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Calf Note #215 – Walking the Farm, Part 4 – Storing colostrum

Introduction

An essential part of a farm's colostrum program is how the product is collected and stored. In this part of "Walking the Farm", I'd like to focus on methods to store colostrum for use with calves during the first three days of life. I will show a few examples of how this is done on farms that I've visited around the world, along with a few suggestions and ideas for making the job easier and better for the calves.



Figure 1. Calving area stanchion with portable milking unit.

Colostrum is, of course, the essential feed for calves in the first 3 days after birth. The manner in which we collect colostrum and use it to feed calves has a large role in its effectiveness. So, here are a few ideas.

Q-Tip #1: collect early

As has been reported previously (Moore et al., 2005), colostrum IgG concentration declines with time after calving. By 12 hours after calving, research suggests that colostrum may lose up to a third of IgG, probably by dilution of the colostrum as the cow transitions from the "job" of making colostrum to the "job" of making milk. Therefore, the ability to collect colostrum shortly after calving is valuable. Most farms have a stanchion or holding pen in the calving area where calves can be pulled, or cows treated as needed. Others have portable milking units, as in Figures 1 and 2. This allows colostrum to be milked shortly after birth and fed to the calf as soon as possible.



Figure 2. Portable milkers are useful to collect high quality colostrum.

One comment about portable milkers – it's always a good idea to train and train and train personnel on how to use the milkers – and how to properly clean them. Written protocols are a PLUS!

Q-Tip #2: Measure it fresh

Once the colostrum is collected, it should be tested with a refractometer prior to pasteurization, further processing, or storage. Although freezing does not appear to change the BRIX reading, freeze / thaw cycles may affect the IgG reading, and perhaps the relationship between BRIX and IgG (Morrill et al., 2015). Using a



Figure 3. Colostrum should not be stored in large containers.

digital or optical BRIX refractometer is fast, easy and the results are reasonable estimates of the colostrum IgG concentration. Look for BRIX values >21% for Holstein colostrum and >18% for Jersey colostrum (Quigley et al., 2013; Morrill et al., 2015) to use as first feeding for the newborns. Lower quality colostrum can be fed during days 2-3 for additional intestinal protection.

Q-Tip #3 – store in single servings

While it's OK to collect colostrum into larger containers for immediate handling, it's not a good idea to store colostrum in these large, multi-feeding containers. Better to use individual containers of colostrum, which would be about 2 to 4 L.

One reason to store individual feedings is that the colostrum will *freeze* faster. We see in Figures 3 and 4 colostrum was collected into containers of 5 L or more. The time required for colostrum in the center of these contains may require several hours to freeze. During this time, bacterial fermentation may continue, increasing microbial load, and perhaps interfering with IgG absorption. Smaller packages will freeze faster and maintain quality longer.

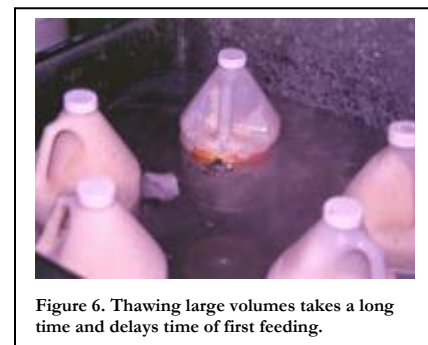
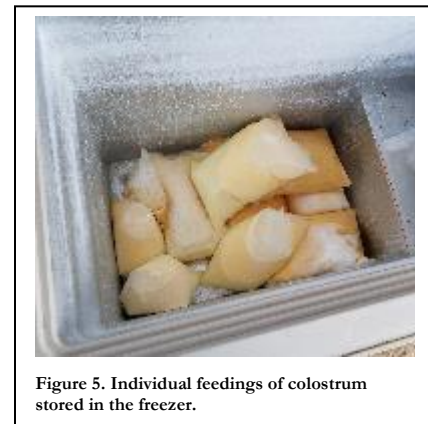
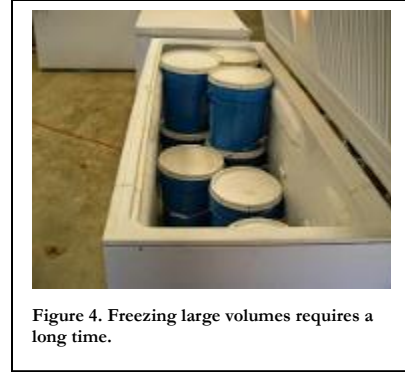
The second reason to store individual feedings is that the colostrum will *thaw* faster. Most producers use warm water to thaw frozen colostrum, so smaller volumes will thaw more quickly than larger ones. Colostrum in Figure 5 will thaw more quickly than in Figure 6. Of course, time is of the essence when it comes to feeding the calf, so the faster the

It's also a good idea to identify the colostrum with date and BRIX number using a Sharpie so supply can be properly managed.

