

Colostrum: How to Manage Shelf Life

Shelf life is the length of time that a perishable item is given before it is considered unsuitable for use. In the case of maternal colostrum we use bacterial contamination to measure determining its suitability. The criteria for colostrum for newborn calves using laboratory incubation methods are in colony forming units per milliliter (cfu/ml):

1. A total or standard plate count of less than 50,000 cfu/ml all bacteria
2. A coliform count of less than 5,000 cfu/ml.

LEAST EFFECTIVE METHOD

Storing colostrum at barn or milk house temperature has a shelf life of less than 4 hours. If you sit a pail of colostrum in the milk house at 70° (21°C) coliform bacteria will double every hour. Other bacteria species will grow, too, but at a slower rate. It is common at 12 hours to find bacteria counts of over 1,000,000 in colostrum stored this way if parlor and equipment sanitation are compromised. In the name of good calf health, if you cannot feed the colostrum within one-half hour after collection, dump it.

OKAY TO FEED FOR 2 DAYS

If a bacterial growth inhibitor or preservative is added at the time colostrum is collected then the generation time [length of time needed to double the population] is 10 times longer. If you start with very clean colostrum and add potassium sorbate liquid preservative, then at milk house temperature the colostrum may be under 100,000 cfu/ml about 2 days later. However, if as harvested the colostrum is already at 10,000 cfu/ml your colostrum is not likely to be suitable for feeding.

Or, if you chill your colostrum to 60° (16°C) within 30 minutes from collection and keep it in a refrigerator at 40° (4°C) the bacteria count may be acceptably low for up to 2 days. To be on the safe side, it is a best management practice to regularly sample colostrum handled like this. Have it tested for bacteria in a laboratory.

OKAY TO FEED UP TO SIX TO SEVEN DAYS

Chilling colostrum rapidly immediately after it is harvested is one key to extended shelf life. The standard is down to 60° within 30 minutes. At this temperature the generation time is extended out to 150 minutes. If you start with good cow preparation in the parlor and clean, sanitized milker cans this can mean a really low bacteria count initially.

Then, add a preservative at collection time. One preservative with which we have considerable experience is potassium sorbate. A 50 percent solution added at the rate of 20 ml/2 quarts and

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mixed in thoroughly extends the generation time 10 times. At 60° this means extending the time for coliform bacteria to double from 150 to 1500 minutes. For directions for using this preservative go to www.atticacows.com, click “Resources”, in this drop-down menu select “Calf Facts Resource Library” and select “Potassium Sorbate: Use Protocol for Colostrum.” Other preservatives probably will work to achieve acceptably low bacteria counts; I just do not have data in hand in order to describe their use.

The routine here is: clean teats, clean collection bucket, add preservative immediately, chill to 60° within 30 minutes, store in refrigerator at 40° or below.

OKAY TO FEED UP TO 8 TO 10 DAYS

If you plan to push the shelf life of colostrum out to 8 to 10 days accept that you will have to heat treat it. Heat treating (sometimes incorrectly referred to as “pasteurizing”) drastically reduces the pathogens in colostrum. Guidelines for heat treating colostrum are posted at www.atticacows.com in the Calf Facts section as “Colostrum: Guidelines for Heat Treating” or click [HERE](#).

The keys to making heat treating colostrum work are:

- Start with clean colostrum
- Keep the pasteurizer clean and in good operating condition
- 60 minutes at 140° with constant agitation
- Chill rapidly to 60°
- Store in clean sanitized containers
- Store at 40° or less

OKAY TO FEED LONGER THAN 10 DAYS

Start with heat treated colostrum that is processed according to the keys listed above. Then, add the preservative as the colostrum comes out of the pasteurizer mixing it in thoroughly. These bacteria counts can be as low as 100 cfu/ml even at the end of a week.

SERIOUS, BIG TIME SHELF LIFE – FREEZE IT!

The keys to effectively freeze colostrum and have a low bacteria count when thawed and fed are:

- Start with clean colostrum
- Store in clean, sanitized containers
- Chill to 60° within half an hour – chill before going into the freezer!
- Store at 0° for up to one year

Thanks to Dr. Sandra Godden, “Colostrum Management for Dairy Calves,” presentation at Cornell Summer Dairy Institute, July 3, 2007 for the background information on colostrum bacteria counts under selected storage conditions. See also her article on microbial hazards of colostrum handling and feeding – click [HERE](#). See also the article on colostrum posted on the Penn State web site – click [HERE](#)