

Colostrum: Feeding Strategies

Summary:

- When testing colostrum quality it is recommended to take a sample from the milker bucket to use with a Colostrometer or Brix refractometer.
- However, if hand-milked colostrum (first 3 or 4 quarts) must be used, for practical purposes it will have an antibody concentration relatively close to colostrum coming from a cow that is milked out entirely.
- Fully 40 to 50 percent of calves will voluntarily consume 3 or more quarts in the first bottle feeding.
- Always have a person available who is trained to use an esophageal tube feeder. It is common to have as many as 3 out of 10 calves that will not voluntarily drink even 2 quarts of colostrum. Most hard-pull calves will need to be fed colostrum with an esophageal feeder.
- Follow best management practices when using an esophageal tube feeder for colostrum feeding. Click [HERE](#) for a review of these practices.

Checking for colostrum quality

Other publications have described how to estimate antibody concentration in colostrum:

1. See www.atticacows.com, in Resources: Calf Facts find “Colostrum testing using a Brix refractometer.”
2. See www.calfnotes.com, #22 “Using the Colostrometer to measure colostrum quality.”

Research done with Holstein cows measured antibody concentration by stage of colostrum milk out. They compared antibody (IgG) values at the very beginning of milking, at 25, 50, 75 and 100 percent of milk out.

The colostrum at the very beginning of milk out (sometimes called cisternal) had the highest concentration of antibodies. Compared to full milk out (could be called composite) the very first colostrum from the udder was roughly 5 percent higher in antibodies. When colostrum is of high quality this difference probably makes no practical difference. However, when testing marginal-quality colostrum, better estimates come from full-milk-out samples.

As an aside here, the average IgG concentration for all animals in this study was 72g/liter (recall our threshold for acceptable colostrum is 50g/l). However, the range of IgG levels was 22g/l to 140g/l.

This emphasizes again the value of checking quality. Four quarts of 22g/l colostrum only supplies a total of 83g of IgG – that’s only about 40 percent of our goal of 200g in the first 4 hours of life. That’s one reason calves fed this poor quality colostrum often get sick.

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Don't expect all calves to voluntarily drink 3 or 4 quarts of colostrum

The research reported here offered 3.2 quarts (3L) with a nipple bottle for 15 minutes at 2 hours of age. All of the calves were able to stand by themselves. They reported:

- 44% of the calves consumed the entire amount offered, 3.2 quarts (3L).
- 31% of the calves consumed less than 2.1 quarts (2L).

My personal experience feeding colostrum suggests about one-half of the unassisted-birth Holstein calves will drink roughly 4 quarts with the balance of them consuming significantly less.

Let's assume that a dairy's colostrum feeding goal is to get consistent and adequate transfer of antibodies from colostrum. Given that about one-third of calves (see above) will consume less than 2 quarts from a bottle they will need to be fed colostrum with an esophageal tube feeder.

So, what is the most effective feeding strategy?

First, I feel from the point of view of animal husbandry it is preferred to start feeding colostrum with a nursing bottle. Then, whatever amount of the 4 quarts is not voluntarily consumed can be fed with a tube feeder. I like to see saliva mixed with as much of the colostrum to promote digestion. Nursing bottle feeding gets the first portion of the colostrum directly into the abomasum and favors earlier absorption of antibodies. Be sure to monitor the calf's drinking rate to avoid flooding the mouth and risking colostrum going into the windpipe (trachea). For more on bottle feeding colostrum click [HERE](#).

Second, recall that in the November 2009 issue of Calving Ease, "Using a tube feeder – Yes or No?" the research showed that when amounts of 2 quarts or less were consumed, using a nursing bottle gave a significantly higher rate of antibody absorption than using a tube feeder. Click [HERE](#) to review these findings.

When a dairy prefers to split the recommended 4 quarts into 2 equal feedings, start with a nursing bottle in order to promote high antibody absorption. If the calf voluntarily drinks less than 2 quarts at first feeding, give the rest of this amount with a tube feeder. At the second feeding, be prepared to feed whatever is not nursed also with a tube feeder.

Third, when a dairy prefers to feed all 4 quarts of colostrum in one feeding shortly after birth, research shows that if 3.7 quarts or more colostrum is fed at one time the method of feeding (nursing bottle or tube feeder) does not change the efficiency of antibody absorption. Thus, if management circumstances make using a nursing bottle impractical it is best to combine a larger volume of colostrum with tube feeding.

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Fourth, should the calf be fed standing or lying down for colostrum feeding? The chances of feeding errors, especially getting colostrum into the windpipe (trachea), are significantly less in a standing calf compared to one lying down. In addition, my observations regarding calf vitality support getting the calf to stand as soon as practical.

This recommendation seems to contradict the rule of feeding colostrum as soon as practical after birth. However, the small advantage of feeding colostrum 30 or 60 minutes sooner before the calf stands is less important than avoiding aspirating colostrum and having a livelier, more vigorous calf.

Reference: Kelvin Urday, M. Chigerwe, J.W. Tyler “Voluntary colostrum intake in Holstein calves.” The Bovine Practitioner, 42:2 198-200 2008. Sandra M. Godden, Amber Hazel “Relationship between milking fraction and immunoglobulin G concentration in first milking colostrum from Holstein cows.” The Bovine Practitioner, 45:1 64-69 2011.