

Effects of extended colostrum feeding period on gastrointestinal tract structure and development in Holstein bull calves

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The objective of this study was to determine the effect of extended colostrum feeding on the structure and development of the neonatal calf gastrointestinal tract (GIT). Twenty-four male Holstein calves were fed the first pooled colostrum meal at 7.5% of their birth body weight at 2 h postpartum, then randomly assigned to 1 of 3 treatments: calves fed pooled colostrum (COL; n=8), calves fed a mixture of 50% pooled colostrum and 50% milk (MIX; n=8), and calves fed pooled milk (MILK; n=8). Calves were fed assigned treatment meals at 5% of their body weight every 12 h thereafter. Calves were euthanized at 3 d of life, and tissue was collected from duodenum, proximal and distal jejunum, ileum, and colon. All treatment groups had adequate passive transfer rate with the COL calves showing the highest rate (68.6%). The GIT weight and length of jejunum, ileum, and colon were normalized to calf body weight for comparison. COL calves had significantly heavier colon weight. In contrast, GIT lengths were similar in all treatment groups, with MIX calves tending to have the longest GIT tract length in all compartments. Both groups that were fed colostrum at any level (COL and MIX) showed longer villi length compared to MILK calves in the ileum and jejunum. The COL and MIX calves were not different with respect to intestinal villi length throughout the small intestine. Moreover, there were no differences in crypt depth among all treatment groups. These findings suggest that extended feeding of colostrum up to 3 d of life increases the villi length of the small intestine, weight, length of the GIT, which would increase the ability to absorb nutrients, and as a result would improve the nutrient status of the young calf. This re-affirms the growth promoting effect of colostrum on the GIT, though considering that there was no significant difference between COL and MIX treatments, there is a limit to this growth promoting effect during extended colostrum feeding.