

# Calving Ease

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## Sooner is Better for Colostrum Feeding But, How Much Better?

- **Efficiency of antibody absorption 46 percent increase between feeding colostrum at birth vs. 6 hours later.**
- **Volume of antibodies absorbed 33 percent increase between feeding colostrum at birth vs. 6 hours later.**
- **Maximum concentration of antibodies (IgG) 40 percent increase between feeding colostrum at birth vs. 6 hours later.**
- **Prevalence of beneficial bacteria associated with colon mucosa was significantly greater when colostrum was fed at birth vs. 6 hours later.**

### **46 Percent increase in efficiency of absorption of antibodies.**

When comparing calves fed colostrum at birth (52% absorption efficiency) and calves fed colostrum at 6 hours after birth (36% absorption efficiency) we see a 46 percent improvement in efficiency.

An industry-wide value for efficiency of absorption of antibodies probably falls in the range of 25 to 30 percent considering all calves on all farms. In this study, the lowest absorption rate was for calves fed 12 hours after birth – 35%.

That value is somewhat higher than the industry-wide average but that could be partially due to the colostrum being heat-treated. Also, consider that the volume of IgG's fed was substantial – between 180 to 220 grams of antibodies [recommended value is 200g first feeding].

Given that we find a lot of on-farm variation of quality of colostrum, we often have to feed less than ideal colostrum for first feeding. Feeding ASAP after birth is one way to get plenty of antibodies into a newborn calf even if we have to use marginal quality colostrum.

What about giving a second or third feeding of colostrum? This study confirmed that even as late as 12 hours post calving antibodies were still being absorbed at rate high enough to benefit the calf. Thus, the recommendation to feed an additional 1 to 2 quarts of colostrum at six and twelve hours after birth can significantly boost immunity – especially beneficial under strong pathogen challenges.

### **33 Percent increase in total volume of antibodies absorbed.**

It follows from the improvement in efficiency of absorption that the total volume of antibodies absorbed should go up when colostrum is fed earlier. Researchers measured the amount of antibodies absorbed at 12, 24 and 36 hours post feeding. When we compare volume absorbed at 12 hours among calves fed colostrum at 0 and 6 hours after birth there was a 33 percent improvement in volume of IgG's absorbed by feeding earlier. All feeding schedules showed continuous increases in volume out to 36 hours.

For all three groups of calves, in my opinion, there would have been a benefit from a second colostrum feeding. My clients that have adopted a second-feeding protocol (for example, 2 more quarts at 6 or 12 hours after initial feeding) consistently report a desirable higher Blood Serum Total Protein (BSTP) values at 2 to 4 days of age.

### **40 percent increase in maximum concentration of IgG is between feeding colostrum at birth vs. 6 hours later.**

Repeated blood sampling allowed the research team to estimate both the maximum concentration of IgG's and when this peak was reached. We can compare a peak of 26mg/ml for the "0" calves with the lower 18mg/ml for the "6-hr" calves. Regardless of feeding time after birth the peak values were reached by 24 hours (0 group = 17 hours of age, 6 hr. group 21 hours of age, 12 hr. group 21 hours of age).

### **Prevalence of beneficial bacteria associated with colon mucosa was significantly greater when colostrum was fed at birth vs. 6 hours later.**

Without getting into the specific detail of each species of bacteria reported in this research report it is possible to draw some conclusions regarding calf health. The authors observe, "The gut microbial community plays a key role in developing the immune system, utilizing nutrients, and influencing the overall physiology of the host." (p3106) Apparently the earlier colostrum feeding favors the development of a more supportive "gut microbial community" than the later feeding protocols.

However, they observed wide variation of prevalence of bacterial species among the calves in each group. This suggests that many other factors in addition to colostrum feeding are involved in bacterial colonization of the gut. We are responsible to see that our newborn calves do not receive any "manure meals" that can tip the balance toward poor immune system development, unfavorable utilization of nutrients and debilitating diarrhea.

### **Where did the data come from?**

Three groups of calves were fed colostrum at either "0" hours (within 45 minutes of birth), or 6 hours or 12 hours after birth. Based on weight, they received 7.5% of colostrum (roughly between three and 4 quarts) – all the colostrum contained 62 g/L of IgG's and was heat treated to insure cleanliness. Blood samples were taken every 3 hours.

Reference: Fisher, A.J., Y.Song, Z. He, D.M. Haines, L.L Guan and M.A. Steele "Effect of delaying colostrum feeding on passive transfer and intestinal bacterial colonization in neonatal male Holstein calves." Journal of Dairy Science 101:3099-3109 (April 2019).

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