

Are you considering a milk pasteurizer?

Tight margins and the high cost of milk replacer have many of you looking for ways to feed waste milk to calves safely. A pasteurizer can make that possible, but is one right for you?

— by Bob James and Chase Scott —

WE ALL remember the tight operating margins during 2006. One item that usually receives cost-cutting attention is calf feeding, and the cost of the liquid diet is right at the top of the list. For many, that probably meant the idea of feeding your calves waste milk may have crossed your mind. Studies have shown that waste milk has higher levels of protein and fat than a 20:20 milk replacer, resulting in better gains and fewer health problems. Sound too good to be true?

Challenges do exist . . .

Although it's a potential resource, there are risks which must be managed, including microbial contamination, variation in nutrient content, and supply.

Studies of waste milk supplies on dairies and calf ranches in Wisconsin and California have isolated Staph, Mycobacterium, Mycoplasma, and other organisms known to cause disease. A 2006 study of 12 dairies and one calf ranch found bacteria levels averaging over several million colony forming units (cfu) and as high as 1 billion per milliliter in raw waste milk. Fortunately, there are pasteurizers available that are well suited to treat waste milk for calf feeding on dairies and calf ranches.

Pasteurizers heat milk to a specific temperature long enough to kill known pathogens and about 98 percent of the bacteria in the milk. Our goal is to reduce standard plate counts (spc) of treated milk to less than 20,000 cfu per milliliter.

Before you buy . . .

If you are considering a pasteurizer, make sure all expenses of the system are included. Here are some factors that should be considered:

- Cost of the unit (\$8,000 to over \$30,000).
- Dedicated hot water supply.
- Housing for the unit and equipment.
- Maintenance and labor to operate.
- How much waste milk is needed?
- How many calves are fed daily?
- What is the average number of calves fed and the range of calves fed each day?
- How much milk is fed per calf per day?
- How old are calves at weaning?

The more "intensive" programs increase amounts of milk required by 50 to 100 percent per calf per day. Obviously, waste milk pasteurizers become more economically attractive as the number of calves fed each year goes up. Although smaller batch systems have been developed, the use of pasteurized waste milk is probably not as attractive for herds with less than 50 calves fed at one time.

Table 1 shows how much milk is required to feed calves under various strategies of weaning ages and feeding rates.

Another major consideration is how much waste milk you have available and how it varies over the course of a year. Table 2 outlines the number of cows required to produce enough waste milk based upon different calf feeding rates.

One study conducted several years ago found that cows produce between 48 and 136 pounds of unsaleable milk per lactation. A subsequent study of 12 dairies found that enough waste milk was produced each day to provide 5.6 to 20 pounds per calf.

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Keep in mind that, although large volumes of available waste milk might be a positive for the calf feeding program, you may want to look into the reasons for this much unsaleable milk and its impact on farm profitability.

An equally important consideration is the daily variation of your waste milk supply. It's unwise to assume that waste milk supply is consistent. The figure shows a recording of daily volumes of waste milk recorded on one dairy farm. Based upon our experiences, this appears to be fairly typical of waste milk supply on most farms.

When there's not enough . . .

There are several options to consider when waste milk supplies are inadequate:

- Feed some calves pasteurized waste milk and others milk replacer. Our research found that

Table 1. Amount of milk required per calf as influenced by feeding rate and age at weaning

