

Making the Case for Chilled Colostrum

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April 2016

As veterinarians we get the opportunity to visit many dairies using varied animal health protocols. We sometimes observe protocols being employed that are considered by most to be far from idyllic. Yet the producers employing some of these protocols are achieving superb animal health and performance as a result. One such example is refrigerated colostrum. One client employing this practice consistently achieves pre-weaning mortality rates of two percent or less. Most calf feeding experts advise against this practice, primarily due to concern for colostrum quality. Bacterial counts can increase rapidly if chilling is not rapid. Colostrum with high bacterial counts does not store well, and can compromise gut health, predisposing newborn calves to disease. The chilling process I observed simply consisted of two five gallon pails containing approximately one gallon of colostrum each placed into a standard 18 cubic foot refrigerator. This colostrum is warmed and fed by calf feeding personnel as soon as a newborn calf is found. Calf feeding personnel are available on this farm between 6 AM and 11 PM. Cows are milked three times daily although fresh colostrum is collected only twice daily.

Why Chill Colostrum?

When investigating calf disease, it quickly becomes apparent that suboptimal colostrum management remains a large factor contributing to diseased calves. One common deficiency on a lot of farms is that not all newborn calves receive their first feeding within three hours of birth. Calf feeders tell us that calves are often ready to nurse within an hour of birth. Because we have not used genetic selection within the dairy industry to breed for maternal instinct or calf vigour, we can no longer rely on Mother Nature. These days, most Holstein, Jersey, Brown Swiss, and other dairy breed calves are completely dependent on human intervention to ensure their survival from the minute they are born.

There are many reasons calves receive colostrum too late:

- 1) Most herds collect milk every 8 or 12 hours. Fresh colostrum is simply not available at the time it is needed.
- 2) Most cows calve at night and calves are generally found at the start of morning milking. They are often fed colostrum once the fresh cow is milked which can cause critical additional delay.
- 3) Frozen colostrum is an option but complete thawing in warm water can take 2 hours or more. This also causes delay.
- 4) Powdered colostrum replacers can be purchased and can work well. At least 150 to 200 grams of immunoglobulin G must be delivered at the first feeding. Most colostrum replacers only contain 100 grams. Colostrum replacers lack the maternal immune cells delivered through fresh colostrum and are more costly than on-farm collected colostrum; but can help prevent disease in herds with high Johnes disease incidence, for example.
- 5) There is lack of labour or the labour is assigned to other time sensitive tasks (e.g. milking) at the time the calf is found.

A Technique for Chilling

We performed a test to assess the success of chilling using a simple technique. Our goal was to chill the colostrum to close to the temperature of the refrigerator within one hour. Knowing that certain

bacteria can double in numbers every twenty minutes in the right conditions, we thought this was an acceptable target. We reheated some recently collected colostrum to approximately body temperature. We then placed four liters of this colostrum into an 8 liter pail along with two small one-pound ice packs. We then placed this pail in an 18 cubic foot fridge and recorded the temperature every 15 minutes. Within 60 minutes, colostrum temperature was close to the fridge temperature setting of approximately 8 degrees Celsius (fridge should be set to 4 to 7 degrees Celsius). This type of chill time should result in high quality stored colostrum that can be readily warmed and fed by placing into warm water bath for approximately 10 minutes and administering with bottle or tube feeder.

