

Table 0052.

Table 1. Mean and significance of differences between group and periods

Response ¹	Group 1		Group 2		P-Values		
	P1 (20 °C)	P2 (30 °C)	P1 (20 °C)	P2 (20 °C)	Group	Period	Group x Period
Time Below 5.5, h/h	0.06	0.01	0.13	<0.01	0.662	0.067	0.418
Time Below 5.75, h/h	0.25	0.07	0.29	0.16	0.560	0.074	0.778
Min. pH	6.16	6.09	6.25	6.23	0.010	0.055	0.266
Mean pH	6.28	6.20	6.36	6.34	0.077	0.004	0.053
Max. pH	6.40	6.30	6.47	6.45	0.060	<0.001	0.005
Max. T, °C	39.7	39.7	39.5	39.4	0.019	0.044	0.165
Mean T, °C	39.5	39.4	39.3	39.2	0.101	0.010	0.310
Min. T, °C	39.2	39.1	39.1	38.9	0.384	0.057	0.241

¹Response variables included minimum (min.), mean, and maximum (max.) pH and temperature (T; °C), proportion of time pH was below 5.5 and 5.75 (hour/hour).

are summarized in Table 1. The significance of the group by period interaction for mean ($P = 0.053$) and maximum ($P = 0.005$) pH demonstrates that that heat stress lowers average rumen pH by reducing the height of pH peaks occurring in between digestion events. However, this pH shift is not associated with decreases in minimum pH or a change in time spent below cutoff pH values ($P > 0.05$). Further work must be conducted to evaluate what effects this pH shift has on rumen fermentation kinetics during heat stress.

Key Words: heat stress, rumen pH, rumen temperature

ADSA-SAD (STUDENT AFFILIATE DIVISION) UNDERGRADUATE STUDENT POSTER COMPETITION

0053 Validation of a commercially available β -hydroxybutyrate meter for assessing rumen development in dairy calves. M. A. Richard¹, C. C. Williams², R. M. Orellana¹, S. J. Blair¹, and A. H. Dolejsiova², ¹Louisiana State University, Baton Rouge, ²Louisiana State University AgCenter, Baton Rouge.

Previous research has shown that glucometers used for testing blood glucose levels in humans are accurate for testing blood glucose in dairy calves and cows. Ketone monitors have been developed for assessment of ketoacidosis in human diabetics. Both acetoacetic acid and β -hydroxybutyric acid (BHBA) are classified as ketones, but BHBA is the metabolite of interest when assessing rumen development. The Abbot Precision Xtra meter measures BHBA in whole blood. Thus, this instrument would be beneficial from both a basic and applied standpoint in dairy calf nutrition and management. The objective of this experiment was to validate the use of a commercially available hand held β -hydroxybutyrate meter for assessing rumen development in young dairy calves. Blood was collected from 24 Holstein calves at the LSU Dairy Farm via jugular venipuncture during weeks 2, 4, 6, 8, 10, and 12

for analysis of BHBA. Blood was immediately tested for BHBA concentrations using the Abbot Precision Xtra meter. The remainder of each sample was separated and frozen until analyzed for BHBA using a commercial spectrophotometric kit. The BHBA concentrations obtained with the Abbot Precision Xtra meter were strongly correlated with overall plasma BHBA concentrations. Correlations were good when monitoring BHBA concentrations in different age groups. The meter values were not accurate when compared with plasma BHBA concentrations. Beta-hydroxybutyrate meters can be useful tools for monitoring changes in blood ketone concentrations but are not accurate for use in research data collection.

Key Words: β -hydroxybutyrate, dairy calves, ketone monitors

0054 The effect of the liquid nitrogen level on the temperature in a semen storage tank. A. Hale^{*1}, A. Ahmadzadeh¹, B. Shafii¹, and J. Dalton², ¹University of Idaho, Moscow, ²University of Idaho, Caldwell.

The temperature in semen storage tanks is critical to maintain the viability of semen stored within the tanks. The objective was to investigate the effect of liquid N level on the temperature in a semen storage tank. Using an electronic thermometer, semen tank temperature was measured at three locations: (a) 2 cm below the top of the neck, (b) 7 cm below the top of the neck (below the frost line), and (c) 2 cm above the level of liquid N. Liquid N volume in the tank was incrementally decreased from 45 to 19 L. The experiment was repeated twice, and temperatures at each location and N level were recorded four times. The data on the effects of N level, location, and two-way interaction on the tank's temperature were analyzed using a general linear mixed model and procedure GLIMMIX in SAS. There was an effect of location and volume by location interaction on tank temperature ($P < 0.01$). Mean tank temperature was greater ($P < 0.01$) 2 cm below the top of the neck as compared with 7 cm below the top of the neck (below the frost line; $6.3 \pm 0.1^\circ\text{C}$ vs. $-38.4 \pm 0.3^\circ\text{C}$). Results showed that the

