Colostrum Management is Key

April 29, 2022

This past winter was particularly difficult for young calves in dairy herds, in large part due to the higher relative humidity compared to previous years. This situation has raised many questions about the housing and health of calves.

Transfer of Passive Immunity (PI) remains a key point in assuring excellent calf health. Calves are born with no immunoglobulins (Ig) or lymphocytes, the sentinels of their immune system. Because of this, it's vital that they integrate the Ig from colostrum to provide temporary protection until their own immune system can take over.

In order to increase the success of PI transfer, it's essential that at least 300g of immunoglobulin G (IgG) be consumed within the first day of life (effectively the first two feedings), with 200g of this being in the first feeding alone. For this to be achieved, there are 4 main criteria to meet: colostrum should be feed quickly after birth, be of excellent microbiological quality, in a sufficient amount and with a high concentration of IgG (we can evaluate this with an optic refractometer, as Brix is an indirect indicator of IgG concentration).

To evaluate key practices, a team of researchers from the Faculty of Veterinary Medicine of Quebec (Morin et al, 2021) looked at the colostrum management practices that were associated with a successful PI transfer for 818 calves from 61 commercial farms in Quebec. Below are the findings of their study:

1. Time

Sufficient PI as a function of time was 1.6 times higher if colostrum was fed in the first 3 hours after birth. The researchers also noted that calves that were given their first drink after the first 4 hours of life had a 2.7 times lower chance of achieving PI.

The first hours of life are critical for calves as the absorption of IgG in the intestine diminishes rapidly with the passage of time.

2. Microbiological Load

“Cleanliness” of colostrum is an important factor that affects the absorption of IgG. In brief, contaminated colostrum will be much less effectively absorbed than colostrum that’s sound. The recommended threshold is ≤ 100 000 cfu/mL (colony-forming units) of total bacteria and ≤ 10 000 cfu/mL for coliforms.

3. Quantity of colostrum at first feeding

Sufficient PI transfer was associated with a colostrum volume of ≥2.5L. Chances of achieving PI transfer were 2.6 times higher for calves who received this volume versus those that did not. This amount is below the current recommendation of 10-12% of birth weight in volume fed.

4. Quality of Colostrum

Previous research and meta-analyses have found that a Brix reading of ≥ 22% is considered excellent when fed in volumes of at least 10% of the calf’s body weight. However, current research posits that the optimal threshold should be ≥ 24.5% Brix, as calves fed more than this had a 2.9 times higher chance of achieving PI transfer versus calves fed below the threshold. It must also be considered, though, that the threshold was

defined exclusively based on the relationship between the quality of the colostrum and successful PI transfer in calves, and none of the other three aforementioned factors.

It’s worth noting that on average, herds fed less colostrum than recommended at the first feeding (2.7L vs 4.0L)—even farms in the 75th centile rank fed 3.3L at first feeding. Knowing this, it’s reasonable to say that to achieve successful transfer of PI with this reduced volume of colostrum (as opposed to 4.0L), the quality of the colostrum should be higher than recommended (24.5% Brix as research suggests versus the recommended 22% Brix).

If we feed 2.7L at 24.5% Brix (76.9g of IgG/L), this means we would be feeding 207g of IgG to the calf in her first feeding—just above the recommended 200g for that meal

To ensure a good start for your calves, you should consider testing colostrum quality, know the amount of IgG that has been fed to your newborns, feed as soon as possible following birth, and take particular care to avoid bacterial contamination of your calves’ first meal.

Morin & al., A calf-level study on colostrum management practices associated with adequate transfer on passive immunity in Québec dairy herds, 2021. J Dairy Sci. 2021 Apr;104(4):4914-4922. doi: 10.3168/jds.2020-19476. Epub 2021 Jan 28

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