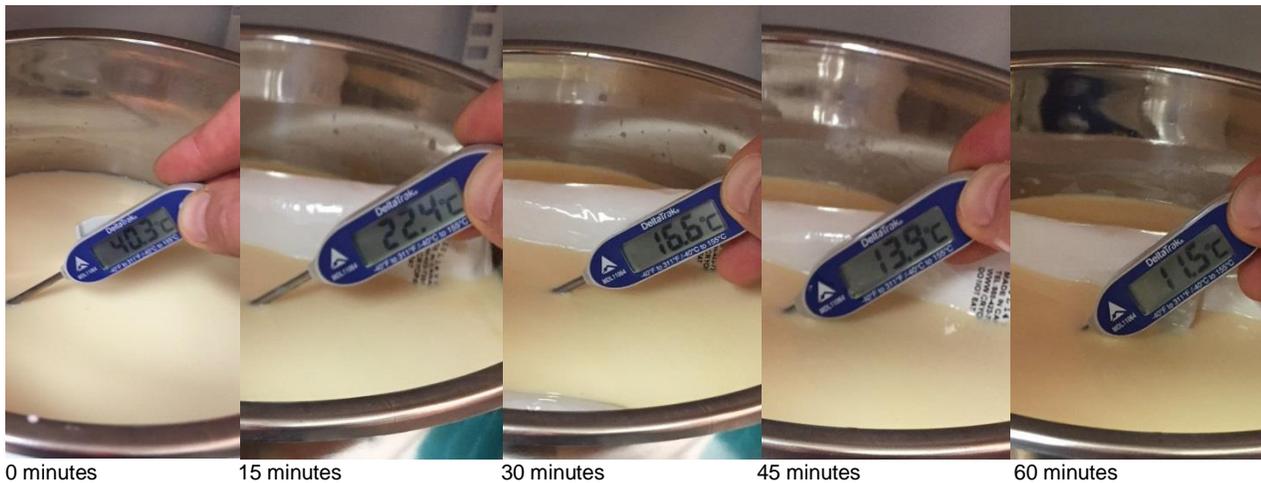


Figure 1. The temperature taken at 15 minute time intervals of 4 liters of colostrum plus two ice packs which was placed in a standard 18 cubic foot refrigerator.

Some key points to remember when feeding chilled colostrum:

1. Collect and store clean, fresh colostrum into clean containers. Stainless steel is preferable due to easy cleaning. We use affordable 7.8 liter stainless pails obtained online from a company in Winnipeg, Manitoba: <http://www.greatwestmetal.ca/products/3-5l-stainless-steel-durapail>.
2. Use of ice packs will greatly reduce chill time. Veterinary clinics regularly have ice packs on hand for shipping and receiving so these can be readily obtained.
3. Use of a standard size fridge (i.e. 18 cubic feet) dedicated primarily to colostrum storage is important. Ice packs can be stored in the freezer portion. The lower portion has room for one to four feedings of chilled colostrum. Bar size fridges are generally inefficient and have poor temperature control.
4. Do not attempt to chill large colostrum volumes at once. Chill meal sized portions at a time.
5. Record when colostrum enters fridge. Properly collected and chilled colostrum should remain fresh for at least 5 days.
6. Monitor colostrum quality with a colostrometer or a refractometer (see figure 2) that gives a Brix value of total solids. Aim to store and feed colostrum with Brix values of 22% or higher. This corresponds to an immunoglobulin content of approximately 50 grams of IgG per liter.



Figure 2. A manual refractometer such as this one can be used to measure total solids content of colostrum

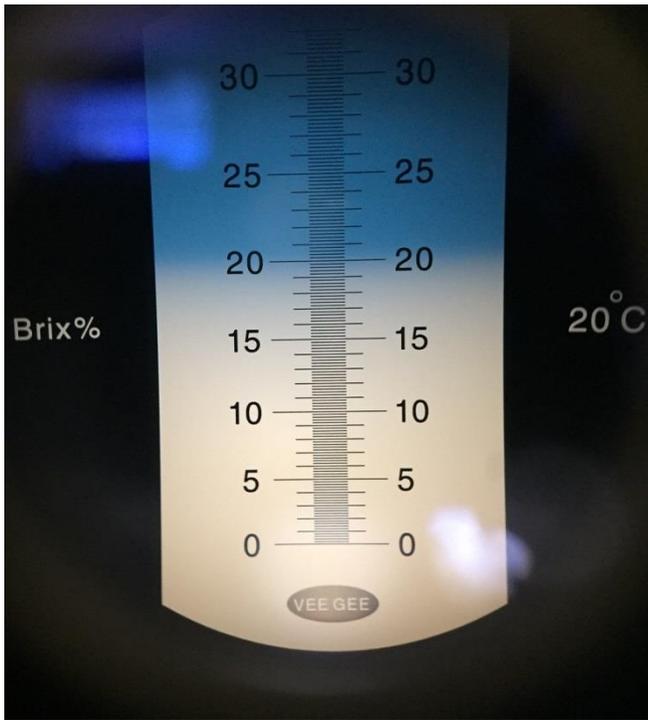


Figure 3. A photo taken through the lens of the refractometer in figure 2 after applying a drop of colostrum. This particular colostrum has a Brix value of 20%.

Happy Calf Feeding!