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THE COLOSTRUM COUNSEL

Unlocking the Power of Transition Milk: Evidence and Application

Introduction

The importance of colostrum within the first hours of a calf's life is universally recognized, as newborn calves are born with a naive immune system and are entirely dependent on colostrum to acquire passive immunity. Traditionally, this feeding is limited to a single dose of high-quality (> 50g/L of IgG) colostrum within the first hours post-birth. However, new evidence suggests that extending colostrum feeding using transition milk (TM), defined as milkings 2 through 6 post-calving (Godden, 2008), can provide significant health and performance benefits to young calves during the critical early weeks of life.

Transition milk maintains many of the nutritional and immunological benefits of colostrum in a lower concentration, including elevated concentrations of fat, protein, immunoglobulins, growth factors, hormones, and oligosaccharides, all of which are present at levels far above those found in mature milk (Fischer-Tlustos et al., 2020). These bioactive compounds contribute to gut development, microbiome establishment, immune maturation, and metabolic stability, especially during the first month, when calves are most vulnerable to disease and environmental stressors (Quigley & Drewry, 1998).

A growing number of studies have shown that extended colostrum or TM feeding improves average daily gain (ADG), reduces respiratory and digestive disease, and lowers calf mortality and antimicrobial use (Berge et al., 2009; Chamorro et al., 2017; Kargar et al., 2020; Cantor et al., 2021). Feeding enriched liquid diets for 4 to 14 days post-birth has been associated with improved long-term performance, although results vary depending on formulation and protocol (Van Soest et al., 2020). Additionally, colostral antibodies that remain in the gut lumen beyond the absorptive window may still provide local immune protection, contributing to reduced enteric infections and improved villus development (Hare et al., 2020).

McCarthy et al. (2023) demonstrated that supplementing milk replacer with colostrum replacer improved ADG and reduced the hazard of diarrhea and mortality during the preweaning period. These findings suggest that transition milk strategies are effective, underutilized tools for supporting calves during high-risk periods such as disease challenges, vaccination, dehorning, and weaning.

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Carter et al (2022) investigated the use of bovine colostrum as a therapeutic intervention for diarrhea. A total of 108 calves at a commercial calf-raising facility in Canada were enrolled upon diagnosis of diarrhea and randomly assigned to one of three treatment groups: (1) control, (2) short-term colostrum supplementation for 2 days following diarrhea onset (50% MR + 50% CR), or (3) long-term colostrum supplementation for 4 days following diarrhea onset (50% MR + 50% CR). Calves in the long-term group experienced faster resolution of diarrhea and grew, on average, 98 g/day more over a 56-day period compared to the control group. These findings support the use of colostrum supplementation as a non-antibiotic strategy for managing calf diarrhea, with positive impacts on both health and growth performance.

The Practical Trial: Koepon Dairy Farm

To test this concept under commercial farm conditions, a practical field trial was conducted at Koepon dairy farm, by student researcher Ruth Huinder, in collaboration with colostrum specialist Dr. Juliana Mergh Leao and Dr. Dave Renaud, Professor at the University of Guelph.

Study Design

Twenty female Holstein calves were enrolled and randomly assigned to a control or test group. All calves received two initial (4L + 2 L) feedings of high-quality maternal colostrum (> 25% Brix) and were fed maternal transition milk on days 2 and 3, followed by milk replacer. The test group (EXT), however, received an additional supplement of SCCL colostrum replacer: 70 g of colostrum powder (CCT 14% IgG) mixed with 140 ml of water (mixed at temperature 43-49°C and fed at body temperature), providing 420 ml per day (divide into two feedings), administered daily from day 4 through day 14.

Calves were monitored for weight gain and health scores over a six-week period, including evaluations for fecal consistency, respiratory status, and general condition.

Results

- The test group (EXT) achieved a numerically higher average daily gain of 135g/d when compared to the control group on the first 3 weeks. Overall growth was +35g/d during the first 6 weeks of life.

Table 1. Weights of the test (EXT) - and control group at birth, week 3 and 6 and calculated average daily gain from birth to week 3, week 3 to 6 and from birth to week 6.

	Weight at Birth	Weight at 3 weeks	Weight at 6 weeks	ADG week 1-3	ADG week 3-6	ADG week 1-6
Test (EXT)	40.84	60.52	71.64	1.00	0.57	0.78
Control (CON)	40	57.98	71.73	0.88	0.63	0.75

- Abnormal feces were significantly more frequent in the control group, particularly during weeks 3 and 4 —time points that coincided with routine stress events like vaccination, dehorning, and relocation.

The mean number of days with diarrhea (defined as a fecal score of 1 or 2) was 3.40 ± 2.01 in CON calves and 3.40 ± 2.37 in EXT calves. In a Poisson regression model, there was no significant difference in diarrhea incidence between treatment groups (IRR: 0.11; 95% CI: –0.37 to 0.60; P = 0.64), nor was birth weight associated with diarrhea occurrence (P = 0.94). However, serum IgG concentration was significantly associated with diarrhea risk: calves with serum IgG > 28 g/L had a lower incidence of diarrhea (IRR: 0.58; 95% CI: 0.35 to 0.95; P = 0.03) compared to calves with IgG < 28 g/L (Figure 1).

