

Graduate Student Paper Competition: ADSA Southern Branch

58 Effect of milk replacer composition on growth and rumen development of neonatal Holstein calves. A. J. Bridges*, C. C. Williams, C. F. Hutchison, J. M. Laborde, A. N. Howard, and C. Leonardi, *Louisiana State University, Baton Rouge.*

A study was conducted to determine effects of different fat and protein levels in commercial milk replacers on the growth performance and rumen development of neonatal Holstein calves. Fifty-three calves (23 male; 30 female) were assigned to one of three dietary treatments which included 3 milk replacers (20%CP: 20% fat; 25%CP:15% fat; 28%CP: 20% fat) fed once per day at 10% of birth weight through weaning on day 42. Calves were offered a 20% CP calf starter and water free choice beginning on day 5. All calves were weaned on day 42. Body weights were measured at birth and weekly through weaning. Additionally, hip height, wither height, and body length were measured weekly. Feed intake and fecal scores were recorded daily. Beginning on day 7 and continuing weekly through weaning, blood samples were collected prior to morning feeding for analysis of IGF-I and on days 14, 28, 42, and 56 for PUN and beta-hydroxybutyrate concentrations. On days 28, 56 and 84 rumen fluid was collected for analysis of pH and short chain VFAs to evaluate possible differences in rumen development. Calves fed 28:20 milk replacer had greater ($P < 0.01$) average daily gain, starter intake, PUN, and beta-hydroxybutyrate concentrations when compared to the other treatments. Also, a treatment by week interaction was observed ($P < 0.01$) for starter intake, with calves on 28:20 milk replacer increasing after week 3 and maintaining the greater starter intake through week 8. No differences were observed ($P > 0.05$) in fecal scores among any treatments. Average weekly wither height and body length were greater ($P < 0.05$) in calves fed 28:20 milk replacer. There were no effects ($P > 0.05$) of treatment on IGF-I concentrations, rumen pH, or concentrations of VFA. Acetate and propionate, as a percent of total VFA, tended ($P < 0.10$) to be greater in calves fed 28:20 milk replacer. These data indicate that increasing the dietary protein content of milk replacer without reducing fat content improved growth in young dairy calves without compromising health or rumen development.

Key Words: Milk Replacer, Growth, Rumen Development

59 Effects of ThermalCare-D® on efficiency and production of lactating dairy cows during hot weather. J. Boyd*¹, J. W. West¹, J. Bernard¹, and S. Block², ¹*University of Georgia, Tifton*, ²*ADM Research, Decatur, IN.*

A trial was conducted to evaluate effects of ThermalCare-D® v1(T1), ThermalCare-D® v2(T2), and ThermalCare-D® v1 with glycerol(T1G) on milk yield, efficiency of yield, and nutrient digestibility in hot weather. Thermal Care D® is comprised of proprietary additives selected for the potential ability to improve physiological response to heat stress. Forty-eight Holstein cows averaging 183 DIM and 43.9 kg/d of milk were used. The study was conducted June to Aug. 2007. Cows were fed a common diet during a 2 wk standardization period, blocked into groups of 4 based on parity, milk yield, and ECM and randomly assigned within block to one of 4 treatments for 8 wks. Experimental design was a randomized complete block. Diets were corn silage based and balanced to be iso-caloric and iso-nitrogenous. No effects on DMI, milk yield,

or energy corrected milk ($P < 0.53$) were noted. Yet, multiparous cows offered T2 and primiparous cows on T1G treatments showed similar milk yield which was greater than cows fed C or T1 diets ($P < 0.02$). An increase ($P < 0.01$) in milk yield was observed for primiparous versus multiparous cows on T1G. Decreased ($P < 0.02$) milk fat percentage was observed for T1 versus C while T2 and T1G had numerically lower fat percentage versus C. An increase in NE balance by week was observed for T1G (42.2 Mcal/d) compared to C, T1, and T2 (22.8, 20.6, and 36.1 Mcal/d, respectively). Cows fed T1G had numerically the greatest weekly weight gain compared with other treatments. No effect on respiratory rate, skin temperature, body temperature or concentrations of serum glucose, urea N, or non-esterified fatty acid was noted. Cows offered Thermal Care-D® treatments tended ($P < 0.13$) to increase DMI versus C when digestibility measurements were recorded. Cows fed T1 and T2 exhibited ($P < 0.05$) improved digestion of DM, NDF and ADF compared with C or T1G. Results suggest ThermalCare-D® may improve feed DMI and nutrient digestion by cows during hot weather. The addition of glycerol to ThermalCare-D® v1 was more beneficial to primiparous cows than multiparous cows.

Key Words: Heat Stress, ThermalCare, Glycerol

60 Effect of starch and casein infusions in the abomasum of lactating dairy cows. A.G. Rius*¹, J. A. D. R. N. Appuhamy¹, D. Kirovski², J. Cyriac¹, and M.D. Hanigan¹, ¹*Virginia Polytechnic Institute and State University, Blacksburg*, ²*University of Belgrade, Belgrade, Serbia.*

The objective of this study was to evaluate the effects of abomasally infusions of starch, casein or the combination of both on milk and protein yields in lactating cows fed restricted diet. We hypothesized that abomasal infusions of starch plus casein could maintain milk and protein yields when cows were fed 70% of requirements for protein and energy. Six primiparous mid-lactation ruminally cannulated Holstein cows were randomly assigned to treatments using a replicated incomplete 4x4 Latin-square design. All animals received the same diet (17.6 % CP and 1.58 Mcal NEI) throughout the study. Beginning on d 13 of each period, cows were restricted to 70% of ad libitum intake and abomasally infused for 36 h with starch (S; 3 kg/d), casein (C; 1.3 kg/d) the combination (S+C) or water (W) using peristaltic pumps. On d 14, milk samples were collected. Milk yield and components were analyzed using the Proc Mixed procedure of SAS to test main effects and differences among treatments. Milk yields were not significantly affected by treatments ($P < 0.55$) and the LSM were 1.23, 1.02, 1.01, 1.05 kg/h for C+S, W, S and C respectively (SEM=0.11). Milk protein yields were also not significantly affected by treatments ($P < 0.36$) with LSM of 39, 29, 30 and 33 g/h for C+S, W, S and C respectively (SEM=3.6). As expected, MUN (milk urea nitrogen) was significantly affected by treatment ($P < 0.05$) and the LSM were 13.43, 10.57, 8.58, 15.17 mg/dl for C+S, W, S and C respectively (SEM= 0.69). Although it was not significant the MUN difference between C+S and C was 1.74 ($P < 0.09$; SEM=0.92) and the difference for W and S was 1.99 mg/dl ($P < 0.06$; SEM<0.92). Other milk components were not significantly affected by treatments. In conclusion the MUN results indicate that nitrogen can be used more efficiently if starch absorption is enhanced.

Key Words: Cow, Casein, Starch