



Minnesota Dairy Health Conference

SPONSORS

GOLD



SILVER



COPPER



Feeding Heat-treated Colostrum Reduces Morbidity in Preweaned Dairy Calves

S.M. Godden¹, D. J. Smolenski², M. Donahue³, J.M. Oakes², R. Bey¹, S. Wells¹,
S. Sreevatsan¹, J. Stabel⁴ and J. Fetrow¹

¹ Department of Veterinary Population Medicine, University of Minnesota, St. Paul, MN

² Division of Epidemiology and Community Health, University of Minnesota,
Minneapolis, MN

³ USDA, FSIS, Minneapolis District. Minneapolis, MN

⁴ USDA, ARS, National Animal Disease Center, Ames, IA

Previous studies have demonstrated that batch pasteurizers can be used on farms to heat-treat bovine colostrum at 60°C for 60 minutes, resulting in a significant reduction in bacterial exposure to the calf while maintaining overall colostrum Immunoglobulin G (IgG) concentrations. However, studies have been lacking to date to demonstrate if feeding heat-treated colostrum results in improved calf health.

A randomized controlled clinical trial was conducted using 1071 newborn calves from six commercial dairy farms in Minnesota and Wisconsin, with the primary objective being to describe the effects of feeding heat-treated colostrum on serum immunoglobulin G concentration and health in the preweaning period. A secondary objective was to complete a path analysis to identify intermediate factors that may explain how feeding heat-treated colostrum reduced risk for illness.

On each farm colostrum was collected each day, pooled, divided into two aliquots, and then one aliquot was heat-treated in a commercial batch pasteurizer at 60°C for 60 minutes. Samples of fresh and heat-treated colostrum were collected for standard microbial culture (total plate count, total coliform count, cfu/ml) and for measurement of immunoglobulin G concentrations (mg/ml). Newborn calves were removed from the dam, generally within 30-60 minutes of birth, and systematically assigned to be fed 3.8 L of either fresh (FR, n = 518) or heat-treated colostrum (HT, n = 553) within 2 hours of birth. Venous blood samples were collected from calves between 1-7 days of age for measurement serum IgG concentrations (mg/ml). All treatment and mortality events were recorded by farm staff between birth and weaning.

Regression models found that serum IgG concentrations were significantly higher in calves fed HT colostrum (18.0 ± 1.5 mg/ml) as compared to calves fed FR colostrum (15.4 ± 1.5 mg/ml). Survival analysis using Cox proportional hazards regression found that there was a significant increase in risk for a treatment event (any cause) in calves fed FR colostrum (36.5%, $H.R._{Fresh} = 1.25$) as compared to calves fed HT colostrum (30.9%). Also there was a significant increase in risk for treatment for scours in calves fed FR colostrum (20.7%, $H.R._{Fresh} = 1.32$) as compared to calves fed HT colostrum (16.5%). Path analysis suggested that calves fed HT colostrum were at lower risk for illness because the heat-treatment process caused a significant reduction in colostrum TCC, which was associated with a reduced risk for illness as a function of improved

serum IgG concentrations.

Full Manuscript In Press: J. Dairy Science. April, 2012.