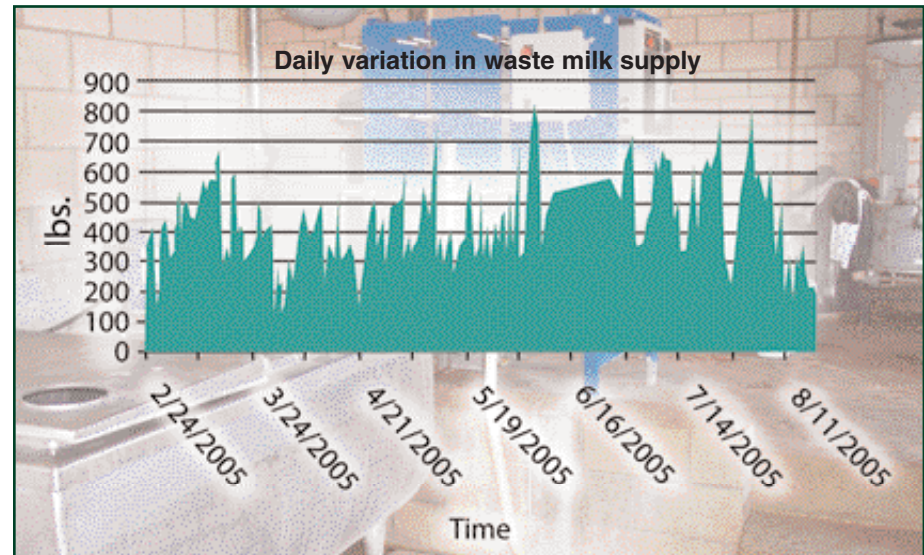
Feeding rate		Age at weaning			
Amount (quarts)	Amount (lbs.)	6 wks.	8 wks.	10 wks.	12 wks.
4	8.6	361	482	602	722
6	13	546	728	910	1,092
		Total milk required (lbs.)			

Table 2. Number of cows to produce waste milk required for given number of calves

Feed rate	Waste milk/cow/day	Number of calves fed/day			
		25	50	75	100
4 qts.	40 lbs.	6	11	16	22
4 qts.	60 lbs.	4	7	11	14
6 qts.	40 lbs.	8	16	24	32
6 qts.	60 lbs.	6	11	16	22

calves grew equally well when abruptly switched at 4 weeks of age to an "intensive" milk replacer of similar nutrient content as whole milk. Conversely, calves can be started on an "intensive" milk replacer and switched to pasteurized whole milk at 4 weeks. It's important to note that the switch should only be made once and in calves older than 3 to 4 weeks of age.

- Add milk solids to the waste milk. This can be challenging since the nutrient content of waste milk can vary. The number of fresh cows in the waste milk supply and whether or not the water used to flush the milk lines after milking treated cows or the hospital pen is included has a large impact on nutrient content of waste milk. Several field studies have shown that protein varies from 2.7 to more than 5 percent and fat from 1.5 to more than 5 percent. This amount of variation makes supplementation strategies challenging. However, Land O'Lakes Animal Milk has developed a program using a refractometer which enables estimation of dry matter percentage of waste



milk and provides recommendations for addition of a milk replacer designed to supplement nutrient deficiencies of waste milk.

- Use saleable milk from the bulk tank. This option is probably the safest from the calf's perspective but also may be the most expensive alternative.

Quality control counts . . .

Waste milk is highly perishable, and it must be handled with the same care as saleable milk.

- Timing is important. Ideally, milk should be pasteurized shortly after milking and fed as soon as it's cooled to 110°F. If there's a delay of more than 30 to 60 minutes in any interval, it should be refrigerated.

- Sanitation, sanitation, sanitation. Follow pasteurizer manufacturer's recommendations. Be sure to establish a sanitation program for all milk storage receptacles — pre and postpasteurization and during feeding is essential.

- Institute a testing program. Milk should be tested for fat percent, protein percent, and total solids. This will allow supplementation when needed and also indicate if excessive flush water is entering the waste milk supply.

You also should obtain a SPC of milk before and after pasteurization. It's helpful to measure SPC of milk after the last calf is fed to indicate cleanliness of milk tanks, bottles, or buckets. These measures monitor success of the sanitation program and pasteurizer. Tests should be conducted at least monthly with weekly monitoring being even better.

On-farm pasteurizers have been a valuable tool. However, don't assume that they can overcome the negative impact of milk with extremely high levels of bacteria. Even if we assume the pasteurizer kills 98 to 99 percent of bacteria in milk, milk with cfu exceeding 2,000,000 per milliliter will not meet the postpasteurization goals of less than 20,000 cfu per milliliter.

It's also important to remember that most waste milk contains variable levels of antibiotics. The impact of these antibiotics on digestive function of the calf and development of antibiotic-resistant strains of bacteria has not been established but so far appear minimal.

Feeding waste milk can be a money-saving proposition, but it can also pose significant risks to your young stock program. Sufficient protocols have to be established and followed to ensure low bacterial growth and a consistent nutrient supply. 