Clean Colostrum:
Letting Biology Work for You

- **Know how bacteria grow.**
- **Let biology work for you.**
- **Do not blend or pool fresh colostrum with stored colostrum.**
- **Give high priority to keeping warm slurry out of fresh colostrum.**
- **Extend generation time by lowering colostrum temperature.**
- **Extend generation time by using liquid potassium sorbate bacteria inhibitor.***

It is always easier to achieve a goal when working with rather than against biology. By taking advantage of important characteristics of bacterial growth, we can better achieve our goal of feeding clean colostrum.

How do bacteria grow?

Bacteria when added to a medium go through predictable phases of growth:

1. A lag phase - this is when they begin to make the enzymes and proteins needed to sustain themselves in their new environment - no growth.
2. A growth phase - this is when they have abundant food and absence of waste products. It can be very rapid growth. Each doubling of the population is called a generation. The time for one generation will depend on how favorable growth conditions are such as pH, temperature, nutrient and water availability.
3. A stationary phase - this is when food is less abundant and waste products are beginning to pile up. Growth and death rates are about equal.
4. A decline phase - this is when the removal rate for waste products falls behind their production and food becomes scarce. Because death rates far exceed growth rates, bacteria numbers decline rapidly.

Let biology work for you

Take advantage of the "lag phase." Remember this is the time between collecting colostrum and when the bacteria are ready to start their rapid growth phase. Under average on-farm conditions, this "lag phase" probably is about half an hour. How we manage colostrum can shorten or lengthen this "lag phase." The same is true for the length the time bacteria take to double in numbers – the generation time. This is subject to how we collect and store colostrum.

Ideas to consider

- **Do not blend or pool fresh colostrum with stored colostrum.** This can be avoided by storing colostrum from each cow in individual nursing bottles or plastic bags rather than in pooling it

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in 10 or 20 litre buckets. The reason for this? Stored colostrum always grows some bacteria. If we add fresh warm colostrum to it these bacteria immediately start growing more rapidly - no lag phase at all.

- **Give high priority to keeping warm slurry out of fresh colostrum.** Why is this so dangerous? Colostrum is a warm liquid; slurry is at nearly the same temperature and in a liquid medium. The closer the two media are in form (liquid) and temperature (37-39°), the shorter the lag phase. While on the average the lag phase for coliforms added to colostrum might be 30 minutes, bacteria coming from fresh liquid feces may enter the rapid growth phase in a much shorter time.

  If we have milked cows in a parlour, we all know about this risk. You have two cows to milk into buckets. After milking the first fresh cow, you transfer the lid from the full bucket to the empty one to milk the second cow. Or, the lid falls off on the floor. As soon as this happens, you-know-what comes next. Plop! Slpatter! Right into the colostrum. Keeping containers covered in the parlor or moving the colostrum out of the parlour has to be high priority.

- **Extend the lag phase by lowering colostrum temperature.** As temperatures fall from cow body temperature, bacteria are slower to synthesize the proteins and enzymes necessary to obtain food from the colostrum. If we can drop the temperature rapidly from 39°C even to 27°C we may add an extra half hour to the "no growth" interval. Chilling to 16°C may add hours rather than minutes to the lag phase.

  During freezing weather, it is not hard to find a cold place with unlimited capability to chill colostrum - outdoors. In warmer weather, however, we cannot depend on our outdoor chilling. Do not depend on a refrigerator to chill colostrum quickly enough to control bacterial growth. One option is to set up a small ice bath. An inexpensive plastic tub with ice from your freezer will work well.

  Another method is to freeze water in small plastic bottles (half to one litre). The outside of the bottles must be clean. Many farms use discarded milk and soft drink bottles. I recommend making them single use. The ice bottles may be added to the colostrum collection bucket either before or after the colostrum is collected. Add one part of bottled ice for each 4 parts of colostrum to get rapid chilling.

Let biology work for you. Capitalize on natural growth inhibitors, avoid inoculation with rapidly growing cultures, and chill rapidly.

*For more information on potassium sorbate go to www.calffacts.com, click on Metric version, scroll down to "Potassium sorbate Use Protocol."

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