. When the animal in the *ad libitum* nutritional level reached 15 kg BW, all animals in the group were slaughtered. In the second trial, kids were fed *ad libitum* and slaughtered at 15, 20, and 25 kg BW. Similar to trial 1, twenty-one animals were allocated to three nutritional levels into seven groups. The animals in a group were slaughtered when the animals in the *ad libitum* nutritional level reached 25 kg BW. The following body parts were used: head plus feet, hide, organs (all viscera, blood and abdominal fat), neck, shoulder, ribs, loin, leg, whole 9 to 11th ribs and right half carcass. The means of chemical composition obtained for each treatment (body and body parts), within slaughter weight and nutritional level, were subjected to principal component and cluster analyses. The whole 9 to 11th ribs and neck had the highest accuracy in predicting the body composition of the kids. The removal of the whole 9 to 11th ribs to measure body composition damaged the retail price of the carcass. Our experiment indicated the composition of the neck was as accurate as the whole 9 to 11th ribs to estimate body composition. Additionally, fat concentration in the neck was accurate to predict the composition of all body nutrients and energy. Therefore, we recommend the use of the neck to estimate the body composition.

Key Words: Indirect method, Multivariate, Neck

W188 Calibration of a respiratory chamber for calorimetry studies. N. Rodriguez*[1], W. Campos[1], and M. Lopez[2], [1]*Universidade Federal de Minas Gerais*, *Belo Horizonte, Minas Gerais, Brazil*, [2]*Consejo Superior de Investigaciones Científicas*, *Granada, España*.

The influence of CO2 on O2 determination by a paramagnetic analyzer was performed using mixtures of O2, CO2 and N2 with the following proportions: 21:0:79; 21:0.5:78.5; 21:1:78 and 21:1:78. These gases were injected in the analyzers for four minutes and thereafter six samples were analyzed. This procedure was performed five times. The effect of CO2 on O2 determination was calculated by regression. To calibrate the system (analyzers + acrylic respiration chamber) atmospheric air, CO2 (99.99%), CH4(99.99%) and N2 (99.99%) were injected in the chamber for six h by a rate of 68.51L/min, 0.35L/min, 0.04L/min and 1.10L/min, respectively. These flows reproduce the respiratory exchanges of a lamb of 65 kg (nitrogen was used to reduce the O2 concentration inside of the system). After the six h, atmospheric air was injected by a rate of 70L/min for more 14 h. The concentrations of gases inside the chambers and of atmospheric air that was inflowing were analyzed every eight minutes during the whole procedure (20 h). The volumes of the injected gases were determined by gravimetric method. The gases cylinders were weighted before and after the injection, then the following densities were considered: 1.964776786g/l for CO2, 0.716205357g/l for CH4 and 1.250892857g/l for N2. The injection of gases mixtures in the oxygen analyzer resulted on the following equation:[O2] = [O2]-(0.0053X2 + 0.0117X). This shows the necessity of using correction factors for the influence of CO2 on O2 determination by analyzers that use a paramagnetic principle. The system correction factors were 1.0379, 1.1885 and 1.0009 for determination of the volume of CO2, CH4 and O2, respectively. It shows that the efficiency of gases determination was almost 100% suggesting a good performance of the system. To confirm those results measures of heat production of 12 lambs fed *ad libitum* with hay and concentrate (50%) were determined by open circuit respiratory exchanges. The values recorded varied from 330 to 539kj/kg$^{0.75}$ with an average of 434kj/kg$^{0.75}$ after 20 h of measurements for each animal. These values are similar to those found in the literature which suggest a good operation of the system.

Key Words: Respirometry, Calorimetry, Chamber

W189 Lipe, an external natural marker for digestibility studies. E. Saliba, N. Rodríguez*, and D. Pilo-Veloso, *Universidade Federal de Minas Gerais*, *Belo Horizone, Minas Gerais, Brazil*.

