

Graduate Student Poster Competition: National ADSA Production MS Poster

M191 Assessment of tannin-free and tanniniferous legumes in lactating dairy diets using continuous culture. C. M. Williams*¹, C. M. Dschaak¹, J.-S. Eun¹, J. W. MacAdam², and A. J. Young¹, ¹*Department of Animal, Dairy, and Veterinary Sciences, Utah State University, Logan*, ²*Department of Plants, Soils, and Climate, Utah State University, Logan*.

Dual-flow continuous culture fermentors (700 mL) were used to determine the effects of feeding tannin-free (alfalfa and cicer milkvetch) and tanniniferous (birdsfoot trefoils and sainfoin) legumes in lactating dairy diets on in vitro methane production and ruminal fermentation characteristics by mixed ruminal microbiota. We hypothesized that methane and ammonia-N production would be reduced when alfalfa hay was replaced by cicer milkvetch and tanniniferous legumes as main forages in TMR diets. Fermentors were inoculated with filtered ruminal contents and allowed to adapt to experimental diets for 6 d, followed by 3 d of sample collection. All dietary treatments were formulated for lactating dairy cows in early lactation. Five TMR diets were evaluated, each containing a different forage source as hay: 1) alfalfa (ALF) as a control, 2) cicer milkvetch (CMV), 3) Norcen birdsfoot trefoil (NBFT), 4) Oberhaunstadter birdsfoot trefoil (OBFT), and 5) sainfoin (SF). The experiment was conducted as a 5 × 5 Latin square design, and all data were analyzed using the MIXED procedure of SAS. Culture pH was not influenced when replacing ALF with CMV, NBFT, and OBFT, but increased when feeding SF ($P < 0.01$). Ammonia-N concentration was reduced when feeding CMV and SF ($P < 0.01$), but was not affected when replacing ALF with NBFT and OBFT. Total VFA production and acetate molar proportion were not influenced by treatments. However, molar proportion of propionate increased by feeding CMV, NBFT, and OBFT ($P < 0.01$). Acetate to propionate ratio decreased in cultures offered CMV and OBFT, but increased by SF when compared with ALF ($P < 0.01$). Methane production, as measured in headspace gas, decreased when replacing ALF with all other treatments ($P = 0.01$). The decrease of in vitro methane production when feeding cicer milkvetch, birdsfoot trefoils, and sainfoin may make these forages suitable for mitigating enteric methane emissions by lactating dairy cows, and maintaining potential productive performance.

Key Words: tanniniferous legumes, continuous culture, methane

M192 Post treatment outcomes of clinical mastitis on commercial dairy farms. C. Pinzón-Sánchez*, C. Hulland, and P. L. Ruegg, *University of Wisconsin, Madison*.

The objective was to characterize 60 d outcomes after treatment of mild (abnormal milk) and moderate (abnormal milk and abnormal udder) cases of clinical mastitis (CM) occurring on WI farms ($n = 4$). Duplicate milk samples were collected for microbiological analysis at onset of CM (PRE) and 20 d later (POST). Cows were treated with an intramammary product containing 125mg ceftiofur. Bacteriological cure (BCURE) was defined as absence of pathogens in POST sample, whether or not a causative pathogen was isolated in PRE sample. Recurrence (RECUR) was defined when CM occurred after the milk withholding period. Permanence (PERM) was defined as cows remaining in the herd. Somatic Cell Cure (SCCURE) was defined as SCC at first test after CM below 200,000 cells/ml. Effects of farm, DIM, parity, severity, PRE outcome, BCURE, previous milk yield, previous SCC, previous occurrence of CM and treatment duration were assessed using Chi-squared analysis and logistic regression. Distribution of cases was: *E. coli* (14), *Klebsiella* sp. (11), *Enterobacter* sp. (8), *Serratia* sp. (7), other gram neg. (3), *Strep*

