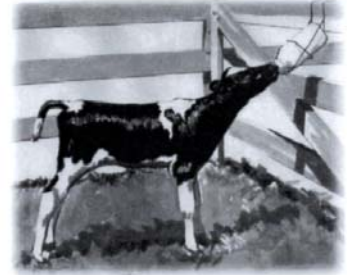


FrontLine®

TECHNICAL INFORMATION FOR TODAY'S FEED PROFESSIONAL

Acidified Calf Milk Replacers

Non-Medicated Alternatives (Part 1)



HISTORY

Acidified milk replacers were first developed in Europe in the 1960-1980 period from by-products of acidic whey from certain cheeses and processing methods. Fermentation and the resulting acidification of foods for preservation go back several centuries.

Along with the use of these by-products, there was also interest in preserving milk replacer for a longer period of time from mixing to feeding with storage at ambient temperatures. Gang or group feeding of calves was fairly common during this time period, either by buckets, troughs, or multiple nipple buckets or barrels.

Typically, calves were fed milk once per day with enough milk for 12-24 hour ad-lib feeding. Feeding equipment was not always cleaned and sanitized daily. If the milk replacer turned sour or had an off-taste, reduced milk intake was frequently observed, along with higher incidence of scours. This also provided a great method of passing pathogens from one calf to the next by constant group contact and sharing of feeding equipment.

Group feeding of milk replacer is generally not recommended for calves under today's production systems, but is still commonly used in lamb and goat kid rearing.

Longer-term storage at ambient temperatures requires control and/or reduction of bacterial growth rates. The concept is to reduce the pH of the milk replacer to the point that bacterial growth, especially pathogenic organisms, is significantly reduced. By acidifying milk replacer to a pH of 5.0-5.5 (from a typical pH of 6.2-7.0), milk replacer might remain stable for up to 72 hours at room temperatures.

Common organic acids used have included citric, formic, propionic, malic, fumaric and acetic, and in some formulations, the sodium salts of these acids are used.

The theory behind acidification of animal feeds is similar. Lower pH in the small intestine may favor the growth of Lactobacillus and other beneficial bacteria that prefer pH below 6.5 for optimal growth. An intestinal environment above pH 6.5 is preferred by many pathogenic bacteria, such as E. coli, for optimal growth. Improved enzymatic digestion of intestinal contents has also been suggested.

RESEARCH

There are several calf trials (see back for reference listing) published in the scientific literature that have demonstrated a reduction in coliform bacteria in calves during the first 4 weeks of life, improvements in fecal scores (less watery feces) and better calf growth when calves were fed acidified milk replacer.

However there are also trials that report no growth improvement in calves fed acidified milk replacer. Water quality (pH, dissolved minerals, buffer capacity, bacterial contamination and possibly other factors) on individual farms appear to have a significant effect on the success of acidified milk replacer in reducing and holding the pH in the 5.0-5.6 range after reconstituting the milk replacer powder.

Well water sometimes presents more of a challenge than water treated by a rural water system. The source of the milk protein (whey from different types of cheese manufacturing) also appears to result in some variation in pH level after reconstitution.

APPLICATION

The recommendation to use acidified milk replacer must be based on individual farms and management practices. There is some additional cost associated with the acidified products. In situations where scours is of pathogenic origin, the use of acidified milk replacer

 **Milk Products Inc.**
The Milk Replacer Source™

should be considered, especially for calves under 4 weeks of age.

Acidification should also be considered in larger calf facilities where the milk replacer is mixed but not consumed within 60 minutes and may stay in feeding tanks and lines for 1-4 hours (or longer). Acidified milk replacer should also be considered where sanitation of mixing and feeding equipment is less than adequate. Remember, acidified milk replacer will not cure all production problems - but it is another management option that is available and may be of benefit under certain management practices.

Acidifying Agent	Level of Acidification	Cost Per Bag of Milk Replacer
Citric Acid	Mildly Acidified	\$0.25
Calcium Prop ionic Acid Plus Citric Acid	Heavily Acidified for Free Choice Feeding	\$0.75

Suggested References for Acidified Milk Replacers.

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