Lignin from wood of eucalyptus was isolated and purified giving a hydroxyphenyl propane polymer called LIPE. It has been tested as an external marker of fecal production in digestibility trials. In rabbits, sheep and swine, dry matter digestibility, voluntary feed intake and fecal output were compared using LIPE and total fecal collection. Feed intake was not affected by marker, and fecal recuperation for rabbits was 99.3%, for sheep 96.9%, and for swine 102.6%. The LIPE marker was used to test fecal production, digestibility and metabolic energy content (ME) of various feed ingredients, compared with chromic oxide and total fecal production in chikens. Estimates of digestibility and ME content using LIPE were similar than those obtained with total fecal collection ($P>0.05$). An experiment with Nelore esophageal fistulated steers was ran on pasture of Brachiaria brizantha CV. Marandu. Chromic oxide (CO) and LIPE were used to estimate fecal excretion and intake comparing different periods of adaptation to markers, three (CO3 and LIPE3) and 7 d (CO7 and LIPE7). Dry matter intake was estimated to be 2.12%, 2.09%, 2.16% and 2.10% of LBW for treatments CO3, LIPE3, CO7 and LIPE7, respectively, ($P>0.05$) which are normally expected values. Fecal excretion estimated by LIPE was constant after 48 hours of initial dosage. When estimated

by chromic oxide it was constant after 72h. An experiment with four dry cows in metabolic crates using LIPE as a marker, fecal production was measured as total collection (a), estimated by LIPE in a sample of homogenized total feces (b) and by LIPE in a single spot sampling (c). Mean values of DM fecal excretion were 4.61kg (a), 4.47kg (b) and 4.46(c) with a CV of 7.3% (P>0.05). Studies of Nuclear Magnetic Ressonance and Electronic Microscopy showed that original and fecal LIPE have the same ultra structure and identical spectra meaning that there was no modification during the passage through the intestine. The use of LIPE as a not expensive, not hazardous to the health or environment natural external marker, requires very simple preparation for analysis and can be accurately and rapidly assayed by Infra Red Spectroscopy.

Key Words: Marker, Digestibility, External

W190 Effect of choice of microbial marker and variation in solid- to liquid-associated bacteria proportion in duodenal contents on the estimation of duodenal bacterial nitrogen flow. B. Vlaeminck*[1], R. J. Dewhurst[2], and V. Fievez[1], [1]*Ghent University*, *Belgium*, [2]*Lincoln University*, *New Zealand*.

Using data from four dairy cows fed diets varying in forage:concentrate ratio (80:20, 65:35, 50:50 and 35:65), we evaluated to what extent variation in solid- (SAB) and liquid-associated bacteria (LAB) proportions in duodenal bacteria affect the estimation of duodenal flow of bacterial N (BN). Differential centrifugation was used to separate SAB and LAB from rumen contents, collected four hours after the morning feeding. Adenine, cytosine and odd and branched-chain fatty acids (OBCFA) were determined both in SAB and LAB and used to estimate BN flow, using marker:N ratios. Differences in marker:N ratios between SAB and LAB were evaluated by a paired t-test and effects of bacterial marker and isolate on BN were tested using mixed model analysis. Marker:N ratios significantly differed between SAB (0.043, 0.059 and 0.090 g/g for cytosine, adenine and OBCFA, respectively) and LAB (0.062, 0.087 and 0.096 g/g). Average duodenal flow estimates of BN were 168, 246 and 209 g/d when SAB:LAB ratios of 0:1, 1:0 or 0.71:0.29 (as estimated from the OBCFA pattern of duodenal bacteria) were assumed and using cytosine as bacterial marker. Using adenine as bacterial marker, daily duodenal flows for these SAB:LAB ratios were 222, 335 and 283 g/d, whereas the effect of varying SAB:LAB ratio was considerably lower when using OBCFA as marker (220, 239 and 233 g/d). The results suggest that, depending on the marker used, changes in the proportions of SAB and LAB can have a substantial impact on estimated duodenal flow of bacterial N. However, differences among markers are also obvious, with current results suggesting OBCFA to be a more appropriate bacterial marker due to small differences in OBCFA:N ratio between SAB and LAB.

