Calf Notes.com

Calf Note #35 – Risks of using waste milk

Introduction

Waste milk - milk produced by dairy cows that is unsaleable - has been used to feed calves for about as long as it has been produced. Few dairy farms are completely without waste milk. Cows get sick with a variety of ailments that require treatment with antibiotics. Milk produced by these cows must be discarded to avoid residue problems. Other milk may be of insufficient quality (e.g., mastitis) and must be discarded. Waste milk is also called discard milk, pot milk, hospital milk, and many other terms. Instead of discarding waste milk, many producers feed it to their calves prior to weaning.

For many years, scientific studies have evaluated the nutritional value of waste milk as a feed source for calves. Other studies have evaluated methods of storage (e.g., fermentation) and feeding management. However, researchers have recently begun to critically evaluate the use of waste milk as a feed - particularly in light of the microbial load in milk and the presence of antibiotics. The object of this Calf Note is to highlight some of their findings.

Microbial load in waste milk

The bacterial and viral load in waste milk is a function of the initial load (that produced by the cow), bacteria in the equipment used to collect and store the milk and storage time and conditions. Waste milk placed in 5-gallon containers and left in the calf barn for hours at ambient temperature will very likely contain a significant microbial (and possibly endotoxin) load. Researchers in California measured the number of viable bacteria and presumptive antibiotic residues in waste milk fed to calves (Selim and Cullor, 1997). The mean number of bacteria in waste milk was significantly higher than in other types of milk or milk-based products (milk replacer, colostrum). Streptococcus species (84/165) and Enterobacter (83/165) were predominant bacteria identified, followed by Staphylococcus (68/165). E. coli (32% of samples) was the most common gram-negative bacteria. Many other organisms have been identified in waste milk, including Listeria, salmonella, BVD, BIV, and others.

Microbial load in waste milk is a function of several factors, including:

- microbial content of milk produced by the cow
- cleanliness of the equipment used to collect the milk
- cleanliness of the equipment used to store the milk prior to feeding
- storage time (time from collection to feeding)
- temperature of milk during storage
- exposure to microbial sources (feces, flies, etc.) from the environment
- pasteurization or other processing to reduce microbial load

The microbial content of waste milk will increase dramatically if the milk is left at room temperature or above. Unfortunately, some milk, collected at morning milking may not be fed until the afternoon. Consequently, the microbial load may increase dramatically. Although this may **not** cause problems in some cases, in others, the microbial load may become a source of disease.

Pasteurization

Pasteurization can be an effective means for reducing microbial load of waste milk and improving overall milk quality. Calves fed pasteurized colostrum and waste milk were worth $8.13 more in gross margin/calf compared with calves fed nonpasteurized milk and colostrum. The minimum number of cattle for which feeding pasteurized colostrum and waste milk was economically feasible was 315 calves/d. Benefits of pasteurization include higher mean BW gain, reduced mortality and decreased costs of veterinary intervention (Jamaluddin et al. 1996).

Pasteurizing colostrum has also been considered. Meylan et al. (1996) pasteurized colostral samples at 63 C for 30 min. The researchers reported that mean colostral IgG concentration was 44.4 g/L in unpasteurized samples and 37.2 g/L in pasteurized samples, a decrease of 12.3%. High-quality colostrum (> 48 g of IgG/L) had a significantly greater loss of IgG concentration than did colostrum of lesser IgG concentration. Thus, the use of pasteurization on colostral quality must be considered in light of effects on IgG concentration.

Pasteurizing waste milk or colostrum must be done carefully. Equipment must be properly installed, carefully maintained, and used consistently and properly. Costs of collecting waste milk, pasteurizing and storing milk before and after pasteurization must be evaluated before a producer considers installing pasteurization equipment.

Antibiotic residues

When waste milk was tested (using commercial kits) for antibiotic residues, 63% were positive for beta-lactams or tetracycline. As the study authors concluded "Waste milk that has not been effectively treated (eg, pasteurization) to reduce microbial load prior to use as calf feed should be used with caution, because it may contain a high number of bacteria that may be pathogenic to cattle and human beings." (Selim and Cullor, 1997). In a 1990 British study (Wray et al., 1990), the effects of feeding calves antibiotic-containing waste milk were studied in two trials. In the first trial both fermented and unfermented waste milk were fed and in the second trial only unfermented milk was used. Antibiotic-containing milk was unpalatable and rejection rates were high. Growth rates of the calves were poor and in the second trial differed significantly from those of the calves that were fed milk replacer. Fecal *E. coli* were monitored for antibiotic resistance and were higher (MIC for streptomycin) from calves fed antibiotic-containing milk, but no differences were observed for ampicillin. In the second trial, no differences were observed between isolations from calves fed antibiotic containing milk and control calves. The ambient conditions in the United Kingdom inhibited natural fermentation, which would degrade the antibiotics and make it an acceptable feed. The authors concluded that the high numbers of bacteria in the product may present disease risk. Other researchers have reported that waste milk contributed to diseases of preweaned calves (Walz et al., 1997).

Conclusions

Waste milk **can** be a source of nutrients; however, the risks of antibiotic residues, antibiotic resistance, and infection are important considerations. Larger producers should evaluate whether pasteurization is a viable option for their farms. Other sources of liquid feeds should be considered if pasteurization is not an option.
Other resources related to waste milk and feeding liquids to calves include:

- *http://www-das.cas.psu.edu/dcn/calfmgt/311/feeds.html* - Penn State Special circular 311
- *http://www.dairyherd.com/nutr17.htm* - Dairy Herd Management Dairy Profit Tip
- *http://www.inform.umd.edu/EdRes/Topic/AgrEnv/ndd/youngsto/FEEDING_THE_NEWBORN_CALF.html* - A thorough evaluation of calf rearing and feeding practices from Penn State University
- *http://www.canr.msu.edu/dept/ans/mdr2114.html* - Questions and answers on calf feeding by Ron Green, Extension Dairy Agent

References

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. JAVMA. 209:751-756.

Meylan M., D. M. Rings, W. P. Shulaw, J. J. Kowalski, S. Bech-Nielsen, and G. F. Hoffsis. 1996. Survival of Mycobacterium paratuberculosis and preservation of immunoglobulin G in bovine colostrum under experimental conditions simulating pasteurization. Am. J Vet. Res 1580-1585.

Selim, S. A. and J. S. Cullor. 1997. Number of viable bacteria and presumptive antibiotic residues in milk fed to calves on commercial dairies. JAVMA. 211:1029-1034.

Walz, P. H., T. P. Mullaney, J. A. Render, R. D. Walker, T. Mosser, and J. C. Baker. 1997. Otitis media in preweaned Holstein dairy calves in Michigan due to Mycoplasma bovis. J. Vet. Diag. Invest. 9:250-254.

Wray C., S. Furniss, and C. L. Benham. 1990. Feeding antibiotic-contaminated waste milk to calves--effects on physical performance and antibiotic sensitivity of gut flora. Br. Vet. J. 146:80-87.

!