sp. (25), *CNS* (4); *Staph. aureus* (1); *Staph. ag* (1), other gram-positives (9), and culture negative (60). The first case of CM was 8 times more likely to result in BCURE compared with cases preceded by CM ($P < 0.001$). Cases that were culture positive were 3–5 times less likely to experience BCURE as compared with cases that were culture negative ($P = 0.05$). Occurrence of a previous case of CM, parity, and DIM were associated with the probability of RECUR ($P < 0.04$). Older cows and cows in earlier lactation were more likely to RECUR. The odds of RECUR were 5 times greater for the first case of CM as compared with second or greater cases. Greater milk yield ($P < 0.001$) was the most important predictor for PERM. Farm, severity, milk yield and BCURE were associated with probability of SCCURE. SCCURE was more likely to occur when cows presented mild symptoms of CM (Odds ratio = 20) as compared with cows with moderate symptoms and cases that resulted in BCURE were 29 times more likely to result in SCCURE.

Key Words: mastitis, dairy, treatment

M193 Assessment of prior grazing experiences on adaption to pasture and performance of dairy heifers. F. Lopes*¹, D. K Combs¹, P. C. Hoffman¹, N. M Esser¹, and W. Coblenz^{2,1}, ¹*University of Wisconsin, Madison*, ²*USDA/ARS, US- Department of Agriculture/Agricultural Research Service, Marshfield, WI*.

The objective of this study was to evaluate how previous grazing experience affects animal behavior on pasture. Animal behavior was monitored in 32 Holstein ($n = 21$) and Holstein-Jersey ($n = 11$) yearlings. Two heifer groups ($n = 8$ per group) had been exposed to pasture from August through October 2008, while the other 2 groups had been continuously housed in a bedding pack barn since weaning. All 4 groups were housed in the same bedding pack barn from November 2008 until the start of the experiment. In June 2009, heifers were assigned to one of 4 Italian ryegrass pastures. The experimental unit was paddock and the experimental design was a randomized complete block. Each group was allocated approximately 50kg pasture DM/head initially. Animal activity was assessed by visual observation. The same person recorded the activity of each heifer every 15 min from 0700h to 1600h during the first 5 d of the study. Heifer's activities were categorized as: walking, drinking water, grazing, lying down or standing but not grazing. Behavior of heifers that grazed in 2008 initially differed from those with no previous grazing experience. During the first day, heifers with grazing experience spent more time grazing than heifers that had no prior grazing experience (57 vs. 43% of the time, $P < 0.05$). By the fourth day no difference between treatments group was observed. After the first week, behavior was monitored every 2 weeks through August 2009 (7 periods, 2 consecutive days per period). After the initial week on pasture, both groups spent approximately 60 percent of the time grazing (60 vs. 59% of the time, $P > 0.05$). At the end of the grazing season animal body weight was not different between experienced and inexperienced animals (451 vs. 442 kg, $P > 0.05$). The data suggests that prior grazing experience initially affected animal behavior on pasture. Time spent grazing increased for both experienced and inexperienced heifers over the first few days of the grazing period. Both groups of heifers adapted to the pastures within one week and there was no evidence that grazing behavior or weight gain were affected after the first week of pasture adaptation.

Key Words: grazing, heifers, behavior

M194 Seasonal variation of nutrients and in vitro dry matter degradability of forage hay. L. Shi*, N. Li, T. Shenkoru, W. Yang, S. McCannahey, and T. Wuliji, *University of Nevada, Reno*.

Nutrient composition and digestibility change from season to season. It is advantageous to determine which month of the growing season is most nutritious for the forage hay production. The objective of this study is to determine the seasonal variation in the feed composition and in vitro dry matter degradability of forage hay harvested from the irrigated pastures. The forage hay samples were collected at 3 intervals during the growing seasons from the irrigated grazing pastures, namely for interval I, II and III respectively at the end of June, August and October on the Rafter 7 Ranch, Yerington, Nevada. Organic matter (OM), ash, neutral detergent fiber (NDF), acid detergent fiber (ADF) and crude protein (CP) were estimated. The in vitro dry matter degradability (IVDMD) was determined by incubating dried ground samples in tubes with cattle rumen fluid (Tilley and Terry, 1963). The OM and CP of interval I were higher than II and III; Ash, NDF and ADF were increased from June (I) to October (III), except NDF was lower in II than I and III. But ADF was remained the same for both I and II sampling intervals. The IVDMD was significantly ($P < 0.05$) higher for interval I than II and III. The IVDMD of interval II was lower ($P < 0.05$) than III. Data of feed composition were analyzed for mean and standard errors whereas data of IVDMD were analyzed for ANOVA and t Tests (LSD) procedures of SAS. The results showed that forage hay nutrients and IVDMD estimates are highest at June interval, which is also more suitable to produce a high quality forage hay production from grazing pastures.