Key Words: Bacterial markers, Rumen

W191 Effect of centrifugal force on the recovery of markers in ruminal bacterial samples. A. N. Hristov* and S. Zaman, *University of Idaho*, *Moscow*.

The objectives of this experiment were to: (1) study the effect of centrifugal force during preparation of samples from ruminal bacteria on ^{15}N recovery and distribution between supernatant and pellets; and (2) compare the recovery of ^{15}N with that of total purines. Three ruminally cannulated lactating dairy cows were used as donors of ruminal inoculum. The cows were fed a 60% forage:40% concentrate diet. At the day of the experiment and before the morning feeding, the ruminal contents of the cows were labeled with $(^{15}NH_4)_2SO_4$. Samples of ruminal contents were collected 30 min thereafter and filtered through a 100 μm fabric. The filtrate was used to prepare samples from the fluid-associated bacteria (FAB) and the solids retained on the fabric were used to harvest the solid-associated bacteria (SAB) after blending with buffer. Fluid samples containing FAB or SAB were centrifuged at $800 \times g$ (Low) and aliquots of the supernatant were further centrifuged at 5,000, 15,000, and $24,000 \times g$ (High). Ruminal phases (supernatants and pellets) from these centrifugations were analyzed for N, ^{15}N, and total purines. Data were analyzed as a 4 (centrifugal force) × 2 (ruminal phase) factorial blocked by donor cow. ^{15}N enrichment of FAB samples was greater ($P < 0.001$) and that of SAB lower ($P = 0.004$) in the supernatant than in the centrifugal pellets. For both FAB and SAB, concentration and recovery of N and ^{15}N recovery were greater ($P < 0.001$) in the pellets than in the supernatants. Centrifugal force had no effect on ^{15}N enrichment, N content, and ^{15}N recovery of FAB or SAB supernatant or pellets ($P = 0.208$ to 0.930). The amount of N recovered in FAB pellets increased linearly ($P = 0.014$) with increasing the centrifugal force from Low to High. The distribution of marker between centrifugal pellets and supernatant from sonicated Low ruminal fluid was similar for ^{15}N or purines (average ratio of 5:1; $P = 0.941$). These results indicate that centrifugal force has no effect of marker distribution or recovery during preparation of samples from ruminal bacteria.

Key Words: Centrifugal force, Ruminal bacteria, Marker

W192 Relationship between in situ dry matter disappearance and gas production technique. A. Taghizadeh* and M. Hatami, *Tabriz University*, *Tabriz, East Azarbayjan, Iran*.

In vitro gas production technique and in situ dry matter disappearances were used to measure the gas production and disappearance of Iranian treated and untreated corn silage by formaldehyde and urea as test feeds. The corn silage samples were chopped to 2 cm length. Treatments contain CS: untreated corn silage, CSF: CS + 4 g/kg DM formaldehyde, CSU: CS + 10 g/kg DM urea, and CSFU: CS + 4 g/kg DM formaldehyde + 10 g/kg DM urea. The production of gas and in vitro DM disappearances of test feeds were measured in each vial after 0.0, 2, 12, 24 and 48 h of incubation. The results were analyzed using completely randomized design (CRD) in each incubation time with Duncan's multiple range test used for the comparison of means. Feeds were the only sources of variation considered. The in vitro gas production data and in situ DM and CP disappearances were in triplicate fitted to a equation of $p=a+b\ (1-e^{-ct})$; where (p) is the gas production and DM and CP at time, t, (a+b) is the fermentation of soluble and the insoluble (but with time fermentable) fraction, (c) is the fractional rate at which b is fermented per hour. The gas production of soluble and insoluble fraction (a+b) for CS, CSF, CSU and CSFU was (ml/g) 241.8, 240.0, 225.0 and 238.1, respectively. The fractional rate (c) was (%/h) 0.028, 0.023, 0.025 and 0.027, respectively. The DM soluble fraction (a) for CS, CSF, CSU and CSFU was (%): 3.81, 8.52, 7.79 and 6.62, respectively. The insoluble (but with time fermentable) fraction (b) was (%): 74.99, 63.4, 60.41 and 63.3, respectively There was a close relationship between In Situ disappearance results and the gas production in incubation times ($p<0.01$). The relationship of DM disappearance and gas production results in CS, CSF, CSU and CSFU were obtained ($P<0.05$): 98.64, 98.09, 97.33 and 98.77, respectively. The high relationship of ruminal DM disappearance and gas production data showed that In situ disappearance technique can be proper replacement assay for gas production technique.