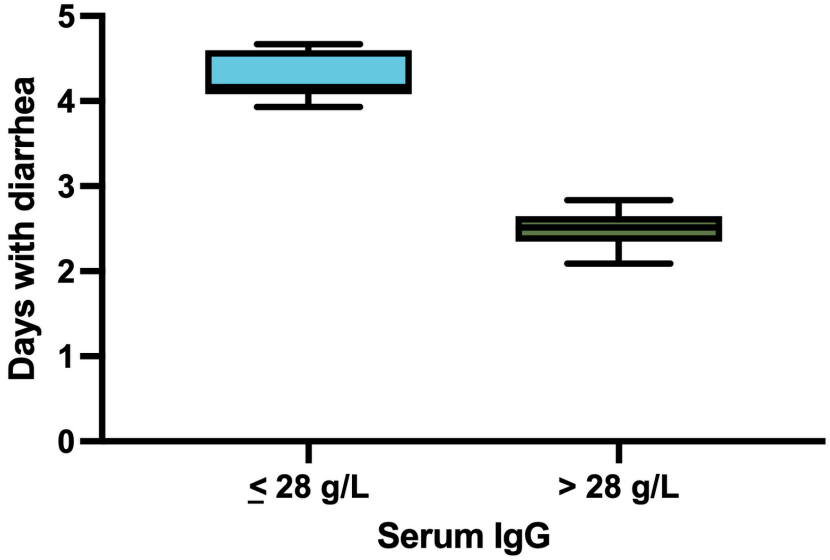

Figure 1. Predicted days with diarrhea over time by serum IgG from repeated measures model, controlling for treatment group and birth weight.

The mean number of days with severe diarrhea (fecal score of 2) was 1.10 ± 0.88 in CON and 0.50 ± 0.71 in EXT. In the Poisson model, controlling for IgG (P = 0.31) and birth weight (P = 0.81), treatment group tended to be associated with the outcome. Specifically, calves in EXT tended to have a lower incidence (IRR: 0.40; 95% CI: 0.14 to 1.19; P = 0.099) of severe diarrhea compared to CON (Figure 2).

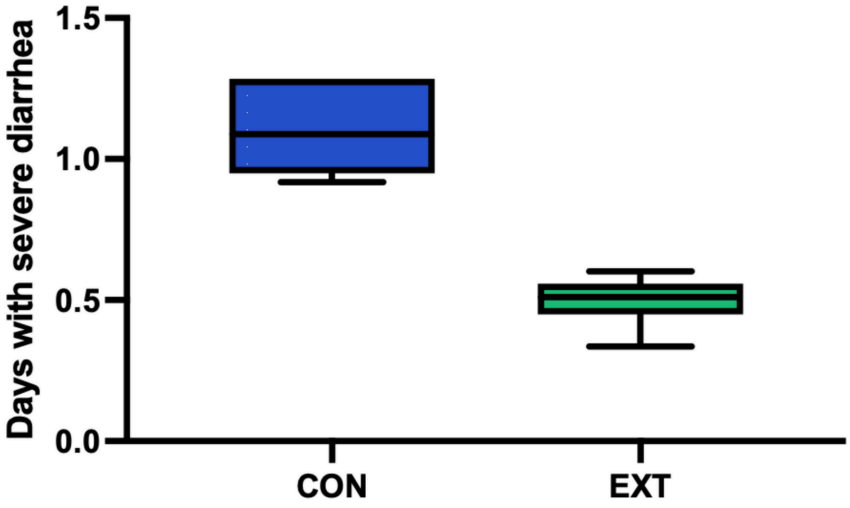

Figure 2. Predicted days with severe diarrhea over time by treatment group from repeated measures model, controlling for serum IgG concentration and birth weight.

- During these high-stress periods, the test group displayed notably greater resilience, with fewer clinical symptoms and better fecal consistency.

These outcomes reinforce the hypothesis that transition milk, whether naturally collected or simulated via high-quality colostrum replacers added to the liquid diet, can serve as a bridge between passive immunity and active immune development, reducing disease risk and enhancing growth even in well-managed herds.

A Healthy Calf Is Priceless

While some producers may initially view the purchase of colostrum powder as an added cost, this study highlights the clear economic and welfare returns: faster-growing calves, fewer treatments, and better health outcomes. Transition milk strategies also contribute to greater job satisfaction, as healthier calves reduce the daily burden of disease management.

As the dairy industry continues to evolve, approaches that combine science with practical application, such as the one tested at Koepon farm, represent a valuable shift toward proactive calf care. With more research and field trials confirming the benefits of extended colostrum and transition milk feeding, it's time to recognize transition milk not as a byproduct, but as a vital resource in the development of high-performing, resilient dairy calves.

Data referenced in this article is currently unpublished and will be made publicly available in the near future.

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