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Calf Note #66 – Chemical treatment of colostrum

Introduction

Colostrum is an essential part of calf management. There is little doubt regarding the value of colostrum to newborn calves. Immunoglobulins in colostrum when fed within the first 24 hours of life will be absorbed intact into the circulation of the calf and have a marked effect on the health (and survival) of the animal.

Storage of colostrum

A regular supply of high quality colostrum is an essential part of all newborn calf production systems. In some situations, colostrum may be unavailable from the dam, or is of poor quality. In this situation, the producer has two options – using previously stored colostrum or to use a colostrum supplement or replacer. Frozen colostrum is an expensive alternative, and sometimes is not available. Therefore, researchers have evaluated potential methods of storing colostrum without freezing, primarily by chemical treatment. Treating colostrum to maintain its immunological capability may be of significant value, particularly if the IgG (and other immunological content of colostrum) may be maintained.

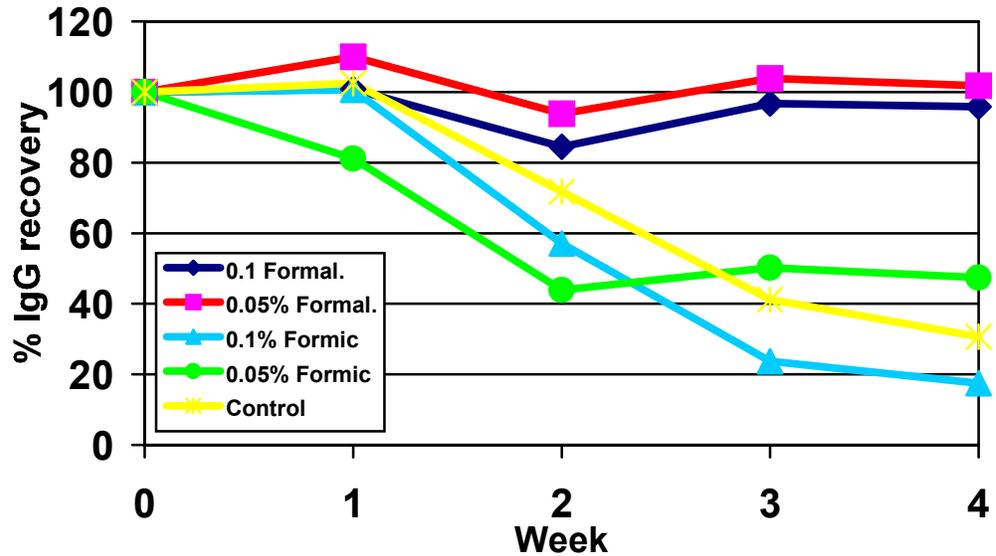
The research...

In the study done by Mbutia and coworkers (1), colostrum was collected from dairy cows in Germany. Four pools of colostrum were made by colostrum from several cows. One liter of each pool was frozen until the beginning of the experiment. Each pool was then treated with 0.1 or 0.5% formaldehyde or similar amounts of formic acid. The samples were then stored at 28 C in 200-mL plastic bottles for four weeks.

Control samples of two of the pools (those not treated with formaldehyde or formic acid) spoiled by 14 d, and the loss of IgG was very significant, and the smell from the colostrum was putrid. These samples were discarded.

The loss of IgG in control colostrum samples became significant after 7 days (Figure). In addition, the smell, taste and separation of whey from casein in colostrum indicated that the material would be unusable for feeding calves. These results clearly indicate that storing colostrum at 20 C is an unacceptable method of storage.

Treatment with formic acid reduced Ig content of colostrum even more than the control treatment (Figure). This result clearly indicates that formic acid is unacceptable as a means of storing colostrum. The authors did, however, report that formic acid treatment did not become putrid and separate as did the control colostrum samples.



Formaldehyde treatment of colostrum maintained the integrity of the IgG molecules throughout the 4 week study (Figure). Other researchers (2) have fed formaldehyde treated colostrum to calves and shown that absorption of IgG is acceptable and similar to other methods of storage. However, extreme care must be use when handling formaldehyde and feeding formaldehyde treated products, as poisoning may occur.

Conclusions

Storing colostrum by refrigeration (up to 7 days) or freezing are optimal methods for maintaining high quality colostrum. However, this research indicates that 0.05% or 0.1% formaldehyde can be an effective method for storing colostrum and maintaining immunological value. It is important to be sure, however, that the necessary precautions are taken to ensure the safe management of formaldehyde.

References

1. Mbuthia, E. W., F. Klobasa, C. K Gachuiiri, and A. Abate. 1997. Effect of treatment with formaldehyde and formic acid on immunoglobulin content of stored bovine colostrum. *Animal Feed Science & Technology*. 67:291-298.
2. Meyer, H., H. Lustermann, G. Steinbach, R. Leirer, W. Tettenborn, and G. Reichard. 1982. Conservation of colostrum. *Monatsheft Vet. Med.* 37:27-32.

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