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1. Accession	Agency Identification No.	5. Work Unit/Project No.	6. Status
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7. Title

Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises

12. Investigator Name(s) (Last Name and Initials)

Williams, C. C.; Jenny, B. F.

20. Termination Date 09/30/2013

40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011

Outputs:

The effects of shade and resistant starch were evaluated in calves. Two publications disseminated the results.

Outcomes/Impacts:

Sixteen Holstein heifers were assigned to either non-shaded (NS)or shaded (SS)hutches for 8 weeks. Body weight, hip and wither height were measured at birth and at weeks 1, 2, 4, 6, and 8. Blood was collected at birth and then weekly for analysis of plasma urea nitrogen (PUN) and packed cell volume (PCV). Starter intake, body weight, hip height, and wither height increased with age while fecal scores decreased over time. However, there were no treatment effects on these parameters. A treatment by time interaction ($P < 0.01$) was observed for surface temperature with lowest values in the SS calves in the morning. There was a treatment by time interaction for respiration rates, with afternoon values for NS calves and morning values for SS calves being the highest. There was no significant ($P > 0.1$) treatment effect on PUN, although PUN levels increased ($P < 0.05$) as calves aged. In a second study, 42 female Holstein calves were assigned to one of three treatments to study effects of adding resistant starch (RS) to milk replacer on health and performance. Treatments were control (C) (no RS), 4g RS (low; L), and 8g RS (high; H) mixed into milk replacer. Calves were housed in individual calf hutches and fed milk replacer once daily until d 42 of age. Feed intake and fecal scores were recorded once daily through d 56. On d 14, 28, 42, and 56, fecal samples were collected for analysis of pH and volatile fatty acids (VFA) and blood was collected for analysis of PUN and total protein (TP). PUN and TP did not differ ($P > 0.05$) and were within normal ranges, indicating no major metabolic problems. There was no effect ($P < 0.05$) of treatment on body weight, HH, HW, WH, or body temperatures. There was a treatment by week interaction ($P<0.01$) and a week effect ($P<0.01$) for grain intake, with all calves increasing intake throughout the duration of the study. There was a treatment by week interaction ($P<0.01$) and a week effect ($P<0.01$) for fecal scores, with calves having lower fecal scores at the end of the study compared to the beginning. Fecal pH increased as calves aged ($P<0.01$). There was a treatment by week interaction ($P<0.05$) with an effect of both week ($P<0.01$) and treatment ($P<0.05$) for propionate concentrations in the feces. There was an effect of week ($P<0.01$) for acetate and butyrate concentrations as well as total VFA concentration in the feces. While differences were observed in physiological parameters, there were no improvements in growth performance of these calves with addition of shade as a management practice. Providing shade did lower body temperature and respiration rates during the afternoon when heat stress was more severe. Overall, incorporation of resistant starch in the milk replacer of neonatal dairy calves did not show any significant effects on growth or gut health of Holstein dairy calves.

Publications:

Thibeau, S.S., L.B. Sage, C.C. Williams, B.F. Jenny, and A.H. Dolejsiova. 2011. Effects of shade on heat stress reduction in Holstein dairy calves. J Dairy Sci. 94 E-Suppl. 1:93.

Fisher, B.L., B.F. Jenny, C.C. Williams, C.F. Hutchison, A.H. Dolejsiova, and R.G. Morrell. 2011. Effects of resistant starch in milk replacer on health and performance of neonatal Holstein heifer calves. J Dairy Sci. 94 E-Suppl. 1:87.

Participants:

C.C. Williams (PI), B. Jenny, C. Hutchison, A. Dolejsiova, R. Morell, B. Fisher, S. Thibeaux, and L. Sage, LSU AgCenter.

Target Audiences:

Dairy producers and dairy industry professionals who serve as consultants will benefit from the information generated by these projects.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date
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