Key Words: Gas, Dry matter, Disappearance

W193 Relationship between in vitro dry matter disappearance and gas production technique. A. Taghizadeh*, M. Hatami, and G. A. Moghaddam, *Tabriz University*, *Tabriz, East Azarbayjan, Iran*.

In vitro gas production technique and in vitro dry matter disappearances was used to measure the gas production and disappearance of Iranian treated and untreated corn silage by formaldehyde and urea as test feeds. The corn silage samples were chopped to 2 cm length. Treatments contain CS: untreated corn silage, CSF: CS + 4 g/Kg DM formaldehyde, CSU: CS + 10 g/Kg DM urea, and CSFU: CS + 4 g/Kg DM formaldehyde + 10 g/Kg DM urea. The production of gas and in vitro DM disappearances of test feeds were measured in each vial after 0.0, 2, 12, 24 and 48 h of incubation. The results were analyzed using completely randomized design (CRD) in each incubation time with Duncan's multiple range test used for the comparison of means. Feeds were the only sources of variation considered. The in vitro DM disappearances and Gas production data were in triplicate fitted to a equation of $p=a+b\ (1-e^{-ct})$; where (p) is the gas production at time, t, (a+b) is the fermentation of soluble and the insoluble (but with time fermentable) fraction, (c) is the fractional rate at which b is fermented per hour. The gas production of soluble and insoluble fraction (a+b) for CS, CSF, CSU and CSFU was (ml/g) 241.8, 240.0, 225.0 and 238.1, respectively. The fractional rate (c) was (%/h) 0.028, 0.023, 0.025 and 0.027, respectively. and insoluble fraction (a+b) for CS, CSF, CSU and CSFU was (%) 70.33, 71.5, 80.94 and 71.65, respectively. The fractional rate of fermentation (c) was (%/h) 0.04, 0.0389, 0.0322 and 0.0401, respectively. There was a close relationship between in vitro disappearance results and the gas production in incubation times ($p<0.01$). The relationship of DM disappearance and gas production results in CS, CSF, CSU and CSFU were obtained ($P<0.05$): 88.11, 86.6, 87.01 and 87.12, respectively. The high relationship of ruminal DM disappearance and gas production data showed that in vitro disappearance technique can be proper replacement assay for gas production technique.

Key Words: Gas, Dry matter, Disappearance

W194 Relationship between in vitro gas production of ethanol extracted residue and NDF of corn silage and unfractionated corn silage. M. Hatami and A. Taghizadeh*, *Tabriz University*, *Tabriz, East Azarbayjan, Iran*.

