

# CALVING EASE

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Sam Leadley, Attica Veterinary Associates

## **Clean Colostrum: Letting Biology Work for You**

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.

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. We call this growth rate exponential or logarithmic. It is very rapid growth.
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 one-half hour. However, good management can make this phase last longer. That means we end up feeding cleaner colostrum.

### **Ideas to consider**

- Lactoferrin, an iron-binding glycoprotein, occurs naturally in colostrum. It inhibits bacterial growth. The higher its concentration in colostrum, the longer the lag phase.

The longer a cow waits after calving until colostrum is collected the greater the volume of milk she has the opportunity to produce. Thus, the lactoferrin concentration at one-hour post calving clearly is substantially higher than at six hours after calving. Clearly, sooner is better when it comes to milking a fresh cow. A side benefit of this practice is that the antibody concentration will be higher, also.

- Do not blend or pool fresh colostrum with that which is stored. This can be avoided by storing colostrum from each cow in individual nursing bottles or plastic bags rather than in pooling it in three or five-gallon pails. The reason for this? Stored colostrum always grows some bacteria. If we add fresh warm colostrum to it the bacteria start growing more rapidly - no lag phase at all.
- Give high priority to keeping liquid warm feces out of fresh colostrum. Why is this so dangerous? The colostrum is a warm liquid. The feces are at nearly the same temperature and in a liquid medium. The closer the two media are in form (liquid) and temperature (100 - 102 degrees), the shorter the lag phase. While on the average the lag phase for coliforms added to colostrum might be thirty minutes, bacteria may enter the rapid growth phase in a much shorter time in this situation.

If we have milked cows in a parlor, 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 parlor floor. As soon as this happens, you-know-what comes next. Plop! Spatter! Right into the colostrum. Keeping containers covered in the parlor or moving the colostrum out of the parlor has to have 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 102° even to 80° we may add an extra half hour to the "no growth" interval. Chilling to 60° 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. From April through October, however, we cannot depend on our outdoor chilling. Do not depend on a refrigerator to chill more than two nursing bottles (one gallon) of 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 (16-24 ounce). The bottles must be clean. Many farms use discarded milk and soda bottles. I recommend making them single use. The ice bottles may be added to the colostrum collection pail either before or after the colostrum is collected. Add two bottles for each gallon 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.

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