

Answers to Pasteurization Questions

Section: Health Column Posted: Nov 01, 1999 By Marguerita B. Cattell who is consulting veterinarian in Loveland, Colo.

A 1996 study indicates that more than 40 percent of dairy producers fed waste milk to calves; however, the desire for disease eradication in the dairy industry has caused many producers to question the practice. With producers wanting both biosecurity and an inexpensive source of milk for calves, the idea of pasteurizing waste milk is becoming more common. Producers have many questions about on-farm pasteurization, including:

Q: How does pasteurization affect colostrum?

A: Pasteurization doesn't appear to harm the immunoglobins in colostrum. In a University of California study, no difference was found in the rate of passive transfer failure between calves fed pasteurized and unpasteurized colostrum. However, the death loss in the group fed unpasteurized milk and colostrum was greater because pasteurization reduced the disease challenge.

It is important to note that the act of pasteurizing doesn't lower or raise the IgG level in colostrum, nor does it change the calf's ability to absorb colostrum or change the protectiveness of the immunoglobulin once it's absorbed.

Q: What diseases will pasteurization block?

A: Pasteurization kills many disease-causing organisms, as well as those pathogens which inhabit the calf but don't become apparent until lactation. These include: Mycoplasma, Staph aureus, salmonella and coliform pathogens. However, researchers are unsure whether one important pathogen - Mycobacterium paratuberculosis, the pathogen that causes Johne's disease - survives pasteurization. The ability for the pasteurization process to kill M. paratuberculosis appears to depend on the pathogen load in the milk and the pasteurization temperature and time used. It is questionable whether the design, management and maintenance of the current on-farm systems can consistently eliminate M. paratuberculosis.

Some human food-grade pasteurization systems are available for on-farm use and should be as effective as commercial milk pasteurizers used by processors.

Q: Does it improve calf health?

A: In the University of California study, researchers found calves fed pasteurized waste milk cost \$8.13 less per calf to raise when compared to calves fed unpasteurized waste milk. This was due to a decrease in diarrhea, pneumonia and the labor needed to treat these diseases. Additionally, mastitis due to Mycoplasma can be eliminated from the milking herd by preventing infections in baby calves.

Q: How many calves do you need to pay for the system?

A: Due to the cost of the pasteurization equipment, energy and maintenance, the financial return is justified when a dairy or calf ranch feeds around 315 calves a day. That equates to a dairy of approximately 1,300 cows.

Q: Is on-farm pasteurizing difficult?

A: On-farm pasteurization can present a few management challenges. First, you must be able to control water temperature. Depending on which method of pasteurization you use - batch or HTST (high temperature short time) - you need to heat the water to either 145 F for 30 minutes or 161 F for 15 seconds. Some dairies have failed to reach the correct temperature due to the hot water needs of cleaning the milking system. This can be corrected by running the pasteurization equipment at a different time than parlor clean-up or by setting up a separate boiler for the calf area.

Variation in batch sizes can be another problem. With sick cow numbers changing constantly on most dairies, the batches may be too small or too large to heat evenly in a vat pasteurizer. In-line, tube pasteurizers can help avoid this problem.

Third, the waste milk must be free of debris or manure so that the pasteurization system is not overwhelmed with pathogens or rendered unpalatable. The milk should be filtered to remove debris. And, if not pasteurized immediately after it is collected, the milk must also be chilled to avoid bacterial overgrowth. Finally, after pasteurization, the milk must be cooled again if not fed immediately. The most energy-efficient process would take cow waste milk or colostrum from the line, pasteurize it, and then let it cool to body temperature before it's fed.