In vitro gas production technique was used to measure the gas production of ethanol extracted residue (ETR) and NDF of corn silage and unfractionated (whole) corn silage. The corn silage samples were chopped to 2 cm length. Treatments contain UCS: unfractionated (whole) corn silage, ETR: residue insoluble in 90% ethanol, NDF: Isolated cell wall. The production of gas and in vitro DM disappearances of test feeds were measured in each vial after 2, 4, 8, 12, 16, 24, 36, 48, 72 and 96 h of incubation. The results were analyzed using completely randomized design (CRD) in each incubation time with Duncan's multiple range test used for the comparison of means. Feeds were the only sources of variation considered. The in vitro DM disappearances and gas production data were in triplicate fitted to a equation of $p=a+b\ (1-e^{-ct})$; where (p) is the gas production at time, t, (a+b) is the fermentation of soluble and the insoluble (but with time fermentable) fraction, (c) is the fractional rate at which b is fermented per hour. The gas production of soluble and insoluble fraction (a+b) for UCS, ETR and NDF was (ml/g) 241.8, 261.8 and 239.3, respectively. The fractional rate (c) was (%/h) 0.028, 0.0235, and 0.0268, respectively. There was a close relationship between in vitro gas production of UCS, ETR and NDF in incubation times ($P<0.01$). The relationship of gas production results in UCS with ETR and NDF were obtained ($P<0.05$): 96.25 and 98.85, respectively. The high relationship of gas production data in UCS with ETR and NDF showed that obtained information of UCS can be proper replacement for required information of gas production of ETR and NDF.

Key Words: Gas, NDF, Corn silage

W195 Relationship between dry matter and crude protein disappearance using in situ technique. A. Taghizadeh* and M. Hatami, *Tabriz University*, *Tabriz, East Azarbayjan, Iran*.

In situ technique was used to determine of ruminal disappearance of dry matter (DM) and crude protein (CP) of Iranian treated and untreated corn silage by formaldehyde and urea as test feeds. The corn silage samples were chopped to 2 cm length. Treatments contain CS: untreated corn silage, CSF: CS + 4 g/Kg DM formaldehyde, CSU: CS + 10 g/Kg DM urea, and CSFU: CS + 4 g/Kg DM formaldehyde + 10 g/Kg DM urea. The disappearance of dry matter and crude protein of test feeds were measured at 0.0, 2, 4, 6, 12, 24, 36, 48, 72 and 96 h of incubation. The results were analyzed using completely randomized design (CRD) in each incubation time with Duncan's multiple range test used for the comparison of means. Feeds were the only sources of variation considered. The in situ DM and CP disappearances data were in triplicate fitted to a equation of $p=a+b\ (1-e^{-ct})$; where (p) is the disappearance at time, t, (a) is intercept and ideally reflects the fermentation of soluble and readily available, (b) is fermentation of the insoluble (but with time fermentable) fraction, (c) is the fractional rate at which b is fermented per hour. The DM soluble fraction (a) for CS, CSF, CSU and CSFU was (%): 3.81, 8.52, 7.79 and 6.62, respectively. The DM insoluble (but with time fermentable) fraction (b) was (%): 74.99, 63.4, 60.41 and 63.3, respectively. The DM fractional rate (c) was (%/h) 0.0256, 0.0247, 0.0292 and 0.0288, respectively. The CP soluble fraction (a) for CS, CSF, CSU and CSFU was (%): 5.61, 7.25, 9.21 and 8.8, respectively. The CP insoluble (but with time fermentable) fraction (b) was (%): 66.11, 55.55, 67.78 and 58.31, respectively. The CP fractional rate (c) was (%/h) 0.0306, 0.0277, 0.0232 and 0.0322, respectively. There was a close relationship between in situ DM and CP disappearance results in incubation times ($p<0.05$). The high relationship of DM and CP disappearance results in CS, CSF, CSU and CSFU were obtained (%) ($P<0.05$): 98.85, 99.42, 99.07 and 99.49, respectively. The high relationship of ruminal DM and CP disappearance data showed that in situ DM disappearance can be proper replacement assay for in situ CP disappearance.

Key Words: In situ, Dry matter, Crude protein

W196 Comparison of using a reflux apparatus or ANKOM Fiber Analyzer with sequential or direct analysis to evaluate the fiber content in various feeds. D. H. Kleinschmit*, D. J. Schingoethe, A. R. Hippen, and K. F. Kalscheur, *South Dakota State University*, *Brookings*.

