

Effect of Pasteurization on Uptake of Colostral IgG in the Newborn Calf in the First 12 Hours

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Pasteurization of colostrum is becoming a popular on-farm management practice to help protect newborn calves from vertical transmission of potentially infectious pathogens such as *Mycobacterium avium* ssp. *Paratuberculosis* (Johne's Disease). Important components of colostrum may be altered by heat-treatment, which may influence IgG uptake by the gut. The objective of this experiment was to study the effects of heat-treatment of colostrum on passive transfer of immunity and gut development by determining the timing and extent of colostral IgG uptake by the neonate in the first 12 hours of life. Fifteen newborn bull (n=12) and heifer (n=3) calves were separated from their dam prior to suckling and fed 2L of either control (not heated;n=8) or pasteurized (n=7) colostrum, via esophageal tube, within one hour of birth. Blood samples were taken at 0 (< 30min), 3, 6, 9 and 12 hours after birth for analysis of plasma IgG concentration. Plasma concentration of IgG was low and did not differ between control and heated colostrum at 0h (1.4 ± 3.3 vs 3.3 ± 1.6 mg/ml) or 3h (3.2 ± 1.1 vs 2.2 ± 1.4 , mg/ml) respectively. Calves fed control colostrum had numerically higher blood IgG concentrations, compared to those fed heated, at 6h (10.1 ± 1.1 vs 8.1 ± 1.1 mg/ml) and 9h (14.5 ± 1.6 vs 12.3 ± 1.6 mg/ml). Calves fed control compared with heated colostrum had significantly higher IgG concentrations by 12h (15.8 ± 1.1 vs 12.2 ± 1.2 , mg/ml; p=0.05), respectively. These results indicate that heat-treatment of colostrum had a negative impact on timing and extent of IgG uptake by the neonatal gut during the first 12h postpartum. Further work will examine gut morphology and gene expression that will help to identify factors that control IgG absorption in the gut of the calf.

Implications: Pasteurization of colostrum may affect uptake of colostral IgG by the calf in the first 12 hours of life.