Feeding Waste Milk to Dairy Calves

Dan N. Waldner
Extension Dairy Specialist
Oklahoma State University

Michael L. Looper
Extension Dairy Specialist
New Mexico State University

Ellen R. Jordan
Extension Dairy Specialist
Texas A&M University

Sandra A. Stokes
Extension Dairy Specialist
Texas A&M University

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: **http://osufacts.okstate.edu**

Dairy producers feed a variety of liquid feeds to young calves after the initial colostrum. These liquid feeds include surplus colostrum, whole milk, transition milk, waste or discard milk, and milk replacer. Waste or discard milk is milk that cannot be sold for human consumption because it comes from cows treated with antibiotics for mastitis or other illnesses.

Discarded milk losses range from 48 to 136 pounds of milk per cow per year. To reduce some of the economic loss, 38% of dairy producers feed waste milk to calves.

Many dairy producers avoid feeding waste milk to calves for fear of increasing calf morbidity or increasing the incidence of heifers calving with mastitis or blind quarters. In early studies, calves were generally housed in pens that enabled them to suckle the rudimentary teats of other calves. This led to an increase in the incidence of mastitis in developing heifers.

Research shows that calves fed waste milk have similar growth rates and incidence of scouring as milk-fed controls.

Precautions for Feeding Waste Milk

Waste milk can be a safe liquid feed for calves provided certain precautions are followed.

- Do not feed waste milk to newborn calves on the first day of life. Bacteria could penetrate the intestinal wall and cause illness.
- House calves are fed waste milk individually to prevent the suckling of one another. This should reduce possible transmission of infectious microorganisms that cause mastitis.
- Do not feed waste milk from antibiotic-treated cows to calves intended for meat production. Antibiotic residues from the milk could be deposited in the tissues of the calves.

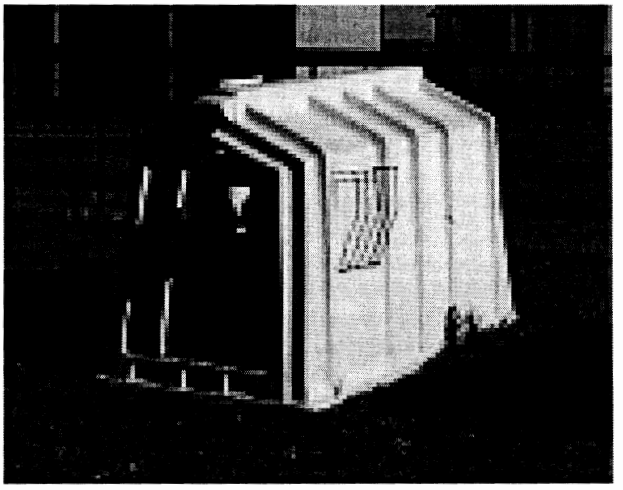
Waste Milk Storage

The need to handle large quantities of waste milk requires dairy operators to have the proper equipment. A small, used bulk tank can store the daily production of waste milk. This allows pooling of all sources of waste milk (i.e., mastitis and/or transition milk, etc.) and reduces the chances of feeding excessively high levels of antibiotic milk in one feeding. Clean the tank at least every other day.

Pasteurization of Waste Milk Fed to Calves

Young calves are susceptible to diseases. When expanding herds or buying replacements, it is important to know the complete health status of introduced cows. Feeding milk from cows of unknown health status could be harmful to the health of calves.

Pasteurization safely decreases pathogens in all types of milk fed to young calves. Recently, University of California at Davis researchers reported that calves fed pasteurized milk had fewer days with diarrhea and pneumonia than calves fed unpasteurized milk. Also, calves fed pasteurized milk had greater average weight gain than calves fed non-pasteurized milk. Calves fed pasteurized milk grossed an extra $8.13/head and attributed to reduced health complications and treatment costs when compared with calves fed unpasteurized milk. The researchers calculated that 315 calves (from a dairy of



approximately 1,260 cows) would need to be fed daily to make pasteurization economically feasible.

Research from the National Animal Disease Center showed that pasteurization of milk at 162°F (72°C) for 15 seconds killed all *M. paratuberculosis*, the bacteria responsible for Johne's disease. To effectively destroy *M. paratuberculosis* in milk, a continuous-flow (turbulent) pasteurizer is necessary. A continuous-flow pasteurizer quickly heats and holds milk at temperatures that kill bacteria. The milk is then quickly cooled, maintaining the nutritional components and flavor. Bacterial organisms in milk may clump together and not be pasteurized with a batch-type (static) pasteurization system.