Two types of apparatuses, a reflux apparatus (RA) and the ANKOM Fiber Analyzer (AFA), are currently being used for the fiber analyses of feeds. In addition, the measurement of the ADF concentration in feeds may be conducted by sequential analysis (S) following an NDF extraction or directly (D) with the original feed. The objectives of this study were to evaluate NDF content of various feeds using RA or AFA and ADF content using RA or AFA with D or S (RAD, AFAD, RAS, and AFAS). PROC Mixed was performed on each feed, with models: NDF = apparatus + residual, or ADF = apparatus + method + apparatus

× method + residual. The samples used were two sources of alfalfa hay (1 and 2), corn silage (1 and 2), dried distillers grains plus solubles (1 and 2), grain mixes (1 and 2), and TMR (1 and 2), and one source of soybean meal, soybean hulls, whole cottonseed, sunflower seeds, and feces. Six replicates were used for each analysis. With the exception of soybean meal and sunflowers, the NDF content was determined to be greater ($P < 0.05$) in samples analyzed with RA compared to AFA. Acid detergent fiber for alfalfa-1 (30.9 vs. 29.5%), feces (33.2 vs. 31.1%), soybean meal (8.7 vs. 5.9%), soybean hulls (47.0 vs. 45.7%), and TMR-1 (22.3 vs. 20.7%) was greater ($P < 0.05$) when measured with AFA versus RA. In addition, the ADF in alfalfa-1 (32.0 and 28.4%), corn silage-1 (27.8 vs. 25.6%) and 2 (28.0 vs. 26.5%), feces (34.0 vs. 30.3%), grain mix-2 (8.2 vs. 5.4%) soybean meal (9.0 vs. 5.6%), soybean hulls (46.9 vs. 45.8%), and TMR-1 (21.6 vs. 19.8%) and 2 (23.8 vs. 19.2%) was greater ($P < 0.02$) with D versus S. An interaction ($P < 0.05$) between apparatus and method was observed in corn silage-2, soybean meal, and soybean hulls, such that the decrease in ADF from AFAD to AFAS in these samples was much greater compared to the decrease in ADF from RAD to RAS. In conclusion, analysis with RA vs. AFA yielded increased values for NDF in most of the samples analyzed and decreased ADF in some of the samples. Analyzing samples with S decreased ADF in most feeds compared to D.

Key Words: Feed analysis, Feeds, Detergent fiber analysis

W197 A comparison of soluble true protein assays using three precipitating agents and filter pore sizes. D. A. Ross*, J. B. Robertson, and M. E. Van Amburgh, *Cornell University*, *Ithaca, NY*.

Protein in feeds for ruminants is separated into two primary categories based on solubility and the soluble pool is characterized by true protein (TP) versus non-protein nitrogen (NPN). Tungstic acid (TA) is the preferred precipitating (PPT) agent as it chelates smaller peptides than trichloroacetic acid (TCA) but does not filter efficiently. The objective of this study was to improve the efficiency of the TP assay. Two criteria for improvement were identified. The PPT agent needs to chelate smaller peptides and the filtration step requires improvement in recovery of the chelated peptides. Nine feeds (1 alfalfa hay, 1 alfalfa silage, 3 feathermeals, 2 soy products and 2 hay crop silages), rumen fluid and trypticase were analyzed using three PPT agents: TA (Licitra et al., 1996; 16-h; 1.18 % final dilution.), a Stabilized TA (STA; phosphate buffered; 16-h; 1.11 %) and TCA (1-h; 10 %). Three different filters were also evaluated under vacuum for all PPT agents: 20, 6 and 1 um pore size filter papers. For each PPT and filter combination, N was determined for TP recovered on the filter and NPN in the filtrate. All samples were analyzed in duplicate. Results are expressed as percent of sample N recovered as TP or NPN and compared using GLM in SAS and Tukey's method to separate means. Among all filter combinations STA recovered 2.65 % more N in the TP than did TA ($P < 0.0001$) and 4.35 % more N than TCA ($P < 0.0001$). Trypticase, because of the range in peptide size, was considered the negative control and demonstrated the greatest range in precipitable TP values: 0.025, 21.0 and 33.09 % (TCA, TA and STA, respectively; $P < 0.005$). Without trypticase STA recovered 1.7 % more N in the TP than did TCA ($P < 0.0001$). The overall N recovery averaged 97.8 %. The 1 um pore filter recovered 0.5 % more TP than did the 6 um and 1.3 % more than the 20 um ($P < 0.0001$) while the 6 um recovered 0.8 % more TP than the 20 um ($P < 0.003$). In summary, the STA assay using either a 6 or 1 um filter under vacuum is more efficient than the current method.

