

# The Colostrum Counsel

When it comes to on-farm calf management, the producer's main goal is to have healthy, productive calves that will eventually become high-producing cows. To achieve this goal, certain techniques should be used on farm to ensure the calf can reach its full potential. In this issue of The Colostrum Counsel, producers can learn how to assess the quality of colostrum using a Brix refractometer, as well as how to blood sample young calves.

## The Colostrum Counsel: A practical guide to on farm techniques to ensure healthy calves

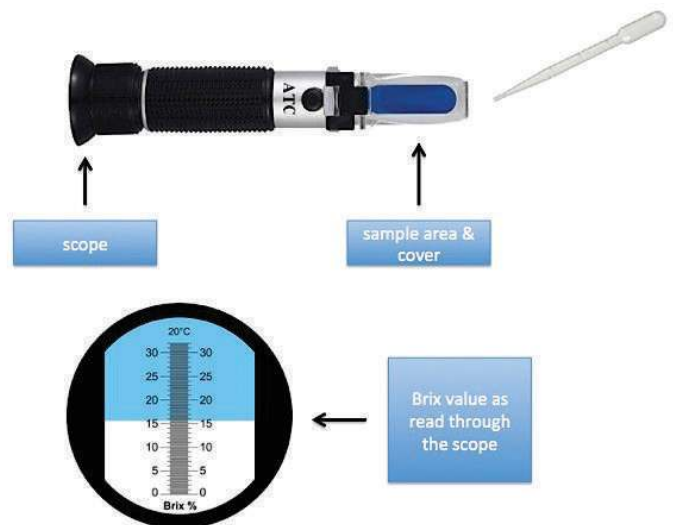
We know that feeding insufficient amounts of IgG to calves during the first day of life results in the failure of passive transfer, which compromises the health of the calf. However, only a small percentage of producers actually assess the quality of colostrum, with most of them doing so by visual inspection only. It is essential to feed colostrum containing at least 50 g of IgG per litre, yet it has been reported that 16-29% of samples actually contain less than this amount (Bartier et al., 2015; Quigley et al., 2013; Morrill et al., 2012). So, how can we measure IgG concentrations in a time and cost efficient way on farm to ensure passive immunity?

### Using a Brix Refractometer

A Brix refractometer is an efficient and user-friendly way to determine the quality of colostrum. A refractometer measures the refractive index of sucrose (sugar) in a solution and for this reason has historically been used in the wine, fruit juice and sugar industry. In regards to colostrum, a Brix refractometer indirectly measures IgG concentrations by determining the amount of total solids. A recent study suggested that a Brix value of 23 percent should be used as the cut-off point for adequate quality colostrum (Bartier et al., 2015). Optical Brix refractometers are fairly inexpensive (\$100-\$200 CAD) and are just as accurate as a digital Brix refractometer, which is less cost-efficient (\$400+).

To use an optical Brix refractometer:

1. Open the sample cover and place a few drops of colostrum on the sample area. Close the cover when finished.
2. While looking in the scope of the refractometer, hold it at a 90 degree angle to a light source.
3. The Brix value can be read between the light and dark areas.
4. When finished, wipe off the entire sample and clean the area before testing a different sample.



## Blood Sampling Calves

Now that you know how to test the IgG in your colostrum, you can also learn how to check if successful passive transfer did indeed occur in the calf. While blood can be drawn during the first week of life to assess IgG status, it can also be drawn to monitor the presence of disease on your farm at any point and therefore is a useful skill to possess. Drawing blood from the calf is an easy technique to learn and should not be stressful to yourself or the calf.

Although blood is typically drawn from cows using the tail-vein, this vein is too small in calves and thus the jugular vein is used instead. The jugular vein is not very large and therefore an 18- or 20-gauge, 1-inch transfer needle should be used. The most common way to collect a sample is by using a serum vacuum tube, so a special holder is also needed (Image 1). The needles, holders and tubes should be available at local animal health stores and can also be ordered online.

Once you have all the supplies, the calf can be blood sampled following the steps below:

1. Back the rear of the calf into a corner. This will prevent the calf from moving too much while you are collecting the sample. Leaning over the calf, place one hand at the base of the calf's neck, and use your other arm to extend the calf's neck across your upper thigh (Image 4).