Table 1. Nutrient composition (mean±SE) and IVDMD (%) of forage hay from Rafter 7 Ranch, Yerington

Interval	OM%	ASH%	NDF%	ADF%	CP%	IVDMD%
I	89.2±0.01	10.8±0.01	52.3±0.19	33.7±0.44	15.7±0.14	66.3 ^c
II	86.9±0.02	13.2±0.02	48.8±0.19	33.1±0.05	14.5±0.04	51.2 ^a
III	83.6±0.01	16.4±0.01	58.4±0.33	40.1±0.38	12.2±0.03	53.6 ^b

^{abc}Mean with a different superscript differs significantly at $P < 0.05$ in column.

Key Words: degradability, in vitro, forage hay

M195 Performance of Holstein heifers supplemented with probiotics. J. Graves*¹, S. Hill¹, E. Suever¹, B. Rude¹, J. Brett², and Y. Vizzier-Thaxton³, ¹*Department of Animal and Dairy Science, Mississippi State University, Mississippi State*, ²*College of Veterinary Medicine, Mississippi State University, Mississippi State*, ³*Department of Poultry Science, Mississippi State University, Mississippi State*.

Sixty (n = 12) Holstein heifers were used to evaluate growth and health when supplemented with coccidiostat, mannanoligosaccharide (MOS) or β-glucan in milk replacer. Calves were randomly assigned to one of 5 treatments at birth: CX (1 g/d Deccox), MOS (10 g/d MOS), β-g (0.5 g/d β-glucan), CX + MOS (1 g/d Deccox + 10 g/d MOS) and MOS + β-g (10 g/d MOS + 0.5 g/d β-glucan). Heifers received 3.8L milk replacer (22% CP, 20% Fat) once daily until 6 wks of age, but remained on trial for 56d. Calves were fed a non-medicated starter (18% CP) at 0.9 kg/d and increased by 0.9 kg/d when orts = 0. Orts were collected and weighed daily and pooled by week within treatment. Calves had ad lib access to clean water. At birth, calves were fed colostrum via esophageal tube, weighed, and measured. Fecal and respiratory scores were recorded daily; body measurements, blood and fecal samples were collected weekly. Fecal samples analyzed for coccidia bi-weekly after 21 d; at 2, 4, and 8 wks fecal samples were analyzed for *E. coli*. Blood samples were analyzed for CBC w/differential. There were no significant differences in DMI ($P < 0.93$), FE ($P < 0.95$), ADG ($P < 0.79$) or blood analysis ($P > 0.10$) among treatment groups. Given similar diets fed, no changes in growth or intake were expected. No differences in fecal or respiratory scores, CBC, or other health measures indicated that supplementation with MOS, β-g, or a combination supported immune function similarly to CX. Fecal shedding of *E. coli* was not different across treatments ($P < 0.23$), however, orthogonal contrasts showed greater *E. coli* from MOS + β-g (80.4×10^4 CFU/μl feces) compared with β-g (23.2×10^4 CFU/μl feces; $P < 0.04$). There was also a trend for calves fed MOS to shed more *E. coli* compared with the calves fed β-g (70.3 vs. 23.2×10^4 CFU/μl feces, respectively, $P < 0.06$). *E. coli* shedding decreased over time (114.6, 49.4 and 5.0×10^4 CFU/μl feces at wk 2, 4 and 8, respectively; $P < 0.01$).

Key Words: probiotics, growth, Holstein heifers