While it is recommended that waste milk be pasteurized, pasteurization of colostrum is discouraged. The elevated temperatures associated with pasteurization can destroy immunoglobulins that are important for passive immunity transfer to young calves. Colostrum is more dense than milk, which makes it more difficult to raise pasteurization temperatures high enough to kill bacterial organisms such as *M. paratuberculosis*.

Several bacterial organisms, including *E. coli*, bovine viral diarrhea (BVD), salmonella, *Streptococcus* species and *Staphylococcus* species, have been identified in waste milk. Pasteurization of waste milk reduces microbial loads before use as calf feeds. Pasteurization destroys Mycoplasma mastitis species, thus eliminating mycoplasma transmission to calves. Similarly, pasteurization destroys bovine leukosis virus (BLV), so the pasteurized milk from BLV-positive cows can be fed to calves when BLV-free milk is not available.

Although pasteurization reduces the microbial load of waste milk, pasteurization is not sterilization. A heavy bacterial load in waste milk will not be completely eliminated by pasteurization, and it does not remove potential contamination from antibiotics in waste milk.

Usage Guidelines

Milk from transition and sick cows cannot be sold and must be discarded. Waste milk can be fed to calves but follow a few precautions.

- Before using as a calf feed, pasteurize waste milk to reduce microbial load.
- Do not feed waste milk to newborn calves.
- Use caution when feeding waste milk to calves that are destined for beef production.
- House heifer calves individually (i.e., hutches) when feeding waste milk.
- Know the health status of the cows from which waste milk is obtained. Unless milk is pasteurized, do not feed milk from cows shedding BVD, Johne's, or from cows infected with *E. coli*, *Pasteurella,* or BLV.
- Don't allow waste milk to sit for extended periods of time without refrigeration.
- Discard waste milk that is excessively bloody, watery, or unusual in appearance.

Pasteurization of waste milk decreases illnesses in calves compared with no pasteurization. If handled properly, waste milk is an economical and nutritious source of liquid feed for young dairy calves.

References

Blosser, T.H. 1979. Economic losses from and the national research program on mastitis in the United States. J. Dairy Sci. 62:119.

Butler, J. A., S. A. Sickles, C. J. Johanns, and R. F. Rosenbusch. 2000. Pasteurizatien of discard mycoplasma mastitic milk used to feed calves: thermal effects on various mycoplasma. J. Dairy Sci. 83:2285.

Chardavoyne, J. R., J. A. Ibeawuchi, E. M. Kesler, and K. M. Borland. 1979. Waste milk from antibiotic treated cows as feed for young calves. J. Dairy Sci. 62:1285.

Davis, C. L., and J. K. Drackley. 1998. Liquid feeding programs. In: The Development, Nutrition, and Management of the Young Calf. Iowa State University Press, Ames. p. 259.

Heinrichs, A. J., S. J. Wells, H. S. Hurd, G. W. Hill, and D. A. Dargatz. 1994. The National Dairy Heifer Evaluation Project: A profile of heifer management practices in the United States. J. Dairy Sci. 77:1548.

Jamaluddin, A. A., T. E. Carpenter, D. W. Hird, and M. C. Thurmond. 1996. Economics of feeding pasteurized colostrum and pasteurized waste milk to dairy calves. J. Am. Vet. Med. Assoc. 209:751.

Kesler, E. M. 1981. Feeding mastitic milk to calves: a review. J. Dairy Sci. 64:719.

Keys, J. E., R. E. Pearson, and B. T. Weinland. 1980. Performance of calves fed fermented mastitic milk, colostrum, and fresh whole milk. J. Dairy Sci. 63:1123.

Pelzer, K. D. and D. J. Sprecher. 1993. Controlling BLV infection on dairy operations. Vet. Med. 3:275.

Quigley, J. 1998. Colostrum from Johne's positive cows. Calf Notes #51. www.americanprotein.com/calf/calfnotes/APCCN51.htm.

Schaffer, L. V., and R. K. McGuffey. 1980. Effects of feeding mastitic milk to calves. Proc. Nat. Mastitis Council. 19:67.

Selim, S. A., and J. S. Cullor. 1997. Number of viable bacteria and presumptive antibiotic residues in milk fed to calves on commercial dairies. J. Amer. Vet. Med. Assoc. 211(8):1029.

Stabel, J. R., E. M. Steadham, and C. A. Bolin. 1997. Heat inactivation of *Mycobacterium paratuberculosis* in raw milk: Are current pasteurization conditions effective? Appl. Environ. Microbiol. 63:4975.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0607