2. In order to find the jugular vein, firmly place your left hand at the bottom of the calf's neck to enlarge the vein (Image 2). You should feel the vein "pop up" in the jugular groove. If this is your first time attempting a jugular vein sample you can also shave the jugular groove area on the calf's neck until you are confident in the location of the jugular vein (Image 3).
3. Once you have located the vein, you can puncture the vein with the needle. Do not puncture directly perpendicular to the vein - the needle should be inserted almost parallel to the vein (Image 6). Once the needle is inserted, you can attach the vacuum tube to the holder. Blood should flow easily into the tube. If blood does not flow easily, you can gently adjust the needle by moving it back and forth until blood begins to flow. If the needle comes completely out of the vein with the vacuum tube attached, the vacuum will be ruined and you will need to use a new tube during your second attempt.

A calf should only be poked a maximum of three times on each jugular vein. If you are having difficulty keeping the calf still, ask for assistance restraining the calf. Dehydrated or sick calves may have smaller veins that require less insertion of the needle into the vein in order to obtain blood flow.



*Image 1.*  
Needle, needle transfer and serum vacutainer tube.



*Image 2.*  
Position of jugular vein on an unshaved calf.



*Image 3.*  
Position of jugular vein on a shaved calf.

4. Allow the blood to flow into the tube until an adequate sample is collected. Once finished, gently remove the needle from the vein and apply pressure on the insertion site for ~5-10 seconds. This will prevent a hematoma (a pooling of blood) from forming over the jugular vein.
5. Once finished, dispose properly of the needle and store the blood tube. Ensure you use a new needle between each calf.

After you have collected your blood sample, you can either send your sample away for analysis of IgG content or you can do so yourself. All you need to estimate the IgG concentration of blood is a Brix refractometer, which you may already have for estimation of IgG content in colostrum, as well as a centrifuge (\$100-\$400 CAD) to spin the blood. After collection from the calf, the serum vacuum tube can be stored at room temperature for 1-3 hours

to allow for blood clotting. After clotting, centrifuge the blood sample at a low speed (e.g. 3000 x g) for 20 minutes. To estimate IgG content, simply pipette a few drops of serum supernatant (the clear layer) onto the sample cover and read the Brix value. A Brix percentage is highly correlated (93%) with serum IgG concentrations and the cut-off point to be used for successful passive transfer is 8.4 percent (Deelen et al., 2014).

### Take Home Message

Learning how to blood sample calves and estimate the content of IgG in blood and colostrum using a Brix refractometer are easy skills to learn and the use of these techniques is a worthwhile investment of both your time and money. Using these skills on farm ensures that you are feeding the best colostrum and gives you piece of mind knowing that successful passive transfer occurs in your calves to reduce the risk of disease on your farm.



Image 4.

Restrain the calf and extend its neck so the vein is accessible.



Image 5.

Find the jugular vein while still restraining the calf.

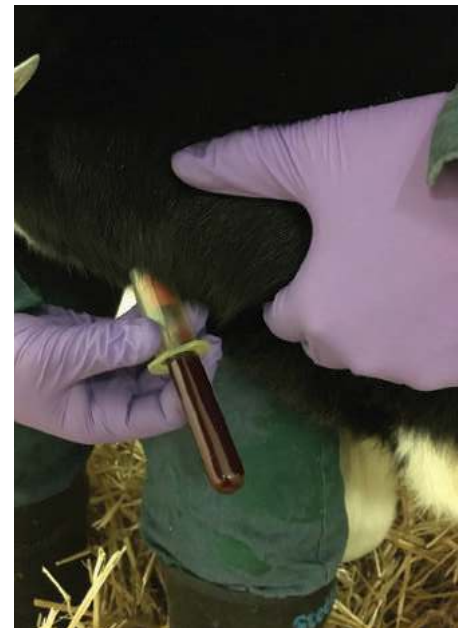


Image 6.

Puncture the vein and attach the serum tube. Blood should flow easily into the tube. If not, you can gently move the tube until blood flows.

### References

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Amanda graduated from the University of Alberta with a Masters of Science, specializing in the effects of current colostrum management practices on the health of the newborn dairy calf. Amanda plays a role as an author and editor of The Colostrum Counsel and is also a research assistant at the University of Alberta with a focus on strategies to maximize the health and productivity of young dairy calves.