In conclusion, molasses and microbial inoculation improved silage fermentation parameters, decreased proteolysis and aerobic stability of high dry matter alfalfa.

Key Words: alfalfa silage, inoculant, CNCPS


Feeding nutrients more closely to a cow’s nutrient requirements will reduce excretion of nitrogen and phosphorus by dairy cattle. The impact of improved feeding accuracy on whole farm nutrient balance through the use of feed management software was studied on 18 dairy herds located in Virginia. Nine herds began using the TMR Tracker feed management software in 2006 and were compared to 9 control herds not using feed management software. Each of the treatment herds was visited on a monthly basis. Annual inputs of nitrogen and phosphorus from purchased feed, fertilizer and animals were recorded from 2005 through 2008. Nitrogen and phosphorus exported from the farm as milk, animals, sold manure and feed were recorded. Whole farm nutrient balance was calculated using University of Nebraska software. After 2008, eight treatment herds and four control herds remained. Herd sizes averaged 290 and 325 for treatment and control farms. Milk production averaged 29.4 and 26.1 kg/d per cow respectively. Crop hectares averaged 326 and 284 respectively. Data were analyzed using proc mixed of SAS. Fixed effects included in the model were dairy day basis prior to analysis. Data were then analyzed by using the proc summarized annually by operation and then converted to a per cow per Kansas dairies were collected over a 9-year period (2000-2008). Fresh water and waste water data from 11 freestall (FS) and 12 dry lot (DL) treatment and control herds. Annual nitrogen ratios averaged 3.0 ± 1.5 (SD). On a per cow basis, annual nitrogen surplus averaged 16.1 ± 2.6 (SD) kg/yr and annual nitrogen surplus averaged 138.4 ± 12.7 (SD) kg/yr. Due to the large variation observed the use of feed management software did not have an effect on whole farm nutrient balance.

Key Words: whole farm nutrient balance, phosphorus, nitrogen


A meta-analysis was performed on 65 studies that recorded water intake by dairy cattle. The meta-analysis was utilized to develop a prediction equation for water intake in lactating dairy cattle. Studies were selected based on quantitative measurements of DMI, water intake (WI), and milk yield. Published papers were selected throughout the world but they mainly came from the Journal of Dairy Science. Many of the studies used more than one parameter to determine WI values leading to 137 data points from the 65 studies. With the addition of Na in the meta-analysis, 41 data points were available from the studies to examine the effects of Na on WI. The effects of dietary CP, diet DM%, dietary Na, and levels of milk production on WI were evaluated. Including data from cows with higher levels of milk production (>30kg/d) improved the correlation (R² 0.725) between WI and milk production. The meta-analysis results were then compared to on-farm measurements. Fresh water and waste water data from 11 freestall (FS) and 12 dry lot (DL) Kansas dairies were collected over a 9-year period (2000-2008). Fresh water usage was recorded from water pumping records. Data were first summarized annually by operation and then converted to a per cow per day basis prior to analysis. Data were then analyzed by using the proc mixed procedures of SAS. Fixed effects included in the model were dairy type (FS or DL) and year was considered a random effect. The DL dairies averaged 186 L/cow/day and were lower (P < 0.05) than the FS dairies which averaged 237 L/cow/day. Differences between DL and FS dairies may have been due to differences in waste management or cow cooling systems. Estimated drinking water accounted for 70% of the total water usage on DL dairies and 55% on FS dairies. Based on this data facility type may influence total water usage in dairy facilities.

Key Words: water intake, facilities, meta-analysis

W331 Dietary CP and tannin extracts impact ammonia emissions from manure deposited on dairy barn floors. J. M. Powell¹, M. J. Aguerre², and M. A. Wattiaux³, ¹US Dairy Forage Research Center, Madison, WI, ²University of Wisconsin, Madison.

The impact of dietary CP and Quebracho-Chestnut tannin extracts on dairy cow performance and N partitioning are reported elsewhere at this meeting. Mixtures of feces/urine from these studies were analyzed to lab-scale ventilated chambers to measure ammonia-N emissions (ANE) from simulated concrete barn floors. Feces and urine were collected separately from lactating Holstein cows fed 2 levels of dietary CP (%DM): low protein, LP = 15.5 and high protein, HP = 16.8; each at 4 levels (%DM) of dietary tannin: T1 = 0, T2 = 0.45, T3 = 0.90 and T4 = 1.80. Feces and urine having a total weight of 16g were mixed in their excreted mass ratios (g/g) and applied to chambers. ANE were measured 1, 3, 6, 12, 24, 34 and 48 after application. Although patterns of ANE were similar over time, the 48h cumulative ANE (CANE, mg) was lower (P < 0.05) for manure from the LP diets (12.1) than from the HP diets (24.7). As a percent of total N (%TN) and urinary N (%UN) applied, losses from the LP diets (16.9 and 46.2) were lower than from the HP diets (27.4 and 56.3). Tannins impacted CANE, %TN and %UN for both the LP and HP diets. For the LP diets, the non-tannin ration (T1) had CANE, %TN and %UN of 14.6, 19.6 and 48.0, respectively vs. 11.2, 16.1 and 45.7, respectively for the tannin-containing rations (average of T2, T3 and T4). Results were similar for the HP diets, except for %UN. Average CANE and %TN for manure from the HP non-tannin ration were 27.5 and 29.1, respectively vs. 23.7 and 27.2 for the HP tannin-containing rations. %UN was lower however for manure from the HP non-tannin ration (52.4) compared to the HP tannin-containing rations (57.5). These differences were likely due to overall higher excretions of urinary N by cows fed HP diets, and therefore higher amounts of urine N applied. For the LP diets, lowest CANE, %TN and %UN occurred at T2 and T4. For the HP diets, lowest CANE, %TN also occurred at T2 and T4, but %UN was lowest at T1 and T2 due to reasons mentioned above. The addition of tannin extracts to dairy rations can reduce ammonia emissions from dairy barns, but relative reductions depend on the amount of CP fed and therefore urinary N excretion.

Key Words: tannins, CP, ammonia emissions

W332 Emissions from a dairy waste management system in south-central Idaho. M. E. de Haro Martí¹, R. E. Sheffield², and M. Chahine³, ¹University of Idaho, Gooding, ²Louisiana State University, Baton Rouge, ³University of Idaho, Twin Falls.

This study evaluated the concentrations and emission rates of ammonia and hydrogen sulfide from a wastewater storage pond, manure processing area, and composting area from a 5,000 cow freestall scrape dairy located in south-central Idaho over a six months period. Pollutant concentrations were measured using an Ultraviolet Differential Optical Absorbance Spectrometer and emission rates were calculated using backward Lagrangian modeling via the WindTrax model. Measurements were collected continuously at a final 15-minute integration time. Average summertime concentrations adjacent to a 9.8-ha wastewater