effect of liquid N volume on tank temperature was not consistent across locations. As N levels decreased, the temperature gradient remained above 0°C and did not change at 2 cm below the top of the neck. However, as liquid N level decreased, the temperature gradient increased ($P < 0.05$; from -41 ± 1 to $-36 \pm 1^\circ\text{C}$) at 7 cm below the top of the neck (below the frost line). Similarly, as N levels decreased, the temperature gradient increased ($P < 0.05$; -187 ± 0.3 to $-185 \pm 0.3^\circ\text{C}$) at 2 cm above the level of liquid N. Based on covariance parameters estimated, the temperature gradient below the frost line in the neck of the tank demonstrated the most variability. Data provide evidence of an increase in temperature gradient at 7 cm below the top of the neck (below the frost line) as the liquid N level decreases over time. Therefore, as liquid N level in the tank decreases, removal of semen straws should be done efficiently, to preserve semen viability via minimization of semen exposure to increased temperatures in the neck of the tank.

Key Words: semen storage tank, nitrogen level, temperature gradient

0055 Evaluating the effects of a sodium hypochlorite post milking teat disinfectant on teat condition using a split udder trial. N. Lind*, *University of Kentucky, Lexington.*

The objective of this study was to compare the effects of sodium hypochlorite, DX 648, (GEA Farm Technologies, Naperville, Illinois) and 1% iodine postmilking teat disinfectants on teat condition. Sixty-two primiparous and multiparous lactating Holstein cows averaging 209.63 ± 128.12 d in milk, from the University of Kentucky Coldstream Dairy Farm, were included in an 8-wk study from 27 Nov. 2015 to 21 Jan. 2016. A split udder trial was used to control for cow effects and maximize the number of experimental units. The teats on the left side of the udder were dipped in DX 648 while the teats on the right side were dipped in iodine. All teats were dipped using nonreturn dip cups. Teat end condition and teat skin condition were scored weekly after milking. Teat end condition was scored on a scale of 1 to 4 (1 = no ring, 2 = smooth or slightly rough ring, 3 = rough ring, and 4 = very rough ring). Teat skin condition was scored on a scale of 1 to 3 (1 = normal, 2 = dry, and 3 = rough). The MIXED procedure of SAS 9.4 was used to evaluate the fixed effects of week and teat dip on teat end and teat skin condition. Data was repeated by week with teat within cow as subject using a compound symmetry covariance structure. Teat skin condition scores were not significantly different ($P = 0.98$) between teats dipped with sodium hypochlorite (1.04 ± 0.01) and iodine (1.04 ± 0.01). Teat end condition scores were not significantly different ($P = 0.40$) between teats dipped with sodium hypochlorite (2.45 ± 0.05) and iodine (2.45 ± 0.05). The DX 648 teat dip performed similarly to iodine regarding teat end and teat skin condition, indicating that this dip may be used

without adverse effects.

Key Words: postmilking teat dip, sodium hypochlorite, teat condition

0056 The effect of ergothioneine-containing mushroom powder (MP) on sensory acceptability and probiotic survivability in yogurt. B. Blain, C. Boothroyd*, D. R. Roberts, and E. Furumoto, *The Pennsylvania State University, University Park.*

L-ergothioneine, produced by certain fungi and bacteria, is known to have protective effects for both microorganisms and humans due to nonoxidative capabilities. Commercial preparations of L-ergothioneine are derived from mushrooms and can also serve as a source of vitamin D. The objective of this work was to determine if addition of commercial mushroom powder (ErgoD2) could be used as a natural source of vitamin D and antioxidant in yogurt. To test this hypothesis, control and treatment probiotic-containing yogurts (composition: 12% milk solids nonfat, 0.5% milk fat, 3% sucrose) were produced in the Food Science Pilot plant. Mixes were homogenized at 2000 psi and pasteurized at 85°C for 30 min. Mushroom powder (2.5 mg/g ergothioneine) was added at 0.02% by weight to the treatment sample before pasteurization. The pH was monitored throughout fermentation and viable counts of *Streptococcus thermophilus*, *Lactobacillus delbrueckii* subsp. *bulgaricus*, and the probiotic *Bifidobacterium animalis* ssp. *lactis* Bb-12 were monitored at the beginning and end of fermentation. The pH of yogurt and probiotic survival were also monitored weekly for 5 wk. Hedonic liking and preference tests were conducted on both control and treatment products with 106 participants. Yogurt containing mushroom powder fermented at a similar rate to the control. Addition of mushroom powder did not affect growth of Bb-12, *S. thermophilus*, or *L. delbrueckii* subsp. *bulgaricus*. Although counts of Bb-12 decreased during storage, the rate of decline was similar in control and treatment yogurts throughout the 5 wk storage period. No significant differences were observed in acceptability between control and treatment products. Results suggest mushroom powder containing L-ergothioneine and vitamin D could be used successfully in yogurt.

Key Words: ergothioneine, yogurt, probiotic