

### HISTORY

European dairy farmers began moving away from raising individually housed calves on a restricted feeding regimen (2-3 feedings per day) towards group housing using free-access milk-feeding systems that mimicked the calves' natural feeding cycle when left with their mothers. The positive results noted from moving to the free-access milk-feeding system, include improvements in health, greater feed conversion and rate of gain and growth. Acidifiers are used to preserve the milk for longer periods to allow for this free-access form of milk feeding. An added benefit to acidification of the milk is the resulting associated reduction in labor costs. In eastern Canada, feeding acidified milk replacer to group-housed calves and goat kids has become more prevalent in recent years and interest in its use and application continues to grow.

### WHY ACIDIFY?

- Bacteria multiply rapidly under ideal conditions in raw milk
- Examples of methods that have been proposed to control this proliferation range from immediate cooling of raw milk, to pasteurization which is up to 90% effective in killing bacteria
- Acidification using organic acids can be effective in reducing bacteria but is highly dependent upon the final pH achieved which can only be effectively verified using a pH meter; pH kits and litmus paper may not be as accurate
- When acidifying milk replacer solution on farm, individual results will vary considerably as they will be dependent on the pH of ground water used to make the milk replacer solution which varies from region to region

### TYPES OF ACIDIFICATION

#### Complete Acidification (pH 4.0-4.5)

- Can be effective in killing bacteria and preventing further growth.
- Results in preservation of the milk for up to 2-3 days in cold weather; 1-2 days during warm or hot weather.
- May not be effective in preventing mold growth
- Mixture is prone to separation and must be periodically agitated (3-6 times daily)
- Milk or milk replacer is acidified down to **pH 4.0-4.5**
- Most effectively done with a Formic Acid solution (65%-85%) which **must be handled with extreme caution**
- Acid must first be diluted by adding acid to water; **NEVER** add water to acid
- When acidifying milk replacer it must first be mixed in warm to hot water according to brand directions, then cooled **BEFORE** acid solution is slowly added. The resulting solution should be warmed to optimum temperature (38-40°) before feeding to young animals
- Acidified milk may also be fed at lower temperatures (20°C) **BUT** be aware that together, acidification and low milk temperatures are **limiters of intake**
- Can be used on mob feeders, but must have some form of agitation and heating
- Intended for feeding to group-housed calves

#### Partial Acidification (pH 5.0-6.0)

- Milk/milk replacer is acidified down to **pH 5.0-6.0**
- Does not kill all bacteria, but will sufficiently inhibit growth to allow for the safe feeding of milk replacer solution
- Milk replacer solution **MUST** be replaced daily; static solutions may be subject to separation if not agitated periodically
- Effective acidification can be achieved using a combination of dry organic acid salts which can be directly added during manufacture of the milk replacer for ease of on-farm use
- Partially Acidified milk replacers (and sweet milk replacers) may be used in a variety of feeding systems – individual bottle/bucket feeding; mob feeders and automated calf feeders offering more flexibility

## **EFFECT OF ACIDIFICATION AND PARTIAL ACIDIFICATION ON ANIMAL PERFORMANCE**

### **Scours**

- There are lower incidences of diarrhea due to pathogenic bacteria when animals are fed acidified milk replacers compared to some non-acidified milk replacers
- This is due to harsher acidic conditions resulting in lower growth and slower proliferation
- This results in better overall calf growth, since there are fewer setbacks to the animal, and fewer secondary infections, such as pneumonia
- Healthier animals are less predisposed to secondary infections

### **Intake**

- On average, when left on the dam, calves feed up to 7 times per day, averaging around 7 minutes per feed
- With traditional 2-3X per day feeding regimens, calves are typically restricted to 2 meals per day, about 10-12 hours apart. Maximum volume fed depends on age and gut capacity; calves are still left for significant time periods without feed.
- On free-choice acidified milk replacer calves may drink up to 9-12 litres of solution per day (depending on breed, frame size and age)
- Acidification allows milk solution to be offered to young animals on a continual basis, and animals are able to feed at will, taking smaller meals more often
- Satiated animals are less predisposed to sucking pens or each other; better adjusted to group housing scenarios
- However, higher intake of milk/milk replacer may delay transition to calf starter, resulting in slower rumen development and differentiation
- Acidification specifically does not affect intake, rumen development or weight gain; however free access to milk solution does

### **Labor Savings**

- Producers can realize labor savings with acidification programs since solutions are mixed and maintained for up to 3 days, so less mixing time required.
- Periodic system disinfection **MUST** be strictly maintained, particularly in hot weather
- Less mixing and cleaning should save time **HOWEVER**, since calves would typically be housed in groups, increased observation is necessary to detect and treat sick animals immediately.
- It is still necessary to spend time in the pens observing animals, which would normally be done at feeding times with non-acidified programs.
- There is no substitute for taking time for close observation to monitor for sickness and distress

## **OTHER FEEDING SOLUTIONS FOR CALVES IN GROUP HOUSING**

### **Automated Calf Feeding Systems**

- These can be an effective alternative to Complete Acidification systems
- Typical Feeders are constructed of stainless steel, and have sophisticated computer controls
- Can be programmed to provide unrestricted access to a milk replacer solution, and can be tailored to individual calves housed in a group pen
- Recorded intake data can be downloaded, allowing barn managers to monitor individual calf performance
- May be used with either partially acidified or sweet milk replacers.
- Machines respond to a suckling calf, mix milk replacer on demand, allowing the calf to suckle fresh solution.
- After feeding, automated calf feeders would typically flush any remaining unused solution
- Labor savings realized through reduced mixing and cleaning time
- Calf health must be closely monitored in group housing
- Automated calf feeders may be used from 3 days of age

## Milk Replacer Partial Acidification

**WET NURSE™** all milk-protein Calf and Specialty Milk Replacers (for lambs kids and piglets) have always contained organic acids to provide the benefits of mild acidification (reduces pH by approximately 1 unit of pH). We've known the benefits all along.

On special request, we are now offering our customers the choice of lowering the pH of the mixed milk replacer solution on our full line of Wet Nurse milk replacer products by approximately 1.5 units of pH which is 5 times our regular acidification level. (pH is measured on a logarithmic scale) This is available by special order only.

Not only do our all-milk protein Wet Nurse™ milk replacers contain organic acids to reduce pH, providing a level of mild acidification, ALL Wet Nurse Calf and Specialty Milk Replacers also contain:

ESSENTIAL  
Lipids 4 Life

### Setting the NEW Standard in Milk Replacer!

Our lipid technology provides a nutritional solution to help strengthen the young animal's immune system supporting better health, increased average daily gain, improved structural growth and improved feed efficiency. The research results are proven, peer reviewed and published. Wet Nurse™ Milk Replacers with Essential Lipids 4 Life are versatile and easy to use.

For group housing systems, we recommend using our products in the URBAN calf feeder. This is an excellent machine providing a unique clean out after every use and many features to assist in tracking feeding statistics of individual calves. The Urban calf feeder has been proven effective when used with our Wet Nurse™ Milk Replacers in group housing systems.

For more information on the above products contact:



[www.urbanfeeders.ca](http://www.urbanfeeders.ca)  
1-519-425-0206

Wet Nurse is manufactured by:



[www.pmtgroup.com](http://www.pmtgroup.com)  
1-800-299-7904