Storage length depends on the type of freezer used. Small freezer units on top of regular refrigerators go through freeze / thaw cycles, that will cause the contents to freeze somewhat (this is the cause of "freezer burn" on the ice cream!). Thus, storage should be limited to 1-2 months. Large chest freezers do not use this type of system and colostrum can be stored up to 6 months.

Some companies produce containers specific for managing colostrum. The Colo Quick system (Figures 7 and 8) is easy to use, and can speed the time to feeding, as well as to minimize the risk of contamination of colostrum. It is an option on dairies that want to improve and simplify the handling, storage and feeding of colostrum.

The Perfect Udder system (Figure 9) is another option that provides sanitary, easy to use storage, pasteurization, and feeding of colostrum. These systems are designed to improve the quality of the



colostrum fed by making it easier to manage the process. Instead of reusing 2 L nipple bottles or plastic bags that may break during the process, these systems provide clean containers that can be pasteurized and stored with little risk of contamination.

Q-Tip#4: Fridge for 1 day only

Several studies have shown clearly that leaving colostrum in the refrigerator leads to increasing microbial load, fermentation of the colostrum and spoilage. Feeding this colostrum is a major problem that should be avoided.

Individual recommendations as to when the time of spoilage occurs, mainly due to the quality of refrigeration and the initial microbial load of the colostrum. In this case, a more conservative approach is safer. Therefore, I recommend that colostrum stored in the refrigerator for no more than 24 hours. If it will not be fed by 24 hours, it should be placed in the freezer to minimize spoilage.

Storing colostrum in the fridge is quite common, and – unfortunately – inappropriate management of colostrum is common. It's important to remember that colostrum is a *perishable commodity*. It contains no preservatives and has not been pasteurized unless do so on the farm. Thus, the shelf life of colostrum is quite limited. It is also very high in nutrients – fat, protein, vitamins, and minerals that are terrific growth media for bacteria. So, handle it carefully and if it's not going to be fed soon, it should be frozen to protect the quality.

In Figure 10, we see open containers of large amounts of colostrum (>5 L) stored in the refrigerator. No doubt, it will take many hours for the colostrum to cool to the point at which fermentation stops. The amount of microbial contamination will increase exponentially until the fridge is cold enough to stop the bacteria. Also, any dirt, dust, manure, or other contamination in the containers above the open containers will fall into them, further contaminating the colostrum.

Clearly, there is more colostrum in the fridge that can be used in one day, so much of the remaining colostrum will be spoiling until it is used. The microbial load will be quite large, and the calves will be challenged at birth because of improper colostrum storage.

Finally, the open container on the bottom has separated and it will be challenging to adequately mix the colostrum to make uniform feedings. This farmer needs to start over and rethink his approach to colostrum management.

Figure 11 is on a better managed farm, and the approach is better. However, the large containers at the bottom of the refrigerator need to be allotted into individual



Figure 7. Commercial ColoQuick system for managing colostrum.



Figure 8. Freezers and thawing baths are available for the system.



Figure 9. Perfect Udder system for cleanly storing and feeding colostrum.

containers and if they will not be used in a day, they should be frozen.

Summary

1. Collect colostrum early after calving. Portable milkers work well.
2. Keep the equipment clean and well maintained. Have a maintenance schedule and ensure everyone knows how it should be cleaned.
3. Collect colostrum into clean containers and measure with a BRIX refractometer prior to processing.
4. Dispense into individual containers of about 2 L. Use your own plastic containers or commercial packages. Commercial packages are more expensive, but ensures safety, minimal risk of contamination and ease of use.



References

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Written by Dr. Jim Quigley (03 May 2020)

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