Key Words: Tungstic acid, Stabilized tungstic acid, TCA

Ruminant Nutrition: Calves & Heifers – Dairy

W198 Rearing of dairy calves Sahiwal × Holstein feeded with Arachis pintoi and sugar cane. J. Avellaneda-Cevallos*[1], P. Cansing-Yépez[1], W. Vera-Benavides[1], O. Montañez-Valdez[2], S. González-Muñoz[3], J. Vargas-Burgos[1], J. Tuarez-Cobeña[1], and R. Vivas-Moreira[1], [1]*Unidad de Investigación Científica y Tecnológica, Facultad de Ciencias Pecuarias, Universidad Técnica Estatal de Quevedo*, *Quevedo, Ecuador*, [2]*Centro Universitario del Sur. Universidad de Guadalajara*, *Guadarajara, México*, [3]*Colegio de Postgraduados*, *Texcoco, México*.

The substitution (0, 25, 50 and 75%) of the DM and the total protein (TP) of a commercial balanced (B) for the foraging peanut (P) (Arachis pintoi) more sugar cane (S) (Saccharum officinarum) was evaluated. It was used 20 Sahiwal x Holstein, veals with weight initial average of 72.5±4 kg. The treatments were: BS, B (100% of the requirement total protein (TPR) in DM) + S; BSP25, 75% of B + P (25% of the TPR in DM) + S; BSP50, 50% of B + P (50% of the TPR in DM) + S; BSP75, 25% of B + P (75% of the TPR in DM) + S. A totally at random experimental design was used. The daily gain of weight (DWG), consumption of DM (DMC), feed conversion (FC), consumption of TP (TPC) and economic analysis was evaluated. Three experimental periods were evaluated (1-30, 31-60 and 61-90 d) and a total (1-90 d). The DWG per period and total (g d-1) were not different ($p>0.05$). In the total period the averages of DWG were 0.587, 0.627, 0.549 and 0.584; for the levels of substitution 0, 25, 50 and 75% of PT, respectively. The DMC in the periods 31-60 d and total was bigger ($p <0.05$) when the diet contained less P. The FC was not affected ($p>0.05$) for the substitution. The TPC in the periods 1-30, 31-60 and total was superior ($p <0.05$) in the treatments with bigger quantity of P. There were better economic profit with BSP75 (223.94 dollars and 74.14% of profitability). It was concluded that the P is a potential source of protein that allows to improve the productive and economic efficiency of ruminant in growth.

Key Words: Arachis pintoi, Substitution, Saccharum officinarum

W199 Effects of applying exogenous, non-starch polysaccharidases to pre-weaning starter diet on performance of Holstein calves. G. R. Ghorbani[1], A. Jafari[1], A. H. Samie[1], and A. Nikkhah*[2], [1]*Isfahan University of Technology*, *Isfahan, Iran*, [2]*University of Manitoba*, *Winnipeg, MB, Canada*.

This study aimed to assess the effect of applying exogenous, non-starch polysaccharidases (ENP) to pre-weaning starter diet on starter intake, nutrient digestibility, and calf growth. Eighteen Holstein calves (9 males and 9 females; 47.9 ± 2.5 BW; mean ± SD) were grouped by sex and monitored for 84 d in a randomized complete block design with repeated measures. One male calf on EB was noticed unhealthy at week-3 and excluded from the trial. Treatments included pre-weaning starters with 1) no enzyme additives (C), 2) enzyme additive A (EA, 0.6 ml/kg DM), and 3) enzyme additive B (EB, 1.9 ml/kg DM). The